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Does exposure to a traumatic event make organizations resilient?

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ABSTRACT

Why do some organizations bounce-back from traumatic events more quickly than others? While the research on organizations offers extensive insights on recovery from economic or technological shocks, there is limited understanding of how organizations recover from life-threatening events such as terrorist attacks. In this study, we build on the research on resilience and argue that organizational recovery from a traumatic event is informed by the perception of threat. Higher perception of threat increases inter-organizational collaboration and the care associated with the deployment of slack as well as to learning. We tested our arguments with a sample of US and non-US firms before and after the 9/11 terrorist attacks and found that, due to spatial proximity, US firms’ higher perception of threat led to a larger increase in the frequency of inter-organizational alliances than that of non-US firms. This preference was more frequently directed towards local partners and demonstrated a distinct emphasis on slack and learning. Contrary to conventional wisdom, our findings suggest that organizational resilience in the face of a traumatic event benefits not from immunity but from spatial proximity to the threat. Proximity increases the perception of threat, and with it, the impetus for adaptation.

Introduction

The theory of resilience has become a critical lens to understand the capacity to overcome traumatic shocks (Linnenluecke, 2017; Williams et al., 2017; Mithani, 2020). It explains how individuals, organizations, and larger systems bounce-back after life-threatening events such as terrorist attacks, natural disasters or the spread of chronic diseases (Alexander, 2013; Earvolino-Ramirez, 2007; Meerow and Newell, 2015). The nature of the threat, which leads to a heightened fear of life, property, and emotional well-being, distinguishes resilience from the traditional notion of recovery. That is, while our traditional understanding of organizational recovery is dominated by economic concerns, in large part due to the focus on technological and economic threats (Frey and Stutzer, 2010; Meyer, 1982; Tushman and Anderson, 1986), resilience is central to the study of life-threatening events where emotional recovery complements and may even surpass an emphasis on economic concerns (Sutcliffe and Vogus, 2003; Mithani, 2017).

Although few and largely theoretical, the research on organizational resilience has focused on two primary themes (Linnenluecke, 2017; Sutcliffe and Vogus, 2003; Van Der Vegt et al., 2015; Williams et al., 2017). The first includes resource endowments such as slack where higher slack prior to a traumatic event has been associated with an increase in the rate of recovery subsequent to the threat (Gittell et al., 2006). The second is the capacity for learning; higher learning is found to improve the rate at which organizations

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recover in the aftermath of a threat (Shepherd et al., 2011; Wildavsky, 1988). These discussions suggest that the possession of slack and the capacity for learning is sufficient for resilience. What remains unclear is whether organizations differ in the deployment of slack or in the pursuit of learning. In other words, do comparable organizations respond identically to a life-threatening event or are some organizations more effective in the use of slack and learning opportunities than others?

In this study, we argue that it is the latter. Despite being endowed with comparable resources and learning opportunities, organizations are not equally likely to exhibit resilience. Rather, resilience is motivated by how strongly the organization perceives the threats that they are confronted with. Spatial proximity to a traumatic event increases the perception of threat, making an organization more vulnerable, and in turn, more eager to seek knowledge and emotional support from other organizations (Barreto and Patient, 2013; Luthar and Zelazo, 2003). This encourages the development of inter-organizational alliances, especially with firms that are equally affected by the threat, and it entails distinctive attention to slack and learning.

We used a unique empirical setting to test our arguments – all publicly traded firms across the globe in the oil industry before and after the 9/11 attacks. We observed that US firms, despite spatial proximity to the terrorist attacks, exhibited a higher frequency of inter-organizational alliances in the aftermath of the attacks relative to their non-US counterparts. This difference, we found, was strengthened by how they deployed slack resources and selected alliance partners. US firms prioritized slack for experimentation in contrast to buffering by non-US firms, and they viewed local partners as more critical for recovery than non-US firms. The resulting learning was not immediate; we found that US firms only became more effective over time, suggesting that resilience manifests from a persistent distinction in organizational choices.

Our study makes three contributions to the literature. First, we illustrate that despite equal access to resources and learning opportunities, organizational outlook necessary for resilience is not uniformly distributed. Resilience is learned gradually and through the distinctive deployment of resources in the face of a higher perception of threat. Second, we extend the discussion of alliances from a source of knowledge development to a means of emotional capital (Chakrabarti and Santoro, 2004). Alliances allow organizations to overcome fear and vulnerability by helping them make sense of an uncertain external environment, and by encouraging the search for a more effective outlook for the future (Barsade and Knight, 2015). And third, our findings suggest that exposure to a traumatic event is more valuable than immunity. Contrary to conventional wisdom, we explain that spatial proximity to a life-threatening event benefits organizations more conducive to recovery. And comprehensibility captures the belief that despite the threat the world remains a place that can be predictable and consistent. By facilitating a meaningful, manageable, and comprehensible view of the environment, relational ties contribute to cognitive wellbeing and serve as a source of emotional capital (Barsade and Knight, 2015; Williams et al., 2017, p. 744).

Theoretical framework

Resilience represents the ability of a system to retain or return to its normal position after an externally induced shock that threatens its survival (Alexander, 2013; Fazey et al., 2007; Gunderson, 2000; Meerow and Newell, 2015). Given the broader use of the term, the interpretation of survival varies across contexts. In engineered systems, survival refers to effective functioning, and resilience, an operational concern that captures the persistence of the system in the aftermath of a shock. In human systems, survival refers to the emotional capacity to withstand or bounce-back from experiences that can have life-threatening implications (Linnenluecke, 2017; Meerow and Newell, 2015; Rutter, 1987; Wildavsky, 1988; Williams et al., 2017). Resilience in this case translates into the resumption of normal activities. Although the identification of normalcy is difficult for humans and social systems due to their continuous evolution, it is often gauged in relative terms (Luthar and Zelazo, 2003); the extent to which one group performs better than others after experiencing a traumatic event (Rutter, 1987). Thus, when comparable systems (i.e. individuals, units or organizations) are exposed to a traumatic event, the group that resumes proper functioning faster relative to the others is identified as being more resilient (Reid and Botterill, 2013; Sutcliffe and Vogus, 2003).

But what contributes to the resilience of social systems such as organizations? In contrast to engineered systems where resilience is determined by technical specifications, human and social resilience is associated with two distinct considerations (Linnenluecke, 2017; Williams et al., 2017). The first refers to protective factors that are present at the individual or organization’s disposal in the event of a life-threatening event. They include financial resources or assets acquired prior to the event that cushion or reduce the disruptive implications of the threat. The second consideration pertains to the realization that new knowledge and mental models are necessary to develop an outlook that can help overcome the trauma that accompanies the threat. As a changed outlook unfolds with learning, it turns into a coping mechanism for individuals and organizations to make sense of their environment and promptly resume prior activities.

Resilience and inter-organizational alliances

A common theme amongst both considerations, that is the protective influence of resources acquired prior to a threat or learning that follows the threat, is the need for relational ties (Linnenluecke, 2017, p. 25). That is, the need for close associations with like-minded others that can offer meaningfulness, manageability, and comprehensibility (Antonovsky, 1987). Meaningfulness through close relationships arises from a shared realization that coping is desirable and worth striving for. It encourages learning from the experiences of comparable others on how to overcome fear and uncertainty that follows a threat. Manageability includes the identification of resources that are pertinent to the task. These resources are then sought, and where available, deployed towards ends that are more conducive to recovery. And comprehensibility captures the belief that despite the threat the world remains a place that can be understood, if not from the perspective of self then by sharing with others, to develop a comprehensive outlook that can provide a sense of predictability and consistency. By facilitating a meaningful, manageable, and comprehensible view of the environment, relational ties contribute to cognitive wellbeing and serve as a source of emotional capital (Barsade and Knight, 2015; Williams et al., 2017, p. 744).
In the case of organizations, relational ties include inter-organizational alliances. They represent relationships that involve the exchange, coordination, sharing and/or joint development of resources and capabilities without the exertion of control (Gulati and Singh, 1998; Park and Mezias, 2005; Rosenkopf and Almeida, 2003; Rothaermel and Deeds, 2004). By maintaining organizational independence as well as of their partners (which is compromised in the case of mergers and acquisitions), alliances allow firms to benefit from the knowledge and support of various others. But alliances are structured around economic activities, a distinction that is critical in the aftermath of a traumatic event. The transactional and economic nature of inter-organizational alliances makes them risky in the face of a traumatic event. They can become a burden in the face of a threat because alliances expose firms to partners who consume significant attention and resources (Oxley and Wada, 2009; Shenkar and Li, 1999; Gulati, 1995; Powell, 1987) and in the face of an adverse event (Park and Mezias, 2005) firms strive to protect their interests. A focus on relationships can exacerbate the difficulty of balancing coordination with effectiveness (Agranoff, 2006). It raises the potential of diverse self-interests that compound the challenge of dealing with an uncertain environment. Thus, an attempt to conserve resources and reevaluate plans in the aftermath of a traumatic event can limit firms’ openness to relational ties and decrease the frequency of inter-organizational alliances (e.g. Brounen and Derwall, 2010; Chesney et al., 2011; Nikkinen and Vähämää, 2010).

Despite the downside, organizations may prioritize inter-organizational alliances as a means to attain meaningfulness, manageability, and comprehensibility (Antonovsky, 1987). Rather than focus on the economic risks of relational ties, they may be more attentive to the emotional risks posed by their immediate environment (Shepherd and Williams, 2014). These risks draw them towards opportunities to develop emotional capital (Williams et al., 2017). The emotional capital that manifests from alliances includes their facilitating organizational participants to sense of an uncertain external environment, allowing an avenue to collaboratively envision the future (Gulati et al., 2012), and offering a means to strengthen and build competences that are critical in the post-event environment (Lengnick-Hall and Beck, 2005; also see Ring and Van De Ven, 1994). They also offer an opportunity to neutralize the effects of trauma by improving organizational capacity to deal with stress and more effectively manage environmental risks (Quinn and Worline, 2008). It is this characteristic of inter-organizational alliances, the potential to serve as a coping mechanism in the aftermath of a traumatic event that corresponds to resilience. Stated differently, firms that recognize emotional capital as a coping mechanism are likely to orchestrate resilience by emphasizing inter-organizational alliances. For them, each alliance will be one in a series of adjustments that help reduce the impact of the threat (Grant et al., 2007) and aid adaptability (Hauser et al., 2009).

Spatial proximity and organizational resilience

We argue that the distinction between organizations that consider inter-organizational alliances from a perspective of economic risk and those that view it as a means for emotional capital is grounded in their perceived vulnerability to the threat. Since the perception of threat is dramatically higher for those that are geographically closer to the threat due to its immediate ramifications, as well as, due to the fear of a repeated occurrence in the foreseeable future, spatial proximity significantly escalates the perception of threat (Fischhoff et al., 2003; Schuster et al., 2001; Silver et al., 2002). This is likely to draw proximate firms towards choices that help them adjust to the changed external environment (Shepherd and Williams, 2014), consistent with the “steeling effect” in resilience (Garnezy, 1986). The steeling effect suggests that an experience of acute stress increases the potential for change as a means to overcome trauma and to equip the system to be able to deal with the potential of future threats (Rutter, 2006). Several studies support this notion. They include the evidence of psychological adaptation such as in parachute jumpers, who were found to become less vulnerable to stress after one or more attempts (Rutter, 1981). In children, a happy separation from parents at an early age has been associated with diminished stress of hospital admission (Stacey et al., 1970). Similar evidence has emerged from the research on financial markets where subsequent to the 9/11 attacks in the US, there was a widespread decrease in the market capitalization of firms throughout the world. However, the effect was significantly smaller for the geographically proximate US markets when compared to the distant non-US markets. The US markets not only recovered more quickly but they also went through a relatively smaller decline in stock prices than the rest of the world (Brounen and Derwall, 2010; Chesney et al., 2011; Nikkinen and Vähämää, 2010). These findings challenge conventional wisdom. While we may be inclined to think that immunity from a threat is a preferable outcome, the steeling effect suggests that direct exposure to a traumatic event builds resilience. It hardens the system against current and future threats (Rutter, 2006).

Thus, we argue that organizations that are spatially proximate to a life-threatening event will exhibit a greater inclination to focus on the utility of alliances rather than their economic risk. They will draw on relational ties as a source of emotional capital to overcome the fear and uncertainty induced by the traumatic event (e.g. Denz-Penhey and Murdoch, 2008; Jackson et al., 2007). And while one may consider that in the presence of equal exposure to threats, firms that respond more positively should be deemed more resilient. Our argument centered on the steeling effect suggests that despite greater exposure, firms that are spatially proximate to a traumatic event will exhibit a stronger coping response, and accordingly, proximate firms will exhibit greater openness to alliances than the more spatially distant firms. It leads us to hypothesize that while there is likely to be a widespread decrease in the frequency of inter-organizational alliances in the face of a traumatic event due to the association of alliances with an increase in economic risks, the decrease in alliance activity will be relatively smaller for firms that are spatially proximate to the shock than for firms that are farther away:

Hypothesis 1. While the frequency of inter-organizational alliances will generally decrease after a traumatic event, the decrease will be smaller for firms that are spatially proximate to the event than for firms that are farther away.

Our argument for resilience based on the direct exposure to a threat suggests that spatial distance from the threat may change the way protective factors come into play. Studies on resilience have conceptualized slack, that is, resources in excess of what is necessary
for ongoing operations (Cyert and March 1963), as a protective factor or cushion that shields the firm from the devastating effects of trauma (Wan and Yiu, 2009; Williams et al., 2017). The beneficial effect of slack in the face of a traumatic event pans out in two primary ways. First, slack in the form of readily available resources such as excess cash provides the capacity and freedom to expedite internal adjustments (Gittell et al., 2006). This makes it possible for firms to avoid delays in the commitment of resources, supplies, and materials that can help remedy the immediate implications of a threat and protect against future ramifications. It suggests that slack as excess cash, commonly called unabsorbed slack, will contribute to the frequency of alliances, since the availability of easily deployable resources improves the flow of information and materials between partnering firms, facilitates their interactions, and removes logistical impediments that may hamper agreements (Baum et al., 2005; Patzelt et al., 2008). Second, slack also serves as a signal of credibility (Natividad, 2012). In the form of the capacity for indebtedness or potential slack, it offers potential partners greater confidence in firm’s capacity to fulfill its obligations (Tyler and Caner, 2016). This makes it likely that in the aftermath of a life-threatening event potential partners can overcome concerns that correspond to environmental uncertainty or lack of clarity on operational considerations when moving forward with alliances.

Since slack, whether potential or unabsorbed, is accumulative and its presence precedes the threat, there is no reason to believe its protective influence will vary (see Bradley et al., 2011). Firms should be equally disposed to use slack to shield themselves from the threat induced by the event. However, we argue that the use of slack will differ between firms that are spatially proximate to the threat and those that are farther away. Proximate firms, due to their eagerness for recovery and adjustment, will prioritize knowledge, competencies, and emotional capital to help them deal more effectively with the changed environment (see Meyer, 1982). They will be inclined to deploy slack to uses that help build a cognitive frame that can “rapidly notice and make sense of signals of potential disruptions, use critical insights in creative and flexible ways, and combine and deploy knowledge and repertoires of action to resolve the problems at hand” (Williams et al., 2017, p. 744). Slack, therefore, allows proximate firms to capitalize on collaborative opportunities, build more partnerships, and experiment with allies who may otherwise be ignored (Marino et al., 2008; Patzelt et al., 2008). In contrast, the lower vulnerability of firms that are farther away from the threat is likely to make them pay greater attention to identifying ways that can help insulate them from future threats (Miller and Chen, 1994; also see Goll and Rasheed, 2011). They are likely to view slack as a mechanism to perpetuate the status quo until the environmental uncertainty is over.

These contrasting perspectives reflect the implications conceptualized by Cyert and March (1963) who identified slack as a mechanism for ‘adaptation’ through the development of new competencies as well as of ‘stabilization’ to buffer against threats (p. 38). Subsequent research has empirically demonstrated the two manifestations of slack (Nohria and Gulati, 1996; Greve, 2003). Accordingly, we propose that distant firms’ use of slack will be directed towards stabilization that would discourage external relationships, avoid cognitive adjustments, and in turn, limit the frequency of alliances (Cheng and Kesner, 1997). In contrast, proximate firms will be eager to deploy slack as a means to acquire new competencies and emotional capital for a more effective outlook towards the environment. Thus, slack will serve as a moderator that increases the difference in coping strategies deployed by the proximate and the distant firms. Spatially proximate firms will be inclined to use slack as an adaptive mechanism to strengthen resilience by increasing the number of new inter-organizational alliances while distant firms will use slack as a stabilizing mechanism to maintain the status quo. It leads us to hypothesize that:

Hypothesis 2. Firms that are spatially proximate to the traumatic event will exhibit a stronger effect of slack (potential and unabsorbed) on the frequency of inter-organizational alliances than firms that are farther away.

The higher vulnerability to future threats for proximate firms (Fischhoff et al., 2003; Schuster et al., 2001; Silver et al., 2002) and their greater interest in coping suggests that they may develop a difference in perspective when seeking alliance partners. Proximate firms are more likely to find partners that have a similar outlook towards change, are equally determined to learn and develop newer competencies, and show a greater willingness to experiment (Hamel, 1991; Koza and Lewin, 2000). This emphasis on familiarity and reciprocity, on the one hand, “reinforces the capability for broad information processing”, and on the other hand, motivates “interactive and coordinative dynamics... to loosen control, as decision making and problem solving shift to those that have the greatest expertise with the problem at hand” (Sutcliffe and Vogus, 2003, p. 108). However, this is likely to lead towards geographical asymmetries in alliance preferences. Given the perceived higher exposure to future threats (Schuster et al., 2001; Silver et al., 2002), the tendency to seek partners with a similar outlook towards the future is likely to be stronger among proximate firms (e.g. Tinsley et al., 2012). They are more likely to find other spatially proximate firms like-minded and therefore more attractive partners; while firms that are more distant are less likely to find a match with firms that were recently exposed to a traumatic event due to differences in their sense of urgency (see Traugott et al., 2002). As discussed, proximate firms’ vulnerability increases the emphasis on relational ties as a means for emotional capital (Williams et al., 2017, p. 744). In contrast, distant firms’ relatively smaller tolerance for risks and a preference for stability will lead them to identify allies that share a similar low-risk perspective (Beckman et al., 2004). The relative immunity from adverse implications of the threat will make distant firms circumvent frequent associations with the more proximate firms. This asymmetry in preferences amongst firms that are spatially closer versus those that are farther away can induce an intra-industry partitioning based on geographical lines (see Sjostrand, 1992), with proximate firms’ inclination for alliances leading to a stronger preference for local partners. It leads us to speculate that the differences in resilience will manifest with spatially proximate firms exhibiting a preference for partners that are also closer to the attack, i.e. local partners, and fewer alliances with more distant firms. Thus:

Hypothesis 3. Firms that are spatially proximate to the traumatic event will exhibit a stronger effect of local partnerships on the frequency of inter-organizational alliances than firms that are farther away.

We argued above that the difference in alliance activity is a manifestation of the contrast between the preferences of proximate and
distant firms that can lead to a geographical confinement of resilience. This suggests that the coping strategy will become localized and firms that are farther away will be less likely to incorporate the choices that manifest in resilience. But does this difference persist?

If the geographical confinement of resilience does not last long, sooner or later distant firms will start to appreciate the value of proximate firms’ choices and imitate them (Barney, 1991). Accordingly, distant firms will eventually develop a preference for competencies that can be valuable for recovery and we should therefore see differences in the frequency of inter-organizational alliances of proximate and distant firms diminish in the long-run. However, if the difference in perspectives persists, this may indicate that distant firms do not understand the outlook of the proximate firms (e.g. Woods et al., 2008), more so because the lack of alliance activity between the proximate and distant firms (Hypothesis 3) decreases the opportunities for the latter to learn the choices necessary for resilience. Even when there is an alliance, distant firms may fail to appreciate proximate firms’ emphasis towards newer competencies and they will continue to prioritize the prevailing cognitive frame (Sutcliffe and Vogus, 2003). This will undermine the value of the knowledge and skills that are associated with resilience. This, we believe, is more likely since it is the change in outlook – the learning process – that shapes the recovery for proximate firms (Lengnick-Hall and Beck, 2005; Wildavsky, 1988; Park and Mezias, 2005). It suggests that the coping strategy underlying resilience may not diffuse to the unaffected firms, resulting in a persistent long-term difference in the frequency of alliances.

Observations on resilience regarding the steeling effect suggest that it becomes more substantive over time (Rutter, 2006, 1981), from a few years to decades, during which those who are affected learn to become more effective in their coping strategy (see Elder, 1999; Rutter, 1981). This suggests two things. First, in the immediate aftermath of the traumatic event, proximate firms would still be learning to place greater emphasis on relationships and competencies. As a result, there will be a smaller relative difference in the frequency of alliances between proximate and distant firms. Second, as this difference increases over time, the gradual nature of this difference is unlikely to be noticed by the distant firms, due to the lack of sensitivity as well as due to fewer opportunities for collaboration (Rahmandad et al., 2009). Over time, this can lead to a growth in cumulative difference in the alliance activity between proximate and distant firms. Thus, the difference in the frequency of alliances demonstrated by proximate and distant firms will be less significant in the immediate aftermath of the traumatic event when coping strategies appear and proximate firms’ emphasis on learning starts to take shape. Over time, this difference will become larger as proximate firms become more effective in their choices, leading to a more robust increase in alliance frequency relative to that of the distant firms. This leads us to hypothesize that:

**Hypothesis 4.** The relative difference between the frequency of inter-organizational alliances for spatially proximate and distant firms will be smaller in the immediate aftermath of the traumatic event and will become larger over time.

**Methodology**

**Research setting and context**

Given the limited organizational research on resilience, its empirical examination remains a challenge. In particular, “it is difficult to determine whether a system or one of its components has recovered from an event and learned from experiences if there is no baseline from which to compare the observed performance of the system with what would have happened if the event had not taken place” (Van Der Vegt et al., 2015, p. 976). We addressed this challenge in the following way. First, we chose the oil industry as our empirical setting since the focal products are identical across the globe, making the proximate and distant firms strongly comparable (Baum et al., 2006). Moreover, inter-organizational alliances have become a prominent strategic initiative in the oil industry as a response to growing demand from emerging economies and increased intra-industry competition (Russo, 2001; Sine et al., 2007). This ensures that firms are not averse to alliances and recognize the possibilities and risks rooted in these ties.

Second, we used the 9/11 terrorist attacks as the focal event. These attacks took place in several parts of the US including the World Trade Towers in Manhattan (New York), the Pentagon in Arlington (Virginia), and a field in Shanksville (Pennsylvania) that saw a failed attack aimed at the White House (Washington D.C.). These attacks are considered to be one of the most traumatic events in recent history (Fischhoff et al., 2012; Mehl and Pennebaker, 2003; Traugott et al., 2002). In surveys conducted soon after the attacks, Small et al. (2006) found that participants experienced significant trauma in the form of sadness and anger after the attacks (also see Lerner et al., 2003). The effect was not just limited to those in the immediate vicinity of the attack (Fischhoff et al., 2003), it was felt throughout the US (Woods et al., 2008). The nation-wide effect is attributed to the feeling that it was not a location or a city but the American way of life that was under attack. And while a Gallup poll in September 2001 found that 58% Americans were fearful of being a victim of another major terrorist attack, 43% Americans continued to be afraid of this possibility as late as in January 2006 (Gallup, 2006). This suggests that the fear and uncertainty associated with the threat persisted for a significant time after the attacks. Yet the economic fallout from the 9/11 attacks was felt throughout the world. The United Nations’ Department of Economic and Social Affairs (2001) stated that:

> [T]he attacks of 11 September inflicted a sizeable adverse “shock” on the world economy and may cause significant changes in a number of key determinants of the global economic outlook. . . . The direct economic consequences of eroding confidence will be heightened risk aversion by business investors and a withholding of household spending by consumers. The nervousness and apprehension of investors and consumers may lead not only to depressed demand in the short-to medium run, but also to reduced expansion of supply capacity and lower potential long-term growth (p. 3, 5–6).

Not surprisingly, immediately after the attacks, the New York Times reported that “[t]he price of crude oil, which was around $30 per barrel earlier this year, plunged last week to as little as $17, with warnings that it could go still lower” (18-Nov-2001). This shows that not only does the oil industry offer a valuable setting to examine the global implications of a traumatic event, it provides a rich context...
to examine the differences in organizational preferences between firms that were proximate to the attacks versus those that were distant (Blomberg et al., 2009).

Third, in order to compare the alliance activity of US firms that had a direct exposure to the 9/11 terrorist attacks to that of the spatially distant non-US firms, we followed the previous studies and used US national boundary to identify the extent to which a firm was more directly affected by the traumatic event (Brounen and Derwall, 2010; Chesney et al., 2011; Nikkinen and Vähämää, 2010). This is consistent with the previous studies which have found national boundary to be an effective way to distinguish between those that are exposed to a threat relative to those that are immune from its direct implications (Oh and Oetzel, 2011; Spilerman and Stecklov, 2009). However, the comparison of proximate and distant firms can misrepresent the pre-existing differences between firms. It is not difficult to imagine that the US and the non-US firms may differ in their alliance activity regardless of the terrorist attack. A failure to recognize the prevalent distinctions that preceded the attacks can lead us to erroneously associate those differences with the threat. An effective comparison therefore requires incorporation of the alliance activity prior to the attack to establish the baseline when examining the frequency of alliances subsequent to the threat (Van Der Vegt et al., 2015). Thus, we examine the difference between the alliances of US and non-US firms before and after the 9/11 attacks.

Sample

We developed our sample from two primary sources. We first extracted the information on all publicly traded oil (petroleum) companies from around the world. For this, we used Bloomberg, the world’s largest supplier of listed company information. It offers a uniform source of data that avoids the possibility of any systematic differences. Using the industry list, we collected firm-specific details from national exchanges. This produced a sample of 174 firms from 28 countries. Of these, 31 firms are from the US and the remaining 143 are from other parts of the world, including Germany (39), Russia (19), India (11), Nigeria and the UK (10 each).

We used corporate headquarters as the primary location of the firm as identified in Bloomberg. Although it is not unusual for the oil companies to have their facilities in multiple countries, corporate headquarters remains an effective representation of the point for key decisions since most top executives are generally at this location (Palmer et al., 1986; Tilcsik and Marquis, 2013). To validate this information and to ascertain that the corporate headquarters did not change during the sample period, we tracked the company history from multiple sources including the corporate websites, company press releases, and other public sources.

Next, we collected the financial information for each of these companies. The firm-level financial information in Bloomberg starts from 1991, which served as the starting point for our sample and continued until 2012. This produced a total of 22 years of data that spanned two 11-year periods - one preceding the focal event (1991–2001) and one following the event (2002–2012). This allowed us to test for the long-term difference in alliance activity over two periods. The data included a total of 2,154 observations, and after

Fig. 1. A. Alliance frequency during the sample period. B. Alliance frequency before and after the 9/11 attacks.
excluding observations with missing values, our effective sample comprises of 2,089 observations.

We combined this data with our second source, SDC Platinum, one of the most comprehensive sources of information on inter-organizational alliances that has extensive global coverage (see Schilling, 2008), to identify the alliance activity. However, there are two potential limitations of the SDC data. First, public access to information during the pre-Internet era was relatively difficult, which makes it likely that the alliance activity may be systematically inflated in the recent years. We discuss the implications of this limitation below. A second limitation is that SDC may have greater coverage for the US and other more developed economies than the less-developed or relatively remote locations such as Nigeria or Russia, which as mentioned above, have large concentrations of firms in the industry. Although this is unlikely to be a critical limitation due to our incorporation of the baseline, we also chose to evaluate the potential of a systematic bias. We collected the information on all alliances reported by 30 non-US firms from 15 countries from their websites and annual reports and compared this information with that reported in SDC. We found a 100% match that validated that there was no systematic omission of the coverage of alliance activity for our sampled firms. To collect the information on alliances, we manually searched each firm in our sample in SDC and then tracked their respective alliances over the sample period. This led to the identification of a total of 2,398 alliances for our sample of which 247 were by the US firms and the remaining 2,151 were associated with the non-US firms.

To begin, we compared the average alliance frequency per firm before and after the attacks. We saw a significant decrease in overall activity from 2.29 to 0.67 alliances per firm (t-value = 7.48, p < 0.001). Even though US firms have fewer average alliances before and after the attacks, the decrease is less than half (from 0.96 to 0.53; t-value = 2.09, p < 0.05) and much more significant for the non-US firms, which go from an average of 2.72 to 0.70 alliances per firm (t-value = 7.55, p < 0.001) corresponding to a decrease of almost two-thirds in the average per firm alliances. This is consistent with our argument about US firms having a higher preference for alliances in the aftermath of the attacks than the non-US firms. It also overcomes our concern discussed earlier that alliance data may be artificially inflated in the more recent years. Fig. 1 offers a graphical illustration of the alliance activity. Inset A shows the alliance activity over the sample period (i.e. Jan 1991 to Dec 2012) and inset B shows the activity closer to the 9/11 attacks (Jan 1999 to Dec 2003). The figure shows that the decline in alliance activity began only within a few months after 9/11 suggesting an immediate impact of the attacks.

Variables

Dependent and Independent Variables. We operationalize alliance frequency as the total number of inter-organizational alliances per firm per year. It captures a firm’s openness to relational ties. To distinguish between US firms spatially proximate to the traumatic event and non-US firms that were distant from the threat, we use a binary variable. It is 1 for US firms and 0 for firms outside the US (Fischhoff et al., 2003). We use the variable post-event to separate between firm responses prior and subsequent to the attacks. It is 1 for all observations between 2002 and 2012 and 0 for the earlier years (e.g. Kacperczyk, 2009; Mithani, 2017). The latter two variables are the key to our empirical model as they highlight the treatment group (US firms) during the focal period (post-event). We discuss them in detail in our estimation approach.

Moderators. We use the two forms of slack, potential and unabsorbed, as moderating variables that represent excess resources that can be deployed in distinctive ways (i.e. adaptive versus stabilizing) depending on the organization’s outlook. We follow prior research (Greeve, 2003) and operationalize potential slack as the ratio of debt/assets with higher values suggesting limited available capacity for indebtedness and lower values suggesting greater room to borrow external funds; and unabsorbed slack as the ratio of current assets to current liabilities where higher values represent greater organizational access to immediately deployable resources, such as cash, in order to overcome unanticipated contingencies. To measure local partners, we use the proportion of firms’ alliances with others with a similar perception of threat based on proximity. For the US firms, we divided the number of domestic alliances for the focal firm with their total alliances in the year. Similarly, for the non-US firms, we divided the number of alliances with other non-US firms by their total number of alliances per year. This gives a continuous measure with higher values indicating greater geographical confinement of alliance activity (also see Park and Mezias (2005) who used a binary variable for industry sector confinement). We also tested this by replacing the continuous variable with a dummy (i.e. 1 for US to US alliances and non-US to non-US alliances and zero otherwise) and found the results to be identical.

Controls. We control for firm size as the logarithmic value of annual sales (+1). Higher values of sales represent a larger scale of operations, controlling for the possibility that firm size may affect their vulnerability to the threat. We also checked with assets, and although the results are similar, several missing values for the variable led us to use sales. To ensure firm propensity towards alliances is not informed by new investments, we control for capital intensity. It captures the ratio of total capital expenditures to annual sales. Higher values suggest that the firm has made significant investments that can affect the way they respond to the threat. We also control for R&D intensity. It is the ratio of R&D expenses to annual sales to ensure that larger resources invested into R&D do not affect the frequency of alliances. To distinguish between integrated producers who have their own exploration and marketing operations, and non-integrated producers who rely on external entities for their supplies or distribution, we include a dummy variable. Integrated is 1 for firms that span across the supply and distribution channels and 0 otherwise. As our sample includes a large number of firms from various countries, with each country having and responding to a unique set of institutions, we include institutional quality. This variable is operationalized by taking an average of the political rights and civil liberties as measured by the Freedom House survey. The two measures offer longitudinal assessment of the freedom of expression and belief, associational rights, rule of law, personal autonomy, civil liberties, electoral process, political pluralism and participation, as well as the functioning of the government. They are condensed from 23 questions (109 indicators) regarding a country’s legal, political and economic environments (see Chan et al., 2008; Dow and Karunaratna, 2006). The measure is reverse coded with higher values indicating lower institutional quality. In order to account for the
| Variables               | Mean  | S.D.  | 1     | 2     | 3     | 4     | 5     | 6     | 7     | 8     | 9     | 10    | 11    |
|------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1 Alliance frequency   | 1.15  | 4.57  | 1.01  | 0.01  | -0.16 | -0.05 | -0.10 | 0.04  | 0.16  | 0.10  | 0.08  | 0.10  |       |
| 2 Post-event           | 0.71  | 0.46  | -0.05 | 0.01  | 0.10  |       |       |       |       |       |       |       |       |
| 3 US firms             | 0.19  | 0.40  |       |       |       |       |       |       |       |       |       |       |       |
| 4 Potential slack      | 26.84 | 69.20 | -0.04 | -0.03 | 0.04  | 0.10  |       |       |       |       |       |       |       |
| 5 Unabsorbed slack     | 1.47  | 8.82  | -0.02 | 0.01  | 0.01  |       |       |       |       |       |       |       |       |
| 6 Local partners       | 0.20  | 0.39  | 0.15  |       |       |       |       |       |       |       |       |       |       |
| 7 Sales (Ln)           | 9.12  | 3.51  | 0.06  |       |       |       |       |       |       |       |       |       |       |
| 8 Capital intensity (/1000) | 0.02 | 0.47  | -0.01 | 0.01  | 0.01  |       |       |       |       |       |       |       |       |
| 9 R&D intensity        | 0.00  | 0.07  | 0.00  | -0.01 | 0.06  | 0.01  | 0.03  |       |       |       |       |       |       |
| 10 Integrated firm     | 0.38  | 0.48  | 0.17  |       | -0.01 | 0.02  | 0.01  | 0.00  | 0.29  | 0.18  |       |       |       |
| 11 Institutional Quality | 2.35 | 1.87  | 0.00  | 0.07  | -0.35 | -0.03 | -0.03 | -0.09 | -0.03 | 0.01  | -0.02 | -0.02 | -0.16 |
| 12 Oil price           | 55.33 | 30.99 | -0.11 | 0.72  | -0.06 | -0.02 | 0.02  | -0.05 | 0.07  | 0.01  | -0.02 | 0.01  | 0.05  |

N = 2089.

Table 1
Descriptive statistics and correlations.
possibility that changes in the alliance frequency are not simply a response to changes in the price of oil, we include oil price as the average value in US dollars of a barrel of crude oil for the year. This data were obtained from the US Energy Information Administration.

**Model specification**

Our analysis focuses on firm-level differences (i.e. US versus non-US firms) as well as changes in the frequency of inter-organizational alliances over time (i.e. pre- versus post-event). The most appropriate approach is to emulate the difference-in-difference (DiD) model (Kacperczyk, 2009; Mithani, 2019; Reeb et al., 2012) while treating the firm as the unit of analysis. It helps identify the extent to which firms behaved differently after the traumatic event keeping in context their relative differences prior to the event. If a group of firms behave differently from the other group but the differences are not significantly different prior and subsequent to the event, the result yields an insignificant effect. Similarly, if a group of firms behave differently after the attack but the difference is shared across spatially proximate and distant firms, the result yields an insignificant effect. In contrast, a significant effect can validate that not only did the proximate as well as the distant firms experienced changes in alliance frequency after the event, the trajectory of changes was significantly different for the US and the non-US firms. Although past studies using DiD focused on identical samples with the assumption of parallel prior trends, more recent research offers a family of parallel assumptions that recognize that comparable samples may not always be possible (Mora and Reggio, 2017). It suggests sufficient observational length prior and subsequent to the event, which is consistent with our sample (e.g. Mithani, 2017). Our approach controls for the past alliance activity as

| Table 2 | GLS random effects regression models for alliance frequency. |
|---------|-------------------------------------------------------------|
| Variables | 1 | 2 | 3 | 4 | 5 |
| Post-event | -1.89*** | -2.76*** | -3.02*** | -1.73*** |   |
|           | (0.23)  | (0.31)  | (0.33)  | (0.33)  |   |
| Post-event x US firms | 1.37*** | 2.22*** | 2.81*** | 1.86*** |   |
|           | (0.38)  | (0.44)  | (0.64)  | (0.66)  |   |
| Post-event x US firms x Potential slack | -0.04*** | -0.04*** | -0.05*** |   |
|           | (0.01)  | (0.01)  | (0.01)  |   |
| Post-event x US firms x Unabsorbed slack | -0.68 | -0.48 |   |
|           | (0.69)  | (0.67)  |   |
| Post-event x US firms x Local partners | 3.53*** |   |
|           | (0.88)  |   |
| US firms | -1.28* | -2.12** | -2.70** | -1.96* |   |
|           | (0.65)  | (0.69)  | (0.83)  | (0.76)  |   |
| Potential slack | -0.04*** | -0.04*** | -0.05*** |   |
|           | (0.01)  | (0.01)  | (0.01)  |   |
| Post-event x Potential slack | 0.04*** | 0.04*** | 0.05*** |   |
|           | (0.01)  | (0.01)  | (0.01)  |   |
| US firms x Potential slack | 0.04*** | 0.04*** | 0.05*** |   |
|           | (0.01)  | (0.01)  | (0.01)  |   |
| Unabsorbed slack | -0.15* | -0.10 |   |
|           | (0.07)  | (0.07)  |   |
| Post-event x Unabsorbed slack | 0.16* | 0.11* |   |
|           | (0.07)  | (0.06)  |   |
| US firms x Unabsorbed slack | 0.68 | 0.48 |   |
|           | (0.69)  | (0.67)  |   |
| Local partners | 5.48*** |   |
|           | (0.37)  |   |
| Post-event x Local partners | -5.22*** |   |
|           | (0.40)  |   |
| US firms x Local partners | -2.24*** |   |
|           | (0.72)  |   |
| Sales (Ln) | 0.08+ | 0.10* | 0.11* | 0.11* | 0.11** |
|           | (0.04)  | (0.04)  | (0.04)  | (0.04)  | (0.04)  |
| Capital intensity (/1000) | 0.01 | 0.01 | 0.02 | 0.02 | 0.04 |
|           | (0.16)  | (0.15)  | (0.15)  | (0.15)  | (0.15)  |
| R&D intensity | 0.16 | 0.16 | 0.15 | 0.14 | 0.11 |
|           | (1.04)  | (1.02)  | (1.02)  | (1.02)  | (0.98)  |
| Integrated firm | 1.20** | 1.09* | 1.06* | 1.05* | 0.73* |
|           | (0.44)  | (0.44)  | (0.44)  | (0.44)  | (0.36)  |
| Institutional Quality | 0.22* | 0.12 | 0.11 | 0.11 | 0.10 |
|           | (0.10)  | (0.11)  | (0.11)  | (0.11)  | (0.09)  |
| Oil price | -0.01*** | 0.004 | 0.004 | 0.004 | 0.004 |
|           | (0.00)  | (0.00)  | (0.00)  | (0.00)  | (0.00)  |
| Wald Chi² | 33.16*** | 102.48*** | 119.40*** | 125.54*** | 402.39*** |
| R² (within) | 0.011 | 0.042 | 0.049 | 0.052 | 0.149 |

N = 2089; *p < 0.05; **p < 0.01; ***p < 0.001; standard errors in parentheses.
well as the relative differences between the firms. It does so by using two distinct dummy variables and the significance of the effect is ascertained by the interaction between the two dummies. They include post-event which differentiates between observations subsequent to the event from those that are prior to the event, and US firms, which distinguishes the spatially proximate from the distant firms. A significant interaction between post-event and US firm can validate the two conditions identified above as illustrated by the following equation:

\[ y = \beta_0 + \beta_1 \text{ post-event} + \beta_2 \text{ US firm} + \beta_3 \text{ post-event US firm} + \sum \beta_k \text{ controls} + \epsilon \]

Here \( y \) represents the frequency of alliances and \( \beta_3 \) is the coefficient that captures the focal effect by interacting comparative changes in US firms over the post-event period. \( \beta_3 \) is significant only if the outcome variable for US firms (compared to non-US firms) is significantly different in the post-event period (\( t_2 \)) relative to the years prior to the shock (\( t_1 \)). Thus:

\[ \beta_3 (\text{est.}) = (y_{\text{US-t2}} - y_{\text{US-t1}}) - (y_{\text{nonUS-t2}} - y_{\text{nonUS-t1}}) \]

While the difference between US and non-US firms is the focus of Hypothesis 1, subsequent hypotheses examine how this difference is influenced by slack (Hypothesis 2), local partners (Hypothesis 3), and over time (Hypothesis 4). As discussed earlier, we focus on firm-specific panels by accounting for multiple observations per firm. For this, we use the generalized least squares (GLS) estimation random effects model. They allow us to account for the effect of multiple observations per firm while acknowledging the potential of correlation within the panels. Although fixed effects models may also be viable, they exclude variables that are static across the sample period (i.e. US firms), which makes them inappropriate for our analysis.

**Results**

Table 1 includes the descriptive statistics and first-order correlations. While most correlations are moderate or low, post-event has a correlation of 0.72 with oil price. To ensure this correlation did not affect our analysis, we checked the Variable Inflation Factor (VIF) that showed an average value of 1.30 and the maximum value of 2.15. These values are significantly below the threshold of 10 and overcome any critical concern for multicollinearity.

Table 2 includes the test of our hypotheses. Model 1 only includes the baseline controls. It shows that higher sales and integrated operations both have a positive effect on alliance frequency. Although oil price and institutional quality also appear to have a significant negative effect (recall that lower values represent higher institutional quality), the effects go away in the subsequent models, apparently an artifact of correlation with post-event and US firms. Model 2 identifies that while there was a decrease in alliance frequency in the aftermath of the attacks (post-event), the decrease was relatively smaller for US firms. This is tested by the interaction of post-event with US firms. This effect is positive (\( \hat{\beta} = 1.37; p < 0.001 \)), which validates that in the aftermath of the terrorist attacks, spatially proximate firms exhibited a relatively higher alliance activity than the more distant firms. The difference between post 9/11 alliance frequency of proximate and distant firms is 37%, suggesting that direct exposure to the attacks led to a significant relative preference for alliances by the US firms. Thus, Hypothesis 1 is supported.

In models 3 and 4, we test our argument regarding the effect of slack in strengthening the difference between proximate and distant firms. We do this through a three-way interaction between post-event, US firms, and potential slack (i.e. debt/assets) as well as unabsorbed slack (i.e. current assets/current liabilities). The result shows a negative effect for potential slack (\( \hat{\beta} = -0.04; p < 0.001 \)). Since lower values reflect higher levels of potential slack, a negative effect suggests that proximate firms with higher levels of slack experienced a relatively larger increase in alliance frequency than firms with higher slack that were relatively distant. In terms of marginal

![Implications of slack for alliance frequency](image)

**Fig. 2.** Implications of slack for alliance frequency. This figure plots the average number of alliances per firm per year before and after the 9/11 attacks. Solid lines plot US firms and the dotted lines represent non-US firms. Black lines identify firms with higher potential slack (lower than median) and grey lines show firms with lower potential slack (higher than median). The figure illustrates that in the aftermath of the attacks, US firms with higher slack underwent a smaller relative decrease in the frequency of alliances than US firms with lower slack. Non-US firms exhibited a contrasting response; firms with higher slack experienced a much larger decrease in alliance activity than the ones with lower slack.
effects, the alliance frequency of distant firms with higher potential slack (mean ± s.d.) decreased by more than 80% relative to their non-US counterparts with lower potential slack (mean ± s.d.) after the attack. In contrast, the alliance frequency for proximate firms with higher potential slack experienced a decrease that was 5% smaller relative to their lower potential slack counterparts after the attack. This validates that slack invigorated the responsiveness of firms that were closer to the attack but not for the distant firms. In the same model, controls and their interactions show the direct effect of potential slack to be negative suggesting that higher slack increased the preference for alliances, but potential slack x US firms shows a positive sign indicating that this trend was generally the opposite for US firms. This can be more clearly seen in Fig. 2. It shows that prior to 9/11 attacks, for US firms, higher slack led to significantly fewer alliances than US firms with lower slack. After the attack, the change in the frequency of alliances was smaller for firms with higher slack than for firms with lower slack. It explains that US firms with higher slack became relatively more persistent in seeking alliances after the attack. Thus, the availability of slack for the US firms facilitated adaptation. For non-US firms, while higher slack led to a larger number of alliances than lower slack before the attack, firms with higher slack showed a dramatic decrease in alliance activity after the attack, suggesting that slack became a stabilizing mechanism for distant firms that helped maintain the status quo.

However, the effect of unabsorbed slack (i.e. post-event x US firms x potential slack) is not significant (β = -0.68; p = 0.329). The difference between high and low slack firms does not vary sufficiently to make a conclusive interpretation, which suggests that easily deployable resources do not play a critical role in resilience. Thus, Hypothesis 2 is partially supported.

In model 5, we test Hypothesis 3 regarding the geographical localization of alliance activity subsequent to the attacks. We test this through a three-way interaction between post-event, US firms, and local partners. The positive effect (β = 3.53; p < 0.001) shows that there was a greater tendency by US firms after the attack to increase the emphasis on local partners. In comparative terms, the

| Table 3 |
| GLS random effects regression models for alliance frequency. |

| Variables | t + 1 | t + 3 | t + 5 | t + 7 | t + 9 | t + 11 |
|-----------|-------|-------|-------|-------|-------|-------|
| Post-event | −1.47 | −1.42* | −1.52** | −1.77*** | −1.76*** | −1.73*** |
| Post-event x US | 0.63* | 0.19 | 1.17 | 1.74* | 1.94* | 1.86*** |
| Post- x US x Pot. slack | −0.07 | −0.02* | −0.05** | −0.05*** | −0.05*** | −0.05*** |
| US firms | −0.44 | −0.74 | −1.17 | −1.68 | −1.93* | −1.96* |
| Potential slack | −0.10*** | −0.07*** | −0.05*** | −0.05*** | −0.05*** | −0.05*** |
| Post-event x Pot. slack | 0.06* | 0.02* | 0.02 | 0.02* | 0.02* | 0.02* |
| US firms x Pot. Slack | 0.10*** | 0.06*** | 0.07*** | 0.07*** | 0.07*** | 0.07*** |
| US firms x Unabs. Slack | 0.22 | 0.02 | 0.02 | 0.02 | 0.02 | 0.02 |
| US firms x Loc. Partners | −0.19*** | −0.13*** | −0.17*** | −0.21*** | −0.23*** | −0.23*** |
| US firms x Unabs. slack | 0.14 | 0.12 | 0.12 | 0.12 | 0.12 | 0.12 |
| US firms x Loc. Partners | −2.18 | −1.48 | −0.66 | 0.28* | 0.48* | 0.67* |
| Local partners | 5.82*** | 5.03*** | 5.79*** | 5.56*** | 5.75*** | 5.48*** |
| Post-event x Loc. Partners | −1.77 | −5.51*** | −6.22*** | −5.48*** | −5.78*** | −5.22*** |
| US firms x Loc. partners | −2.86 | −1.41 | −1.65 | −2.04* | −2.41** | −2.24** |
| Sales (Ln) | 0.14 | 0.12 | 0.11 | 0.12* | 0.12* | 0.12* |
| Capital intensity (/1000) | 33.25 | 12.05 | 12.05 | 12.05 | 12.05 | 12.05 |
| R&D intensity | −3.01 | 0.13 | 0.13 | 0.13 | 0.13 | 0.13 |
| Integrated firm | 0.44 | 0.74 | 0.80 | 0.79* | 0.79* | 0.79* |
| Institutional Quality | 0.26 | 0.04 | 0.13 | 0.11 | 0.11 | 0.11 |
| Oil price | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 | 0.03 |
| Wald Chi^2 | 61.99*** | 110.74*** | 208.38*** | 255.24*** | 356.98*** | 402.39*** |
| R^2 (within) | 0.084 | 0.144 | 0.172 | 0.147 | 0.160 | 0.149 |

*p < 0.05; **p < 0.01; ***p < 0.001; standard errors in parentheses.
proportion of non-US firms’ local alliances increased by 67% (from 18% to 30% of total alliances) after the attacks, and for the US firms, this increase was more than 80% (from 22% to 40% of total alliances). This validates that greater vulnerability led to relatively higher filtering of potential partners by the proximate firms. In turn, alliance activity subsequent to the 9/11 attacks led to greater geographical partitioning and therefore a larger partnering distance between the US and the non-US firms. This offers insights into why spatially distant firms may have found it difficult to appreciate the choices associated with the resilience of US firms. Overall, the fully saturated model shows a $R^2$ (within panel) of 15%. Although $R^2$ values are not particularly meaningful in the case of random effects, the significant increase in $R^2$ from 1% in the baseline model suggests that the hypothesized effects substantively increase our ability to explain the heterogeneity in coping strategies as manifested by the frequency of alliances between the US and the non-US firms. Thus, Hypothesis 3 is supported.

To test Hypothesis 4 regarding the short-term and the long-term differences in the frequency of alliances, for brevity we plot our results for the odd numbered years after the attack in Table 3. It shows that while the decrease in alliance frequency and the role of potential slack in US firms’ resilience is visible after three years from the attack, the localization of alliance activity only appears to take a significant effect by year 5, and the relatively higher alliance activity of US firms becomes distinctly observable in year 7. This suggests that while resilience starts to come into play immediately after the attack, its wider effects become visible only over time. It validates our argument that the early choices of spatially proximate firms remain unobservable and therefore hard to imitate. The difference in substantive variables is significant across periods at $p < 0.01$, which supports Hypothesis 4.

Discussion and conclusion

We began this study by asking a question that has become increasingly salient: What makes some organizations more resilient in the face of a traumatic event than others. The importance of this question stems from two key challenges. First, while organizational scholars have paid significant attention to economic disruption, there is no substantive research on organizational responses to life-threatening events. The paucity of research may not be a problem if it were not for the second challenge – the growing incidence of events such as terrorist attacks, chronic diseases that can manifest into a pandemic such as COVID-19, or natural disasters that do not just affect our livelihood but also our outlook towards life (Mithani, 2020). The latter demands an understanding of how organizations and its participants overcome trauma while rebuilding competencies. Building on past research, we argued that while resources acquired prior to the event and knowledge accumulated after the event are likely to be valuable (Linnenluecke, 2017; Sutcliffe and Vogus, 2003; Van Der Vegt et al., 2015; Williams et al., 2017), these tendencies will be more likely for firms that have a stronger perception of threat. Spatial proximity to a traumatic event increases perceived vulnerability, making organizations eager to seek knowledge and emotional support via relational ties. Our investigation showed that US firms’ exposure to the traumatic attacks of 9/11 made them more attentive to inter-organizational alliances, which were facilitated by slack and local partnerships, whose effects only became more evident over time. Our findings illustrated that spatial proximity to a traumatic event can be a powerful trigger for the development of resilience. Thus, it is not merely the possession of critical resources or the capacity for learning, but the perception of the significance of the threat that explains the difference between resilient and non-resilient firms.

Along these lines, we observed that proximate firms share mental models and resource arrangements (Pouder and John, 1996), and the resilience that evolves appears to be difficult to transfer. It remains a localized effect that does not diffuse easily in the absence of a direct experience of the threat. Yet the associated preference for local partners is consistent with the growing predisposition to de-globalization, suggesting the potential role of emotions behind the geographical confinement of resilience (Hauser et al., 2009). Our results also suggest that proximate firms view potential slack from reduced leverage differently than unabsorbed slack from more liquid resources. US firms that had lower debt deployed slack to increase their adaptability through engagement in inter-organizational alliances as compared to non-US firms, but liquid resources did not play a meaningful role in widening the difference between US and non-US firms. This may be because proximate firms, similar to the distant ones, view easily deployable slack as a stabilizing mechanism regardless of their vulnerability to the threat.

Our study underscores that trauma has a dramatic effect on relational ties. This effect was stronger for alliances pursued by the proximate firms, demonstrating that their understanding of competencies and partnerships is particularly valuable in an environment of fear and uncertainty. It could be surmised that the higher frequency of alliances in the face of threats increases cognitive load and disincentives change, but our findings show the opposite. Rather than being a liability, geographical proximity to a traumatic event serves as a trigger for organizational adaptation. This offers further advancement to the role and import of alliances. While previous research has shown several beneficial outcomes when firms ally with other proximate partners such as greater institutionalization of knowledge transfer activities (Santoro and Gopalakrishnan, 2000), greater technology transfer (Santoro and Gopalakrishnan, 2001) and more communication and innovation (Stryker et al., 2012), our research suggests that relational ties reduce the effects of trauma. The emotional capital that accompanies alliances, particularly those that are local, is a promising direction for future research. Another important finding pertains to our observation that resilience became substantively visible starting in the 3rd year after attacks. This suggests the steeling effect materializes more quickly in organizations than in humans, where it has been found to take almost a decade to observe its implications (e.g. Beckett et al., 2006; Elder, 1999).

Our study makes three key contributions. First, we show that the organizational outlook necessary for resilience is not associated with resources or learning capacity. That is, despite comparable resources and the potential for learning, resilience develops in the face of a strong perception of threat. Even then, resilience evolves gradually and is observable only in the long run. Second, we show that inter-organizational alliances are not only a mechanism for competence development but also a source of emotional capital. Alliances facilitate organizational participants to overcome fear and vulnerability by helping them make sense of an uncertain external environment, by encouraging the search for a more effective outlook for the future, and by motivating firms to work closely with like-
minded partners. And third, we challenge the conventional wisdom that extreme threats increase the potential of organizational failure. We show that the evidence here points in the opposite direction. Organizations that experience significant threats are more likely to evolve and become effective in the long run, as compared to firms that are immune to the threat which may be more vulnerable to failure.

Despite these contributions, there are limitations. First, although the data obtained here was quite comprehensive, our study only includes publicly traded firms. Privately held firms in this industry that quite possibly had significant alliance activities were not included in our sample. Moreover, while we believe our findings are generalizable to many other types of organizations, our study focused on the oil industry. Thus, future studies might expand our work by identifying the extent to which the effects are similar across industries and types of firms.

We also offer three key implications for practitioners. Foremost is the recognition that life-threatening events offer valuable learning opportunities. Managers should not let fear and trauma turn into a constraint. Instead they should see them as triggers for change. This is not to say that organizations should avoid any focus on self-preservation. Rather, once the threat on life and property has subsided, managers should accelerate their search to find ways to overcome the negative effects of the threat. Second, the capacity for indebtedness is more valuable than excess cash in the aftermath of the event. It is therefore pertinent for organizations to ensure that their leveraged positions are promptly vacated in the face of environmental uncertainty. And third, although local partnerships may appear more vulnerable and less rewarding in terms of broader knowledge, local partners are a critical source of support in the face of extreme threats. Nurturing such ties may be necessary to keep them accessible when needed.

The implications of our study bring up several new questions. For example, can organizations become resilient in the absence of exposure to a traumatic event? Our findings suggest that it is the perception of threat that encourages change, and this perception emanates from spatial proximity to the threat. This offers an avenue for further investigation whether resilience can be learned through ordinary operational choices. As our comparison focused on post 9/11 alliances within and across countries, it would be interesting to adopt a more granular view and explore if firms chose different sets of partners every few years depending on the issues that threatened them the most. It is quite possible that instead of pursuing newer alliances, firms may reconfigure some of their existing alliances. Such an investigation is likely to require a more qualitative understanding of alliance reconfiguration, which we believe has the potential to add significant insights into how alliances are managed differently by proximate and distant firms.

Moreover, does organizational resilience continue to develop if extreme threats persist over time or are there diminishing returns? Such an investigation can offer insights into how firms react and respond differently to frequent traumatic events such as multiple natural disasters or recurring pandemics. It can also explain if frequent disasters may be a mechanism for accelerated learning or if they start to become a constraint on organizational growth. Yet another important question pertains to the nature of threats. Is the development of organizational resilience equally likely for all kinds of events or do certain kinds of threats make a stronger contribution? We believe answers to these questions are not only critical for a better understanding of resilience but they could also contribute to more effective managerial practices.

Credit author statement

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Appendix A. Supplementary data

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