Organization Science

Publication details, including instructions for authors and subscription information:
http://pubsonline.informs.org

After the Storm Has Passed: Translating Crisis Experience into Useful Knowledge

Gwendolyn K. Lee, Joseph Lampel, Zur Shapira

To cite this article:
Gwendolyn K. Lee, Joseph Lampel, Zur Shapira (2020) After the Storm Has Passed: Translating Crisis Experience into Useful Knowledge. Organization Science 31(4):1037-1051. https://doi.org/10.1287/orsc.2020.1366

http://pubsonline.informs.org/journal/orsc

ORGANIZATION SCIENCE
Vol. 31, No. 4, July–August 2020, pp. 1037–1051
ISSN 1047-7039 (print), ISSN 1526-5455 (online)

After the Storm Has Passed: Translating Crisis Experience into Useful Knowledge

Gwendolyn K. Lee,[a] Joseph Lampel,[b] Zur Shapira[c]

[a] Warrington College of Business, University of Florida, Gainesville, Florida 32611; [b] Alliance Manchester Business School, University of Manchester, Manchester M15 6PB, United Kingdom; [c] Stern School of Business, New York University, New York, New York 10012

Contact: glee@alum.mit.edu, https://orcid.org/0000-0003-4276-7982 (GKL); joseph.lampel@manchester.ac.uk, https://orcid.org/0000-0003-0668-6747 (JL); zshapira@stern.nyu.edu (ZS)

Received: May 1, 2020
Revised: May 13, 2020; May 19, 2020
Accepted: May 24, 2020
Published Online in Articles in Advance: July 7, 2020

https://doi.org/10.1287/orsc.2020.1366

Abstract. This virtual special issue (VSI) collects together 19 papers published in *Organization Science* that explore how organizations learn from crises. The objective is to discuss insights that can help us understand the COVID-19 pandemic crisis, implications that existing research carries for organizations' abilities to keep hard-earned lessons after the storm passes, and opportunities that the current phenomenon offers for future inquiry in this domain. Organizations, large and small, in scores of countries, have suspended normal operations. To survive, many organizations have adapted by shifting almost all human-to-human interactions online while facing an ethical dilemma and a tense tradeoff between public health and economic well-being. We take stock of the research on organizational learning from crises, summarize useful knowledge for managing the current crisis, and provide directions for future research.

Funding: G. K. Lee acknowledges the National Science Foundation for funding her research on Effective Recovery for Organizations from the COVID-19: Optimizing Strategic Responses [Award SES2030830].

Keywords: organizational learning • crisis learning • crisis response and management • COVID-19

Introduction

The core objective of the virtual special issue (VSI) is to offer insights from academic research to inform organizational responses to the pandemic crisis. The VSI is a contribution of *Organization Science* to society intended to facilitate the learning about the unprecedented challenges presented by the crisis. We take stock of the research on organizational responses to crisis published in *Organization Science*, derive key insights, and provide directions for future research. We curate from the Special Issue on rare events and organizational learning, coedited by Lampel, Shamsie and Shapira (2009), and enhance this curated set to arrive at a collection of 19 articles published in *Organization Science* that explore how organizations learn from crises: in total, 16 empirical studies, 2 editorial commentaries, and 1 computer simulation model.

Mindful that organization science literature is vast, we decided to focus on research on organizational learning because we felt that it translates more directly to useful knowledge that can help organizations cope with, and adapt to, the COVID-19 pandemic and expected global economic crisis. Our article highlights different types of organizational learning, and lessons learned. It is organized as follows. We start with a brief overview of the current pandemic. We then examine the challenge of translating crisis experience into useful knowledge.

In what follows, we outline a typology of organizational learning from crises. We propose four types: strategic crisis learning, reflective crisis learning, collective crisis learning, and institutional crisis learning. We use the typology to focus on the 16 empirical studies selected for this special issue. We next look at what useful knowledge the selected articles provide for dealing with the current crisis. Looking to the future, we discuss what organizations can learn from the current crisis. We point to three main areas of learning in crisis: learn to imitate, learn from experts, and communicate using science. We conclude with a discussion of expanding research on learning from crises to include research on the role that leaders, and managers more generally, play in learning from crises.

The COVID-19 Challenges to Organizations

The World Health Organization (WHO) declared a global health emergency on January 30, 2020. By April 30, 2020, the coronavirus has sickened more than 3.2 million people worldwide across 177 countries, and at least 231,700 people have died. The pandemic is a round-the-clock drumbeat of awful statistics (WHO 2020). The United States leads with more than 1 million cases and 62,708 deaths (Coronavirus Map 2020). Other countries report lower mortality numbers but, deflated for size of population, the numbers appear truly grim. Calculated per 10,000, Belgium is

66 (7,594 deaths), followed by Spain with 53 (24,543), Italy with 46 (27,967 deaths), the United Kingdom with 40 (26,771 deaths), and France with 36 (24,376 deaths). Merely a few weeks later, by Memorial Day, the U.S. death toll exceeded 97,000. The catastrophic loss of lives surmounts the battle deaths of 47,434 Americans during the Vietnam War and 33,739 Americans during the Korean War (Department of Veterans Affairs 2019).

Soon after the onset of the pandemic, it became apparent to most world leaders that drastic measures had to be taken. Predictions made by various experts (IHME 2020, Walker et al. 2020)—consulted by the U.S. Centers for Disease Control and Prevention (CDC) in March—projected that the virus eventually could reach 48% to 65% of all Americans and would kill up to 1.7 million of them if nothing were done to stop the spread. Therefore, after some hesitation in some cases, and greater determination in others, large-scale social distancing to prevent human-to-human transmission and shelter-in-place orders were deemed to be necessary to flatten the curve.[1] As workers got sick and operations were shut down, the global supply chain that feeds operations across the world is disrupted. Only essential business remains in operation. Stores, offices, and schools are mostly closed. Massive unemployment has ensued as a result.

There have been pandemics before, but perhaps this is the first pandemic where millions of organizations, large and small, in scores of countries, have suspended normal operations. Many organizations have adapted by shifting almost all human-to-human interactions online. Although businesses know that eventually the suppression of face-to-face interactions will be eased and then lifted, what they do not know is what kind of world will emerge. Will the economy return to business as usual? Will the new normal approximate the old normal? Even if it does, how long will it take? Should we even risk a rush to business as usual before an effective vaccine is widely available, considering that the rush may lead to a second wave of infections? We may contemplate normalcy, but when and how it will come is uncertain.

A return to normalcy, in whatever shape, involves a greater role for organizations. Almost 30 years ago, Perrow (1991) spoke of *The Society of Organizations* as the central reality of industrialized nations. In the decades that followed, dynamic entrepreneurs and efficient markets came to dominate political and media thinking. Formal organizations were seen as bureaucratic and far too slow to deal with crises. Conventional thinking maintained that effective management of crises required well-placed individuals temporarily organizing and mobilizing resources through informal networks. The 2008–2009 financial crisis should have reminded pundits that some crises were too big to be handled improvisationally and also that formal organizations, in that case central banks, certainly play a key role in battling crises. In the current crisis, there are numerous organizations that are involved: WHO, CDC, the health ministries of governments throughout the world, city governments, municipalities, and healthcare organizations. Organizations are involved in finding solutions to medical problems, producing, transporting, and distributing medical supplies while facing an ethical dilemma and a tense tradeoff between public health and economic well-being. By the time this crisis is over, we may reacquire Perrow's insight that formal organizations are central to our society.

Crisis Experience and the Knowledge-Action Gap

What useful knowledge can be translated from the studies of crisis experience to help organizations cope with and adapt to the COVID-19 challenges? To translate crisis experience into useful knowledge, we first characterize the features of the current crisis. The COVID-19 crisis, as described earlier, is a rare event with an impact of catastrophic magnitude. Longstanding rules are being debated for their relevance. Medical doctors' decision about intubation is a prime example of where the learning from previous experience may not apply in the current crisis. Doctors say the coronavirus is challenging the core tenets of medicine, leading some to abandon long-established ventilator protocols for certain patients (Dwyer 2020). However, other doctors warn this could be dangerous. Another example is the decree to wear facial masks. In the 1918 flu pandemic, not wearing a mask was illegal in some parts of America (French 2020). The experience from 1918 taught us the usefulness of wearing masks as a rule. Why is that rule not guiding our current action, and more generally, why do countries so often fall asleep at the switch?

David Ho, *Time*'s 1996 Man of the Year for his work on HIV, provides one answer. He suggests that funding dries up when the crisis is over and with it so does research interest. He points to the Severe Acute Respiratory Syndrome (SARS) epidemic as an example: "the SARS epidemic ended in July of 2003. By the next year, there was hardly any interest. Funding for that area kind of dried up. So we simply dropped it and went on with our H.I.V. work" (Hutson 2020). Politics undoubtedly also creates a knowledge-action gap. The alarms sounded by Gates (2015, 2020), Brilliant (2006), and Obama (2014) did not translate to preparedness. The Obama administration made pandemic preparations, but the Trump administration ignored them (Barr 2019, Rice 2020). Taiwan (Wang et al. 2020) and South Korea (Normile 2020) learned from prior epidemic outbreaks (SARS and Middle East Respiratory Syndrome (MERS)), and their response to the coronavirus is among the best globally; yet the knowledge

transfer and best practice adoption were slower to transmit to other countries than the coronavirus.

Four Types of Crisis Learning

Looking at the research on organizational learning leads us to propose four types of crisis learning: (1) strategic; (2) reflective; (3) collective; and (4) institutional. In this section, we discuss these four types, and in Table 1, we list 16 empirical studies on crisis learning from *Organization Science*: 4 articles under each type. The articles' research summary and takeaways are provided in Table 2. In the next section, we provide the interconnections among the articles under each type and present the key insights that could be useful for managing the current crisis.

Strategic Crisis Learning

Strategic learning from a crisis is organizational learning that is focused on the impact of the crisis on the relationship of the organization to the wider environment and on the problems that such crisis may cause to the products and services that the organization produces and markets. The knowledge that accumulates from strategic learning is the feedback that organizations gain from analyzing how a crisis emerged and what actions proved to be effective and ineffective. Strategic learning from crisis comes from the knowledge that organizations gain from their own experience and also from what they can learn from the experience of other organizations.

Crises tend to fall into categories, and the experience of the crises can translate into knowledge that organizations tend to use when facing the same type of crises in the future. Strategic learning is therefore often learning about types of crises that are specific to the industry. For example, the aircraft industry spends substantial resources on analyzing accidents and crashes. It is an important source of learning that it uses to improve aircraft design and operations. As another example, the banking sector has periodically confronted liquidity crises. When the financial crisis of 2008–2009 erupted, the strategic learning gained from previous banking crises was used by central banks to contain the crisis. However, because strategic learning depends on categorizing the crisis, it can also lead to strategic myopia. This can be seen from BP's experience with multiple accidents. In 2005, BP experienced a major accident in its Texas City refinery that killed 15 people (Blumenthal 2007). This was followed in 2006 by a five-day leak in the BP pipeline that released the largest amount of oil in the history of Alaska (Broder 2011). In 2010, BP Deepwater Horizon exploded, killing 11 people and spilling close to five million barrels of oil into the Gulf of Mexico (Beobert and Blossom 2016). From each accident, BP learned to improve safety, first in refining and then in pipeline operations. However, the learning was myopic and confined to specific divisions: refining and pipeline operations. BP did not understand that it had a deeper problem with a culture that sacrificed safety for profit (Mouawad 2010, Lustgarten 2012). By the time BP confronted the Deepwater Horizon oil platform disaster, it was too late.

The COVID-19 pandemic highlights the same tensions on a global scale. What is more, whereas COVID-19 decisions in the United States are made within a democratic system, COVID-19 decisions in one-party authoritarian states are dealt with by officials that lack

Table 1. Four Types of Crisis Learning

Crisis learning	Definition	Publications on crisis learning from *Organization Science*
Strategic	Strategic learning from a crisis is organizational learning that is focused on the impact of the crisis on the relationship of the organization to the wider environment and on the problems that such crisis may cause to the products and services that the organization produces and markets.	Dye et al. (2014) Madsen (2009) Baum and Dahlin (2007) Oetzel and Oh (2014)
Reflective	Reflective learning from a crisis triggers reflection right after the crisis, but it also has to translate into knowledge and new practices if it is to change the organization. Crisis reflection constitutes an audit of how the organization responds to crisis.	Christianson et al. (2009) Rerup (2009) Deichmann and van den Ende (2014) Haunschild et al. (2015)
Collective	Collective learning from a crisis often involves learning to coordinate crisis response. The learning involves reviewing the efforts postcrisis and deciding whether collective efforts should be transformed into permanent collective structures. Collective crisis learning also involves sense-making at the macro level that leads to reinterpretation of culture and key assumptions.	Greve and Yue (2017) Maslach et al. (2018) Beck and Plowman (2014) Quinn and Worline (2008)
Institutional	Institutional learning from a crisis can be formal or emergent. Formal learning entails deliberate postcrisis learning, commissioning research and setting up task forces to collect and analyze information. Emergent learning involves mostly incremental changes resulting from internal assessment and the reactions of external stakeholders.	Glynn (2000) Mintzberg (2001) Nigam and Ocasio (2010) Kaplan and Harrison (1993)

Table 2. Summary and Takeaways

Research questions and results summary	Insights from context
Crisis learning: Strategic	
When the outcome is uncertain, how does a decision maker take the views of stakeholders into account? Stakeholders such as elected officials have on their mind the safety of their constituency but also their own chances of being re-elected, which should not be part of the decision. Pressures exerted by stakeholders may produce nonsocially optimal outcomes.	Dye et al. (2014) study decision errors—both type I and type II (omission and commission, respectively)—in the context of whether and when to evacuate a community during the threat of a hurricane hitting land. The cost of the potential errors is vital to understanding how stakeholder opinions matter to decision makers. So are the stakeholders that differentially bear those costs and could withhold resources.
Does prior experience with disaster make organizations more capable of preventing future disasters? Do organizations learn from disasters experienced by other organizations? Do organizations learn differently from rare disasters than they do from common minor accidents? Organizations do learn to prevent future disasters. Organizations reduce their likelihood of future disaster through direct experience with disaster, direct experience with minor accidents, and vicarious experience with disaster.	Madsen (2009) examines organizational learning from disaster as a complex process that involves learning at the individual, organizational, and institutional levels. Using the context of fatal U.S. coal mining accidents from 1983 to 2006, he finds that organizations do learn to prevent future disasters. Organizations are found to reduce their likelihood of future disaster through direct experience with disaster, direct experience with minor accidents, and vicarious experience with disaster.
How are organizations' patterns of learning from experience influenced by aspiration-performance feedback gaps? What is the role of performance feedback in affecting organizations' attention to and balance between experiential and vicarious learning (their own vs. others' experience)? Learning from failure is essential to organizational learning and adaptation. Failure (performance away from aspirations) stimulates nonlocal search and exploration, whereas performance near aspirations fosters local search and exploitive learning.	Baum and Dahlin (2007) investigate the role of performance feedback in affecting organizations' attention to and balance between experiential and vicarious learning. In the context of U.S. class 1 freight railroads' accidents from 1975 to 2001, they find that, when a railroad's accident rate deviates from aspiration levels, the railroad benefits less from its own operating and accident experience and more from other railroads' operating and accident experiences. Failure (i.e., accident rate deviating from aspiration levels) stimulates nonlocal search and exploration, whereas performance near aspirations fosters local search and exploitative learning.
For multinational corporations' expansion, what is the role of firm experience with discontinuous risks, which are episodic occurrences that are often difficult to anticipate or predict, including terrorist attacks, natural disasters, and technological disasters? Experience with high-impact terrorist attacks as well as natural and technological disasters can be leveraged in expansions in an existing host country, but not for initial entry into other countries experiencing similar high-impact disasters.	Oetzel and Oh (2014) study the role of firm experience with discontinuous risks, which are episodic occurrences that are often difficult to anticipate or predict, including terrorist attacks, natural disasters, and technological disasters. In the context of multinational corporations' expansion, they find that experience with high-impact terrorist attacks can be leveraged in expansions in an existing host country, but not for initial entry into other countries experiencing similar high-impact disasters. They find that experience with natural and technological disasters can be similarly leveraged.
Crisis learning: Reflective	
How and what organizations might learn from rare events? Rare events audit existing response repertoires. Three organizing routines—interpreting, relating, and restructuring—are critical to both learning and responding because they update understanding and reduce the ambiguity generated during a rare event.	Christianson et al. (2009) ask what insights can be gained by viewing rare events as significant interruptions, exaggerations of a type of stimulus that organizations routinely encounter on a smaller scale? Their case study of the collapse of the roof of the Baltimore & Ohio Railroad Museum Roundhouse onto its collections during a snowstorm in 2003 as the museum was preparing for another rare event reveals that, "rare events provoke a reconsideration of organizational identity as the organization learns what it knows and who it is when it sees what it can do" (Christianson et al. 2009, p. 846). Rare events are interruptions that trigger learning because they expose weaknesses and reveal unrealized behavioral potential.

Table 2. (Continued)

Research questions and results summary	Insights from context
What are the structures and processes that organizations can enact to facilitate attention triangulation for learning from rare events? Attentional triangulation, which refers to the intersection of three interdependent dimensions of organizational attention (stability, vividness, and coherence), may help organizations identify potential threats from weak cues in their environment and prevent a crisis from reoccurring.	Rerup (2009) examines the structures and processes that organizations can enact to facilitate attention triangulation for learning from rare events. Using the case of Novo Nordisk, a world leader in diabetes care, which recovered and learned from an unexpected crisis in 1993, he finds that learning from a crisis involves understanding why the crisis occurred and developing organizational designs for preventing the crisis from reoccurring. A mock Food and Drug Administration (FDA) manufacturing audit revealed many product quality problems that Novo Nordisk risked losing its license to sell insulin in the United States. "Although there was nothing wrong with the quality of its insulin, Novo Nordisk was unable to document all the details of its manufacturing processes. As such, Novo Nordisk did not comply with the FDA's stricter enforcement of good manufacturing practices" (Rerup 2009, p. 880).
How do the successes and failures of people who initiate radical ideas influence (a) the inclination to take new personal initiatives and (b) the outcome of those initiatives? Failures, rather than successes, of initiators increase the likelihood of repeat initiative taking. Involving initiators with prior success in initiative taking has a positive effect on the outcome of a subsequent radical initiative.	Deichmann and van den Ende (2014) present an alternative view of how crises generate knowledge. They observe that involving initiators with prior success in initiative taking has a positive effect on the outcome of a subsequent radical initiative, based on the data of 1,792 radical ideas suggested by 908 employees in a multinational firm's idea and innovation program. However, failures, rather than successes, of initiators increase the likelihood of repeat initiative taking.
Why do organizations cycle through periods of learning and periods of forgetting? Organizations change over time as a result of their ability to learn and their tendency to forget. However, why might the organizations change back? That is, why do organizations cycle through periods of learning and periods of forgetting? A theory of organizational oscillation answers these questions.	Haunschild et al. (2015) submit that organizations oscillate between learning and forgetting because serious errors push them toward a focus on safety while also pulling them away from other foci, such as efficiency or innovation. Over time, the effect of a serious error on safety weakens, allowing alternative activities to emerge that lead to subsequent errors. The authors develop a theory of organizational oscillation based on qualitative data from the NASA's Challenger and Columbia accidents. The theory is tested using a data set of all pharmaceutical firms that introduced FDA-approved drugs in the United States from 1997 to 2004.
Crisis learning: Collective	
How does a crisis shape the reactions of organizations and other community members in coping with the next similar crisis? What is the long-term effect of community crises? Organizational memory carries past experience into the future.	Greve and Yue (2017) examine how a crisis shapes the reactions of organizations and other community members in coping with the next similar crisis. Organizational memory carries past experience into the future in the context of bank panics when depositors flock to banks to withdraw their savings. The solution that banks prefer for handling the subsequent crisis (the Panic of 1907) depends on whether the previous crisis 14 years earlier (the Panic of 1893) exposed a lack of trust among community members.
How can firms learn effectively from a repository of failure events? Organizations use information about the failure events of other firms to extract new valid knowledge.	Maslach et al. (2018) study how firms can learn effectively from a repository of failure events. As in the case of a public repository that accumulates reports of adverse events in the medical device industry—the Manufacturer and User Facility Device Experience (MAUDE) data set of the U.S. FDA, organizations learn from the collective failure events of other firms.
How do responders with limited or no history of working together and without a designated leader or existing structure collaborate across organizational boundaries on an unprecedented and complex undertaking? The actions of individual responders who showed up and started doing something put forces in play that contributed to trust, identity, and the success of an unplanned collaboration in the *Columbia* space shuttle disaster response effort.	Beck and Plowman (2014) investigate the actions of individual responders who showed up and started doing something in the *Columbia* space shuttle disaster response effort. In the context of the space shuttle *Columbia* breaking apart and falling from the sky, hundreds of emergency responders involving up to 25,000 individuals from more than 130 federal, state, local, and volunteer agencies transformed multiple, uncoordinated, localized responses into an interorganizational collaboration and successful response effort. In the midst of chaos, the transformation occurred without a plan or a designated leader. The actions of individual responders put forces in play that contributed to trust, identity, and the success of an unplanned collaboration.

Table 2. (Continued)

Research questions and results summary	Insights from context
What makes courageous collective action possible, in the face of unexpected, threatening, or fearful developments? The people in such situations face duress and must determine if and how they will engage in a collective response. By identifying narratives and resources that enable courageous collective action and the types of communicative actions that facilitate people's creation of these narratives and resources, we can improve our theoretical understanding of mobilizing collective action under duress, and of conditions that enable courageous action in organizations.	Quinn and Worline (2008) analyze the responses of the passengers and crew members aboard Flight 93. On September 11, 2001, the passengers and crew members responded courageously to the hijacking of their airplane by organizing a counterattack against the hijackers. To take courageous collective action, people need three narratives—a personal narrative that helps them understand who they are beyond the immediate situation and manage the intense emotions that accompany duress, a narrative that explains the duress that has been imposed upon them sufficiently to make moral and practical judgments about how to act, and a narrative of collective action—and the resources that make the creation of these narratives feasible.
Crisis learning: Institutional	
How is the construction of a cultural institution's identity related to the construction of strategic capabilities and resources? A cultural institution's identity shifts to the claims made by those who can resolve the crisis.	Glynn (2000) studies the relation between the construction of a cultural institution's identity and the construction of strategic capabilities and resources. Claims of organizational identity, made under organizational crisis, accounted for variations in the construction of strategic capabilities and resources. The process of constructing capabilities and resources is nonlinear, nonrational, and socially constructed, particularly under conditions of organizational crisis. Crises can prompt a shift in the perceived legitimacy of a professional group and its claimed ideology. In the context of the 1996 musicians' strike at the Atlanta Symphony Orchestra, the professional ideologies of musicians and administrators were at odds over the orchestra's allocation of resources (investment in artistry vs. cost containment). The organization's identity shifts to the claims made by those who can resolve the crisis.
How can refugee camps of 175,000 and 20,000 people, respectively, be managed to reduce human tragedy when there are risks of death and massacre? A civilized and coordinated response to human tragedy is the only option.	Mintzberg (2001) asks how can refugee camps of 175,000 and 20,000 people, respectively, be managed to reduce human tragedy when there are risks of death and massacre? Managing a refugee camp means running a municipality and more, including food distribution, sanitation, road construction and maintenance, housing, and healthcare. Managers' activities concentrate especially on communicating and controlling a chaotic situation in a steady state, at least temporarily given the unconventionally risky circumstance, in the context of Red Cross refugee camps in N'gara, Tanzania with 175,000 Rwandans and 20,000 Burundians.
How do events create opportunities for cognitive realignment and transformation in institutional logics? The cognitive realignment and transformation in institutional logics reflect a bottom-up process of environmental sense-making.	Nigam and Ocasio (2010) study the cognitive realignment and transformation in institutional logics. A bottom-up process of environmental sense-making led to the emergence and adoption of a logic of managed care. The managed care logic did not emerge in a fully formed fashion, in the context of Clinton's Healthcare Reform Initiative. The label "managed care," previously understood as a specific organizational form, took on a new meaning to symbolize the organizing principles for hospitals' relationships with a variety of institutional actors, as alternative models not congruent with the changing organizational field were abandoned.
How do corporations manage the adverse consequences of the changes in the legal environment such as those increasing the liability exposure of corporate directors? The changes in the legal environment changes resulted in increased liability exposure for directors and a crisis in director liability insurance. Corporations managed the crisis by making changes in board composition, director compensation, and board decision making structures and processes; by developing alternative forms of director liability insurance; and by lobbying for legislation providing greater liability protection for directors.	Kaplan and Harrison (1993) ask how corporations manage the adverse consequences of the changes in the legal environment such as those increasing the liability exposure of corporate directors. New legislation and regulations and a series of court decisions increased the extent to which directors are held accountable for their actions and those of their organizations. These changes resulted in increased liability exposure for directors and a crisis in director liability insurance, as the authors documented in the context of the director liability crisis of 1986.

democratic mandate. For example, in their study of officials deciding whether and when to evacuate a community during the threat of a hurricane hitting land, Dye et al. (2014) submit that stakeholder pressures may produce nonsocially optimal outcomes. In addition, the authors make it clear that experts rather than politically elected officials should make the decision whether to evacuate or not. Elected officials have on their mind the safety of their constituency but also their own chances of being re-elected, which should not be part of the decision.

If, as Dye et al. (2014) suggest, hurricanes test the ability of American state and local governments to balance competing interests, we can also see COVID-19 as a test that speaks to long-standing debates of the relative strengths and weaknesses of democratic versus authoritarian political systems in the midst of a crisis. In democratic systems, stakeholders may have greater influences on crisis decisions because they can exercise voice (directly) or exit (indirectly by abandoning their support for the elected officials in future elections). This influence, as Dye et al. suggest, can reduce the discretionary space which elected officials see as essential to dealing with the crisis. However, from a learning perspective, active involvement by stakeholders increases the legitimacy of the system. Knowing that their voice matters, stakeholders are more open to information disseminated by elected officials and more likely to adapt voluntarily. From the opposite perspective, elected officials are often overly concerned about the reaction of stakeholders to prediction errors. This was the case in October 2001 when Hurricane Irene was threatening Miami. The officials, who issued evacuation orders for two hurricanes earlier that turned into false alarms, were worried that the public would not follow a third evacuation order. In nondemocratic societies, legitimacy is more fragile. The strategies that officials use often reflect this fragility, hence the use of power to control information (Cohen 2020). Officials manipulate information to suit one crisis at the cost of legitimacy in the next. Based on an extrapolation of the evidence of Dye et al. evidence, our conjecture is that what stakeholders in authoritarian systems learn from past crises is to distrust what they are told. They may submit under duress to instructions from the top, but disempowerment also means less willingness to spontaneously organize to aid their fellow citizens. Furthermore, although stakeholders focus on learning the causal relations leading to a crisis in democratic systems, those in nondemocratic systems focus on learning how to manage within a dictatorial regime.

Reflective Crisis Learning

Crises are not only an opportunity to acquire knowledge that can be useful should the same type of crisis happen again, they are also moments of truth for the organization—moments where it is possible for members of the organization to see more clearly the strengths and the weaknesses of the organization. Crisis reflection constitutes an audit of how the organization responds to crisis. The audit can point to problems in strategy, supply chain, and product quality, but as in the case of BP, it can also point to hidden problems that often escape standard reviews; problems of leadership, communication, culture, and so on. A crisis tests resilience, thereby revealing capabilities that are not well known or clearly understood. Reflective crisis learning triggers right after the crisis, but it also has to translate into knowledge and new practices if it is to change the organization.

Most of the literature on crises presumes that crises are unintended disruption to normal activities, often resulting from the intrusion of outside rare natural events such as weather conditions (Perrow 1984), or because the complexity of the system exceeds managerial capabilities (Weick 1987). For instance, Christianson et al. (2009) focus on a natural event as a source of crisis learning, and ask what insights an organization can gain by viewing rare events as significant interruptions that magnify a stimulus that organizations routinely encounter on a smaller scale. Their case study examines how the Baltimore & Ohio Railroad Museum reacted to interruptions. The study examines organizational sensemaking of the collapse of the roof of the museum's Roundhouse onto its permanent collection during a snowstorm in 2003 as the museum was preparing for another rare event: a celebration of 175 years of American railroading.

By contrast, Deichmann and van den Ende (2014) present an alternative view of how crises generate knowledge. The authors examine learning from failures that are the result of deliberate actions and not responses to a natural event crisis. Their study suggests that when actors trigger crises, they are more open to learning. Innovations are more likely to be attempted by people who are intrinsically motivated, and intrinsically motivated people are more likely to learn. Entrepreneurial organizations that challenge the status quo and fail, thereby creating a crisis, are more likely to learn if failure does not dim their ambition to innovate. New aircrafts are often tested to the limit by manufacturers before they are certified. Decades-long learning has taught these companies how to probe for weak spots and how to learn from system failure.

Collective Crisis Learning

Crises may affect industries, sectors, economies, and societies. Crises at the macro-organizational level therefore generate collective and individual learning. Collective crisis learning often involves learning to

coordinate crisis response. This may run the gamut from collectively mobilizing resources, addressing legitimacy challenges, and setting up administrative structures to manage the crisis collectively. The learning involves reviewing the efforts postcrisis and deciding whether collective efforts should be transformed into permanent collective structures. Collective crisis learning also involves sense-making at the macro level that leads to reinterpretation of culture and key assumptions.

An example is the reactions of organizations and other community members in coping with the next similar crisis. In the context of bank panics when depositors flock to banks to withdraw their savings, Greve and Yue (2017) find that the solution that banks prefer for handling the subsequent crisis (the Panic of 1907) depends on whether the previous crisis 14 years earlier (the Panic of 1893) exposed a lack of trust among community members. Bank panics may appear very different from pandemics, hurricanes, or nuclear disasters such as Chernobyl that devastate entire regions, but community response plays a crucial role in all crises. Crises challenge social cohesion when sudden scarcity in such things as food or medical care create extreme inequality in resource access and allocation. Some people have the resources to buy food and obtain access to medical care, and others find that they do not. Sharing, or at least not hoarding, serves the entire community. However, this depends on trust. Communities with a reservoir of trust, often accumulated from tackling previous crises, are more likely to reduce this inequality. Many in Britain evoke the *Blitz spirit* when citizens formed orderly queues, people helped each other, and the black market was generally shunned, to remind the country that they can work together to defeat the current pandemic.

Collectives can take different directions. A collective can follow the reasoned decisions of a leader or, as in the context of the current crisis, a coalition of governors (Camp 2020). Yet, there are plenty examples of chaotic collective behavior, for instance, the herding behavior in stock markets (Venezia et al. 2011). A different example points to the role of tradition in learning. The Andaman people did not lose even one person to the great 2004 tsunami that hit Indonesia and islands in the northwestern part of the Indian Ocean and led to the death of a quarter of a million people. Their tradition passed on to generation after generation says if the sea goes back you have to run to the hills (Simon 2009).

Institutional Crisis Learning

Crises challenge and change institutions that underpin and regulate economic and social life. Formal institutions often engage in deliberate postcrisis learning, commissioning research, and setting up task forces to collect and analyze information. However, institutional self-preservation often leads institutional actors to craft narratives that defend institutional legitimacy. Efforts are often made to use learning to enhance the influence of the institution and to deflect blame for fail-ure to act preemptively. In most cases, however, institutional crisis learning is emergent, leading to incremental changes shaped by internal assessment and the reactions of external stakeholders.

An institution's identity may shift in response to claims made by the actors who can resolve the crisis; hence, the construction of organizational identity is related to the construction of strategic capabilities and resources (Glynn 2000). In resolving the crisis, the actors' activities concentrate especially on communicating and controlling a chaotic situation (Mintzberg 2001). A bottom-up process of environmental sensemaking may lead to the emergence of, and transformation in, institutional logics (Nigam and Ocasio 2010). When actors face adverse consequences that result from changes in the environment, they may respond by modifying their decision-making structures and processes, and engage in lobbying external stakeholders such as the government for protection (Kaplan and Harrison 1993).

Discussion and Paths Forward

In this section, we summarize key insights about organizational learning that could be useful for managing the current crisis based on the articles that we curate for the virtual special issue. Then we discuss more broadly several key issues that organizations should learn from the current crisis. Finally, we point to paths forward as future research directions.

Academic Research for Managing the Current Crisis

The academic research on crisis learning that we reviewed in the previous section uses several lenses for decision makers to consider in managing the current crisis: organizational memory, process-based learning, narrative, evidence-based learning, vigilant learning, uncertain learning, and forgetting.

Through the lens of organizational memory, a useful takeaway from academic research is that organizations learn from infrequent and even unique events in their memory. The analogy to human memory seems apt in this regard, but research points to a more complex picture. Baum and Dahlin (2007) inferred that U.S. freight railroads with higher accident rates tended to reduce their accident rates more quickly. When it comes to failure, railroads engage in efficient learning that recalls operant conditioning theory. However, this may be because as regulated entities they are legally required to report accidents. In many organizations, learning actors, rather than observers, control reporting internally as well as externally,

allowing them to take advantage of ambiguity. Starbuck (2009, p. 927) notes that "when it is unclear whether a sequence of events adds up to success or to failure, organization members try to manipulate interpretations to their own benefit." Rare events and organizations' responses are more likely to be subject to sense-making and storytelling that embed them into the organizational memory, forming the basis for organizations' response repertoire (Lampel et al. 2009).

Through the lens of process-based learning, significant interruptions are viewed as an audit of an organization's existing response repertoires—the stock of routines, habits, and roles that have been experienced, as well as the capability to recombine portions of the stock in novel ways. In the context of the Baltimore & Ohio Railroad Museum Roundhouse experiencing a series of significant interruptions over a period of approximately three years (e.g., the roof collapsing onto its collections), "the organization learns what it knows and who it is when it sees what it can do" (Christianson et al. 2009, p. 846). Organizing routines update understanding and reduce the ambiguity that is generated during significant interruptions.

Through the lens of narrative, mobilizing collective action under duress requires narratives, resources, and communicative actions in a world unsettled by globalization, political instability, terrorism, demographic transformation, and a business climate that is increasingly complex and dynamic (Quinn and Worline 2008). How did the passengers and crew members aboard Flight 93 organize a counterattack against the hijackers as a response to the hijacking of their airplane on September 11, 2001? Organizations and the people within them are more likely to engage in courageous collective action when they have three narratives—a personal narrative that helps them understand who they are beyond the immediate situation and manage the intense emotions that accompany duress, a narrative that explains the duress that has been imposed upon them sufficiently to make moral and practical judgments about how to act, and a narrative of collective action—and the resources that make the creation of these narratives feasible.

Through the lens of evidence-based learning, an organization's reluctance to accept the ramifications of the crisis is often linked to the cost of remedial actions. We see this today with debate of the cost to the economy of taking drastic measures to suppress the COVID-19 pandemic. Short-term cost aversion often stands in the way of accepting that it is better to spend today because the crisis when it erupts will be many times more costly. BP rewarded shareholders with profits generated by cost savings to operations. The savings dwarfed the losses that shareholders suffered after the Deepwater Horizon disaster. Similarly, NASA's decision not to attend seriously to the damage caused to the foam insulation from debris that hit the shuttle's wing led to the *Columbia* disaster in 2003 (Buljan and Shapira 2005).

Through the lens of vigilant learning, organizations require understanding of causal relationships to generate reliable and valid knowledge. Attending to weak cues is one way to collect data on potential or actual causes (Rerup 2009). Attentional triangulation, which refers to the combination of the three different dimensions of attention to comprehend the same issue with greater clarity and depth, proactively identifies, pinpoints, or isolates issues that can evolve into events that are potentially consequential. Another way to collect data is to assemble a repository of failure events that might ordinarily be dismissed as noise (Maslach et al. 2018). Vigilant learning can emerge from studying the failure events and identifying possibilities that the organization had not considered.

Through the lens of uncertain learning, prior beliefs influence how organizations read the data. A recurring example is exemplified previously by the fact that false alarms in hurricane evacuations lead to aversion to call another evacuation, which can lead to disastrous outcomes. This was the case with Hurricane Andrew that hit south Florida in 1992 and was one of the most destructive hurricanes until then. Residents who did not follow the call for evacuation said that there were many such calls before that ended as *cry wolf* so they decided not to evacuate.

Another example is global warming, which illustrates the influence of prior beliefs on willingness to act. Those accepting the evidence of warming have argued that small actions taken immediately could slow the rate of change and moderate changes that might otherwise become necessary later. "Action taken now to reduce significantly the build-up of greenhouse gases in the atmosphere will lessen the magnitude and rate of climate change" (Joint Science Academies 2005, p. 1). Cautious action is a logical reaction to awareness that perceptions are moot or that data are unreliable. As well, people experiencing unexpected shifts in their environments are unsure whether shifts will persist or what actions make sense. Cautious action is also a logical reaction to awareness that inappropriate actions might trigger catastrophe.

> Reactions of various people to global warming suggest a link between causal attributions and willingness to take action. People who think human behavior contributes significantly to global warming advocate taking prompt action to modify problematic behavior. People who doubt that human behavior contributes significantly to global warming advocate gathering more information before taking action. (Starbuck 2009, p. 934)

Through the lens of forgetting, organizational learning declines after crises. Forgetting is part of learning (going back to normal):

> In general, error-free periods tend to be interpreted as an indication that a problem has been solved and resources can be reallocated away from safety.... In actuality, NASA was fortunate that foam strikes never hit a critical part of a shuttle before *Columbia*, yet the role of luck in error-free periods tends to be systematically underestimated. (Haunschild et al. 2015, pp. 1686–1687)

In the aftermath of a crisis, resources are allocated to analyzing and deriving lessons. Yet, despite the attention paid to these lessons, and steps taken to implement these lessons, the knowledge acquired dissipates over time. All too often, when a similar crisis emerges, the structures and strategies devised in the wake of previous crises prove ineffective; either because they have been systematically neglected or because decision makers are reluctant to use them. Broadly speaking, as Haunschild et al. point out, decision makers are also prone to seeing lucky escapes as indicating that they have mastered the crisis. In effect, decision makers become overconfident.

The successful management of the Texas Ebola contamination in 2014 may have engendered confidence that the United States could handle transcontinental epidemics. However, luck had much to do with this success. It is interesting that learning from past crises does not decline as much when the crisis is the result of actions of adversaries, whether sovereign states or groups. Responding to crises that are caused by failure of technological systems or climatic forces can be seen as playing a game against nature. In a game against nature, actors can assume that their actions do not generate information that the other side in the game can use to mount a more effective attack. This is not the case in games between rational actors, where action and reaction are coevolutionary. For this reason, at least when it comes to international crises, the learning generated by one crisis is not forgotten because actors know that the other side has *upped their game*. Although we cannot say that hurricanes up their game, medical measures do affect the ways in which viruses evolve. Therefore, when it comes to fighting future pandemics, it may well be that we will have to learn more from how countries use lessons from past crises to forecast and prepare for the next, rather than assume that past knowledge is adequate.

What Organizations Should Learn from the Current Crisis

More broadly, what should organizations learn from the current crisis? What could have been done differently regarding early detection and rapid response (diagnostic testing, contact tracing, and preventing shortages in medical equipment)? Three key issues stand out based on the features of the current crisis: (1) learn to imitate; (2) learn from experts; and (3) communicate using science.

Learn to Imitate. Innovations get the headlines, but during a crisis, imitation—learning from others—is often the best initial response. When the effectiveness of practices is uncertain (e.g., issuing a decree to wear facial masks when there is a shortage of masks) and the practices are interdependent (e.g., store managers ask shoppers to wear facial masks and impose social distancing), organizations (stores, cities, counties, states, countries) face the decision of how much to copy from practices used elsewhere. Should a country follow the example of New Zealand, where lockdown was strictly imposed, or Sweden, where lockdown was not practiced? If a country decided to borrow strategies from each example, how much should it borrow?

Csaszar and Siggelkow (2010) developed a simulation model to explore what is an effective breadth of imitation. The results of their model highlight that imitation can serve two different functions: (1) mimicking high performers and (2) generating search by dislodging a firm from its current set of practices. Each function requires different organizational routines for its successful implementation. In the presence of many interactions among practices, should a firm attempt to copy very few, some, or many practices of a high-performing firm that operates in a similar business context? How would the answer to this question change as the time horizon shrinks, or as the similarity in business context decreases? Giachetti et al. (2017) examine imitation scope and speed in Red Queen competition. To keep up with a rapidly changing market, organizations imitate product features that their rivals have already introduced. Giachetti et al. (2017) find that firms respond to imitation scope more than imitation speed. Crises that resemble Red Queen competition imply competition for a diminishing, or insufficiently increasing, pool of resources. History records many sieges and famines where people and governments competed for resources, imitating each other's predatory tactics. Sadly, we saw some of this during the current crisis when governments competed for medical supplies in the world market, sometimes paying suppliers to divert promised deliveries. Red Queen can be stopped if organizations and governments decide to cooperate, sharing resources rather than trying to grab as many for themselves as they can.

If you are going to imitate, goes the popular saying, imitate the best. Giachetti and Lampel (2010) point to market leader as a reference point. In a crisis, countries borrow solutions they regard in high esteem.

The United States has long occupied this position: Internationally countries often looked to the United States for disaster mitigation solutions. In the current crisis, however, the United States has not provided a leadership model. Instead, countries such as South Korea and Singapore who have rolled out a range of solutions have been widely imitated, particularly in East Asia. One example is a technological solution—digital contact tracing—for collecting data on the virus's progress and the efforts to contain it including tracking those who are infected and their contacts (Huang et al. 2020). It seems that learning from others in a crisis also requires learning to pick the organization from which it is best to learn.

Learn from Experts. Our forefathers prayed for divine intervention during a crisis. In contrast, modern societies turn to science. In 1932, faced with the worst depression in American history, Democratic candidate and future president, Franklin Roosevelt, assembled a group of experts that came to be known as the *brain trust*. The brain trust played a major role in forming policies to deal with the Great Depression, and the idea was picked up by later presidents such as Kennedy and Obama. It also created a template for such institutions as the Council for Economic Advisors that today operates within the Executive Office of the President. For much of the postwar period, expertise was valued and respected, but starting in the 1960s and increasingly in the following decades, expertise became suspect. Critics seized on mistakes and poor judgement to argue that experts often lacked the knowledge they claimed or that they were biased and motivated by self-interest. This was summed up by Michael Gove, British Minister of Justice, who stated bluntly during the 2016 Brexit debate (Farrar 2017, Portes 2017) that people "have had enough of experts, [enough of] people from organizations with acronyms saying that they know what is best and getting it consistently wrong." It may well be that this distrust of experts is one of the reasons that the UK government ignored a report by experts in 2019 that warned of the potential of a coronavirus outbreak and laid out a detailed list of critical concerns that required attention and advanced planning (Hopkins 2020).

Communicate Using Science. To some extent, discounting expert advice reflects an on-and-off relationship between governments and experts. When a crisis hits, experts are called in to provide answers. Decision makers prefer certainty in the answers that experts provide. However, as Fischhoff and Davis (2014, p. 13664) point out, "All science has uncertainty." Unless that uncertainty is communicated effectively, decision makers may put too much or too little faith in advice given. One example is the scientific evidence about the COVID-19 being much more devastating than the flu in terms of transmission rate, infection fatality ratio, and human suffering from severe symptoms. A major issue facing leaders in the current COVID-19 crisis is how to communicate the scientific aspects of the pandemic and the risks involved with premature opening of the economy—in particular to people who disregard science and are in dire economic situation. Opening the economy involves uncertainties that can be described as error of commission (premature opening) on the one hand and error of omission (delaying the opening too much) on the other hand. The delicate task of pitting one against the other is very difficult, and future research should focus on communicating scientific facts and the risks involved in decisions during crises such as pandemics (Fischhoff and Davis 2014).

Experts use learning from past crises to generate knowledge that prevents future crises and to propose best courses of action if prevention fails. The role of science, however, has diminished in policy making and regulatory decisions before the pandemic erupted. Governments often balk at the cost of acting on scientific advice before a crisis. When there is no crisis, political decision makers are less responsive (Dror 1986, Wildavsky 1987). As Peter Daszak, who directs the pandemic-prevention group EcoHealth Alliance and is also chairman of the Forum on Microbial Threats at the National Academies of Sciences, Engineering and Medicine, stated "The problem isn't that prevention was impossible. It was very possible. But we didn't do it. Governments thought it was too expensive" (Kahn 2020). Governments have to weigh the cost of prevention, and sometimes they get it wrong. What is more alarming, as Plumer and Davenport (2019) extensively document, is the blatant disregard to expertise based on catering to business interests in the name of economic growth.

Paths Forward

The research in this VSI explores how organizations learn from crises. Although for theoretical and empirical convenience, we can say that organizations learn from crises, closer examination suggests that the picture is incomplete unless researchers take into account the role that individuals play in how organizations respond and learn from crises. The obvious place to start is with leaders, the most visible members of organizations, and often the most consequential during a crisis (James et al. 2011). The leader's framing of the crisis can have decisive influence on the resilience of people in the rest of the organization (Boin and 't Hart 2003). This involves stark choices: Should the leader report the unvarnished truth, even when things are bleak, or should the leader strike an upbeat note, reassuring everybody that all is going well

(Allen and Caillout 1994). Winston Churchill asked parliament for a vote of confidence, telling them that he had nothing to offer but "blood, toil, tears and sweat." He got the vote of confidence and the support of the British people during the dark days that followed. On the other hand, an upbeat overview of the crisis can lift morale and energize effort. However, this can be risky and is often overdone if it contradicts reality. In the current crisis, leaders that have painted a rosy picture and raised unrealistic expectations of *victory around the corner* may have boosted optimism temporarily, but if events do not comply, this may create confusion and anger (Brooks 2020).

For most of human history, leadership during a crisis meant male leadership. During this crisis, we have, for the first time, a sufficient number of women in position of national leadership to study the role of gender in the link between how leaders behave and what differences leaders make (Brandert and Matkin 2019). The sample size is small. We have female leaders in 12 countries, including Germany, New Zealand, Denmark, and Taiwan. A small sample to be sure, but it is noteworthy that, although we can point to male leaders in countries that have performed well, their proportion in the total number of countries led by men is much smaller than in the sample of countries led by women. An analysis of the crisis management and performance of countries that are led by women points to effective action and good outcomes (Chamorro-Premuzic 2020, Henley and Roy 2020, PBS NewsHour 2020b, Wittenberg-Cox 2020). We have different explanations for why this is the case that are not mutually exclusive. Psychological traits such as empathy and putting health above economic considerations stand out, but so do societal factors such as greater equality between men and women.

Leaders in a crisis matter not only in what they say or do, but also in how they work with the rest of the organization. This often starts before the crisis is full blown. Front-line employees and middle managers are often the first to notice an impending crisis (Maitlis and Sonenshein 2010). They may feel compelled to alert leadership that normal business is no longer possible, but they may also be aware that the news they bring could fall on deaf ears or may even bring retribution. Whistleblowers, such as Dr. Li Wenliang, who tried to warn his medical colleagues in Wuhan that a SARS-like virus is rapidly spreading and was then forced to recant by the police, caught the world's attention (Davidson 2020, Green 2020). The resulting delay in taking action was devastating for Wuhan as it proved to be for the rest of the world. Another whistleblower, Dr. Rick Bright, who is a vaccine expert and served as director of the Biomedical Advanced Research and Development Authority in charge of developing measures to help guard against infectious threats and securing vital supplies, testified to the U.S. House Energy and Commerce subcommittee that the Trump administration was mishandling the response to the coronavirus pandemic (Norwood 2020, O'Donnell 2020, PBS NewsHour 2020a). Dr. Bright was removed from his director position, a decision he believes was retaliation for his pushing back on the administration's virus response strategies, including the president's support of the unproven use of an antimalarial drug, hydroxychloroquine, to treat the illness (Bright 2020). The early warnings made by Dr. Bright went *unheeded*, as argued by Stolberg (2020) in her description of the whistleblower's testimony to lawmakers.

The repression of whistleblowers is often a symptom of the need of leaders to exercise total control. During a crisis, exercising total control slows down the ability of organizations to respond as people at lower levels of the organization wait for instructions rather than exercise initiative. The great divide during the COVID-19 pandemic is between organizations where the leadership insists on control and those where leadership welcomes ideas and encourages initiative. This extends to top management listening to members of the organization that notice and correctly interpret the disruptive potential of the crisis. Such was the case when James Allard and Steven Sinofsky, two engineers at Microsoft, tried to get Bill Gates and Steve Ballmer's attention to the potential disruption of the Internet to Microsoft's business while Gates was completely focused on Windows 95 (Rebello 1996). As the examples of Dr. Li Wenliang in China and Dr. Rick Bright in the U.S. demonstrate, expert assessments that provide early warnings are not always welcomed by top echelons. Much depends on where the experts are located relative to the decision makers. Green and Shapira (2018) model the process of how sensing by individuals at the frontier of the crisis can get to the higher-level decision makers and how different organizational structures may delay or facilitate getting the information to the attention of the decision makers and eventually lead to errors of commission or omission.

During the COVID-19 crisis, as in many previous crises, resilience, the "idea of bouncing back while sustaining a sense of purpose" (Lampel et al. 2019, p. 5), very much depends on the flexibility and creativity of the organization. Companies that exhibit flexibility and tap creativity are more likely to survive and prosper after the crisis. What caught many observers by surprise is the extent to which companies across the world retooled and reorganized to produce much needed medical supplies during the crisis (Davies and O'Carroll 2020). Perfume makers and alcohol distillers switched to producing hand sanitizers (Calagione 2020, Levenson 2020); engineering firms started to produce ventilators (Fryer 2020); and fashion and clothing companies have reorganized to produce surgical masks

and hospital gowns (Davies and O'Carroll 2020). The willingness to voluntarily respond to social needs runs counter to much of the criticism that companies have endured in the past few decades. This VSI examines research that looks at how organizations learn from crisis, and how they put this learning to use. However, it is possible to argue that during a crisis, organizations also realize that they are part of society, with a responsibility to society. This is a type of learning that fits with collective and institutional learning and to some extent with reflective and strategic learning. What would be useful for organizations and society to learn is why and how companies that are normally so focused on profit act on their social responsibility beyond the call of duty during a crisis. There is little doubt that this will occupy organizational researchers for a long time to come. As the VSI facilitates research on learning from and about the challenges created by the crisis, and points to new research directions, we encourage more submissions to *Organization Science*.

Acknowledgements

The authors thank Editor-in-Chief Gautam Ahuja for his guidance on the virtual special issue, and two anonymous reviewers for their valuable feedback.

Endnote

[1] The curve refers to an epidemic curve that is commonly used to visualize responses to disease outbreaks and illustrate why public and individual efforts to contain the spread of the virus are crucial. The phrase *flatten the curve*, a somewhat counterintuitive notion that a longer outbreak can be easier to handle, means to slow down the infection rate so the healthcare system can adequately take care of people. Interventions that slow down the natural flow of the outbreak give us time to respond.

References

*marks the nineteen articles from *Organization Science* publications for the Virtual Special Issue.

Allen MW, Caillout RH (1994) Legitimation endeavors: Impression management strategies used by an organization in crisis. *Comm. Monographs* 61(1):44–63.

Barr AC (2019) Advisory notice: USAID's Response to the Ebola Virus Disease Outbreak in the Democratic Republic of the Congo. Accessed April 26, 2020, https://oig.usaid.gov/sites/default/files/2019-09/USAID%27s%20Response%20to%20the%20Ebola%20Virus%20Disease%20Outbreak%20in%20the%20DRC.pdf.

*Baum J, Dahlin K (2007) Aspiration performance and railroads' patterns of learning from train wrecks and crashes. *Organ. Sci.* 18(3):368–385.

*Beck TE, Plowman DA (2014) Temporary, emergent interorganizational collaboration in unexpected circumstances: A study of the Columbia space shuttle response effort. *Organ. Sci.* 25(4):1234–1252.

Beobert K, Blossom JM (2016) *Deepwater Horizon: A System Analysis of the Macondo Disaster* (Harvard University Press, Cambridge, MA).

Blumenthal R (2007) Company deficiencies blamed in 2005 Texas explosion. *New York Times* (March 21), https://www.nytimes.com/2007/03/21/us/21explode.html.

Bright R (2020) U.S. Office of Special Counsel Complaint and Disclosure Form. Accessed May 15, 2020, https://d3i6fh83elv35t.cloudfront.net/static/2020/05/R.-Bright-OSC-Complaint_Redacted.pdf.

Boin A, 't Hart P (2003) Public leadership in times of crisis: Mission impossible? *Public Admin. Rev.* 63(5):544–553.

Brandert K, Matkin GS (2019) When the crisis is personal: A phenomenological study of women in leadership. *J. Leadership Stud.* 13(3):56–61.

Brilliant L (2006) My wish: Help me stop pandemics. Accessed April 26, 2020, https://www.ted.com/talks/larry_brilliant_a_global_pandemic_calls_for_global_solutions.

Broder JM (2011) BP is fined $25 million for '06 spills at pipelines. *New York Times* (May 3) https://www.nytimes.com/2011/05/04/science/earth/04pipeline.html?searchResultPosition=1.

Brooks D (2020) How to survive the Blitz: Five lessons from 1940s Britain about national resilience and social solidarity during a crisis. *The Atlantic* (March 29), https://www.theatlantic.com/ideas/archive/2020/03/virus-and-blitz/608965/.

Buljan A, Shapira Z (2005) Attention to production schedule and safety as determinants of risk-taking in NASA's decision to launch the Columbia shuttle. Starbuck WH, Farjoun M, eds. *Organization at the Limit: Lessons from the Columbia Disaster* (Blackwell Publishing, Oxford, UK), 140–156.

Calagione S (2020) Craft-brewed hand sanitizer. *New York Times* (April 8), https://www.nytimes.com/2020/04/08/opinion/dogfish-head-hand-sanitizer-coronavirus.html.

Camp B (2020) States unite on reopening economies: 'Science—not politics—will guide' decisions. *National Public Radio* (April 13), https://www.npr.org/sections/coronavirus-live-updates/2020/04/13/833662246/states-unite-on-reopening-economies-science-not-politics-will-guide-decisions?utm_medium=RSS&utm_campaign=business.

Chamorro-Premuzic T (2020) Are women better at managing the Covid19 pandemic? *Forbes* (April 10), https://www.forbes.com/sites/tomaspremuzic/2020/04/10/are-female-leaders-better-at-managing-the-covid19-pandemic/#7e09db328d41.

*Christianson MK, Farkas MT, Sutcliffe KM, Weick KE (2009) Learning through rare events: Significant interruptions at the Baltimore & Ohio railroad museum. *Organ. Sci.* 20(5):846–860.

Cohen J (2020) Coronavirus under authoritarian rule: The wacky, the in denial, the problematic. *Forbes* (April 3), https://www.forbes.com/sites/joshuacohen/2020/04/03/coronavirus-under-authoritarian-rule-the-wacky-the-in-denial-the-problematic/#38215a66f4c1.

Coronavirus Map (2020) Tracking the global outbreak. Accessed April 30, 2020, https://www.nytimes.com/interactive/2020/world/coronavirus-maps.html?action=click&pgtype=Article&state=default&module=styln-coronavirus&variant=show&region=TOP_BANNER&context=storyline_menu.

*Csaszar FA, Siggelkow N (2010) How much to copy? Determinants of effective imitation breadth. *Organ. Sci.* 21(3):661–676.

Davidson H (2020) Chinese inquiry exonerates coronavirus whistleblower doctor. *Guardian* (March 20), https://www.theguardian.com/world/2020/mar/20/chinese-inquiry-exonerates-coronavirus-whistleblower-doctor-li-wenliang.

Davies R, O'Carroll L (2020) Europe's companies retool production to fight coronavirus fallout. *Guardian* (March 21), https://www.theguardian.com/business/2020/mar/21/europes-companies-retool-production-to-fight-coronavirus-fallout.

*Deichmann D, van den Ende J (2014) Rising from failure and learning from success: The role of past experience in radical initiative taking. *Organ. Sci.* 25(3):670–690.

Department of Veterans Affairs (2019) America's wars fact sheet, Nov. 2019. Accessed May 23, 2020, https://www.va.gov/opa/publications/factsheets/fs_americas_wars.pdf.

Dror Y (1986) *Policymaking Under Adversity* (Transaction Publishers, New York).

Dwyer J (2020) What doctors on the front lines wish they'd known a month ago. *New York Times* (April 15), https://www.nytimes.com/2020/04/14/nyregion/new-york-coronavirus.html?campaign_id=9&emc=edit_NN_p_20200414&instance_id=17621&nl=morning-briefing&regi_id=70072568&section=longRead&segment_id=25091&te=1&user_id=57b40724b5205ba6fea5e0d921716c23.

*Dye K, Eggers JP, Shapira Z (2014) Trade-offs in a tempest: Stakeholder influence on hurricane evacuation decisions. *Organ. Sci.* 25(4):1009–1025.

Farrar T (2017) Michael Gove on the trouble with experts. *Chatham House* (March 3) https://www.chathamhouse.org/expert/comment/michael-gove-trouble-experts.

Fischhoff B, Davis AL (2014) Communicating scientific uncertainty. *Proc. National Acad. Sci. USA* 111(suppl 4):13664–13671.

French P (2020) In the 1918 flu pandemic, not wearing a mask was illegal in some parts of America. What changed? *CNN* (April 4), https://www.cnn.com/2020/04/03/americas/flu-america-1918-masks-intl-hnk/index.html.

Fryer J (2020) NASCAR industry steps up to produce PPE's in COVID-19 crisis. *Associated Press* (March 31), https://apnews.com/39a52c310b307f43db1a0e2f8434eeb9.

Gates B (2015) The next outbreak? We're not ready. Accessed March 31, 2020, https://www.ted.com/talks/bill_gates_the_next_outbreak_we_re_not_ready?language=dz.

Gates B (2020) How we must respond to the coronavirus pandemic. Accessed March 31, 2020, https://www.ted.com/talks/bill_gates_how_we_must_respond_to_the_coronavirus_pandemic.

Giachetti C, Lampel J (2010) Keeping both eyes on the competition: Strategic adjustment to multiple targets in the UK mobile phone industry. *Strategic Organ.* 8(4):347–376.

Giachetti C, Lampel J, Li Pira S (2017) Red queen competitive imitation in the UK mobile phone industry. *Acad. Management J.* 60(6):1882–1914.

*Glynn MA (2000) When cymbals become symbols: Conflict over organizational identity within a symphony orchestra. *Organ. Sci.* 11(3):285–298.

Green A (2020) Li Wenliang obituary. *Lancet* 395(10225):682.

Green E, Shapira Z (2018) Hierarchical sensing and strategic decision-making. *Adv. Strategic Management* 39:123–138.

*Greve HR, Yue LQ (2017) Hereafter: How crises shape communities through learning and institutional legacies. *Organ. Sci.* 28(6):1098–1114.

*Haunschild PR, Polidoro F Jr, Chandler D (2015) Organizational oscillation between learning and forgetting: The dual role of serious errors. *Organ. Sci.* 26(6):1682–1701.

Henley J, Roy EA (2020) Are female leaders more successful at managing the coronavirus crisis? *Guardian* (April 25), https://www.theguardian.com/world/2020/apr/25/why-do-female-leaders-seem-to-be-more-successful-at-managing-the-coronavirus-crisis.

Hopkins N (2020) Revealed: UK ministers were warned last year of risks of coronavirus pandemic. *Guardian* (April 24), https://www.theguardian.com/world/2020/apr/24/revealed-uk-ministers-were-warned-last-year-of-risks-of-coronavirus-pandemic.

Huang Y, Sun M, Sui Y (2020) How digital contact tracing slowed COVID-19 in East Asia. *Harvard Bus. Rev.* (April 15), https://hbr.org/2020/04/how-digital-contact-tracing-slowed-covid-19-in-east-asia.

Hutson M (2020) The quest for a pandemic pill: Can we prepare antivirals to combat the next global crisis? *New Yorker Magazine* (April 6), https://www.newyorker.com/magazine/2020/04/13/the-quest-for-a-pandemic-pill.

IHME (2020) Forecasting the impact of the first wave of the COVID-19 pandemic on hospital demand and deaths for the USA and European Economic Area countries. Accessed April 26, 2020, https://covid19.healthdata.org/united-states-of-america.

James EH, Wooten LP, Dushek K (2011) Crisis management: Informing a new leadership research agenda. *Acad. Management Ann.* 5(1):455–493.

Joint Science Academies (2005) Joint Science Academies' statement: Global response to climate change. Joint statement by the academies of science of Brazil, Canada, China, France, Germany, India, Italy, Japan, Russia, United Kingdom, and United States of America. Accessed April 30, 2020, https://www.academie-sciences.fr/archivage_site/activite/rapport/avis0605a_gb.pdf.

Kahn K (2020) How scientists could stop the next pandemic before it starts. *New York Times Magazine* (April 21), https://www.nytimes.com/2020/04/21/magazine/pandemic-vaccine.html?action=click&module=RelatedLinks&pgtype=Article.

*Kaplan MR, Harrison JR (1993) Defusing the director liability crisis: The strategic management of legal threats. *Organ. Sci.* 4(3):412–432.

Lampel J, Banerjee A, Bhalla A (2019) *The Resilient Decision-Maker* (Lioncrest Publishing, Austin, TX).

*Lampel J, Shamsie J, Shapira Z (2009) Experiencing the improbable: Rare events and organizational learning. *Organ. Sci.* 20(5):835–845.

Levenson M (2020) Anheuser-Busch and distilleries race to make hand sanitizer amid coronavirus pandemic. *New York Times* (March 19), https://www.nytimes.com/2020/03/19/us/distilleries-virus-hand-sanitizer.html.

Lustgarten A (2012) *Run to Failure: BP and the Making of the Deepwater Horizon Disaster* (W. W. Norton & Co. New York).

*Madsen PM (2009) These lives will not be lost in vain: Organizational learning from disaster in US coal mining. *Organ. Sci.* 20(5):861–875.

Maitlis S, Sonenshein S (2010) Sensemaking in crisis and change: inspiration and insights from Weick (1988). *J. Management Stud.* 47:551–580.

*Maslach D, Branzei O, Rerup C, Zbaracki MJ (2018) Noise as signal in learning from rare events. *Organ. Sci.* 29(2):225–246.

*Mintzberg H (2001) Managing exceptionally. *Organ. Sci.* 12(6):759–771.

Mouawad J (2010) For BP, a history of spills and safety lapses. *New York Times* (May 8), https://www.nytimes.com/2010/05/09/business/09bp.html?searchResultPosition=1.

*Nigam A, Ocasio W (2010) Event attention, environmental sensemaking, and change in institutional logics: An inductive analysis of the effects of public attention to Clinton's healthcare reform Initiative. *Organ. Sci.* 21(4):823–841.

Normile D (2020) Coronavirus cases have dropped sharply in South Korea. What's the secret to its success? *Science Magazine* (March 17), https://www.sciencemag.org/news/2020/03/coronavirus-cases-have-dropped-sharply-south-korea-whats-secret-its-success.

Norwood C (2020) Key moments from HHS whistleblower Rick Bright's testimony on coronavirus response. *PBS NewsHour* (May 14), https://www.pbs.org/newshour/politics/key-moments-from-hhs-whistleblower-rick-brights-testimony-on-coronavirus-response.

Obama B (2014) President Obama speaks on the fight against Ebola. Accessed April 10, 2020, https://obamawhitehouse.archives.gov/photos-and-video/video/2014/12/02/president-obama-speaks-fight-against-ebola.

O'Donnell N (2020) The government whistleblower who says the Trump administration's coronavirus response has cost lives. *CBS News* (May 18), https://www.cbsnews.com/news/rick-bright-whistleblower-trump-administration-coronavirus-pandemic-response/.

*Oetzel JM, Oh CH (2014) Learning to carry the cat by the tail: Firm experience, disasters, and multinational subsidiary entry and expansion. *Organ. Sci.* 25(3):732–756.

PBS NewsHour (2020a) What vaccine expert Rick Bright said about the government's pandemic response (May 14) Accessed May 14, 2020 https://www.youtube.com/watch?v=gN1G96cxdo8.

PBS NewsHour (2020b) Why have Australia and New Zealand been so successful at managing COVID-19? Accessed April 28, 2020, https://www.youtube.com/watch?v=aVFeuoicxR8.

Perrow C (1984) *Normal Accidents: Living with High-Risk Technologies* (Basic Books, New York).

Perrow C (1991) A society of organizations. *Theory Soc.* 20(6):725–762.

Plumer B, Davenport D (2019) Science under attack: How Trump is sidelining researchers and their work. *New York Times* (December 28), https://www.nytimes.com/2019/12/28/climate/trump-administration-war-on-science.html.

Portes R (2017) "I think the people of this country have had enough of experts." *Think at London Business School* (May 9), https://www.london.edu/think/who-needs-experts.

*Quinn RW, Worline MC (2008) Enabling courageous collective action: Conversations from United Airlines Flight 93. *Organ. Sci.* 19(4):497–516.

Rebello K (1996) Inside Microsoft: The untold story of how the Internet forced Bill Gates to reverse course. *Bloomberg* (July 15), https://www.bloomberg.com/news/articles/1996-07-14/inside-microsoft.

*Rerup C (2009) Attentional triangulation: Learning from unexpected rare crises. *Organ. Sci.* 20(5):876–893.

Rice S (2020) Trump is the wartime president we have (not the one we need). *New York Times* (April 7), https://www.nytimes.com/2020/04/07/opinion/trump-coronavirus-us.html.

Simon B (2009) The Moken people. *60 Minutes* (October 1), https://www.facebook.com/60minutes/videos/163657995694/.

*Starbuck WH (2009) Perspective-cognitive reactions to rare events: Perceptions, uncertainty, and learning. *Organ. Sci.* 20(5):925–937.

Stolberg SG (2020) 'Lives were lost' as warnings went unheeded, whistle-blower tells House. *New York Times* (May 14), https://www.nytimes.com/2020/05/14/us/politics/whistle-blower-coronavirus-trump.html.

Venezia I, Nashikar A, Shapira Z (2011) Firm specific and macro herding by professional and amateur investors and their effects on market volatility. *J. Banking Finance* 35:1599–1609.

Wang CJ, Ng CY, Brook RH (2020) Response to COVID-19 in Taiwan: Big data analytics, new technology, and proactive testing. *JAMA* 323(14):1341–1342.

Walker PGT, Whittaker C, Watson O, Baguelin M, Ainslie KEC, Bhata S, Bhatt S, et al (2020) Report 12: The global impact of COVID-19 and strategies for mitigation and suppression. Accessed March 26, 2020, https://www.imperial.ac.uk/mrc-global-infectious-disease-analysis/covid-19/report-12-global-impact-covid-19/.

Weick KE (1987) Organization culture as a source of high reliability. *California Management Rev.* 28:112–127.

Wildavsky A (1987) *Speaking Truth to Power* (Transaction Publishers, New Brunswick, NJ).

Wittenberg-Cox A (2020) What do countries with the best coronavirus responses have in common? Women leaders. *Forbes* (April 13), https://www.forbes.com/sites/avivahwittenbergcox/2020/04/13/what-do-countries-with-the-best-coronavirus-reponses-have-in-common-women-leaders/#7288392c3dec.

World Health Organization (2020) Situation reports. Accessed April 30, 2020, https://www.who.int/emergencies/diseases/novel-coronavirus-2019/situation-reports/.

Gwendolyn K. Lee is the Chester C. Holloway Professor at the University of Florida, Warrington College of Business. She holds a PhD from the University of California, Berkeley. Focusing on interdependencies in complex adaptive systems, her research has examined strategies for competition, cooperation, innovation, and entrepreneurship. Her current project, funded by the NSF, studies the effectiveness of organizational recovery in response to the COVID-19 pandemic and global economic crisis.

Joseph Lampel is Eddie Davies Professor of Enterprise and Innovation Management at the Alliance Manchester Business School, University of Manchester. He holds a PhD from McGill University, Montreal. His main research interests are strategy and innovation. He has co-authored six books, notably *Strategy Safari, Management? Think Again!*, and *Strategy Bites Back*, all three with Henry Mintzberg and Bruce Ahlstrand, and *Handbook of Organizational and Entrepreneurial Ingenuity* with Benson Honig and Israel Drori.

Zur Shapira is the William R. Berkley Professor of Entrepreneurship and Management at New York University Stern School of Business. His primary research areas include managerial risk taking, organizational decision making, entrepreneurship, innovation and organizational evolution. His research has been cited in the *Wall Street Journal*, *Inc. Magazine*, and *Institutional Investor*. He has appeared on *BBC Worldwide TV*, *CNBC*, *NBC's Today Show*, *NBC Nightly News* and on *NPR*.