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# The breakdown and rebuilding of learning during organizational crisis, disaster, and failure<sup>☆</sup>



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## A CULTURE OF LEARNING ALLOWS IBM TO REFOCUS ITS BUSINESS

In October 2014, IBM Chairman, President, and CEO “Ginni” Rometty told Wall Street stock analysts that IBM’s earning growth would be lower than had been expected. When Rometty reset expectations, she did more than publicly walk back the aggressive growth estimates made by her predecessor. She made a statement about the company’s ability to change direction and learn. A few months later, Rometty would lay out an investment plan for the future of the company. When she stepped back from aggressive growth estimates and charted a new course for the company, Rometty showed the importance of sustaining learning in the face of organizational threats.

Unfortunately, Rometty is one of the few executives to focus on learning in times of potential crisis. Too often, executives ignore bad news and fail to make organizational-wide changes. Instead of making difficult decisions, executives ignore emerging problems. In doing so, they lose the opportunity to address potential threats before they escalate into full-scale breakdowns.

## ORGANIZATIONAL BREAKDOWN

Over the past decade, we have been studying organizations like IBM and how they sustain or regain learning in the face of crisis, disaster, and failure. As part of this study, we reviewed official investigations covering breakdowns in government, industry,

and business. We reviewed internal procedures and best practices in a variety of organizations, from commercial airlines to an informal group of avalanche awareness advocates. We also conducted several systematic studies of our own.

We use the term ‘organizational breakdown’ because it best describes the psychological and social processes associated with learning in organizations. Breakdown serves as a catchall term to include crisis, failure, and disaster. Breakdown, in psychological terms, describes a situation in which the normal functioning processes of learning fail to work. A breakdown occurs when organizational routines become fixed. The organization finds it difficult to change, as the situation exceeds the capacity of the organization to contain the unfolding events. When learning breaks down, the organization fails to update its perspective, open itself to new ways of looking at a situation, and appropriately assess risk.

## Breakdown of Learning at Lehman Brothers

The global financial meltdown of 2008 helps illustrate what happens with the breakdown of learning. The largest bankruptcy in history unfolded as top executives at Lehman Brothers ignored warning signs, distrusted advisors, and ultimately stood by as inaction fueled the collapse. Systematic, state-of-the-art organizational compensation systems, elaborate training and education programs, the most advanced decision-making technology, and the most sophisticated mathematical models ever devised couldn’t save the company from itself. The stock value plunged from \$42 per share to less than \$2 in the course of months. Billions of dollars of shareholder wealth were lost. Executives behind the organization’s collapse lost millions of personal wealth.

The breakdown at Lehman can be attributed to a variety of causes. Failed communication, financial mismanagement,

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lack of oversight and review, dysfunctional decision-making, and poor leadership, among other factors, contributed to the bankruptcy. Scholarly review suggests a variety of explanations for why organizations like Lehman break down. For example, sociologist Charles Perrow in his book *Normal Accidents* concluded that in complex organizations, where each action is closely linked with a secondary action, breakdowns are inevitable. Similarly, Harold Wilensky's classic book *Organizational Intelligence* identified several ways that organizational learning breaks down due to the mishandling or misinterpretation of information.

The Lehman Brothers breakdown was not inevitable. Executives failed to recognize changing conditions and were unable to update their perspective. The executives leading the company exemplified a situation where the natural process of learning stalls. Even the most sophisticated organizations, it seems, can stumble in the face of breakdown.

Our research on organizational successes like IBM and failures like Lehman Brothers revealed three insights about learning and its breakdown. First, organizational learning spans multiple levels of an organization and involves coordinating complex activity across various functions and stakeholders, building systems that can adapt to change, and sustaining a stance of learning and continuous improvement in the face of setbacks and breakdowns. Learning helps an organization emerge from crisis as it develops the knowledge, skills, and abilities necessary to deal with the breakdown. Second, learning evolves over the course of a crisis in distinct and relatively predictable stages. Successfully navigating each phase requires different learning practices. Third, organizations face four common threats to maintaining learning. This article describes the four stages and the threats to organizational learning while providing examples of organizational breakdown. The learning displayed by Exxon after the Valdez oil spill provides an entry into understanding the importance of sustained learning during breakdown.

### Learning from the Exxon Valdez Accident

Too often, learning becomes relevant to an organization only when it faces a catastrophic breakdown like the one that occurred in March of 1989. Off the coast of Alaska, the oil tanker Valdez crashed and spilled an estimated 240,000 barrels of oil into the Alaskan waters, contaminating about 1500 miles of coast. According to the testimony of a witness, the ship's captain, Captain Hazelwood, had retired to his cabin early, leaving the ship's navigation to the second in command. Once the accident occurred, Captain Hazelwood fled the ship. Exxon, the owner and operator of the Valdez, paid an estimated \$100 million in cleanup costs, and its reputation suffered irreparable damage.

Decades later, Rex Tillerson, the CEO of ExxonMobil, explained how the damage to operations, reputation, and perceived integrity led the company to take action. In the wake of the Valdez accident, Exxon implemented comprehensive, systemwide learning initiatives to anticipate, prevent, and respond to disasters like Valdez. ExxonMobil's Operations Integrity Management System created a routinized approach to learning in an inherently risky industry. The initiative holds individual units within the organization responsible for safety, integrity, and performance on 11 different subtopics, ranging from leadership to operational

integrity. The system now serves as the industry standard. The system works: While other firms in the oil and gas industry have experienced significant operational breakdowns, Exxon has yet to experience a major incident since implementing the system.

## THE FOUR LEVELS OF LEARNING

ExxonMobil, like other organizations that build learning into their daily routines, has learned to navigate potential breakdowns across four levels: individual, group, organization, and industry. A study we conducted verified the fact that learning is a multilevel phenomenon. We collected data from an organization with over 1000 employees in a grocery store chain based in Asia. We found that learning across three of the four levels—the individual, group, and organizational levels—accounted for a significant part of the organization's financial performance. Further, we found that various forms of organizational support—from supervisors, team members, and organizational structures—supported learning in the organization. A second study revealed the value of the fourth level of learning, industry wide or interorganizational learning. Industry wide learning panels, cross-company cooperation, and knowledge sharing between organizations provide examples of how competitors with common interests can learn collectively. Fig. 1 shows different learning behaviors associated with each level of learning.

## THE FOUR STAGES OF LEARNING AND RECOVERING FROM BREAKDOWN

The 2015 software failure at the Federal Aviation Administration center in Virginia shows that breakdowns do not always result in disastrous consequences, but can result in major inconvenience and reputational damage. The software created a new interface for air traffic controllers by providing a dashboard that accessed to up to the minute information. When installed, the new software quickly overloaded the system and flight operation for over 1000 flights became delayed or canceled. The upgrade was part of a system overhaul, part of the next generation air traffic control system called NextGen. The FAA responded quickly by rerouting traffic and rescheduling flights. Luckily, the FAA had processes in place to adapt to such a problem. Reputational damage was already done, threatening the future of a \$40 billion dollar system upgrade nearly 30 years overdue.

All organizations face breakdown, but the software glitch at the FAA shows that some organizations recover better than

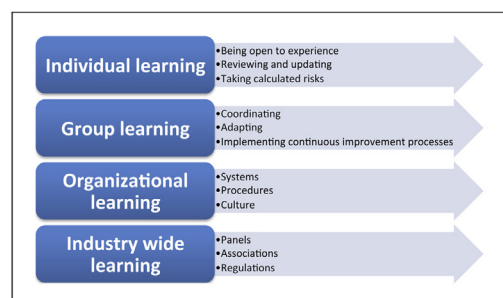


Figure 1 Learning Across Four Organization Levels.

others. Barry Turner studied disasters in the 1970s and uncovered an underlying pattern for how disasters unfold. Hierarchy, misunderstandings, politics, and poor coordination make learning difficult. Nonetheless, Turner believed that all disasters followed a somewhat predictable pattern. He noted that learning is often difficult before, during and after a disaster because of the complexity of handling information in organizations. Our research uncovered a variety of ways that organizations sustain learning across different stages of breakdown. Organizations like ExxonMobile and the Federal Aviation Flight Operations unit of the Federal Aviation Administration show that responding to breakdown requires a comprehensive commitment to learning over time. Fig. 2 shows the four stages of learning that occur before, during, and after organizational breakdown, and Table 1 summarizes the key learning processes associated with each stage.

**Stage 1: Establishing a Culture of Resilience**

In 2005, a series of explosions at the BP Texas City refinery resulted in one of the worst workplace accidents in the US in the last 20 years. Pressure built up inside a tank holding flammable chemicals. The pressure released flammable liquid that led to an explosion and fire. Fifteen employees died and 180 workers were injured.

In the aftermath of the events, several authorities conducted investigations. One independent investigation became known as the Baker Panel, named after the committee Chair of the investigation, former Secretary of the United States, James Baker. The panel described how accountability had failed. Resilience begins at the highest levels, the report concluded, starting with the board of directors. The panel recommended that BP and other companies, facilitate employee empowerment, improve resources and safety capabilities, and infuse the organization with a culture of learning. Another inquiry noted the lack of trust between management and frontline employees, this in turn, led to

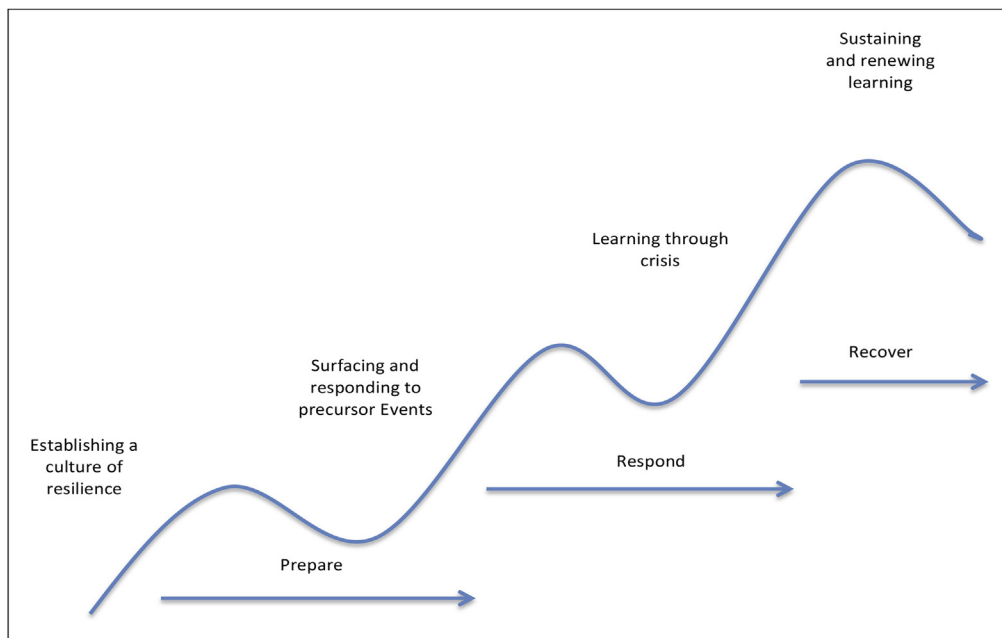
a lack of motivation for following procedures. Ultimately, employees came to accept as acceptable, a certain level of risk.

As the reports suggests, no organization can successfully respond to breakdown without first establishing a culture of learning and accountability for learning. Building a culture that values learning creates open communication across levels of the organization and offers transparency to operational and financial states. Organizations take several concrete steps to build this type of culture. For example, formal continuity planning and business continuity certification standards such as ISO 22301 help organizations assess their vulnerability to various threats and set up protocols for the unlikely event that breakdowns occur.

The scenario planning process pioneered by Shell in the 1970s is an example of how organizations can build learning into its strategic objectives. Originally designed to identify geopolitical, and demographic trends, the organization-wide effort to build scenarios also creates a culture that supports learning, new ideas, and inclusion. Because the process of building scenarios is so inclusive, involving thousands of individuals across the company, it contributes to a culture of accountability for learning. Both learning and accountability are important for responding to the unexpected breakdown. Building a culture of resilience involves getting a leadership team that is involved in identifying, discussing, and intervening in operational problems. It also includes building a culture of continuous improvement, trust, and psychological safety—a culture that promotes positive and trusting relationships where difficult issues can be openly discussed and actions taken when necessary.

**Stage 2: Surfacing and Responding to Precursor Events**

The culture of learning built in Stage 1 promotes an environment where people can openly discuss potential threats to



**Figure 2** Four Stages of Learning Through Crisis, Failure, and Disaster.

**Table 1** Stages of Organizational Learning and Associated Learning Processes.

Stage 1	Stage 2	Stage 3	Stage 4
Establishing a culture of resilience	Surfacing and responding to precursor events	Learning through crisis	Sustaining and renewing learning
<ul style="list-style-type: none"> <li>• Development of a safety culture at the systems level</li> <li>• Strategic and tactical scenario planning</li> <li>• Continuity planning and assessment</li> <li>• Situational awareness</li> <li>• Simulations</li> <li>• Culture building</li> </ul>	<ul style="list-style-type: none"> <li>• Error detection and reporting</li> <li>• Psychological safety</li> <li>• Learning orientation</li> <li>• Checklists and safety inspections</li> <li>• Knowledge, skills, and abilities training</li> </ul>	<ul style="list-style-type: none"> <li>• Knowledge sharing</li> <li>• Team coordination</li> <li>• Team learning</li> <li>• Crisis response</li> <li>• Cognitive readiness</li> <li>• Mindfulness</li> </ul>	<ul style="list-style-type: none"> <li>• Lessons learned database and meetings</li> <li>• After-action reviews</li> <li>• Debriefs</li> <li>• Panels, inquiries, change implementation</li> <li>• Industrywide learning and sharing</li> </ul>

the organization. This sets the foundation for Stage 2: openly surfacing and responding to precursor events. Many organizations remain unaware of underlying threats or fail to address those threats that do surface. Surfacing small problems provides a window into larger issues. This stage is often referred to as the incubation stage because its purpose is to identify *potential* vulnerabilities before they escalate into *actual* breakdowns. The stage involves the development of an integrated and comprehensive crisis management system designed to identify, track, and report problems before they escalate. This stage also includes conducting audits and reviews and implement early warning systems that surface areas of potential vulnerability.

The key to successful navigation in Stage 2 is to create a state of constant updating. Avoid the temptation to fall into automatic pilot. The Federal Aviation Flight Operations unit of the Federal Aviation Administration provides an example of Stage 2 learning. Todd LaPorte, a leading researcher on organizational resilience, reviewed commercial flight operations in the United States. He became intrigued that the air traffic control system is one of the most complex systems, but at the same time one of the safest. The success of the system, he concluded, rests on the commitment of thousands of individuals. Pilots, regulators, air traffic controllers, repair crews, engineers, and system designers, among others, all work to ensure safety; the success of the system demands it.

LaPorte and his colleagues used the term ‘high-reliability organizations’ to describe organizations that are at once complex and safe. Learning plays a key role in the success of these high-reliability organizations. The Federal Aviation Administration’s Aviation Safety Information Analysis and Sharing (ASIAS) System, which captures, reviews, and publicizes lessons learned from past errors and failures, provides one example of how systematic updating can lead to accountability, publication, dissemination, and analysis of errors and near-misses. Industry groups such as the Aviation Safety Network supplement government safety reporting.

### Stage 3: Learning Through Crisis

In Stage 3, the key learning objectives involve emergency management: responding to and containing events. In this stage, the organization finds itself in a situation for which it has neither the capacity nor the tools to manage the situation. Learning aids the organization in dealing with unfolding

events as it continually updates its assessment of the situation and gathers new information. In order to successfully navigate Stage 3, learning organizations take actions in Stage 1 and 2 that create opportunities for employees to learn and develop. These actions include personal and career development opportunities within the organization. Interpersonal competencies such as teamwork and leadership are especially important because they promote free flow of information across individuals and units. Learning practices established in Stage 1 and Stage 2 provide a strong foundation for the response and recovery established in Stage 3.

### Stage 4: Sustaining and Renewing Learning

Rebuilding learning in the aftermath of a crisis, disaster, or breakdown focuses once again on cultural adjustment. The organization begins the long task of rebuilding and refining its learning culture. In the wake of an explosion at the Texas City refinery, multiple investigations were conducted into BP’s operations. Both the internal and external reviews recommended changes to procedures, culture, and reporting within the company. The review boards called on BP leadership to set a new tone of safety in light of the deaths at the Texas City plant. This includes creating a culture that makes individual and system wide safety and compliance the responsibility of everyone in the organization.

The Texas City breakdown should have been a warning sign. Unfortunately, BP experienced another breakdown: the Deepwater Horizon disaster, where oil spread into the Gulf of Mexico. Like the fall of Lehman Brothers, the disaster on the Deepwater Horizon was not inevitable. Unlike others in the industry that had established a system wide culture of learning, BP seemed to miss conclusions in the Texas City investigations. BP continued to operate its drilling in the high-risk act of deepwater drilling without implementing recommended cultural changes. Subcontractors failed to heed safety warnings, and the drive to meet production goals overshadowed safety concerns.

Organizations that successfully navigate the stages of learning move to full cultural adjustment—where a culture of learning permeates the organization. As Exxon and other examples illustrate, rebuilding learning involves systematic change throughout the organization, and this takes effort, resources, and time.

## THREATS TO LEARNING

Even when organizations successfully navigate the four stages of learning, threats to learning abound. *In our research, we drew heavily on the work of Harold Wilensky, who identified four threats to learning in organizations: (1) lack of know-how, (2) leadership challenges, (3) design procedures and technology, and (4) poorly developed or pursued goals and expectations.* The tragic crash of Air France Flight 447 illustrates the first three threats, and the 1895 Montparnasse train derailment illustrates the last threat.

### Lessons from the Disaster of Air France 447

Four hundred miles off the coast of Brazil, two pilots, David Robert, aged 37, and Pierre Bonin, aged 32, increased the altitude of the Airbus A330. This maneuver is designed to avoid bad weather. As they ascended, they flew into moist, cold air. They had no knowledge that outside of the aircraft just below the cockpit, the cool and moist air led the airspeed sensors to freeze. The sensors no longer captured the correct speed of the aircraft. The frozen airspeed sensors resulted in faulty airspeed reported in the cockpit. To the pilots, it appeared that the aircraft speed had become dangerously low. The pilots expressed concern when the plane's autopilot suddenly disengaged, sounding an alarm in the cockpit. The pilots commandeered the plane using manual operations. The flight captain, a third pilot on the three-person crew, previously retreated to the cabin to rest.

The onboard computer showed airspeed decreasing at a dangerous level, but soon after, the pilots recovered the plane and regained an acceptable airspeed. The pilots recovered from the initial failure, but they had not discovered the underlying problem—the faulty airspeed indications in the cockpit. To the two pilots, the plane appeared to lose airspeed again. They discussed the problem in the cockpit:

“What’s happening? I don’t know, I don’t know what’s happening,” reports Robert. At this moment, Robert is the most experienced pilot in the cockpit, but he leaves Bonin in charge of flying the aircraft.

“We’re losing control of the aero plane there,” reports Bonin, the copilot who is now in control of the aircraft.

“We lost all control of the aero plane, we don’t understand anything, we’ve tried everything,” responds Robert.

The pilots continued for several minutes to diagnose the problem. As they tried and retried to fly the plane, the plane continued to lose altitude at a dangerous pace.

Robert then engaged Bonin about the direction of the joystick, the specially designed mechanism used to fly the plane in manual mode, including the pitch of the plane. Bonin was in command.

“But I’ve been at maxi nose-up for a while!” shouts Bonin.

“No, no, no . . . don’t climb,” responds Robert.

The stall warning continued to sound within the cockpit, even as the pilot tried to ascend. The pilots expressed

concern and confusion and called for the captain to return to the cockpit. When the captain arrived in the cockpit, he was unable to diagnose the problem in time to recover the plane. The disaster resulted in the deaths of 228 passengers and crew.

The threats faced in the cockpit of the A330 are not unique to aircraft. All organizations experience four primary threats to learning.

### Threat 1: Lack of Know-how

One threat to learning is associated with the knowledge, skills, and capabilities of the organization and its members. As crisis researcher James Reason has noted, most disasters can be traced to a chain of events that, had any one event been avoided, the accident itself would have likely been avoided. The Air France Flight 447 disaster didn’t follow this time-tested pattern. Rather than being linked to a chain of events, the disaster appeared to result from an inappropriate response to a routine situation. Mistakes made by the pilot operators turned a small problem into a big problem. Threats to learning from lack of know-how usually occur due to lack of training, mistaken assessment of the situation, or application of the wrong procedures. The Air France pilots probably experienced all three.

First, the team of pilots employed the wrong procedures. Data from the flight data recorder revealed that the pilots attempted to execute an in-flight recovery, something called a “touch and go” or “togo” for short. The togo was designed for the group to recover from the apparent dramatic loss of altitude. This is why Bonin maintained maximum nose-up rather than set the nose at 5°, which would have been more appropriate; he was attempting to perform a touch and go maneuver designed to recover the plane.

The touch and go procedure was the recognized procedure for recovering an aircraft after a loss of lift, but there was a problem. The touch and go procedure proved effective only at low altitude. The touch and go is used to abort a landing and return an aircraft to flight; thus, the aircraft touches the ground lightly and quickly and returns to flight. According to investigators and other experts, this was the wrong procedure to engage at high altitude.

Deployment of the wrong procedures may have stemmed from a mistaken assessment of the situation by the cockpit crew. Failed airspeed indicators had become common on their particular model of aircraft, the A330. In fact, the particular A330 being flown in Air France Flight 447 had already been scheduled to have the indicators replaced with more reliable hardware. The crash investigators knew about the failed airspeed sensors because the information was passed to the Air France maintenance facility in Paris through the Aircraft Communications Addressing and Reporting System (ACARS). ACARS reported real-time equipment data to the maintenance facility, but not to the cockpit. So there was little that would have led the pilots to believe that the airspeed indicators had failed, even though this information was being relayed to their final destination in real time.

Contributing to the breakdown, it seems that there was no record that the pilots had been trained to recover a plane at high altitude. Most experienced pilots agree that to regain control of the plane, the pilot team needed to set the thrust at 85% and pitch the plane at 5°. Had any one of the pilots

been trained or had they experienced a breakdown like this before, they might have been able to recover the aircraft. The Air France Flight 447 pilots were pitching the plane's nose up at an angle that was too steep. The upward pitch caused the plane to lose airspeed and lift, which unknowingly directed the plane into the ocean.

### **Threat 2: Leadership Challenges**

The lack of know-how on the part of the pilots contributed to the breakdown, but it wasn't the only human factor that was involved. Ambiguity over leadership roles confused decision-making. The accident report noted that the captain hadn't slept much the night before and left the cockpit early in the flight. Robert and Bonin had the deck stacked against them from the moment Captain DuBois left the cockpit. His exit meant that the relationship between the two remaining pilots became ambiguous. Without a clear leadership structure, Robert and Bonin were left to negotiate, on their own terms, who was now in charge of flying the aircraft. Not only would this negotiation for power take time, it would require consensus on what action to take.

The flight captain remained asleep in the cabin for a critical few minutes while the two copilots struggled with warning alarms. The more experienced pilot, Robert, ambiguously allowed the less experienced pilot, Bonin, to take control of the aircraft, and in doing so, he unknowingly allowed his copilot to execute the touch and go. When Bonin executed the touch and go, he failed to communicate his actions to Robert until it was too late to recover from the fast descent.

Disaster research has often considered the problems that arise during a handoff situation such as this. A handoff involves introducing a new set of individuals or teams to an existing situation. For example, in firefighting, problems often emerge when a new team of firefighters takes its shift because the new shift is not familiar with the exact characteristics of the existing fire. The Flight 447 incident shows that handoffs can also cause problems related to ambiguous leadership.

### **Threat 3: Design, Procedures, and Technology**

Threats to learning caused by design, procedures, and technology are also illustrated by the Air France disaster. It's easy to suggest that the breakdown started with the faulty airspeed sensors and the failure to replace them in a timely manner. This was only one of the design, procedure, and policy problems that contributed to the disaster.

The design of the A330 cockpit played an important role in the breakdown. The cockpit of the Airbus was designed with the main controls on the outside of the cockpit configuration. In other words, the joysticks were placed either to the outermost left or right of the pilots rather than between the pilots. This design limits unwanted bumping of the flight control stick but it also prevents one pilot from viewing the joystick position of the copilot. In Flight 447, Bonin executed the touch and go procedure, but without verbal communication between the two pilots, Robert had no knowledge that his teammate was pointing the nose of the plane up, rather than down.

Despite the problem with the airspeed sensors and design of the cockpit controls, the A330 had had a nearly flawless record after years of service. Until the Flight 447 incident, this model of aircraft had never been involved in a fatal accident. However, this record of exemplary service had unintended consequences. A better understanding of the impressive technology behind the aircraft shows how technological advancements threatened learning.

The A330 aircraft is designed with the most up-to-date 'fly-by-wire' technology. Fly-by-wire technology eliminates the need for hydraulic controls. Because of its advanced fly-by-wire system, pilots operate the aircraft in two distinct modes. In 'auto mode,' the onboard computer sets parameters for the flight. Each time a pilot inputs a new command, an onboard computer reviews the input, which in turn determines if the input fits into predefined parameters. If the input meets the predefined parameter, then the plane executes the input. The pilot's command is executed only after review. In auto mode, the pilot acts within a very narrow set of options, always under the review of the computer. Every input made by a pilot, every altitude change, every flight speed correction, and every rudder change is reviewed and executed by the in-flight computer. In contrast, in 'manual' mode, the pilot sets the parameters and, thus, there is no computer override. The pilot assumes direct control of the aircraft.

In a technology-equipped aircraft such as the A330, pilots fly most of their flight hours in auto mode. A pilot may never face the situation that the pilots of Flight 447 likely faced: the need for a high-altitude recovery. The onboard computer makes all the necessary corrections before the pilots need to execute such a maneuver. Over the years, it is believed that because pilots operate so often in auto mode, their ability to learn and operate under various non-routine situations is diminished. Maneuvering during a high-altitude stall requires training, practice, or experience, but few pilots have these. Even though the pilot team had thousands of flight hours in the A330 aircraft, they had far less experience controlling the plane in manual mode and thus failed to learn to execute non-routine activities such as recovery from a high-altitude stall.

Even more troubling, the need for such a recovery may not have been necessary had the pilots simply flown the plane and understood that the warning alarm sounded because of a faulty airspeed indicator and not an actual threat to the plane's lift.

### **Threat 4: Misdirected Goals**

In addition to threats of know-how, leadership, and design, another threat comes from unrealistic misdirected expectations and goals—a threat that became very clear in our analysis of the 1895 Montparnasse train derailment.

### **Lessons from the 1895 Montparnasse Train Derailment**

One of the train conductors, Guillaume-Marie Pellerin, faced a problem common in many organizations. He was late delivering on a deadline. He decided to make up for lost



time. As the second in command of a passenger train traveling from Granville to Paris, he increased the speed of the train in the hope of meeting his planned arrival time. The lead conductor, Albert Mariette, remained unaware of the emerging situation as he rushed to complete paperwork in the back of the train—in order to ensure a speedy turnaround time once the train arrived at the station.

The situation he faced in 19th-century France is reminiscent of present-day air travel. Commercial airlines boast about on-time arrivals, but such boasting only highlights the pressure that carriers face to meet strict schedules. In 1895 France, train conductors increasingly felt pressure to deliver their passengers on schedule. Passenger railway travel became highly competitive across France. Multiple train lines fed the same hubs, competing for the same limited number of passengers. Faced with increasing pressure to meet aggressive deadlines, confusion over technology, regulations, and disengaged managers, railway managers and operators struggled to remain on track.

The train operated by Pellerin came equipped with the latest technology, Mr. Westinghouse's air brake, but the new system was not equipped to work under high speeds. The air brake failed as the train approached the platform. Regulations prohibited use of the friction brake once the train entered the station, but even when Pellerin tried it, it was too late. Unable to stop the train, Pellerin, his boss, and the other 131 passengers sat helpless as the train plowed through the station platform, through a two-foot-thick wall, and down three stories, landing nose down on the street below. Surprisingly, no passengers died, and despite the rather awkward arrival, the train arrived on time, meeting its deadline. The official investigation into the Montparnasse train derailment cited the excessive speed, authorized by the train conductor, as the primary cause of the accident.

## IMPLICATIONS FOR LEADERS AND ORGANIZATIONS

Few organizations will experience the kinds of breakdowns experienced by the pilots at Air France and train engineers at Montparnasse; however, these and other high-consequence incidents we studied provide insight into how leaders in more traditional organizations can sustain and rebuild learning in the face of breakdown.

First, leaders need to **build learning into every level of the organization**. Every individual in the organization, from the frontline employees to the board of directors, needs to advocate for surfacing and responding to problems, errors, and risks. The organization should focus on developing standards and reporting while holding individuals at all levels accountable for meeting these standards. One former student who works for a highly respected firm in the petroleum industry explained how the culture of safety infused every aspect of the company, even requiring employees to undergo training for how to cut fruit offered in his company's cafeteria.

Second, leaders need to be **open to bad news**. In the case of the Lehman Brothers bankruptcy, leaders failed to accept the declining position of the company. Employees who

brought bad news were treated as disloyal to the organization. In contrast, resilient leaders court bad news and opposing viewpoints because these counterintuitive ideas help uncover possible complications. Setbacks become minimized because the organization has already prepared for problems. Unfortunately, we have seen too many leaders who simply ignore early warning signs and belittle employees who report bad news or who produce modest but realistic projections. Leaders can facilitate a culture of learning by conducting after-action reviews of near-misses, updating procedures when new problems come to light, and communicating the importance of reporting, tracking, and evaluating problems before they escalate. One study, from the health care industry, for example, found that physicians who use a more inclusive leadership style learn new procedures quicker and are better able to respond to problems than leaders who are more authoritarian in their approach to teamwork.

Third, leaders need to build **awareness that most risks do not unfold without warning but follow predictable patterns**. The causes for breakdown are often well documented within an industry or region. Human error—where an individual either ignores the problem, responds inappropriately, or escalates the problem to superiors who fail to take action—is all too common in aviation. In fact, some analysis suggests that between 80% and 90% of airline accidents can be attributed to some human error in a chain of events. In the BP Texas City disaster, one investigation concluded that warning signs had been present for years, but leadership failed to address these warning signs. Further, BP used safety measures that were easy to gather rather than measures that were the most indicative of problems. Organizational leaders became complacent because personal injury rates were low at Texas City, even though years of budget cuts and lack of investment contributed to systematic problems that weren't captured by injury records. In the aftermath of the incident, The Occupational Safety and Health Administration found over 301 willful violations of safety rules, suggesting that leaders either ignored or were indifferent to significant safety concerns.

Fourth, when an unfortunate breakdown emerges, leaders need to ensure that the organization can continue to function and focus on getting back to normal operations. In reviewing the Air France and other airline breakdowns, we learned that a common response by pilots in the face of equipment failure is to **focus on flying the plane**. In other words, pilots often respond to a threat by returning to the fundamental issues associated with flight. During the Air France breakdown, pilots became distracted by warning signals and computer reports and may have overlooked the fundamental issues involve generating lift and maintaining airspeed. In the case of organizational leaders, the fundamental issues might involve returning to normal operations, generating review, or regaining reputation.

Consider once again Ginny Rometty's action of redefining the targets and investment strategies at IBM. Her focus largely lies in getting back to the core business and redefining the businesses strengths in the era of cloud computing. The outcome of Rometty's strategy has yet to be realized, but her redirection is built on an organizational culture of learning and resilience.

The research and cases discussed in the article illustrate the four common threats to learning and provide the steps that organizations can take to identify and manage these threats. Organizational resilience can be achieved through comprehensive and systematic learning processes that

address four distinct phases of organizational breakdown. By establishing a culture of learning and resilience, surfacing and responding to precursor events, learning through disaster, and sustaining and renewing learning, organizations can navigate the challenges of organizational breakdown.





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*Organizational Learning with Scenarios* (New York, NY: Wiley, 2002). For an example, see the *Shell Scenario Yearbook*: <http://s03.static-shell.com/content/dam/shell/static/future-energy/downloads/shell-scenarios/shell-scenarios-40yearsbook061112.pdf>.

A comprehensive review of airline accidents can be found in the Flight Safety Foundation's *Aviation Safety Network*, <http://aviation-safety.net/>, and lessons learned can be retrieved at <http://lessonslearned.faa.gov/>.

A good source for understanding the role of human error is J. Reason, *Human Error* (New York, NY: Cambridge University Press, 1990).

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