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THE CRISIS-PRONE SOCIETY

A Brief Guide to Managing the Beliefs That Drive Risk in Business

Ian I. Mitroff and
Can M. Alpaslan

The Crisis-Prone Society

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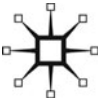

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Contents

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Preface

Charlestown, West Virginia

On Thursday, January 9, 2014, a chemical used in processing coal leaked from a plant of a company ironically named Freedom Industries into the nearby Elk River thereby contaminating drinking water for some 6,000–10,000 people in Charlestown, West Virginia. In addition, some hundreds of thousands of people in towns located downstream were affected as well. The drinking water was contaminated because the water filtration plant for the town was located directly downstream from the chemical plant.

Since the tanks in which the chemicals were stored didn't fall under State or Federal inspection programs, and they weren't considered sufficiently hazardous, environmental permits to operate the plant were not required. Needless to say, these decisions—especially the assumptions that underlay the decisions—are now up for review, particularly since it was found that the tanks had serious cracks that had not been repaired.

As of this writing, Freedom Industries has filed for bankruptcy in order to limit its liability for the spill.

If a terrorist had deliberately set out to disrupt a town and raise heightened fears about the safety of drinking water and other essentials for life, then he or she couldn't have picked a better place and way to do it. Acts of terrorism naturally arise our fears, but we have more to fear from the technologies that permeate our lives and on which we depend.

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Bigger, costlier, deadlier, more frequent, and interdependent

Not a day goes by without the occurrence, or near-occurrence, of a major crisis, disaster, tragedy, and the like. If this weren't bad enough, more than one crisis a day is no longer uncommon. Indeed, it has become the norm.

We have created the kind of society that increasingly is prone to all kinds of crises: corporate malfeasance, crime, "death of the middle class," dysfunctional politics, economic/financial, housing bubbles, environmental, chronic unemployment and underemployment, mass shootings, natural disasters, poor educational system, severe income inequality leading to a new "Gilded Age," terrorism, and so on. And, this is only a partial list!

Worst of all, individual crises are no longer separate or distinct. Instead, they are highly interconnected in strange and unpredictable ways such that they not only reinforce, but actually contribute to one another. Any crisis is capable of setting off an uncontrolled chain reaction of other crises. This is why it is not enough to be prepared for one and only one type of crisis. One must be prepared for a system of crises that can and will strike simultaneously.

It is as though as a civilization we are no longer content to leave crises to chance, but have deliberately gone out of our way to ensure that they occur 24/7/365. There is no doubt whatsoever that they are bigger, costlier, and deadlier. And, the time between them has shrunk precipitously.

The good news is that even if it is humanely impossible to prevent all crises, there is much that has been learned from the field of Crisis Management that can help lower the chances and the ill effects of the next crisis.

Crises affect everyone

The social, emotional, and financial costs of crises are enormous. Their impacts not only reach beyond traditional geographic borders (e.g., Chernobyl, Fukushima) but also extend far into the future. For example, the disposal or storing of toxic nuclear waste affects generations to come. In short, crises don't respect the rules of ordinary space and time. In fact,

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they don't respect the "normal rules" of civilization. To be sure, in killing innocent men, women, and children, terrorists certainly don't respect civilized codes of conduct.

Crises now have the potential to affect everyone everywhere. For this reason alone, this book is written with as little technical jargon as possible. No prior familiarity or knowledge of Crisis or Risk Management is presupposed. Our intent is to explain Crisis Management in easy-to-understand terms such that it is relevant to as many as possible.

If we are to stand any hope of being better prepared for the worst that now happens almost on a daily basis, then more than crisis experts alone need to have a modicum of understanding of Crisis Management. The general public needs to push public officials and corporate executives for better preparation before the next calamities occur. We cannot leave thinking about and preparations for crises to experts, corporate executives, and government officials alone. An informed citizenry is an absolute necessity.

If there are any doubts about this, then the fact that General Motors knew there were serious problems with its ignition systems and did nothing about it for ten years is chilling proof that we cannot leave Crisis Management to organizations alone.

The collapse of major assumptions

The central thesis of this book is that ***without exception,*** *crises result in the collapse of all, or nearly all, of the major assumptions that one has been making prior to the occurrence of the crises as to why they won't occur.* Since assumptions are at the core of a person's, an organization's, or a society's belief system, crises destroy them in one fell swoop. The result is that we are left adrift to fend for ourselves in a disorderly and meaningless world.

Assumptions underlie everything humans do. Given that we cannot know everything prior to our engagement with the world, if even then, we have no alternative but to make countless assumptions about ourselves, others, the myriad technologies on which we depend, and so on. But if our assumptions are faulty or wrong to begin with, then everything that follows from them is wrong as well. If we are to stand any chance of heading off crises before they occur, and responding better to those we cannot prevent, then knowing one's assumptions is fundamental.

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To clarify briefly, assumptions are all of the propositions that stakeholders posit about themselves, other stakeholders, technologies, organizations, and so on, such that if the assumptions are true, then a crisis will NOT result. In other words, assumptions are the *presumed characteristics/properties* of people, institutions, organizations, technology, the environment, and so on. The important point is that it is people who make assumptions about the environment, not the other way around. In short, *assumptions derive from people because they are made/held by people.*

All crises are existential because the assumptions we use to give meaning and order to our existence are pulled completely out from under us. Our basic existence is overwhelmed, if not threatened entirely.

Since the collapse of assumptions is one of the least appreciated and least understood aspects of all crises, it is unfortunately the single most important factor for which most people and organizations are least prepared. As a consequence, the collapse of assumptions does as much damage to our psyches as the initial crises do to our physical bodies and the structures of our institutions.

This book differs fundamentally from other books on crises, including previous ones by the authors. It shows systematically what the prevailing assumptions were, and in many cases still are, that were not only destroyed by major crises, but led to the initial crises themselves. The end result is a systematic portrait of the vulnerabilities facing modern societies. To the best of our knowledge, this has not been done before.[1]

By seeing what is common to the assumptions that led to various crises, the hope is that this will help us to prepare better for future crises.

We hope that by the end of the book it is clear to the reader that there is nothing more practical than knowing one's basic assumptions. This is precisely why we propose that organizations need to have a central clearinghouse of some kind that keeps track of the status of their key assumptions. They certainly need something that warns them when their key assumptions are in danger of going off track. As Roger Cohen wisely put: "The unthinkable is thinkable. Indeed, it must be thought. Otherwise, it may occur …"[2]

Finally, we hope to make clear that assumptions are not neutral in any way shape or form. Because assumptions cut across every aspect of life, there is no way to express them that is free of politics, ideology, and so on. Thus, we would not expect everyone to agree with our wording of assumptions or what we take as assumptions in the first place. Perfect agreement is in fact neither desirable nor necessary since our purpose

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is to engage the reader to become aware of, and hopefully to challenge, his or her own assumptions. Often, there is no better way of doing this than by seeing that with which one disagrees, rather that with which one agrees.

Notes

1 The authors have, of course, previously examined the role of assumptions and their impact on crises. For instance, in Alpaslan, Can M., and Mitroff, Ian, I., *Swans, Swine, and Swindlers: Coping with the Growing Threat of Mega-Crises and Mega-Threats*, Stanford University Press, 2011, we examined a limited set of crises and the assumptions that accompanied them. The present book goes much further in examining a larger set of diverse crises and their underlying assumptions.

2 Cohen, Roger, "The Unlikely Road to War," *The New York Times*, Tuesday, March 18, 2014, p. A19.

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Living in a Crisis-Prone World

Abstract: *Without exception, crises cause the collapse of the major operating assumptions that we use to give meaning and order to our world. In one fell swoop, they destroy our entire belief systems, leaving us adrift in a disorderly and meaningless world. Nonetheless, the collapse of assumptions is the least appreciated and least understood aspects of crises. In each chapter and the book as a whole, we analyze a diverse array of major crises to show systematically what the prevailing assumptions were that the crises destroyed. We also show how the assumptions were a major factor that led to the initial crises themselves. To help us prepare better for future crises, we show what is common to the assumptions.*

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Fort Hood

On November 5, 2009, U.S. Army Major and psychiatrist Nidal Malik Hassan fatally shot 13 people and injured more than 30 others at Fort Hood near Killeen, Texas. From Mitroff's and Alpaslan's more than 45 years of combined experience in studying and consulting with crises of all kinds, the massacre was unfortunately not an isolated exception. It fitted an all-too-common, general pattern. Indeed, we were only able to quickly hone in on the key assumptions that underlay this particular crisis because of our experience in surfacing and analyzing assumptions with regard to countless other crises.

Although there are obviously different types of crises, *all* crises have the *all-too-real potential* to cause major financial losses, serious injuries, deaths, long-lasting psychological trauma, major lawsuits, and unfavorable media coverage. In addition, *without exception*, they cause something just as devastating. They cause the collapse of the major operating assumptions that we use to give meaning and order to our world.

Precisely because it is far less apparent and less anticipated than more overt losses, such as financial costs, multiple injuries, the collapse of assumptions is just as bad as the initial crisis. In many cases, it *is* the crisis.

With regard to the Fort Hood massacre, three major assumptions were invalidated:

1. Soldiers are trained explicitly, and thus hopefully well prepared, for the serious possibility of being injured or killed *overseas in foreign* battles, but they won't be killed in battle-like conditions here at home. In other words, it can't and won't happen here;
2. One of our own won't attack and kill us. Alternately, we don't have anything to fear from "one of us;" and,
3. Least of all, a member of one of the "helping professions" won't turn on his "fellow comrades" and kill them.

Unfortunately, the preceding assumptions are all-too general. As such, they apply to many crises.

The first assumption has to do with geography. It is assumed implicitly that where we live and work is protected ground. Either it is too far removed from places where such tragedies normally occur, or it is physically insulated and secure.

Notice that this same type of assumption applied to 9/11. Terrorism is only supposed to happen in Europe, the Middle East, and other

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dangerous parts of the world where it occurs on a regular basis, not in the U.S.

The second assumption has to do with one's close friends and colleagues. For most people, it is literally unthinkable that someone with whom one works daily and knows intimately, or thinks one does, would turn and act completely out of character by committing one of the most heinous acts imaginable. It goes completely against the grain of what it is "to be one of us."

The third assumption takes the second even further. It is akin to violating the special bond and trust that is placed in one's fellow police officers, priests, physicians, rabbis, or teachers. Certain roles and professions are so sacred that they are invested with feelings such that if they were dishonored—defiled—it would lead to the deepest feelings of betrayal.

Sandy Hook

On December 14, 2012, 20-year-old Adam Lanza shot and killed 20 children and six adults at Sandy Hook Elementary School in Newtown Connecticut. Before driving to the school, Lanza shot and killed his mother at their Newtown home. He later committed suicide by shooting himself.

After the 2007 Virginia Tech massacre, it was the second deadliest mass shooting by a single person in American history.

The shootings prompted renewed debate about gun control. It also prompted a proposal for new legislation banning the sale and manufacture of certain types of semi-automatic firearms and magazines with more than ten rounds of ammunition.

As before, the shootings invalidated a set of deeply held assumptions:

1. Schools are special places where children, especially very young children, are protected from the dangers of the outside world; in a word, they are insulated from harm. Indeed, as much as any institution in society, schools are supposed to guarantee the protection of children. This "guarantee" is one of their most fundamental features.
2. A single gunman will not enter a school with the intent to commit mass murder; everyone respects that schools are special, especially elementary schools.

DOI: 10.1057/9781137454836.0003

3 So many children will not be killed at one time in one place. A mass shooting of very young children will not occur. It is literally unthinkable.

Once again, the first assumption pertains to geography. Only this time, it takes on a very special meaning. In many ways, schools are like churches. They are "holy places." Families can implicitly entrust schools to guard and take care of their most precious "possessions." Parents don't have to worry constantly throughout the day about whether their children will be safe or not.

The second assumption is that *everyone* respects the "holiness" of schools precisely because they are schools.

The third assumption is that so many children will not be killed at one time in one place. The death of a single child is horrific enough, but there is something terribly wrong when so many are killed at one time in one place. Numbers compound the senselessness of the tragedy. Notice once again how this same type of assumption applied to 9/11 as well.

It is important to stress that such assumptions were held even after the Columbine shootings. Even though one part of our minds knows that schools are not perfectly safe, other parts still have to believe that they are safe for our children. The assumption is necessary for without it, we are paralyzed. We couldn't dream for one moment of sending our children out of the supposed safety and comfort of our homes.

BP

On April 20, 2010, a British Petroleum (BP) oil rig in the Gulf of Mexico exploded and sank causing a massive oil spill, and killing 11 people. It is considered to be the largest "*accidental* marine oil spill" in the history of the petroleum industry. Oil flowed for 87 days until it was capped on July 15, 2010. The total discharge was estimated at 4.9 million barrels.

A significant part of the tragedy was the fact that BP deliberately misreported the number of gallons spilled.

A White House commission blamed BP and its commercial partners for a series of cost-cutting decisions and insufficient safety systems that led to the disaster. It also concluded that the spill resulted from "systemic" root causes and poor industry practices as well as poor government policies.

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In November 2012, BP pled guilty to 11 counts of manslaughter, misdemeanors, and lying to Congress. BP agreed to four years of government monitoring of its safety practices. The Environmental Protection Agency (EPA) announced that BP would be temporarily banned from new contracts with the U.S. government. BP and the Department of Justice agreed to a record-setting $4.525 billion in fines and other payments. As of February 2013, criminal and civil settlements and payments to a trust fund have cost the company $42.2 billion.

The following key assumptions were invalidated by the disaster:

1. The disaster was an "accident."
2. The oil spill in the Gulf was not related to earlier "accidents" caused by BP.
3. Cost cutting will not endanger operations in sensitive areas.
4. It is enough to react to crises once they've occurred; backup disaster and damage containment systems do *not* already have to be designed, well-tested, and in place *before* one is granted a license to drill for oil in precarious parts of the world.

After a 2005 massive explosion at its Texas refinery, BP engaged a close friend and colleague of Mitroff's, Professor Karlene Roberts, Director of the Center for Catastrophic Risk Management (CCRM) at the Haas School of Business, University of California. (As a member of CCRM, Mitroff works closely with Professor Roberts.) Precisely because she is one of the founders of the field of High Reliability Organizations, or HROs, Professor Roberts was engaged to improve safety operations at the refinery.

HROs are organizations that have an especially high potential for "catastrophic accidents." Because of the extreme danger to humans, animals, and the environment, HROs cannot afford to have even one disaster. As a result, they have evolved through trial and error—often through having one too many accidents and near-misses—a special set of procedures that lower as much as humanly possible the chances of a major catastrophe. U.S. Aircraft carriers, nuclear power plants, and hospital operating rooms are just a few examples of the types of HROs that have been studied, and as a result, led to the initial concept of HROs.

As a result of studying the causes of the Texas explosion, Professor Roberts prepared a special manual for BP, which if it had been followed would have helped BP become a HRO, and hopefully would have lowered

DOI: 10.1057/9781137454836.0003

substantially the chances of future catastrophes. The manual was never fully adopted. Indeed, it was jettisoned soon after it was produced.

The Gulf oil spill and the Texas refinery explosion were not the only crises BP has experienced over the past decade. For example, the company experienced a major oil spill in Alaska. It was also found guilty by the Department of Justice of manipulating the U.S. market for natural gas. As a result, BP had to pay more than $370 million in criminal fines.

Experts and critics argue that, in many instances, BP has shown that it prefers to pay fines for violating laws and regulations. In BP's way of reckoning, paying fines is cheaper than changing its business practices. Recklessness seems to be a calculated and ingrained aspect of BP's culture and its way of doing business.

The fact that BP failed to take Professor Robert's recommendations, and that of others, seriously undermines the first two assumptions. The spill was not just an "'accident' that was unrelated to BP's culture and past operations."

BP could have avoided the rig explosion and the subsequent oil spill if it had taken at least one of the following precautions:[1]

(1) Circulate the drilling fluid ("mud") long enough to detect whether there was gas in the well. If it was detected, gas could have been removed to prevent a potential leak and blowout;
(2) Don't replace heavy drilling fluid with relatively lighter seawater before installing the last cement plug. If the heavier fluid was left in the drilling pipe, the pressure in the oil and gas reservoirs thousands of feet below the ocean surface might have been more easily balanced;
(3) Test the quality of the cement used around the drill pipe. Higher quality cement might have prevented the bubble of methane gas from finding its way to the top;
(4) Instead of using a single long pipe, two pipes sealed together should have been used.[2] Almost a year before the explosion, a senior engineer at BP expressed concern about the strength of the pipe BP officials chose and warned in an internal memo that it might collapse. According to him, the pipe violated safety and design requirements;
(5) Stop operations and fix the damaged blowout preventer (BOP). A properly functioning BOP might have prevented the blowout.

BP's failure to take any of the preceding actions is due to the fact that it made a number of faulty tradeoffs between safety and cost. Safety wasn't considered to be a worthwhile goal, let alone an ideal constantly worth

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pursuing. Rather, safety was a constraint. For instance, if done properly, circulating drilling fluid would have taken 6–12 hours, but BP circulated the fluid for only 30 minutes.[3] Replacing heavier fluid with lighter seawater would have slowed down subsequent steps. Fixing the hydraulic leak and replacing the pods in the BOP would have slowed things down as well. But BP was running behind schedule and time was money.

BP's choices regarding the use of two sealed pipes, and a higher quality cement job would have also cost more. The project had already gone over budget some time before. BP cut corners to speed up drilling. As a result, the disaster completely invalidated the third assumption. Cost cutting not only endangers operations, but wrecks havoc with safety.

The fourth assumption was invalidated by the 87 days that it took to cap the well and the millions of gallons of oil that polluted the Gulf.

One of the most general findings of Crisis Management is that reacting *after* a crisis has occurred makes the original crisis significantly worse. Tested, in-place, and well-maintained Damage Control Mechanisms are needed *before* one should even be allowed to operate dangerous technologies, especially in sensitive parts of the world. According to this criterion, the U.S. government was as much at fault for giving BP a permit to drill in the Gulf without adequate crisis preparations and safeguards.

Hurricane Sandy

Hurricane Sandy, known as "Superstorm Sandy," was the deadliest and most destructive hurricane of the 2012 Atlantic season. It was the second costliest hurricane in U.S. history.

When it made landfall in Cuba at its peak intensity, it was a Category 3 storm. When it struck off the coast of the Northeastern United States, it became the largest Atlantic hurricane on record with winds spanning 1,100 miles. Estimates of the damage were over $68 billion, a total that was surpassed only by Hurricane Katrina. At least 286 people in seven countries were killed.

In the U.S., Sandy affected 24 states, including the entire eastern seaboard from Florida to Maine and west across the Appalachian Mountains to Michigan and Wisconsin. New Jersey and New York experienced especially severe damage. The storm hit New York City on October 29 flooding streets, tunnels and subway lines, and cutting power in and around the city. Damage in the U.S. amounted to $65 billion.

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At this point, it is not necessary to list formally all of the major assumptions that were invalidated by Sandy. It is enough to say that the extent of the devastation caused not only extreme physical and financial harm, but also extreme emotional harm as the people of New Jersey struggled to recover.

An unusual assumption involved politics when New Jersey Governor Chris Christie, a Republican, openly welcomed President Obama, a Democrat, who visited the state soon after the devastation and offered Federal disaster relief. In doing so, Governor Christie violated extremely conservative norms by not rebuffing President Obama. According to the thinking of extreme conservatives, cooperating with President Obama is akin to consorting with the Devil. At least, that's the prevailing assumption. To his credit, Governor Christie was more interested in serving the victims than misplaced loyalty to his party.

At the time of this writing, Governor Christie's staff is being investigated for deliberately causing a massive traffic jam on the George Washington Bridge as political payback for not supporting him. One of the key lessons of Crisis Management is the following: The fact that one has performed well on one crisis does not ensure that one will do well on the next very same type of crisis or on other types. The only way that one can continue to do well is if one has learned and internalized the lessons of previous crises.

One of the most important assumptions is that contrary to widespread belief, SANDY IS NOT A NATURAL DISASTER. STRONGER STILL, THERE ARE NO NATURAL DISASTERS. ALL DISASTERS ARE HUMAN-CAUSED!

Professor Bob Bea, a leading Civil and Environmental Engineer at UC Berkeley, repeatedly makes the point that *all disasters are human-caused*. Humans do not cause *NATURAL HAZARDS* such as earthquakes, typhoons. (With the advent of earthquakes caused by fracking and Global Warming, to mention only two, even this contention is now debatable.) Humans—not Mother Nature—decide where and how to build houses, schools, and so on, and to which standards. Humans set building codes, not Mother Nature. Thus, human activities in the form of politics are inextricably intertwined with Natural Hazards, especially whether they become human-caused disasters or not.

As we write, the Philippines has experienced one of the worst typhoons ever recorded. And, the Midwest has experienced severe tornadoes that are not supposed to occur in November and certainly not early in the morning—another prime assumption that has gone by the wayside.

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The collapse of major assumptions

Step by step we have been led to the central contention of this book: *All crises result in the collapse of major assumptions.* We cannot stress enough that in one fell swoop, our entire belief systems are destroyed. We are left adrift to fend for ourselves in a disorderly and meaningless world.

To repeat, all crises are existential in the sense that the assumptions that we use to give meaning and order to our existence are pulled completely out from under us. Our basic existence is overwhelmed, if not threatened entirely.

We also cannot stress enough that the collapse of assumptions is one of the least appreciated and least understood aspects of all crises. As a result, it is unfortunately the single most important factor for which most people and organizations are least prepared. For this reason, the collapse of assumptions does as much damage to our psyches as the initial crises do to our physical bodies and institutions.

Fundamental differences

It bears repeating that this book differs fundamentally from other books on crises, including those by the authors. It shows systematically what the prevailing assumptions were, and in many cases still are, that were not only destroyed by major crises, but led to the initial crises themselves. The end result is a new and systematic portrait of the vulnerabilities facing modern societies. To the best of our knowledge, this has not been done before.

By seeing what is common to the assumptions that led to various crises, the hope is that it will help us to prepare better for future crises.

Concluding remarks

It is, of course, a truism to say that if we had to be fully aware of all of our assumptions all of the time, then most of us wouldn't be able to get up in the morning and function throughout the day. We would literally be overwhelmed and paralyzed by tremendous anxiety, doubt, and uncertainty.

Likewise, prior to the occurrence of a major crisis, it is difficult, if not seemingly impossible, to know one's important assumptions, let alone all

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of them. Thus, the task facing us seems to be impossible before we even begin.

However, to say that something is difficult is not a proof of its impossibility. The study of crises is invaluable not just for learning about the errors of the past, but because it offers strong guidelines with regard to what can befall us in the future if we don't undertake the right preparations and corrective actions.

Major crises teach that ALL of our important assumptions—not just one or two—regarding why we believe that we *won't* have a crisis are invalidated. Most of us can live if one or two of our cherished beliefs crash, but few can function when our whole belief systems are totally invalidated.

Like it or not, we have no choice but to know our assumptions as best we can. In the beginning and end, everything depends not only on the quality of our assumptions, but also on how well we continually examine, critique, and replace them when they no longer serve their original intended purposes.

The foregoing contentions are some of the main assumptions of this book! We cannot say it any more clearly or straightforwardly.

Finally, this chapter has deliberately looked at a number of crises that are fundamentally different from one another. We continue to do so throughout the remainder of the book. Only by examining the most diverse array of crises can we begin to assure ourselves that we are in any way familiar with a wide range of the different kinds of assumptions that are involved in crises.

Notes

1 Casselman, Ben, and Gold, Russell, "Unlikely decisions set stage for BP disaster," *The Wall Street Journal*, Thursday, May 27, 2010.
2 Spear, Kevin, "Documents Show BP Chose a Less-Expensive, Less-Reliable Method for Completing Well in Gulf Oil Spill," *Orlando Sentinel*, May 23, 2010.
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2
The Risks of Risk Management

Abstract: *This chapter compares and contrasts Risk Management (RM) with Crisis Management (CM). RM aims to calculate the expected damage that crises inflict. To do this, RM multiplies the likelihood of a crisis by its consequences measured in dollars, injuries, and so on. It then ranks crises in terms of their expected damage, and ignores crises that are below a certain cut-off level. Inevitably, RM neglects disasters that are extremely low in probability but high in consequences such as 9/11. CM acknowledges not only the existence of deep assumptions that prevent serious planning for crises, but surfaces such assumptions so that we can confront and overcome them. For CM, the least likely crises are precisely the ones that are most likely to do the worst damage. In effect,* CM is the Management of Key Assumptions.

Mitroff, Ian I. and Can M. Alpaslan. *The Crisis-Prone Society: A Brief Guide to Managing the Beliefs That Drive Risk in Business*. New York: Palgrave Macmillan, 2014. DOI: 10.1057/9781137454836.0004.

Risk Management

Suppose that you are the founder and CEO of a company called SafQ Manufacturing, a fictitious, but otherwise realistic, company. SafQ makes a critical component for home-heating furnaces. If the component malfunctions, it could cause a furnace not to come on in the dead of winter. This is the best-case scenario. At worst, it could cause furnaces to overheat seriously possibly causing major fires and houses to burn down.

For 50 years, there have been minor incidents, but no serious crises. Although rare, a home has not heated up to a desired temperature because the device cut off prematurely. People were cold, but they did not freeze to death. Nothing has even come close to a serious problem, let alone a major fire.

However, recently, more and more small problems have been showing up. Since the problems have been relatively minor as well as few and far between, no important alarm bells have gone off. For example, devices have been cutting off a few degrees lower than usual. Nonetheless, 50 years is a long time to operate without major problems. As a result, SafQ continues to function under the chief assumption that the probability of one of its component parts failing is exceedingly small, say one in a million. (SafQ has no valid, scientific, for example, statistical, reasons for the figure one in a million. It's just part of the company's folklore.) Thus, even if a million dollar house burned down and there was a major lawsuit, a probability of one in a million times a $10,000,000 lawsuit is still on average only $10! SafQ could more than afford to pay out $10 many times over. Even if 1,000 houses burned down, it would only cost SafQ on average $10,000. Of course, this kind of calculation doesn't account for all the money that would be lost to bad publicity.

The figure of $10 is based on the logic of traditional RM. Suppose we have an unbiased coin. If we toss it 100 times, we would expect the coin to come up heads 50 times and tails 50 times. (Actually, even if the coin is unbiased, it's still possible to get 70 heads and 30 tails, or any other amount of heads and tails as long as they add up to 100. Furthermore, even if the probability is exceedingly small, it's still possible for an unbiased coin to have a run of 70 heads in a row.) Suppose further that every time the coin comes up heads we win a dollar and every time it comes up tails, we lose two dollars. On average, we would then expect to get 50 times one dollar minus 50 times two dollars or to lose 50 dollars. That is, $50 \times \$1 - 50 \times \$2 = -\$50$.

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In more general terms: the number of times, or probability, that heads comes up multiplied by the amount of money one gets or loses if a head shows plus the number of times, or probability, that tails comes up multiplied by the amount of money one gets or loses if a tail comes up EQUALS ON AVERAGE the total amount of money one expects to make or to lose. In the theory of probability, this procedure is known as Expected Value, that is, the amount of money we expect to make on average. In RM, RISK is equal to Expected Value. In short, RISK EQUALS THE TOTAL, AVERAGE AMOUNT OF MONEY THAT ONE EXPECTS TO MAKE OR LOSE.

Unfortunately, the problems with this seemingly simple procedure are many and often quite serious. Even if one has a lot of historical data, one rarely knows exactly or reliably the probabilities that something will fail or succeed today or tomorrow. To extrapolate from past historical records, one has to make the critical assumption that the future will be like the past. One also has to make the critical assumption that the conditions that made for past performance will be the same for future performance. This requires that one knows or assumes what past conditions were. Even if such conditions are known, they can still change, often drastically and suddenly, without one necessarily being aware of them.

The procedure also assumes that we know, again reliably, what the consequences of failure or success are. For many situations, we don't know or have such knowledge. Recall the nuclear toxic waste crisis that we may be creating for future civilizations.

The procedure is also flawed in the sense that we never experience the "expected" or "average" costs of success and failure. We experience the "actual" costs of success and failure. We don't necessarily experience the costs or benefits in terms of the procedure for calculating Risks. Thus, if a $1,000,000 house burns down, then more likely than not, it will cost much more than $1,000,000 to rebuild it to today's standards.

The same problems arise if instead of using data, we use mathematical models for estimating probabilities or consequences. For this and other reasons, the authors are extremely dubious with regard to the typical applications of RM. This doesn't mean that we never calculate Risks, but that we calculate and use them very differently.

For instance, when we are working with an organization, we typically split a group of 30 or so people into at least four subgroups. One group is asked to consider the assumptions they have to make, for

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example, that a disaster hitting their city or town is both highly probable and high in costs. Another is asked to consider the assumptions they have to make such that a disaster hitting their location is low in probability, but high in costs. Still another is asked to consider the assumptions they have to make that a disaster is highly probable, but low in costs. Finally, the last group is asked to consider the assumptions they have to make such that a disaster is low in probability and low in costs.

The reason for having four groups explicitly look at the same event from four different perspectives is that the assumptions underlying the use of RM are too critical to trust a single number that purports to represent "'the true Risks' associated with a critical situation." We cannot stress enough that we are extremely reluctant to trust any single number that purports to measure Risk. One cannot trust any single number without knowing the assumptions that led to it.

There is another aspect of RM that is equally troubling. Since Risks are determined by multiplying the probability of the occurrence of an event by its consequences measured either in dollars, lives lost, injuries, and so on, a cut-off point is usually specified in comparing multiple Risks. That is, Risks are ranked in terms of their Expected Value and those that are below a certain cut-off level are typically ignored. This means that disasters such as 9/11 that are very low in probability but high in consequences are typically neglected. In sharp contrast, CM does not ignore such Risks. This is precisely why we prefer CM.

There is one more equally troubling aspect of RM. Calculating Risks should they occur without plans for managing them is at best only half of the task. What good is it to know the magnitude of Risks if we have no way of managing them before, during, and after their occurrence, assuming, of course, that we have calculated the magnitudes of the Risk accurately to begin with? This again is why we prefer CM to RM.

If RM has such serious problems, why then is it used so widely? RM appeals to a high-tech society such as ours that is highly enamored with science and technology. For all its faults and limitations, RM confers the patina of precision, exactitude, and most of all, "Hard Science." RM is thus used to help protect organizations legally and politically. They can claim that they have used the best tools currently available to protect themselves and the public from widespread harm. But, as we have seen, RM is anything but a "Hard Science." It is dependent upon countless assumptions, many of which we are not aware.

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As an important aside, NO science is ever completely "hard." Every science rests on a bedrock of critical assumptions. We deliberately refrain from calling such assumptions "soft," as far too many unfortunately do, because calling something "soft" demeans their importance. One of the most critical assumptions underlying RM is that it can be applied to complex situations. The concept of Expected Value, which underlies RM, was developed historically for relatively simple situations such as the tossing of coins, dice, and drawing of cards. These situations are structured enough such that the probabilities and consequences of various events such as 50 heads in a row or drawing an ace from a deck of cards can be computed. But without positing some very strong assumptions, it does not follow that the concept of Expected Value can be applied wholesale to complex situations.

We cannot emphasize enough that even if we were able to measure Risks accurately and reliably, by itself this does not necessarily help us to manage Risks because the act of measurement does not automatically lead to management. The Great Financial Recession of 2008 demonstrated that a number of the banks that were deemed "Too Large to Fail" told their RM departments in effect to "take a hike." The money that was being made in risky and criminal transactions was far too much to be hamstrung by overzealous considerations of Risk even though the estimates of Risk were close to the mark in many instances.

With these limitations in mind, we turn to CM. While we are firm advocates of it, we would be less than honest if we didn't note that CM is not without its own limitations as well. We cannot always know whether our preparations are adequate or not prior to the occurrence of an actual crisis. In spite of this, we believe that CM is more systematic and systemic than RM.

Crisis Management

If SafQ were following the tenets of Proactive CM, then well before the first signs of serious trouble, it would already be collecting early warning signs of both potential and real problems with its heating components. (Notice carefully that RM does not necessarily collect early warning signs of potential Risks.) Corporations and government agencies typically collect volumes of up-to-date, daily information on their sales, revenues, costs, and expenditures. They also collect reams of information on their

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customers, clients, and those they serve generally. Thus, when it is in their direct interest, organizations collect all kinds of information. This is especially the case in the age of "Big Data" where organizations collect and process mountains of data in order to understand their customers better and hence sell more of their products and services. Given all the recent concerns with regard to what the U.S. government surreptitiously collects about its own citizens, there is as much to be concerned about "private organizations" as there is about "government organizations."

Those who practice Proactive CM also collect timely information on potential problems with regard to their products and services. While not perfect by any standard, by collecting early warning signals of potential problems, they engage in the best form of CM: preventing crises before they happen, and thus, before they are too big to handle properly.

As an important aside, it has come to light that months prior to all the problems that millions of people experienced with the Affordable Care website, President Obama was informed that serious problems were highly likely.[1] This is direct contradiction to the president's claim that he was not informed prior to all of the problems with the website. How good the information he was given was, of course, is another matter. Nonetheless, the fact that such information has surfaced reveals another important aspect of crises: in today's 24/7, highly charged news world, there are few if any secrets. One has no alternative but to act as if all of one's important, highly prized information will be revealed sooner rather than later. (As we show later, to put it mildly, this has important repercussions for how we treat the case of Edward Snowden.)

To collect signals of potential crises requires one to think broadly about the kinds of crises that can and will strike one's organization, industry, society, civilization, or the planet as a whole. Thus, to continue with our example, SafQ's problems with its components could have originated in any part of the company.

For instance, the problems could have started with the initial design of the heating component. The components could have been designed improperly from the very beginning. If this were the case, then perhaps Quality Control failed to do its job in picking up that the components were substandard. Or perhaps a disgruntled employee tampered with the records of the inspections conducted by Quality Control. Thus, conceivably, criminal malfeasance could be involved. Perhaps one of the foremen, top mangers, or executives is in league with one of SafQ's main

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competitors. They could have a stake in seeing that SafQ produced faulty parts.

Information Technology (IT) could be involved if it failed to do its job or crucial information was tampered with. Since SafQ's components contain computer chips and the machinery for making the parts are controlled by computers, the potential for tampering with and disabling key information is high. Perhaps the chips themselves were faulty and not inspected thoroughly. Suppose a Natural Hazard resulted in a disaster that affected the operation of critical machinery. Suppose that a downturn in the economy forced letting go some of SafQ's key employees or they left of their own accord. Suppose that the employees who remained suffered from low morale and even engaged in sabotage. Suppose the media got hold of SafQ's troubles and made the link with homes that burned down as a result of the failure of its components. Finally, suppose that unless SafQ's parts were produced properly, they represent a severe threat to the environment.

What's interesting and important about all of the preceding suppositions is that they not only represent different *factors* that can cause a major crisis for SafQ, but they also represent different *types of crises*. Thus, there are Informational, Economic, Criminal, Media, Environmental, and other kinds of crises.

What's even more interesting and important is that any one of the various factors and types of crises acting either singly or in combination can produce any of the other crises. **Every type of crisis can be the cause and/or the effect of any other**. In short, the various factors and kinds of crises constitute a tightly coupled system. This is precisely why CM is systemic. CM must be done systemically or it cannot be done effectively at all.

The best organizations—those that are Crisis Prepared—understand this implicitly. They not only prepare for *at least one* of the various types, but they "connect the dots." They do not prepare for individual crises in isolation. In other words, they do NOT assume that any major crisis will occur in isolation.

It is not that Crisis Prepared organizations are perfect by any means. Like all organizations, they too experience crises. But by being prepared, they experience significantly fewer of them, and they recover significantly faster with substantially fewer injuries, lawsuits, and loss of revenues than those that are not prepared. In sharp contrast, Crisis-Prone

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organizations are not prepared. This is precisely why they are more susceptible to experience crises.

Deepest assumptions

We leave other important aspects of CM for later. However, one aspect is extremely critical. It involves the deepest layers of an organization—its culture.

One of Sigmund Freud's most important discoveries was not only the existence, but the functioning of Defense Mechanisms, that is, the various devices the mind used to protect itself from painful events and situations. For example, faced with the possibility of certain death, serious injury, sexual assault, and the like, a person's mind was perfectly capable of shutting down and engaging in Denial. It could block, and thereby deny altogether, the existence or certainty of painful events. Or, it could engage in Disavowal. It could recognize the existence of serious threats, but it could reduce their magnitude considerably such that they were bearable psychologically. Thus, for example, faced with the direct threat of a man-eating tiger, the mind could reduce the threat to a small, harmless cat.

The mind of a person could also engage in Idealization and Grandiosity. In this case, people could trick themselves into believing that they were Supermen or Superwomen, thereby able to handle and overcome any challenge that was thrown at them.

People could also Project their inner turmoil outwards and blame someone or something else for their predicament. They could engage in Compartmentalization whereby they could see a threat (register it by sight) but not connect the smells and sounds of a threat because if they did, then they would be overwhelmed and become paralyzed. Finally, people could engage in Intellectualization whereby they could rationalize or think a threat away.

Mitroff and Alpaslan and their colleagues discovered that there were direct organizational parallels with individual defense mechanisms. Organizations also used various defense mechanisms to trick themselves into believing that they wouldn't be subject to crises. If this were true, then they had no need to engage in Proactive CM. In effect, the various defense mechanisms served as organizational assumptions as to why they didn't need to think about crises because they weren't subject to them.

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Thus, Denial took the form of Invulnerability, for example, "We are invulnerable as an organization; nothing can bring us down!" Disavowal assumed the form, "The impacts of crises are negligible." Idealization became, "We don't have any problems." Grandisoity became, "We can handle and react to anything. Therefore, there is no need to plan and prepare for crises." Projection became, "Someone else is to blame for all our problems." And, Compartmentalization assumed the form, "Crises can't affect our whole system."

Needless to say, such assumptions run deep. They make it virtually impossible for an organization merely to acknowledge the possibility of crises, let alone take them seriously, and thereby plan and prepare for them.

Concluding remarks

This chapter has outlined, compared, and contrasted the essentials of RM versus CM.

In a word, CM digs deeper. It not only acknowledges the existence of deep assumptions that prevent serious planning for crises, but it also works to bring such assumptions up to the surface where they can be confronted and overcome. The assumptions we have identified not only hamper the effective deployment of CM, but they sabotage all of the key initiatives and programs of organizations.

In effect, *CM is the Management of Key Assumptions*.

Finally, the discussion provides a strong heuristic with regard to thinking about, planning for, and preparing for crises. Every organization not only needs to think about the distinct form that each of the various types of crises can assume in their organization and for their particular set of circumstances, but it needs to give special attention to those crises that it thinks are the least likely to happen, and thus experience. The crises that one assumes are the least likely to occur are precisely the ones that are most likely to do the worst financial, emotional, media, and other damages. In today's world, one avoids thinking about the unthinkable at great peril!

With these ideas as background, let us turn to an examination of certain aspects of modern societies that are especially prone to major crises, disasters, and so on. In particular, we examine the assumptions that were made prior to the crises such that the organizations, institutions, and so on didn't think they would experience major crises.

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Note

1 Roberta Rampton, and Bohan, Caren, "Obama was briefed earlier in year on health website problems," *Reuters Website*, Washington, Wednesday, November 20, http://www.reuters.com/article/2013/11/20/us-usa-healthcare-idUSBRE9AI18920131120.

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3

Why Technology Always Bites Back

Abstract: *We investigate the faulty assumptions responsible for the failure of a prime technology. We show that many of the faulty assumptions apply to virtually all technologies, and that, in essence, technology is literally encased in a vast and complex web of institutions and stakeholders, and their assumptions. We raise a prime ethical question: If technologies contain potentially dangerous known and unknown side effects, should we ever use any technology, the consequences of which we do not completely understand and are able to contain? We argue that the management of technology and Ethical Management must be done together at every step from the initial design of a technology to its operation, maintenance, and eventual disposal. In short, we show why technology and ethics are inseparable.*

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Fukushima

On Friday, March 11, 2011, a magnitude 9.0 earthquake, the most powerful ever to hit Japan, occurred off its Pacific Coast. Since modern records began in 1900, it was the fifth most powerful earthquake ever recorded. The earthquake not only triggered strong tsunami waves that reached heights of 133 ft., but it moved the main island of Japan 8 ft. eastward and shifted the Earth's axis by estimates between four and ten inches.

In September 2012, the Japanese National Police Agency confirmed that there were 15,883 deaths, 6,150 injuries, and 2,651 people missing as a result of the earthquake; 129,225 buildings totally collapsed, 254,204 buildings were reported as "half collapsed," and another 691,766 buildings were partially damaged.

The earthquake was responsible for the meltdown of three reactors at the Fukushima Daiichi Nuclear Power Plant. Electric generators failed when they were inundated by a 13-meter high tsunami that overwhelmed the ten-meter high seawall that was supposed to protect the plant from seawater.

The generators are extremely critical. They supply power to the pumps that constantly circulate the water to cool the reactors so that they don't dangerously overheat, which unfortunately they did.

The World Bank estimated the economic cost at 235 billion U.S. dollars, making it in their terms, the costliest "Natural Disaster" in world history. In contrast, post analyses establish beyond any doubt whatsoever that Fukushima was anything but a "Natural Disaster." It was a "Human-Caused Disaster" of the first order.

To say that Fukushima raises troubling questions is putting it mildly.

First, how was it possible that a major nuclear disaster on the scale of Chernobyl not only happened in one of the world's most industrially advanced countries, but in a country that is supposedly the most prepared for "Natural Disasters?"

According to a report by Greenpeace, Fukushima completely destroyed the myth of "nuclear safety." There are only unpredictable nuclear risks that can occur at any time. In contrast, the nuclear power industry not only functioned under, but promoted, the dubious assumption that the design of reactors and their operations were such that the probability of a Fukushima type "accident" was so low that it warranted little, if any, concern. As a matter of fact, the industry still continues to use the same flawed Risk models to calculate the Risk of a nuclear meltdown.

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In sum, Fukushima was not an extremely rare, Black Swan event as it was portrayed, that is, a highly improbable event so low such as not to warrant serious concerns. In fact, reports warning of the vulnerability of Japan's nuclear reactors to "Natural Disasters" had been written about for decades prior to the disaster. Although rare, a magnitude 9.0 earthquake was not unthinkable, let alone completely improbable.

Second, it was known that there were crucial vulnerabilities in the initial design of the reactors. As a result, some, but not all, of the earlier reactors were replaced. Those that were not replaced were the ones that failed. Also, the generators that ran the pumps that cooled the newer reactors were encased in concrete structures to keep them from being flooded by seawater. In contrast, the older generators were housed in wooden huts that were extremely vulnerable to being swamped. Most damning of all, the preceding facts were covered up by both the Japanese government and the Tokyo Electric Power Company (TEPCO) that owned and operated the plant.

Third, emergency-planning systems failed completely. Many people were needlessly exposed to radiation. In one of the worst aspects of the entire disaster, in fear for their own lives, nurses and doctors abandoned their posts at clinics and hospitals leaving the frailest without care or the possibility of evacuation. For another, it was assumed that people would only be displaced for days, not weeks and months. It was also assumed that the radiation would be confined to relatively small regions around the plant and not be widespread. In some cases, people were evacuated to areas with more, not less, radiation. Finally, compounding the disaster, the communities to which people were evacuated ran out of food and fuel.

Fourth, TEPCO escaped full liability. Many who lost their homes and land were offered as little as 1,000 U.S. dollars in compensation. To add insult to injury, to receive payment, those affected had to plow through a 60-page application form accompanied by a 150 pages of instructions before they could even file a claim. When the Japanese government stepped in to offer financial aid, the Japanese people in effect paid for TEPCO's lax management. Finally, the disaster exposed the collusion between TEPCO and the government in the negligent regulation of the industry.

The government was caught in a serious role conflict. On the one hand, it was the promoter of nuclear power. On the other hand, it was the main regulator or cop of the industry. Further blurring the lines between the

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two, officials in TEPCO and the government constantly went back and forth.

Fifth, the actual amount of radiation that was released depended, as it always does, on which organization did the calculations. The notion of objectivity was once again exposed as a myth. Nonetheless, all parties agreed that that it was the largest discharge of radio elements into the Pacific Ocean.

With this as background, let us list as we did in Chapter 1 the assumptions that were invalidated by the disaster.

1. Being a world-leader in preparation for "Natural Disasters" ensures preparation for "Human-Caused Disasters."
2. In the extremely rare case that a nuclear meltdown actually occurred, it would be the result of a "Natural Disaster," and furthermore, it would be regarded as such by all parties.
3. Saving costs by building the plant farther up on an overlooking bluff would not come back to haunt TEPCO and the government. Putting the generators in flimsy wooden buildings would be sufficient to protect the reactors from a meltdown.
4. Replacing some, but not all, of the initial reactors is sufficient.
5. The fact the initial design of the reactors was flawed would not be a prominent factor in a disaster, and the fact that they were flawed wouldn't come to light.
6. People would be evacuated to safer, not more dangerous, areas.
7. Emergency systems would work as planned.
8. People would be fairly and timely compensated for whatever losses they incurred.
9. People would be evacuated for days at most, not for weeks and months. Further, it would not be the case that many people would never return.
10. The government and TEPCO would not be caught in collusion and lies.
11. The government would not be caught in a serious role conflict between being a promoter of nuclear power and the regulator of it.
12. Doctors and nurses would not abandon their posts in time of greatest need. It is completely unthinkable that they would even consider doing so.
13. Finally, all of the above would not come to light!

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Because in many cases the assumptions are perfectly general, they warrant further comment.

The first assumption is a "Generality of Preparation." It assumes that preparation for a very limited, particular set of crises, disasters, and so on confers preparation for any and all types. This is plainly false. For instance, preparation for physical hazards does automatically confer preparation for social crises such as corruption, and vice versa.

The second assumes that how one party frames a disaster is how others will see it as well. This is a "General Framing Assumption." Thus, if we call it a "Natural Disaster," the world will agree with us.

The third is that cost cutting will not affect safety. Unfortunately, this assumption is made time and again by organizations that manage dangerous technologies. As we saw, BP made it with regard to the Gulf.

The fourth is a form of Disavowal. Partial improvements in a system that is tightly coupled are enough. The system as a system will not fail.

The fifth is that poor initial conditions won't affect later conditions. The future is somehow decoupled from the past.

The sixth is that people will not be put in greater harm. Talk about feelings of betrayal. The twelfth assumption is involved here as well.

The seventh is that things will work as planned.

The eighth is that people will be compensated fairly. This is not only an assumption about compensation systems, but fundamentally, it is about justice.

The ninth is that there will be clear, definitive limits to the time people will spend away from their homes, jobs, and lives. In other words, disruptions will be minimized.

The tenth is that we can trust the government implicitly to act in our best interests. It will not betray us.

The eleventh is that the government is free of role conflicts that can harm us.

The twelfth is that we can always trust our doctors and nurses.

And, the thirteenth is that none of the above will come to light. Secrets will remain secrets.

We cannot emphasize enough that the assumptions are extremely general. They pertain to virtually all technologies.

One of the most far-ranging conclusions is that technology never manages itself. It is literally encased—intertwined—in a vast and

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complex web of social institutions and stakeholders. Most important of all, technology and ethics are inseparable.

Nuclear disasters such as Chernobyl and Fukushima affect everyone. Even if we eventually find ways to avoid future nuclear disasters, the problem would be far from over. As we noted in Chapter 1, we still need to find ways to store the nuclear waste we have already created and are creating everyday. This is not a simple technical problem because nuclear waste remains lethal for tens of thousands of years. What we do with nuclear waste today affects not only future generations, but future civilizations as well. And, figuring out how to store nuclear waste safely is only a part of the mess. How to label it so that future civilizations stay away from it is another.

Scholars, businesses, and governments have been studying the messy issue of nuclear waste for a long time. Unfortunately, it seems that there is no foolproof way of storing nuclear waste or communicating its dangers to future civilizations. For instance, we cannot rule out the possibility that future civilizations can and will accidentally drill into toxic nuclear waste as they search and drill for resources. We cannot also rule out the possibility that future civilizations and scholars will not be able to understand and believe our warning signs and symbols.

This leaves us with the following prime ethical questions: Should we use nuclear energy at all? More generally, should we ever use any technology, the consequences of which we do not completely understand and are able to contain? Notice carefully that if we answer "No," then this means that we would abandon the use of virtually all technologies. All technologies contain potentially dangerous known and unknown side effects.

Concluding remarks

After so damning a discussion, it may come as a shock to learn that the authors are not unalterably opposed to nuclear energy or technology in general. Indeed, both authors have degrees in Engineering. Mitroff has a Ph.D. in Engineering Science and Alpaslan has a B.S. in Mechanical Engineering. What we are firmly opposed to is the all-too-often radical separation of Technology and Ethical Management.

Technology and Ethical Management must be done together at every step from the initial design of a technology to its operation, maintenance,

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and eventual disposal. One cannot develop dangerous technologies and then only afterward give thought to their Ethical Management. They are either done together throughout or they are not done properly at all. For instance, while not perfect by any standard, Historians and Sociologists of Technology must be integral members of the teams that develop technologies of any kind.

Take, for example, Social Media. Facebook should have anticipated from the very beginning that teenagers could and would use it as a prime vehicle to engage in cyber bullying. Parents and experts—even young people themselves—should have been involved early on to fashion steps to help counter bullying.

This means that one not only has to practice Proactive CM at the very beginning but throughout the lifespan of a technology. Thus, if one builds ten-meter high seawalls in the beginning to hold back seawater, then as a condition of being allowed to continue to operate, the seawalls must be increased by a specified amount each year until they reach the height necessary to withstand, at a minimum, the highest known recorded tsunami waves, and if technologically possible and economically feasible, even higher waves. For the very simple fact that the highest known recorded tsunami wave will not remain forever as the highest known wave.

This chapter has investigated the faulty assumptions responsible for the failure of one prime technology. Nonetheless, we have shown that many of the assumptions are perfectly general such that they apply to many, if not virtually all, technologies.

There is another consideration that makes the results of this chapter more general. This is the fact that depending upon those factors that we emphasize, any of the examples in this book can be used to illustrate any of the various types of crises.

Finally, a chilling footnote to Fukushima dispels any doubt whatsoever that not only was Fukushima a Human-Caused Disaster of the first magnitude, but that it continues to be one three years after its occurrence. This is the fact that only the poor and unskilled are willing to do the cleanup job. As an article in *The New York Times* put it:

> "'Out of work? Nowhere to live? Nowhere to go? Nothing to eat?' the online ad reads. 'Come to Fukushima.'"
>
> "That grim posting targeting the destitute, by a company seeking laborers for the ravaged Fukushima Daiichi nuclear plant, is one of the starkest indications yet of an increasingly troubled search for workers willing to carry out the hazardous decommissioning at the site."[1]

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Technology not only bites back, but poorly designed and operated technology keeps biting back indefinitely.

Note

1 Tabuchi, Hiroko, "Fukushima cleaned up by poor and unskilled," *The New York Times,* Monday, March 17, 2014, p. A1.

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4

Why People and Organizations Break Down

Abstract: *One of the most difficult tasks facing humans is to become aware of and challenge their key operating assumptions* before *a major crisis has occurred. The only way to do this is to study a wide variety of crises both within and outside of one's industry. In addition, one must continually study and review the assumptions under which one's organization and technology operate. In this chapter, we focus on several operating assumptions that lead to technological and organizational breakdowns. We investigate why the reliance on technology is not always a good idea, why training is not enough, why organizational culture matters, why organizations mistake the absence of accidents for the presence of safe operations, and why organizations constantly drift away from safety into failure.*

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Asiana Airlines Flight 214

On July 6, 2013, in conditions of clear weather and excellent visibility, Asiana Airlines Flight 214, a Boeing 777 airliner from Incheon, South Korea, crashed on its final approach to San Francisco International Airport (SFO). Because it was flying too slow and too low, Asiana 214 crashed into the seawall that protected the runway on which it was supposed to land. It was revealed later that the crew had failed to operate properly the automatic controls that were supposed to land the plane safely. As a result, three of the 307 people aboard died.

In Mitroff's talks with retired pilots, it was pointed out that Asiana 214's pilots may have confused the Boeing 777 instrument panels with those of other planes. The panels are similar enough such that it is easy to operate a control in a plane thinking that it's the right one when it isn't.

Furthermore, one of the pilots with whom Mitroff spoke said that he just happened to be that day in a park directly under the final flight path into SFO. He noticed that a plane that was landing was off course. It was Asiana 214.

Three captains and one first officer were in charge of the plane. Captain Lee Jeong-min was both the flight instructor and the command captain responsible for the safe operation of the plane. Captain Lee Jeong-min had 12,387 hours of flying experience of which 3,220 hours were in a 777. Still, it was his first flight as an instructor.

Captain Lee Kang-kook, the pilot who was receiving his initial operating training (IOE), was halfway through Asiana's IOE requirements. He had 9,793 hours of flying experience of which nine flights totaling 43 hours were in a 777. He was operating the controls under the supervision of Captain Lee Jeong-min as the instructor.

Although he had previously landed a Boeing 747 and other aircraft in San Francisco, it was Lee Kang-kook's first landing at SFO in a 777. It was also his first flight with Captain Lee Jeong-min.

At the time of the crash, relief first officer Bong Dong-won was observing operations from the cockpit in a jump seat. Relief captain Lee Jong-joo was sitting in business-class in the passenger cabin.

The first officer in the cockpit received medical treatment for a cracked rib. None of the other pilots needed hospital care.

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Twelve flight attendants were onboard: ten South Korean and two Thai. Six flight attendants received physical and emotional treatment. The other six returned to South Korea.

A few days after the crash, *USA Today* carried the remarks of retired pilot Barry Schiff. We read them with more than a modicum of disquiet and annoyance. According to Mr. Schiff, one shouldn't be afraid to fly on planes with pilots who are undergoing training with a supervising pilot. After all, given the high cost of fuel, it would be highly uneconomical for the airlines to have pilots fly training missions with no passengers aboard.

That may indeed be a perfectly reasonable and well-accepted assumption or operating condition for Mr. Schiff and the other members of the airline industry, but it's not for us. This is precisely why one can never leave the testing and acceptance of key assumptions to the members of a company or industry. This is also why when we conduct CM workshops, we insist upon having members from different industries present who can challenge the "normal, accepted modes of thinking" of those inside an industry.

The crash of Asiana Flight 214 raised a number of questions about some of the key assumptions under which airlines operate.

First, because pilots have accumulated a lot of hours, it doesn't follow that they will quickly and easily coalesce into a tightly integrated team with other pilots, especially those with whom they have never flown before. If it takes many hours to become an experienced pilot, it takes many hours to become a member of a well-functioning team. You can't just throw people together in high-stress, precarious situations and expect them to handle it without making errors. Indeed, the more success one has as an individual, often the more difficult it is to be part of a team. This is especially true in situations where the captain is virtually always assumed to be right and hence never questioned. In such cases, crewmembers have to be trained explicitly to challenge the actions and decisions of anyone in charge. This is especially true of cultures where it is not natural or permissible to question those in authority.

Second, criticisms have come to the fore recently with regard to the overuse and overreliance on computers on critical operations such as landing. While computers are obviously important, and no one wants to

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get rid of them, overreliance has a detrimental effect on flying skills. One cannot assume that computers alone confer safety. Both of these factors/assumptions were judged to play a key role in the crash.

Assumptions really are a matter of life and death.

Children's Hospital in Boston

In 2003, a five-year-old boy died at Children's Hospital in Boston,[1] a top pediatric center, after experiencing a severe 1.5-hour-long seizure because none of the attending medical staff—several doctors and nurses—recognized on time the severity of the boy's condition and made the crucial decision that would have saved the boy's life.[2]

There is no doubt whatsoever that the doctors and nurses in Boston wanted to save the boy's life. But when the formal procedures of the hospital and the "informal, unwritten rules of medicine" interacted with the social processes that were going on in the hospital room, the doctors and nurses failed to act.[3] For instance, everyone in the room was comforted by the presence of others. As a result, they collectively misjudged the gravity of the situation. After all, if the boy were in really serious condition, someone would have already taken action.

Responsibilities become diffuse—and reality becomes disjointed—when there are too many experts with too many differences in rank. Everyone assumed that it was someone else's direct responsibility to act. Everyone also deferred to those higher in rank. Nurses deferred to interns, interns to residents, and residents to the attending physician. No one wanted to make an embarrassing mistake. By the time the highest-ranked physician arrived and intervened, the boy had already stopped breathing. No one in the room responded to the boy's condition; instead, they responded to each other's presence.

The story of the boy reminds us of another well-known, sad story:[4] According to the conventional version of the story, more than 40 years ago, Kitty Genovese was murdered in the presence of at least 38 witnesses none of whom helped her or even called the police. Scholars have suggested a number of explanations: The various witnesses did not observe each other so each had a reason to believe that someone else had already intervened or called the police; they were worried about their own safety; they didn't want to be blamed; they didn't want to embarrass themselves by overreacting, and so on.

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There are striking similarities between the two stories, but the differences are even more striking. Those who witnessed the Genovese murder did not belong to the same organization, but everyone in the hospital room did. More importantly, the organization, Children's Hospital in Boston, was purposefully designed to prevent and respond to such events.

It is important to note that the facts surrounding the initial accounts and renditions of the Kitty Genovese case appear to have been seriously distorted.[5] The number 38 was due to a clerical error, and one neighbor actually chased the attacker away while another called the police. It's not only assumptions that need to be tracked, but facts as well.

Blackhawk down

In 1994, two U.S. Army Black Hawk helicopters were shot down by friendly fire in northern Iraq.[6] All the passengers—military personnel and peace-keepers—on board of the helicopters were killed.[7] This was the first major accident in more than 1,000 days and 50,000 hours of safe flight operations. General John M. Shalikashvili, Chairman of the Joint Chiefs of Staff at the time pointed out that the accident happened when a series of safeguards broke down and that each of these errors was avoidable.[8]

Virtually all organizations are in constant danger of breaking down. This often occurs when the actions of each unit slowly deviate or become uncoupled from written procedures.[9] When units try to become more efficient, they often modify the written procedures that have initially guided the design of the whole organization.[10] Over time, practices that are efficient locally become taken-for-granted and replace the practices dictated by written procedures. But, when local units drift away from written procedures, which may be entirely justified, they assume that other units will not only follow their example, but are "in sync." Also, as a rule, the units generally don't inform one another that they've modified their local practices and how they modified them. When something out of the ordinary forces all of the units to interact, or to act in concert, with each other, every unit assumes that all the other units are following the same procedures. Since this assumption is wrong, unexpected and unplanned interactions between units make the initial problem worse, if not cause a major crisis.

The accident is too long and rich to cover in detail here. Instead, we want to focus on only some of the key assumptions that were violated.[11]

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Assumption 1. Because all coalition aircraft *must* be listed on the flow sheets for F-15's, therefore they *will be* listed. (A flow sheet is a diagrammatic representation of the sequence of events in an operation.)

Although all coalition aircraft must be listed on the F-15 flow sheets, the U.S. Army helicopters that were accidentally shot down were not. "Why?" is of course THE question! Because F-15s are air-to-air combat aircraft, and as such, never fly at low altitudes, F-15 pilots do not need to know where helicopters are. In fact, within the F-15 culture, helicopters are not considered "aircraft." The F-15 is a dogfighter. It is not in the same category with "low status helicopters." This is a prime example of how the local definition of a very important and supposedly unambiguous concept of what is an "aircraft" can differ from the general definition.[12]

Assumption 2. No aircraft will fly in the no-fly zone prior to F-15s.

Helicopters entered the no-fly zone before the area was swept by F-15s because the incursion was "personally approved" by General Pilkington, who himself was an F-16 pilot. The F-16 is a multipurpose aircraft that can fly at both high and low altitudes; thus, the flow sheets of F-16s always include helicopters. Pilkington's approval of the flight not only contradicted his own policy that prohibited such flights, but he also failed to communicate his decision to other units. But even if General Pilkington had communicated effectively the exception he made, there was no guarantee that the information would have been included in the F-15's flow sheet, because helicopters are not "aircrafts."

Definitions are not arbitrary as well. Like assumptions, they can be a matter of life and death.

Assumption 3: Helicopter pilots would talk to the right controller.[13]

The pilots of the helicopters that were shot down talked to the wrong controller (the Enroute Controller) because of a very practical and locally efficient reason. The helicopter pilots wanted to avoid the rule that forces them to switch controllers (from the Enroute Controller to the No-fly-zone Controller) when they go across borders. In 90 percent of the flights, helicopters land very shortly after they've crossed a border. Thus, the pilots knew that switching controllers during landing was dangerous. The general rule simply didn't make sense, so the pilots created their own local rule: "Helicopters do not switch controllers." The rule became taken-for-granted. As a result, it began to be used in all flights. Thus, although they were flying deep inside the no fly-zone, the helicopters

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that were shot down were still talking to the Enroute Controller. But the F-15 was talking to the no-fly-zone Controller. This is another example of how changes that are efficient locally and assumptions that are not communicated or integrated into the broader system may create coordination problems across different units that are deadly.

Assumption 4: Helicopter pilots could talk directly to the F-15 pilots.

Helicopter pilots weren't able to talk to the F-15 because they weren't aware of the correct friend-or-foe (IFF) code. The general rule in the military was that all coalition aircrafts had to use only *one* IFF code wherever they happened to be flying. The Air Force, however, changed the rule after one year into the operation, and started using *two* codes: one for Iraq and another for Turkey. But they never informed the Army, and the Army helicopter pilots kept using the wrong IFF code. This is yet another example of how local practices that drift slowly away from formal written procedure can contribute to a crisis.[14]

Notice that the operations of the Air Force and the Army were loosely coupled. Thus, no accidents happened for a year. *Both organizations mistook the absence of accidents for the presence of safe operations.* Meanwhile, they were unaware that they were drifting constantly toward failure.

A constant drift toward failure

Most organizations merely *react* to major safety failures and crises.[15] After they occur, organizations become more concerned about safety and reliability. As a result, they invest more time and money in safety, reliability, and crisis prevention and response. But vigilance is temporary. When things get back to normal, and as a result of increases in allocated resources and heightened attention, the safety and reliability of operations do improve. *Organizations then begin to mistake the absence of failure for the presence of safety*. They become complacent. Eventually, resources begin to drift away from safety and reliability and toward productivity, efficiency, and profitability. The drift toward failure accelerates when there are time and cost-cutting pressures, and when organizations make a tradeoff between safety and efficiency/productivity/profitability. When the next crisis hits, the cycle begins again.

The challenge is to break the cycle and question the fundamental assumption on which it is based: That there is an acceptable tradeoff

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between safety and efficiency. There isn't, period! But, this is easier said than done. There is no doubt that after the Gulf oil spill, BP, Transocean, and other companies in the deep-water drilling industry began to (or were forced to) review their safety procedures, test their equipment, renew their commitment to safety, and so on. The corrupt branch of the government (Material Management Service) that was supposed to regulate the industry was also restructured. But if history is any guide, this renewed focus on safety will wane over time. Consider the following.

In February 2001, Mitroff and Alpaslan mailed a questionnaire on CM to the top executives of the 1,000 largest companies (measured in revenues) in the United States. In one section of the questionnaire, the executives were given a generic list of types of crises (such as fires, explosions, tampering, environmental disasters, major lawsuits), and they were asked to indicate how many of each their organization had experienced in the past three years. They were also asked to indicate the capabilities of their organization in responding to, or handling, the list of crises.

One of the crisis categories happened to be "terrorist attacks." Mitroff and Alpaslan chose to include this type because they wanted to see if U.S. companies were prepared for crises that are extremely infrequent if not improbable. Not surprisingly, the majority of the companies indicated that they had experienced no terrorist attacks and that they had very little capability to handle them. Then, 9/11 happened. In response, Mitroff and Alpaslan mailed the same questionnaire to the same executives three more times: January 2002, August 2002, and August 2003.

Analyses of the data collected over more than two years showed strong support for the notion of the constant drift toward failure and unacceptable tradeoffs between safety and productivity. A significant number of executives who responded to the two questionnaires mailed out in 2002 reported significantly higher levels of capabilities in handling or responding to terrorist attacks. Executives who responded to the questionnaire mailed in 2003, however, reported lower levels. In fact, the average level of capabilities reported *before* 9/11, and the average level reported two years *after* 9/11 were about the same. In other words, companies reacted to the 9/11 terrorist attack, increased their preparation level for terrorist attacks, and when it didn't occur again, their levels of preparation went down dramatically.

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A Canadian town blows up

We could multiply such examples *ad nauseam*. For instance, on July 8, 2013, a train loaded with oil crashed in the center of a small Canadian town. The resulting explosion not only killed five people, but it literally wiped out the entire town.

It may well have been a reasonable working assumption to let engineers take a breather by just putting the brakes on a large train carrying dangerous cargo without shutting the train down completely. It was until this working assumption failed disastrously. Now even the CEO of the company questions the practice.

We cannot emphasize enough that one of the hardest tasks facing humans is to get them to become aware of, and challenge, their key operating assumptions *before* a major crisis, disaster, and so on has occurred. Given that everything rides on the assumptions we make, knowing one's key assumptions is often literally a matter of life and death.

The only way to do this is to study a wide variety of crises both within and outside of one's industry. In addition, one must continually study and review the assumptions under which one's organization operates.

Concluding remarks

Obviously, we have only scratched the surface with regard to why far too many people and organizations are unable just to think about crises, disasters, and so on, let alone do what is necessary to be prepared for them. One thing, however, is abundantly clear. It's not necessarily what we know that hurts us, but what we don't know, and especially *what we don't want to think about that's really dangerous*.

Notes

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5
Economic Crises

Abstract: *Humans are not rational calculating machines. They suffer from a tremendous number of cognitive biases. For instance, they are not good at computing and distinguishing between probabilities; they overestimate the probability of recent or more salient events, and their degree of control over events; they are overconfident and overly optimistic; they search for and remember information that confirms their beliefs, and stick to their beliefs when presented disconfirming evidence. While humans may or may not consciously recognize their biases, psychoanalytic theory tells us that human behavior is also influenced strongly by unconscious fantasies. These fantasies and projections are among some of the deepest assumptions that humans have. In this chapter, we highlight the importance of constantly questioning our deepest assumptions about the world.*

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To understand what John Maynard Keynes referred to as "animal spirits," the "insane and irrational springs of wickedness in most men,"[1] and why individuals, organizations, and whole societies don't follow the precepts of Risk Management (RM), we need to put together two strange bedfellows, Sigmund Freud and Behavioral Economics. Neither by itself is sufficient to explain why people and organizations don't follow the presumably "rational dictates" of RM.

As we show, economics is not just a "real thing." True, it deals with "real things" such as observable economic behavior and complex institutions. But it also has deep layers of psychological meanings. In short, given the tremendous anxieties, dreams, fears, and hopes that are connected with the economy, psychological fantasies and projections most of which are unconscious are fundamental aspects of economic behavior and institutions. These fantasies and projections are among some of the deepest assumptions that humans have.

Behavioral Economics was basically invented to account for the fact that people don't reason and behave in accordance with the thinking of traditional economics. For one, people are not "cold-blooded, emotionless, rational calculating machines." In considering problems, people don't look at all of the alternatives that possibly lead to a solution. They don't even consider a large number of alternatives because they get confused and overwhelmed if there are too many of them.

For another, people are very poor when it comes to computing and distinguishing between probabilities. They are also not particularly good at weighing the consequences of various courses of action. Most people tend to be overconfident, overestimate their degree of control over events, overly optimistic about positive outcomes, search for, or remember, information that confirms their beliefs, stick to their beliefs when presented disconfirming evidence, overestimate the probability of events that are salient in their memories, and so on. All of these factors wreak havoc with RM.

While there are many factors that affect why people don't behave and reason in accordance with the dictates of traditional economics in general and RM in particular, one factor is especially important. How a problem or issue is framed initially is extremely important with how we deal with it subsequently. Amos Tversky and Daniel K Kahneman, two of the principal inventors of Behavioral Economics, showed this in one of their by now classic experiments. Tversky and Kahneman gave subjects the following:

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> Imagine that the U.S. is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimate of the consequences of the program is as follows:
>
> Half of the group was given alternatives A and B:
>
> If Program A is adopted, 200 people will be saved.
>
> If Program B is adopted, there is a 1/3 probability that 600 people will be saved, and a 2/3 probability that no people will be saved.
>
> Which of the two programs do you favor?
>
> The other half of the group was given alternatives C and D.
>
> If Program C is adopted, 400 people will die.
>
> If Program D is adopted, there is a 1/3 probability that nobody will die, and a 2/3 probability that 600 people will die.
>
> Which of the two programs would you favor?

The most interesting thing is that purely from the standpoint of RM, which as we have seen is based on Expected Value, the two situations are exactly alike. The same numbers of people die and survive in both scenarios. The chief difference is that Program A is viewed as a gain because it is presented in terms of survival whereas Program C is viewed as a loss because people die.

Two of the main findings of Behavioral Economics are that people prefer situations that are certain to those that are probable. The other is that people are loss adverse. That is, they prefer to avoid losses. It is not the case that people don't like gains, but that they dislike losses even more.

Why do people dislike losses even more than they like gains? Unfortunately, Behavioral Economics does not go far and deep enough to provide a satisfactory answer. People are far more irrational than behavioral economists assume. We need to dig deeper into the human psyche.

Here is precisely where Freud enters the discussion. Freud recognizes losses, but from an entirely different standpoint. Loss can't be defined purely or solely in terms of numbers because that's not how humans fundamentally experience it. The first and primary "loss" that humans are extremely sensitive to is the loss of one's primary caretakers, typically but not always, one's mother and father. And, "loss" is more than the death, disappearance, or abandonment by one or more of the parents. When a child is young and if for some reason the parents aren't fully "emotionally there" for the child—perhaps because their parents weren't

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emotionally there for them—then the child can experience a profound loss, sometime lasting an entire lifetime. In other words, the history of the type and amount of loss is crucial in how people experience loss later in life.

If we couple these thoughts with our earlier discussion of the Freudian Defense Mechanisms, then we begin to get a better picture of the complex sets of forces that impact and govern individuals, organizations, and societies. Imagine the not atypical case of a senior executive or a high official in an organization who experienced loss as a child, whether it be the death of a parent or a parent who was not available to meet the emotional needs of the child, then is it surprising that there might be considerable Denial in even considering the possibility of major crises, disasters, and so on? A certain amount of Denial is necessary to get up and face the hazards of a complex world, but when Denial and the other Defense Mechanisms are pronounced, one is literally out of touch with reality, and thus, unable to manage effectively.

Sigmund and Melanie go to Wall Street

Sigmund Freud and Melanie Klein are two of the giants of psychoanalysis. Among many things, both worked with the concept of phantasy. Phantasy is different from fantasy in the sense that the former refers to our *unconscious, unrecognized* emotions. According to Freud, phantasy is basically a form of wish-fulfillment.[2] For Klein, our childhood phantasies shape our behavior throughout our lives.[3]

To understand the influence of phantasy on the investment decisions of individuals, consider what Scott McNealy, the CEO of Sun Microsystems, the company that created the Java programming language, said in a *Business Week* interview in 2002:[4]

> At ten times revenues, to give you a 10-year payback, I have to pay you 100% of revenues for ten straight years in dividends. That assumes I can get that by my shareholders. That assumes I have zero cost of goods sold, which is very hard for a computer company. That assumes zero expenses, which is really hard with 39,000 employees. That assumes I pay no taxes on your dividends, which is kind of illegal. And that assumes with zero R&D for the next 10 years, I can maintain the current revenue run rate. Now, having done that, would any of you like to buy my stock at $64? Do you realize how ridiculous those basic assumptions are?

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Psychoanalytic theory offers deep insights into why Sun Microsystems shareholders' exuberance and irrationality are predictable.[5] To put the matter in a nutshell, investing is not only an economic activity, it is also an emotional activity shaped by investors' unconscious fantasies involving anger, anxiety, blame, excitement, fear, greed, and so on.[6] It is interesting to note that investment-related facts don't fluctuate much and don't change very quickly, but investors' assessments of the facts follow a fairly predictable emotional cycle: excitement, euphoria, panic, blame.[7]

Dot.com stocks as "phantasy objects"

Tuckett and Taffler make the case that Sun Microsystems is a "phantastic object." A phantastic object "is a mental representation of something (or someone) which in an imagined scene fulfills the protagonist's deepest desires to have exactly what she wants exactly when she wants it."[8] A phantastic object can be anything, or any person, that makes us feel omnipotent. For instance, railway and Internet stocks with their potential to transform the whole economy can be phantastic objects. Someone such as Alan Greenspan was a phantastic object in the sense that his monetary policies during his tenure as the chairman of the Fed resulted in a widely held expectation among investors that when the economy is in trouble, the Fed will lower interest rates and pump money into the economy until the trouble disappears. In this role, Alan Greenspan wasn't very different from the proverbial genie that came out of Aladdin's lamb and granted its owners their every wish. In short, Greenspan allowed investors to feel omnipotent. In a word, phantastic objects distort reality, making the impossible and the elusive seem not only possible, but real and tangible.

During the dot.com bubble, as the prices of dot.com stocks soared, investors felt omnipotent and excited as they treated the no-income generating, cash-burning dot.com stocks as sure bets, not as the highly risky investments they really were. The market values of companies that added ".com" to their names increased significantly more than the market values of companies that did not.[9] Eventually, dot.com investors turned the concept of "loss aversion" on its head: missing the opportunity to make more money scared investors more than losing their savings.[10]

Investors stopped using "the 'reality' principle" and began to use "the 'pleasure' principle" to assess their investments.[11] Instant gratification

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replaced long-term thinking; wishful thinking replaced risk analysis; and unconditional belief replaced doubt. Of course, the process was not free of conflict. In fact, it was extremely painful; it created enormous anxiety and guilt. Investors, however, reduced their internal conflicts by "splitting" off from their awareness information that led to "bad" feelings.[12]

After the crash in 2000, investors suddenly realized that they had been living a fantasy. As dot.com stocks disappeared, investors' unrealistic hopes turned into denial, anger, and blame.[13] This time, the market values of companies that removed ".com" from their names increased significantly.[14] Unfortunately, evidence suggests that the reality principle did not entirely replace the pleasure principle.[15] Instead, instant gratification, wishful thinking, and unconditional belief turned into feelings of panic, hate, and vengeance. In this way, one childhood fantasy replaced another.

Hedge funds as phantasy objects

Investopedia defines a "hedge fund" as "an aggressively managed portfolio of investments that uses advanced investment strategies such as leveraged, long, short, and derivative positions in both domestic and international markets with the goal of generating high returns, either in an absolute sense or over a specified market benchmark." Hedge funds have a legitimate place in diversified portfolios,[16] improving risk-adjusted returns of all kinds of portfolios.[17] Nonetheless, scholars also argue that it is difficult to measure and evaluate the performance of hedge funds.[18]

Hedge funds fascinate investors for several reasons:[19] (1) Hedge funds use highly sophisticated tools that are not available to the general public to offer high risk-adjusted returns, that is wealth; (2) The financial media always talk about or interview wealthy hedge fund managers, turning them in investors' minds into some kind of omnipotent investment gurus, fueling investors' fantasies; (3) To invest in a hedge fund is to join an elite, exclusive private club for rich and sophisticated people.

According to Barclays, in 1997, there were $118 million in hedge funds. This amount grew at an annualized rate of 33 percent to more than $2.1 trillion dollars in 2007. In 2008, during the financial crisis, as a result of their bankruptcy and investor withdrawals, hedge fund assets dropped 32 percent to $1.45 trillion.

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Before 2008, fascinated by the mystical appeal of hedge funds, investors developed an emotional bond with their hedge funds, transforming them into phantasy objects of excitement and desire.[20] As a result, hedge funds followed a trajectory that was similar to dot.coms. Focusing exclusively on the positive qualities of hedge funds, such as diversification and higher risk-adjusted returns, investors failed to acknowledge that hedge funds also had negative qualities such as difficult to measure returns and the risk of substantial downsides. Once the bubble burst in 2008, painful feelings such as panic, denial, hate, vengeance, and anger replaced feelings of pleasure, and the blame game began.

Madoff as a phantasy object

Bernie Madoff may be the best example of the love/hate/disgust relationship between investors and their phantastic objects, that is, investment gurus that appear to be omnipotent, indeed, that we need and want to be omnipotent.[21] Eshraghi and Taffler argue that Madoff successfully fueled his investors' phantasies. For instance, he told potential investors that his fund was closed, making them want even more to get into it. He had a stellar reputation among investors. Very few people questioned their assumptions about Madoff or his investment strategies.

Madoff had been chairman of Nasdaq. In addition, he was a registered advisor. Thus, people believed that he was an expert. He was also one of the big boys on Wall Street. Since Royalty and the rich invested with Madoff, they surely must know what they were doing.

Madoff was secretive because he had a working formula for investing. He refused to work with a well-established accounting firm because he was trying to protect his formula. One of his investors said, "Doubt Bernie Madoff ? Doubt Bernie? No. You doubt God. You can doubt God, but you don't doubt Bernie."[22] His friends believed that he was a good person; they respected him. In their eyes, he was a legend. In short, he was a phantasy object even though he possessed none of the qualities that were projected onto him.

Although a few observers questioned the consistency of Madoff's returns, why no one else had been able to replicate similar returns, and how Madoff executed his trading strategy without affecting the market,[23] most investors and many people in the SEC ignored the early warning signals about Madoff's fund and refused to take appropriate action.[24] In

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other words, investors failed to acknowledge the above inconsistencies and the lack of transparency in Madoff's explanations of how he did so well. In short, they focused only on the positives such as Madoff's ethos and reputation. When the financial crisis of 2008 hit, investors wanted to withdraw money from the fund and couldn't. That's when they realized that their investment guru Bernie has been running a Ponzi scheme.

Homes as phantasy objects

The S&P/Case-Shiller U.S. National Home Price Index tracks the change in home prices in the United States. A 10 percent increase in this index means that the average home price in the U.S. went up by 10 percent.

In the summer of 1996, the index was at 81. When it peaked in the summer of 2006, the index was at 190. That is, during this ten-year period, the average home price in the United States increased by 134 percent, at a rate of approximately 9 percent annually.

Once again, many homeowners and flippers focused only on the positive and avoided the negative, turning their homes into investments that could only go up in price. Once again, they were phantasy objects. Many homeowners believed that home ownership was the best path to wealth, a second home was your best investment, everyone was making a profit flipping houses, and it was different this time. Of course, it wasn't really different this time. Home prices fell by more than 30 percent between the summer of 2006 and the spring of 2009.

Maestro or Mr. Magoo: Alan Greenspan as phantasy object

As noted before, Alan Greenspan served as the chairman of the Federal Reserve Board, mostly known as the Fed, for 18 years until his retirement in 2006. During his tenure, the U.S. economy expanded and inflation declined, but it also experienced several problems such as the crash of 1987, the Asian currency crisis, the bailout of Long-Term Capital Management, the dot.com bubble, 9/11, the accounting scandals of Enron, and Arthur Andersen among others. As the U.S. economy resumed expansion after each of these crises, most investors began to trust more and more in the ability of the Fed, the lender of last resort,

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and its chairman, the "Maestro," to insure the health of the financial system and the economy. In fact, after the crash of 1987, many investors began to trust the "Greenspan put" which referred to Greenspan's loose monetary policy of lowering the overnight interest rates to combat possible financial crises. The "Greenspan put" was like an insurance policy protecting investors against risks to their investments.

By 2004, the Fed had lowered interest rates to nearly record lows, which, according to some observers, fueled the housing bubble that burst in the summer of 2006. After the housing bubble burst, Greenspan said on national television that there was a flaw in his worldview: "Those of us who have looked to the self-interest of lending institutions to protect shareholder's equity—myself especially—are in a state of shocked disbelief …" Greenspan might as well have said that his own phantasy objects, Ayn Rand and her ideology of objectivism, which tout rational selfishness, failed him.

Concluding remarks

Economic and financial crises have been with us as long as there have been financial markets and economies. There are no reasons to believe that they will not occur in the future. The actors and contexts will be different but the mechanisms underlying the booms and busts, manias and crashes, bubbles and bursts will remain the same.

Behavioral Economics tells us that humans suffer from a tremendous number of cognitive biases. Psychoanalytic theory digs deeper and tells us that human behavior is influenced strongly by unconscious fantasies that involve emotions such as fear, greed, anxiety, excitement, anger, and blame.

If nothing else, this chapter highlights the importance of constantly questioning our deepest assumptions. Our perceptions and understanding of the world are often heavily influenced, if not completely shaped, by our biases and unconscious desires.

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6
Political Crises

Abstract: *We look at some of the underlying assumptions that are deeply rooted in our fundamental beliefs and ideas about what makes us Americans. We review several studies that highlight some of the most basic fears and myths that shape how we solve our political and social problems and, more importantly, what we take as problems in the first place. We explore why we are unduly reactive when it comes to planning seriously for crises before they occur. The problems we look at, however, are not unique to Americans. Every nation and culture has its own version. We argue that hanging onto outmoded beliefs and assumptions is not only inappropriate for coping with current crises but it also gets nations and cultures into new crises.*

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In *Who Stole the American Dream?*[1] Hedrick Smith makes the case powerfully that on every front of its existence, the U.S. is in deep trouble: economically, morally, politically, socially, and so on. Smith's basic argument is that as a nation we have allowed the top 1 percent to run free and literally hijack American democracy. The super-rich have not only used their massive wealth to unduly influence the political system, but for all practical purposes, they own it outright. Little wonder that they have gotten tax laws passed that benefit them enormously. Indeed, the top 1 percent came out of the Great 2008 Financial Recession better off than when they and we entered it. It is estimated that the wealthiest 25 percent of U.S. households own 87 percent of the wealth in the United States. As of 2009, this was $54.2 trillion.

No wonder that the middle class rightly feel that their country has been stolen out from under them. They have more than ample reason to believe that the game is completely rigged against them. Income inequality is as great as it was during the 1920s and 1930s. In fact, income inequality is greater in the U.S. than in any of the other Western industrialized democracies. Social mobility is now lower in the U.S. than it is in other countries.

In short, we are living in a new Gilded Age.

Underlying assumptions

In examining what got us into the current mess, we want to take a step back and look at some of the underlying assumptions that are deeply rooted in our fundamental beliefs and ideas about what makes us Americans. In *Humble Inquiry*,[2] Edgar Schein has captured succinctly the fundamental and enduring beliefs that set Americans apart. Many of the beliefs are not only outmoded in the sense that they are not appropriate for succeeding in a globally interconnected world, but hanging onto them only gets us into new crises:

> U.S. Culture is individualistic, competitive, optimistic, and pragmatic. We believe that the basic unit of society is the individual, whose rights have to be protected at all costs. We are entrepreneurial and admire individual accomplishment. We thrive on competition. Optimism and pragmatism show up in the way we oriented towards the short term and in our dislike of long-range planning. We do not like to fix things and improve them while they are still working. We prefer to run things until they break because we

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> believe we can then fix or replace them. We are arrogant and deep down believe we can fix anything—"The impossible just takes a little longer." We are impatient and, with information technology's ability to do things faster, we are even more impatient. Most important of all, *we value task accomplishment over relationship building* and either are not aware of this cultural bias or, worse, *don't care and don't want to be bothered with it* [italics in original].

Schein points out that we do not like groups, nor do they trust groups. Moreover, we would never want to pay group members equally:

> In politics we build relationships with some people to further our goals and in order to gain advantage over other people . . . Basically in our money conscious society of today, we don't know whom to trust and, worse, we don't know how to create a trusting relationship. We value loyalty in the abstract, but in our pluralistic society, it is not at all clear to whom one should be loyal beyond oneself.
>
> In the United States, status and prestige are gained by task accomplishment, and once you are above someone else, you are licensed to tell them what to do.[3]

It is tempting to dismiss Schein by saying that he has grossly overstated the case, presented a caricature of American culture, that other cultures possess many of the same characteristics, and hence, they are not unique to us, and so on. Nonetheless, we believe that he has captured more than just a kernel of the truth about ourselves. Indeed, if we take Schein seriously, then he helps us to understand why we are unduly reactive when it comes to merely thinking about crises, let alone in planning seriously for them before they occur. In other words, he helps us to understand why we don't practice Proactive CM.

Schein also helps us to understand why the super-rich could obtain such enormous power in societies such as ours. If we believe primarily in the individual, and further, that those who have achieved the most deserve to be in charge, or at the very least, be left alone, then it follows that the super-rich deserve to run the show, if not own it. It also follows that radical groups such as the Tea Party who believe that we have too much of the kind of government that constrains the individual would inevitably appear. It even helps to explain why that even after Sandy Hook it is so difficult, if not seemingly impossible, to pass sensible gun laws. It also helps to explain why it is so hard to get sensible regulations passed that would help prevent future economic recessions and technological disasters.

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Rupert Wilkinson and Robert Reich

Schein is, of course, not the only one to offer a perceptive analysis of U.S. society. Two of the most incisive analyses are due to Rupert Wilkinson and Robert Reich.[4]

In his study of U.S. history, Wilkinson has uncovered four basic fears that have been present from the founding of the Republic. These basic fears have shaped Americans' assumptions and beliefs about the nature of individuals and society. And, as a result, these fears have not only governed how we go about solving our enormous political and social problems, but even more, have governed what we take as problems in the first place.

The Fear of Being Owned

The Fear of Being Owned is one of the earliest and most primitive of all the fears that Americans share. It is not an exaggeration to say that the long-suffered oppression at the hands of European nobility is the underlying major factor that caused our forefathers to leave Europe and immigrate to America. Because of the depth of this fear in the American psyche, it has instilled a deep distrust of centralized big government. At its best, the fear is experienced as "deep distrust." At its worst, it is outright paranoia with respect to any and all government. No wonder why even after Sandy Hook it is so difficult just to have a discussion about sensible gun controls.

It is difficult for Americans to understand, let alone accept, that the individual is no longer the basic unit of society. Not all countries believe or assume that the individual is the basic unit of society. The U.S. is competing with countries, such as Germany, that have forged strong ties between business, government, and workers. As a result, they are not frequently torn apart by the kinds of unproductive labor/government/industry conflicts that are a prominent feature of U.S. society. This doesn't mean that they are free of all conflicts for that's not possible. Nor does it mean that the individual is no longer important. It merely means that these countries have evolved more sensible means for discussing and ironing out the conflicts that are part of every society.

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The Fear of Falling Apart

The Fear of Falling Apart is that we will be overwhelmed by all the problems of a complex and heterogeneous society such as the U.S.'s: crime, racial unrest, drugs, the homeless, the ups and downs of the global economy, huge federal deficits, and so on. The fear is that our problems have become so big and so unwieldy that they will literally kill the American experiment. With the rise of worldwide terrorism, we propose that Wilkinson's Fear of Falling Apart has been transformed into the Fear of Being Blown Apart.

The Fear of Falling Away

The Fear of Falling Away is the fear of abandoning and losing the ideals of the American dream. It is the fear of losing our spiritual heritage. In coming to America, our forefathers were journeying to a new moral landscape, a new beginning for all of humankind, not just to a new physical destination.

This fear is especially prominent in the Tea Party. Indeed, it is the underlying basis of it. It is the fear that within a few short years at best, Whites will no longer be a majority in the U.S. With the election of a Black President, America is and will no longer be the America of old. The fact that President Obama is intelligent and not a stereotypical "angry Black man" only heightens the fear. No wonder why so many of the depictions of President Obama are that of a Hitler and why he is so freely branded as a Socialist and a Muslim. In a word, President Obama is the perfect receptacle for some of our worst unconscious fears. It is easier to project our fears onto President Obama than to face them consciously.

The Fear of Winding Down

The Fear of Winding Down is the fear that we have lost the boundless energy of our forefathers. No wonder why we constantly have to scream that "We are number 1!" We need to reassure ourselves continuously that we are still on top. Indeed, the more that statistics point out that we are losing ground in competitiveness, education, health, and so on, the more reassurance we need. The constant need for reassurance has become a national addiction.

Given the tremendous upheaval that was experienced in mind and body in leaving the Old World, the perilousness of the journey, the

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frightful conditions during the first winters in the new land, plus the oppressive conditions from which we came, each of the fears make perfect sense. It would be strange and highly surprising if they hadn't occurred. Given that the fears were and had to be ingrained in the American psyche as a matter of survival, this helps us to understand why change, especially cultural change, is one of the most difficult things facing humans. Even though the fears—really primal assumptions—no longer fit today's world, they still exercise a tremendous hold on our collective mind.

Robert Reich

Robert Reich is no less incisive. He has outlined four myths that have governed U.S. society from its founding.[5] A society's myths are its deep beliefs and assumptions about itself.

The Mob at the Gates

The Mob at the Gates is the fear that unless America is constantly on guard, it will be overrun by the barbarians just outside our walls who want to rob us of our hard-won riches. Even worse, in today's world, they literally want to destroy us. It is easy to see that this myth embodies the fundamental need and desire to establish a clear psychological wall between "us" and "them," whoever "they and them" are.

Notice how this myth features prominently in the current debate over whether illegal aliens—primarily Hispanics—should be granted a path to citizenship.

The Rot at the Top

The Rot at the Top is the perennial myth that the common people are the repository of all goodness and instinctive wisdom. If America has been betrayed, then it is by the powerful at the top. Notice once again that the original rot was the European Kings and Royalty from whom we fled.

The Triumphant Individual

The Triumphant Individual is the quintessential lone American hero who gets things done in his or her own determined way. At one time, he is John Wayne. Most recently, he is Steve Jobs.

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The Benevolent Society

The Benevolent Society is, of course, America herself: the perennial champion of the underdog, the provider to the tired, poor, hungry, the downtrodden yearning to be set free. It is an America that can do no wrong because America is the fountainhead of all that is good in the world. That the rest of the world does not share this myth is an understatement.

Psychoanalytic meanings

Given the evil Kings from whom we fled, the Rot at the Top and the Fear of Being Owned were natural, if not inevitable. They are Oedipal fears writ large. As such, they formed the basis of a new society. The human animal is inclined to exaggerate such fears in the best of childhoods, but given some basis in reality, they became magnified out of proportion. They still are.

Similarly, the Mob at the Gates is our unchecked projection of the evil done to us onto others. The Benevolent Society is, of course, the good, nurturing mother. And, the Triumphant Individual is the young ego, unfettered by any past or sense of history, strutting on the world stage.

The Fear of Winding Down is the fear of losing the youthful energy of the Triumphant Individual. The fear of Falling Away is the companion fear of losing virtues of the Benevolent Society. The Fear of Being Owned is a combination of being overwhelmed by the Mob at the Gates and/or the Rot at the Top. So is The Fear of Falling Apart.

Concluding remarks

In *It's Even Worse Than It Looks: How The American Constitutional System Collided with the New Politics of Extremism*, Thomas Mann, a liberal, and Norman Ornstein, a conservative, both place more blame on the Republican Party than they do on Democrats, although there is more than enough blame to go around for the breakdown in our inability to get along, let alone govern with any degree of respect and civility.[6] Democrats certainly see the Republicans as defenders, if not the embodiment, of the Rot at the Top, that is, the 1 percent. And, Republicans see Democrats as defenders and embodiment of the Mob at the Gates.

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Mann and Ornstein essentially see the House dominated by right-wing insurgents who are scornful of anything even hinting at compromise. In short, the current crop of Republicans put fealty to their party ahead of problem solving, which is the kiss of death for the kind of complex, integrative thinking that is necessary just to be able to state our problems and assumptions cogently, let alone anything even approaching a solution. For this and other reasons, Mann and Ornstein view the current Republican Party more like an apocalyptic cult than a political party.

What suggestions then do Mann and Ornstein offer for ways of getting out of our current political impasse? In a word, expand moderate thinking by increasing the electorate through the reduction of gerrymandered Congressional districts. It is hoped that this will help to bring out more moderate voters and candidates.

Other ideas include recreating the "public square" where hopefully more moderate ideas can be aired. The idea that has the most power is the restoration of public shame. Public shame has the most power because it works by having those with more moderate voices speak out loud, clear, and long against the extreme arguments of the NRA, conspiracy groups, and so on. The danger, of course, is that public shame will only further divisiveness.

Writing in *FOREIGN AFFAIRS*, Professor Lane Kenworthy offers a more sanguine view. In essence, he argues that America is moving slowly but steadily toward a peculiarly American but less efficient and effective version of social democracy, and that the Affordable Care Act is another step toward that future.

It comes down to whether one believes in the following assumptions or not:[7]

1. In the future, Americans will spend more and more on social policies that enhance fairness, pursue economic security and equal opportunity, and increase living standards.
2. The government will play a larger role in accomplishing these goals.

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7
National Insecurity

Abstract: *The world is getting more complex and interdependent. A breakdown in one institution, technology, or element of infrastructure leads often quickly and unexpectedly to the breakdown of others. Yet, no agency has overall responsibility to manage the interactions and interdependencies between the various infrastructures. Complex and interdependent issues such as national security, water/electrical infrastructures, and nuclear technologies are always a mixture of contradictory feelings and thoughts* that tug *at our hearts and minds with equal force. Each side makes assumptions that are often in complete opposition. Before we choose one side or reach a final conclusion, we must judge such issues by examining the strongest Dialectic that we can arrange.*

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As one would naturally expect, the vast majority of discussions of national security are focused primarily, if not almost exclusively, on terrorism. Preoccupied is a more apt description. Given the horrific nature of the threat, one would be greatly surprised to find anything else. Indeed, 9/11 and the 2013 Boston marathon bombings are still too fresh in the minds of Americans such that one would not only be surprised, but shocked if anything else took center stage. Benghazi only furthers the fears.

The majority of discussions of terrorism focus on "who," "what," "when," "where," and "how."[1] That is, "who"—which individuals and groups—will commit the next acts of terrorism? "What" will the next acts consist of? "Where" and "when" will they occur? And, "how" will they occur? All of these questions inevitably hinge on information and surveillance. Namely, what do we know about known and suspected individuals and groups such that we can accurately predict, and thus hopefully intervene, to prevent the next horrific acts of terrorism? And, if we don't have such knowledge, how can we go about obtaining it?[2]

Notice that from the standpoint of terrorists, one wants persons that are new, unknown, and/or highly improbable as agents. One also wants novel means of delivery. And, one wants places and times that are completely unexpected. In this way, terrorists hope to catch those who are charged with protecting us completely off guard.

Notice that the same types of questions enter into apprehending the hackers who at the time of this writing have stolen the personal credit information of literally millions customers of Target and Neiman Marcus.

As important as these issues are—and make no mistake about it, they are of extreme importance—we want to take a different approach. We want to focus on a different, but related, set of issues. First, we want to look at the case of Edward Snowden, the 29-year old National Security Agency (NSA) contractor who released secret government information to the news media that demonstrated conclusively that the U.S. government was spying on its own citizens. Second, we want to take another look at a recent chemical spill in Charlestown, West Virginia that rendered residents without safe drinking water for up to five days.

Edward Snowden

The case of Edward Snowden is interesting for many reasons. The first and primary reason, of course, is whether Snowden did the citizenry of

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the U.S. a great service by showing them that their own government was in effect treating them as potential threats to national security. A second is that some of the U.S.'s leading pundits as well as members of Congress have widely divergent views of Snowden and what this tells us about the types of inordinately complex issues with which we are faced. Even more interesting and important is that the first reason cannot be decoupled from the second. They are inextricably intertwined.

Table 7.1 summarizes the basic issues. They concern: (1) whether Snowden is a hero or a traitor, (2) whether he deserves serious punishment by the U.S. government or should be given clemency and pardoned, (3) whether Snowden's motives are pertinent in judging what he did or they are not, and finally, (4) whether he is a whistle-blower or a supreme narcissist/betrayer. Since the views are so polarized, we have deliberately placed them side by side in the form of a Dialectic. Indeed, the views are so polarized that with little modification they constitute a natural Dialectic. The point is that more often than not, issues that are highly charged automatically generate equally strong, opposing assumptions.

As far as we have been able to ascertain, no one sees Snowden as a complex mixture of both sides of the Dialectic. In ordinary logic/thinking one is either a hero or a traitor, but certainly not both. Yet, as we read down the list of opposing opinions, we find ourselves agreeing with both sides. Each side has more than a kernel of truth. In fact, the nature of a true Dialectic is that both sides are equally strong and compelling. For this reason, we believe that important issues can only be judged by examining the strongest Dialectic that can be arranged with respect to them. Failure to do so misses some of their most crucial aspects.

Nonetheless, contrary to our long-standing Liberal leanings and our belief that there *are* heroic elements in Snowden's actions, in this particular case, we lean more toward the Con side of the argument. In reaching this judgment, we are strongly influenced by Jeffrey Toobin of *The New Yorker*, who argued that Snowden was neither a hero nor a whistle-blower, and that a narcissist like him deserved to be in prison. Toobin's main argument was that Snowden did not blow the whistle on something illegal, he exposed only how flawed our institutions are.[3] Nonetheless, we leave it to the reader to reach a judgment for him or herself.[4]

Think of it this way. Each side of the Dialectic is a set of assumptions that have to be made in order to reach a judgment either way. In the end, the best thing we can do is to lay out as clearly as we can the key assumptions underlying critical issues.

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At best, the Dialectic reveals the immense ambivalence that many feel. At worst, they show how confused we are, and perhaps should be. The fact remains that complex issues are at their core a mixture of contradictory attitudes, feelings, and thoughts that tug at our hearts and minds with equal force. This is in fact the definition of a true Dialectic. They represent different World Views that are in complete opposition and tension. The hope is not only that this way of showing the issues involved is more informative that merely picking one side or the other, but is necessary before one chooses or reaches a final conclusion. Of course, the most desirable outcome is a third view that is a synthesis of the original two. So far as we know, none has emerged.

In Slate.com, Fred Kaplan pointed out some of the self-contradictory aspects of Snowden's actions and beliefs.[5] For instance, on the one hand

TABLE 7.1 *The Dialectic of national insecurity*

Pro	Con
Clemency/Pardon	*No Clemency/No Pardon*
"[the *Guardian's*] high-profile source is a hero worthy of a presidential pardon."[a]	"the proper punishment for NSA leaker Edward Snowden would be for him to be 'hanged by his neck until he is dead,'"[c] Former CIA Director James Woolsey.
"the New York Times opined that the Obama administration should offer Snowden 'a plea bargain or some form of clemency that would allow him to return home' and serve less time that the three decades he faces under a pending criminal complaint so that he can enjoy 'the hope of a life advocating for greater privacy and far stronger oversight of the runaway intelligence community.'"[b]	"The news media want to hand him not a rope but a pedestal."[d]
Hero/Whistle Blower	*Traitor/Betrayer/Narcissist*
"Other politician and reporters have defended Snowden and called him a hero. Democratic Senators Mark Udall (Colo.) and Ron Wyden (OR) are introducing a bill in Congress this week which will limit the federal government's authority to collect data on Americans."[e]	"Regardless of political party, mainstream media and Republicans like former Vice-President and Senator [sic] John Boehner and Democratic Senator Dianne Feinstein have referred to Snowden as a traitor. They do not believe he is defending and serving the public interest in revealing NSA's surveillance of innocent, suspicionless [sic] Americans."[f]

Continued

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TABLE 7.1 *Continued*

Pro	Con
"John Cassidy, *New Yorker*: He's clearly a hero. 'He has performed a great public service that more than outweighs any breach of trust he may have committed.' Cassidy . . . concludes that Snowden hasn't done any real damage to the NSA's ability to keep the nation safe. The agency . . . can still go to court to get a wiretap or a search warrant, even if Congress stops phone companies 'from acting as information-gathering subsidiaries.'"[g]	"Davis Brooks, *New York Times*: He ticks off the things Snowden has betrayed, including honesty, his friends, his bosses, the cause of open government (because the powers-that-be will now 'close the circle of trust a little tighter'), privacy (if we go from gathering metadata back to old-fashioned eavesdropping). And the Constitution (it's not for one person to decide what should be disclosed). Brooks warns of 'the rising tide of distrust, the corrosive spread of cynicism, the fraying social fabric and the rise of people who are so individualistic in their outlook that they have no real understanding of how to knit others together and look after the common good.'"[h]

a Saunders, Debra J. "Free Edward Snowden—really?" San Francisco Chronicle, Sunday, January 5, 2014, p. E3.
b Ibid.
c Ibid.
d Ibid.
e DiTosti, Carole, "NSA surveillance pros & cons: a Georgetown professor weighs in on Eric Snowden [sic]." Technocratic, June 19, 2013.
f Ibid.
g Cassidy, John, "Why Edward Snowden is a Hero," The New Yorker, June 10, 2013. See also Johnson, John, "Edward Snowden: hero or traitor? Pundits weigh in on both sides," Newser, June 11, 2013.
h Brooks, David, "The Solitary Leaker," The New York Times, June 10, 2013. See also Johnson, John, "Edward Snowden: Hero or traitor? Pundits weigh in on both sides," Newser, June 11, 2013.

Snowden claimed to be a "patriotic whistle-blower" but on the other he released classified information about Taliban fighters and NSA's use of phone records to track terrorists. Similarly, while Snowden was portraying himself as a champion of individual liberty and government transparency, he was seeking refuge in countries such as China and Russia.

Finally, we refer the interested reader to Rahul Sagar's book, *Secrets and Leaks: The Dilemma of State Secrecy*, and an important review in *Foreign Affairs*.[6] Snowden does not come off well in either account.

Charlestown West Virginia

As we noted in the Preface, on Thursday, January 9, 2014, a chemical used in processing coal leaked from a plant into the nearby Elk River

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thereby contaminating drinking water for some 6,000 to 10,000 people in Charlestown, West Virginia, and thousands of people downstream. The drinking water was contaminated because the water plant was located far too close downstream from the chemical plant.

We also noted that since the tanks in which the chemicals were stored didn't fall under State or Federal inspection programs and they weren't considered sufficiently hazardous, environmental permits to operate the plant were not required. These decisions are up for review, especially since it was found that the tanks had serious cracks that had not been repaired.

The real tragedy is that for years the citizens of the state of West Virginia have not only opposed, but fought strenuously against State and Federal regulations of dangerous chemical plants. Anything that in any way threatened the safety of jobs was more important than environmental health and safety. Like Sandy Hook, we have to wait and to see if the same old priorities prevail.

It bears repeating: If a terrorist had deliberately set out to disrupt a town and raise heightened fears about the safety of the essentials for life that we take for granted, then he or she couldn't have picked a better place and way in which to do it. As much fear as the specter of terrorism naturally raises, we have as much to fear in our everyday lives from all of the processes and technologies on which we depend.

Concluding remarks

One of the major research projects at The Center for Catastrophic Risk Management (CCRM) at UC Berkeley has shown that we live in a society in which the breakdown in any one technology or element of infrastructure is virtually guaranteed to lead to the breakdown of others. For instance, in virtually all localities, gas lines are located next to electrical lines, sewers, highways, railways, and so on. And, of course, schools always seem to be nearby, or in many cases, literally on top of gas lines. Somehow or another, a failure in one part of the infrastructure or technology inevitably leads to failures in others. Yet, there are essentially no agencies that have overall responsibility and thus manage the interactions and interdependencies between the various infrastructures. In short, we live in a world where everything is more tightly coupled than ever and it is getting more tightly coupled everyday.

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To take another example, everything is dependent on electricity. If electricity fails, then virtually everything else from ATMs, waste treatment plants, and so on shut down or fail to operate.

As a result, we cannot overemphasize an earlier point. We have as much to fear from ourselves (our technologies) than we have from outside forces.

Notes

1 For instance, see Dyson, William E., *Terrorism: An Investigator's Handbook*, Anderson Publishing, Elsevier, Boston, 2012.
2 Dahl, Erik J., *Intelligence and Surprise Attack, Failure and Success from Pearl Harbor to 9/11 and Beyond*, Georgetown University Press, Washington, DC, 2013.
3 Toobin, Jeffrey, "Edward Snowden is no hero," *The New Yorker*, June 10, 2013.
4 See, for example, Rushkoff, Douglas, "Edward Snowden is a hero," *CNN*, June 10, 2013.
5 Kaplan, Fred, "Snowden: does he deserve a pardon?" *The Week*, January 17, 2014, p. 4.
6 Sagar, Rahul, *Secrets and Leaks: The Dilemma of State Secrecy*, Princeton University Press, Princeton, NJ, 2013; Shafer, Jack, "State secrets in the Snowden era," *Foreign Affairs*, March/April, 2014, pp. 136–42.

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8
Global Warming

Abstract: *Nature and Society are inseparable. Technologies we create to harness Mother Nature depend on social and political arrangements, and vice versa. While we give a single name, Global Warming, to the impending crisis humankind faces, the actual crisis consists of multiple intertwined crises such as the adequacy of alternative energy sources, the strength of the political will to use alternative sources, and the efficacy of future technologies that will mitigate the effects of Global Warming. Complex systems of intertwined crises cannot be separated from one another. We must consider them jointly to deal with them properly. Humankind's most critical assumption to date may be the following: As it has done throughout its history, humankind when faced with seemingly insurmountable challenges will rise to the challenge.*

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The most critical assumption to date may be the following: As it has done throughout its history, faced with seemingly insurmountable challenges, humankind will rise to the challenge.

For the most part, in previous chapters, we've considered crises that have already occurred. We then examined the assumptions that were made prior to the crises such that supposedly they wouldn't occur. Next, we showed that the assumptions were not only false, but that in most cases, they played a significant role in causing the crises.

In this chapter, we consider a crisis that is considered to be virtually certain to happen, especially if we don't take immediate and decisive corrective steps. Indeed, many reputable experts consider that the crisis is essentially inevitable given the magnitude of the problem and that it may be already too late to do anything serious about it. In brief, we are already headed toward an irreversible disaster of biblical proportions. To put it differently, we have already crossed a divide from which there is no turning back.

Global Warming

Due to the increasing concentration of carbon dioxide (CO_2) in the Earth's atmosphere, the ultimate environmental crisis is of course Global Warming. The concentration of carbon dioxide in the Earth's atmosphere determines its contribution to the greenhouse effect. In pre-industrial times, the concentration of CO_2 was 280 ppm (parts per million). In 2013, it rose to 392 ppm. The present level is the highest in the past 800,000 years. It is also believed to be the highest in the past 20 million years.

Many believe that we only have until 2050 to get the concentration of CO_2 to level out at 550 ppm before we are thrust into an irreversible disaster. The planet will continue to heat until it can no longer support life as we know it. In the past, transitions from one dominant fuel to another, such as from wood to coal and from coal to oil, took 50–60 years, but today, nations are not adopting renewable alternative energy sources as fast as they should, partly because energy demand is rising quickly and globally.[1] David Unger pointed out that "if nothing is done to limit emissions, average global temperatures could rise by as much as 5 [degrees] C (9 [degrees] F) by the end of this century, with catastrophic effects on climate, sea levels, and agriculture."[2]

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While it is easy to give a single name such as Global Warming to the impending, monumental, if not cataclysmic, crisis we face, the actual crisis consists of a number of factors each of which is complicated in its own right. Furthermore, each of the factors is not only a crisis in itself that contributes to each of the others, but is deeply intertwined with them. We are dealing with a complex system of factors/crises that cannot be separated from one another. They must be considered jointly, or they cannot be dealt with properly at all.

The first factor/crisis is the set of worst-case scenarios and their dire consequences that are hypothesized to occur as a result of Global Warming.

The second factor is whether alternative energies are adequate and can be implemented quickly enough to replace coal-based technologies that are currently used to supply the majority of humankind's insatiable need for energy and form the basis for our current standards of living. Coal or carbon-based technologies are responsible for the increase of CO_2 in the atmosphere that is directly responsible for Global Warming.

The third is whether there is sufficient political will to switch to alternative sources of energy that not only will not contribute to further amounts of CO_2, but will actually lower the CO_2 currently in the atmosphere.

The fourth is whether there either exists, or there are foreseeable technologies in the future that will allow us to engage in geo-engineering to ward off the effects of Global Warming. That is, if we can't adopt alternative sources of energy in time to reduce the concentration of CO_2, and even if we can but they are not adequate to do the job of removing CO_2, are there other technologies that will shield us from the worst effects of Global Warming?

Since each has been dealt with extensively elsewhere, we consider each of them briefly.

Hypothesized scenarios

If humankind doesn't reduce immediately its use of carbon-based technologies, then the scenarios for humankind's future are not only exceedingly grim, but downright apocalyptic. As much as anyone, Gwynne Dyer[3] has laid out a series of grim scenarios that he not only regards as eminently possible, but highly likely.

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The essence of Dyer's scenarios is the following: Global Warming will affect the entire planet. While Northern climes will still be able to produce food because of their more favorable locations, Southern climes will be devastated altogether.

Southern regions will experience unending draughts with the result that they will not be able to grow almost any food at all. This in turn will prompt mass influxes of food seeking refugees from Southern to Northern countries. Northern states will try in vain to close their borders. This in turn will only prompt wars between the North and the South. Whether wars will drastically reduce the Earth's population so it can support itself is anyone's guess. This tacitly assumes, of course, that wars are a morally acceptable way to check the growth in the world's population. And, of course, this also assumes that wars would not add further to Global Warming.

While no one knows for sure whether such dire scenarios will come true, a number of things are clear. Virtually no reputable scientist disputes the facts of Global Warming and that it is due primarily to humans. Second, whether one fully accepts Dyer's scenarios or not, the inescapable conclusion is that the physical condition of the planet is inextricably wedded to enormous social forces. The physical and the social spheres are linked in ways we have just begun to understand.

One assumption that clearly falls by the wayside is that the physical and the social worlds are independent. (They never have been.) But this means that we need new kinds of "experts" who are deeply conversant with both realms of knowledge and policy-making.

Notice carefully that virtually every aspect of Dyer's hypothesis is an assumption. Ideally, if we were rational in the sense of traditional economic thinking, we would act immediately to refashion our world so that we wouldn't have to wait to see if the assumptions were proved true or not.

There is little disagreement that Global Warming will affect the entire planet. However, no one knows the extent to which Northern climes will still be able to produce food because of their more favorable locations, and whether Southern climes will be devastated entirely. Similarly, we do not know the extent to which Southern regions will experience unending draughts with the result that they will not be able to grow food. Thus, we also do not know whether there will be mass influxes of food refugees from Southern to Northern countries. Whether Northern

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states will try in vain to close their borders, and whether this in turn will only prompt wars between the North and the South is also not known. Finally, whether wars will eventually lower the Earth's population so it can support itself is anyone's guess.

Alternative sources of energy

As a result of the previous dire scenarios and others that can easily be foreseen, many see alternative sources of energy as humankind's only hope of saving it from unmitigated environmental disasters. That alternative sources of energy are humankind's only principal hope is clearly a critical, if not key, assumption.

In *Green Illusions*, Ozzie Zehner outlines the immense problems with alternative sources of energy.[4] (This alone does not endear Zehner to environmentalists. Indeed, many see him as a traitor to the cause, which he is not.) The fact that there are substantial troubles with current sources of alternative energy doesn't mean that we shouldn't embrace them and work seriously to make them more feasible and widespread.

The basic trouble is at their *current* level of development, they are unable to free us from a carbon-intensive world, and hence alleviate to any substantial amount the effects of Global Warming. In short, current sources of alternative energy cannot produce the amounts of energy that are needed to replace that which is produced by carbon-based technologies such as coal-fired plants.

Zehner's basic argument is that the production, installation, operation, and maintenance of alternative energy sources whether they be solar, wind, or biofuels require substantial amounts of carbon-based, specifically coal-based, energy sources to offset any of the gains that might be derived from alternative sources. That is, if one takes into account the *total amounts of energy* needed to produce, install, operate, maintain, dispose of alternative sources, then at their current levels of development, alternative energy sources not only end up consuming considerable amounts of energy produced by carbon-based technologies, but as a result, they do not save more energy. Most important of all, they do not thereby lower the amounts of CO_2 put into the atmosphere.

There is another problem with alternative sources of energy. They are not always available or reliable. Take solar for example. That the Sun doesn't always shine is an obvious fact. Less well known is the fact that

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solar panels have to be cleaned constantly or else their efficiency drops substantially. One has to look at the total amounts and kinds of energy that are used in order to save energy.

Is there political will?

Polls show repeatedly that high percentages of the public support the development and use of alternative energy sources.[5] On the other hand, when presented with policy choices that favor preserving the environment at the expense of future economic development and jobs, the economy consistently wins out over the environment. Similarly, when asked how much they would pay in taxes and other forms of expenditures, people will only pay or forego so much in order to save the environment. Even less encouraging is the fact that a substantial proportion of Americans still do not believe in Global Warming and that it is due primarily to human activities.[6]

Geo-engineering

In the highly likely event that we will be unable to decrease the amount of CO_2 that human activities are putting into the atmosphere in time to prevent a global catastrophe, several schemes have been proposed for limiting and reversing the effects of Global Warming. One is the use of high-altitude balloons to shield the Earth from sunlight in order to prevent further melting of the polar icecaps. Another is cloud seeding on a massive scale to cause rain to fall in Southern regions that will be especially hit by severe droughts.

The trouble with both of these and other proposals is that not only are the technologies not sufficiently developed to allow us to proceed with the needed assurance that they would actually work, but that we still don't know enough about the dynamic complexities of the Earth's atmosphere to know what undesirable side effects they might produce. In short, experiments on the scales proposed are fraught with massive uncertainties and dangers.

Paradoxically, there are also dangers if they were to work. Not only would such schemes be enormously expensive to implement, but they could lull people into believing that we could continue indefinitely to

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put greater and greater amounts of CO_2 into the atmosphere. That is, we would not have to change our use of carbon-based technologies in order to produce the enormous amounts of energy on which our civilization currently depends.

A counter argument is that ever since the dawn of farming, humans have in effect been conducting large-scale geo experiments with the planet! Nonetheless, large-scale geo-engineering projects would up the level of experimentation to unprecedented heights (pun intended!).

Concluding remarks

This chapter has demonstrated once again that the physical and social worlds are inseparable. Indeed, they are more coupled than ever. Every technology depends on social and political arrangements, and vice versa. It is not possible to affect/change one without affecting and changing the other.

Time and again, those who have studied Global Warming point out that the only viable alternative is to change our lifestyles drastically to consume less of the wrong, that is, harmful, kinds of energy. (In particular, at its present levels of consumption, the U.S. needs the equivalent of eight Earths, which is clearly not sustainable.) But if so, how does one persuade less-developed countries not to pursue the kinds of energy consumption that the developed countries have used to become industrialized?

Notice carefully that if the preceding is correct, then the "energy problem" is a "consumption problem." The point is that the "energy problem" is not just an "energy problem!" It is inextricably intertwined with a host of other thorny problems.

Finally, the most critical assumption of all may be the following: Humankind has been faced throughout all of its history with seemingly insurmountable challenges. Every time humankind has risen to the challenge. What is there to think that we won't do it again?

Humankind may rise to the challenge once again, but we would put it differently. What kind of a crisis and how big will it have to be before we will act differently? And, will be able to act in time so that the crisis doesn't become so big such that we can't control it?

We are still not sure that humankind has accepted the seriousness of the problem. But that's a critical assumption. We hope we are wrong.

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Notes

1 Smil, Vaclav, "Renewable energy sources could take the world by storm," *Scientific American*, January, 2014, p. 54.
2 Unger, David C., *The Emergency State: America's Pursuit of Absolute Security at All Costs*, The Penguin Press, New York, NY, 2012, pp. 284–5.
3 Dyer, Gwynne, *Climate Wars: The Fight for Survival As the World Overheats*, Oneworld, Oxford, UK, 2010.
4 Zehner, Ozzie, *Green Illusions: The Dirty Secrets of Clean Energy and the Future of Environmentalism*, University of Nebraska, Lincoln, Nebraska, 2012.
5 Pielke, Roger Jr., *The Climate Fix: What Scientists and Politicians Won't Tell You About Global Warming*, Basic Books, New York, NY, 2010.
6 Ibid.

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9
The Future of Crises

Abstract: *Assumptions, not facts, are the building blocks of our knowledge of the world around us. Therefore, monitoring of key assumptions is an integral part of strategic thinking and crisis management. Our guiding motto is "Know thy assumptions and prepare for the highly likely event that they will be rendered false." We hope that we have examined enough crises and assumptions so that the reader is better equipped to face new crises head on and to anticipate and uncover the critical assumptions that underlie them.*

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Throughout this book, we have seen time and again that the assumptions and beliefs that were supposed to protect us from crises were wrong. In each case, the assumptions and beliefs were not only proved invalid, but they actually contributed to making the resulting crises worse.

In this final chapter, we want to review briefly some of the main types of assumptions and beliefs that were wrong. Our hope is that this will help us to be better prepared for future crises.

Misplaced trust

The most basic assumption and belief that over and over again has been shattered, if not violated altogether, is trust. Whether it is the loss of trust in particular individuals, organizations, institutions, the government, technology, and the like, the end result has been devastating. The very individuals, institutions, technologies on which we have depended to protect and safeguard us—at the very least do no harm—have not only let us down, but deeper still, have betrayed us. The result is not only a loss of confidence in individuals, organizations, and so on, but a growing sense of cynicism: the feeling that you can't depend on anyone except yourself to protect you. The loss of trust shreds the very fabric of society.

One of the worst outcomes is the loss of trust in government, one of the prime institutions on which we depend to formulate and enforce sensible inspections and regulations to protect us from all kinds of unscrupulous individuals and organizations. If anything, our study has shown that we need new kinds of organizations and institutions that can help ensure that those who operate dangerous technologies have adequate safeguards in place and furthermore that they are continually tested and updated.

Geography

Time and again, we have also seen that there are no places anywhere that are any longer free from potential harm. In particular, schools that are supposed to be the very essence of places that we can depend on to protect and shield very young children from harm are no longer sanctuaries. As recent events demonstrate all too painfully, neither are shopping malls and other public place where we gather.

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For some, this means that we need to fortify schools, and so on, in effect, to become Fortress America. We disagree. We need to become More Vigilant, But Not Paranoid, America. Terrorists want nothing more than to see us become Fortress America.

Human-caused

We have argued that ALL crises and disasters are human-caused. To repeat an earlier point, it's humans, not Mother Nature, who design buildings that may or may not standup to floods, earthquakes, and so on. For this reason, we have also argued that crises and disasters don't "just happen." They are not random aberrations or accidents. They are the result of imperfections in design, operations, maintenance, and so on.

One of the biggest contributing factors to disasters and crises is the attitude that getting products out the door is more important than safety, or there is only so much safety that one can afford to buy; in other words, there is a trade-off between health, safety, and profits. This faulty belief fails because it doesn't understand that the proper way to do CM is such that it is an integral part of Quality and Safety, Environmentalism, and so on. In this way, CM not only adds to the bottom line of organizations, but is also taken seriously. In other words, CM must be imbedded seamlessly such that it's an integral part of the day-to-day operations of all organizations.

Unit of society

At best, the notion that the individual is the basic unit of society is outmoded. At worst, it fails to understand that the lines between individuals, organizations, and societies are more blurred than ever before.

The notion that problems can be dealt with separately from one another is also seriously outmoded. We have argued that unless CM plans and procedures are prepared and executed systemically, then individuals and organizations will be unprepared for the fact that any crisis and disaster is not only *capable of* setting off an uncontrolled chain reaction of other crises, but that the chances that *it will* set off a chain reaction are virtually certain. In short, we don't live in a world of

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separate crises and problems any longer. Problems and crises are now connected in strange and complex ways. This doesn't mean that they are necessarily unpredictable. We may not know exactly when and where the next big earthquake will strike, but we know that there will be a "Big One."

We also argued that complex issues such as those involving Edward Snowden require, if not demand, a different way of examining them. As an aside, while we are more critical than supportive of Snowden, we would be remiss if we didn't note that with the rise of Google, and other such organizations, the potential for the collection and misuse of personal data have grown enormously. In no way is this meant to excuse or justify the abuses of the NSA. It is meant to warn us that we can expect organizations other than the government to abuse our supposedly private and personal information. The supreme irony is, of course, that many of us now give such information willingly to Google and others.

Founding myths and stories

We have also argued that many of our founding myths and stories are no longer well suited for the complex world in which we live. This doesn't mean that all of our basic values are useless and false, but that they need to be reformulated. For example, even though our society lionizes the achievements of the lone hero/inventor such as a Steve Jobs, the fact is that it takes many people working in complex organizations to bring products and technologies to market, let alone to ensure that they are safe.

Denial

If trust is the most basic assumption that is too often violated, then Denial is the basic impediment that stands in the way of effective CM. Technology never manages itself. It is managed by complex people in complex organizations. If an organization is full of Denial, then CM will not be respected, and as a result, it will not get done. Furthermore, organizations that are high in Denial tend to mistake the absence of accidents for the presence of safety.

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Thinking the Unthinkable

Worst-case scenarios are one of the best ways to think about and confront the Unthinkable. For this very reason, we list the prime elements of the worst that can happen to individuals and organizations.

Notice carefully, that each component of a worst-case scenario is also a critical assumption as to why the scenario will or won't happen. In other words, it is a list of critical assumptions as well.

The essence of worst-case scenarios is as follows:

1. Crises Occur at the Worst Possible/Least Expected Times
2. Crises Are the Result of the Least Probable/Most Unforeseen Set of Circumstances/Most Improbable Confluence of Disparate Factors
3. Crises Occur in Least Probable/Unforeseen Places
4. Crises Involve the Least Probable/Unthinkable/Unforeseen Stakeholders
5. Least Probable Set of Crises Occur All At Once
6. Early Warning Signals Are Blocked/Ignored
7. The Organization Is High in Denial, Completely Discounts Worst-Case Scenarios
8. All Critical Assumptions Collapse and Are Invalidated
9. The Organization Is Clearly at Fault/Branded a Villain By Media
10. Multiple Injuries/Lawsuits Occur
11. The Organization Suffers Enduring/Long-lasting/Permanent Damage to Its Reputation
12. The Organization Is Branded an Industry Pariah/Receives Intense Criticism from Other Industry Members
13. Severe Financial Losses Occur
14. The Organization Loses Key Customers/Stakeholder Support
15. The Organization Loses Key Employees/Confidence/Support
16. The Organization's Crisis Management Team Breaks Down/Underperforms
17. Faulty Risk Analyses Lead to False Conclusions/Low Probability High Consequence Risks/Crises Are Ignored/Not Prepared For
18. The Organization Is Ridiculed on the Internet/the Organization's Logo(s) Are Doctored
19. Adverse Legislation Is Passed/Criminal Proceedings Are Undertaken against the Top Officers of the Organization
20. The Organization Is the Continuing Butt of Jokes by Late-Night Comics

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21 Prominent Celebrities and Interest Groups Speak out Repeatedly and Strongly against the Organization
22 Major Nation-Wide Actions Are Taken against the Organization

Concluding remarks

We have no illusions whatsoever that we have examined every kind of crisis and type of assumption that can go wrong. We would be the first to admit that we have not examined important international crises such as humanitarian crises. Instead, our hope is that we have examined enough crises and assumptions so that the reader is better equipped to face new crises head on and to anticipate and uncover the critical assumptions that underlie them.

With respect to our own assumptions, it would be false to conclude from our study that the situation is utterly hopeless. We don't believe this for one moment.

We have argued for greater preparation and vigilance, not despair.

"Know thy assumptions and prepare for the highly likely event that they will be rendered false" has been our guiding motto.

To this end, it behooves organizations of all kinds to have a "central clearing house" of some kind where they can monitor their key assumptions on a regular, if not daily, basis. The monitoring of key assumptions is an integral part of strategic thinking.[1] It needs to be regarded as such.

In the end, the only thing that can keep us safe is by continually "Thinking the Unthinkable." Since we can't prevent all crises from happening, we have to do everything in our power to prepare for and mitigate their worst effects.

Note

1 See Barabba, Vincent P. and Mitroff, Ian I., *Business Strategies for a Messy World: Tools for Systemic Problem-Solving*, Palgrave Macmillan, New York, NY, 2014.

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Index

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