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Risk and Risk Management

Basic Concepts

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“This has got to be the worst day of my life,” observed William Clay Ford Jr., Ford Motor Company Chairman, as he contemplated the February 1999 natural gas explosion in boiler number six that had just leveled part of the River Rouge powerhouse in Detroit, Michigan. The disaster killed 6 people and seriously injured 14, and cut off power to the 1,100 acre facility.

While Ford Jr.’s remarks were directed toward the human dimension of the tragedy, from a corporate standpoint the prognosis must have appeared equally sobering. The Rouge complex powerhouse—the centerpiece of Henry Ford’s dream of building entire cars in a single location—had supplied electricity, compressed air, mill water, and steam to six assembly and parts plants employing 10,000 workers, and also to the independently owned Rouge Steel plant. Although an engineering marvel of its time, the concentration of production at River Rouge had precipitated a risk manager’s worst nightmare, as the effects of the integrated plant’s shutdown rippled through Ford’s internal supply network.

First hit was Rouge’s own Mustang assembly plant, which had been working overtime with two 10-hour shifts daily cranking out the popular sports compact. Next came Rouge’s metal stamping plant, supplying metal parts (fenders and similar products) to 16 of Ford’s 20 North American plants. Results were predictable. Shifts were cut from 8 hours to 4 hours at three Midwest assembly plants, and lost production at Rouge’s frame plant resulted in the elimination of scheduled overtime at truck plants in Kansas City, Missouri; Norfolk, Virginia; and Oakville, Ontario.

Even at these reduced levels, production was supported only by the buffers of existing inventories and supplies in transit that, once exhausted, would necessitate plant shutdowns. And a previously planned \$240 million replacement powerhouse would not be completed for at least a year (*Financial Times* 1999).

Risk is endemic to our personal, as well as professional, experiences. Every time we decide to cross the street or ascend the stairs in our homes, we are making personal decisions involving risks and their management. How we handle these situations has an important impact on the quality (and, in many cases, the length!) of our lives.

WHAT IS RISK?

Webster's dictionary defines risk as "the chance of injury, damage, or loss." Unlike, say, a portfolio of stocks, which has a potential for gain, risks present only a down side. A risk is a chance of something bad occurring and, hence, to be avoided. Of course, even bad things can provide a profit opportunity to somebody—the city taxes me to haul away my garbage, thereby providing employment, and the "Orkin Man" is happy to fumigate my house, for a fee. But I do not generally bring home extra garbage or encourage termites to infest my house. Nor do sensible people seek out risk. However, risk can be managed. This chapter lays out the key elements of risk management: identification and quantification, mitigation and control, financing, and catastrophe planning.

IDENTIFICATION AND QUANTIFICATION

Given that risks are endemic in our uncertain world, adopting appropriate strategies to deal with risk exposures and their consequences is an everyday task. Consider the case of the pedestrian contemplating crossing a busy street. The first step is to identify the risk (speeding automobiles with distracted drivers chatting on cell phones?) and to quantify its magnitude (scrapes? bruises? broken bones? fatali-

ties?). This mundane task is the critical point of departure for one crafting a risk management strategy—remember the old aphorism that “forewarned is forearmed,” which is probably the best piece of cheap advice that a risk manager can give.¹

In the business setting, many kinds of risk are identifiable, even to the most uninitiated. Dangerous machinery or exposed electrical wiring in a factory setting, or slippery floors in an office or retail establishment (squashed grapes on the floor are a grocer’s nightmare) are obvious examples. Other types of risk exposures may be less apparent and discernible only to those with experience in a particular area of risk analysis. Much as standing under a tree during a thunderstorm may seem reasonable to those unfamiliar with lightning, risk exposures may not be apparent to an untrained eye.

In the case of the Ford Rouge power plant, for example, there were certainly engineering advantages associated with the consolidation of production of the electricity, steam, and high-pressure air required by the entire Rouge complex. But the risks of this approach also turned out to be substantial, as the events of February 1999 attest.

Perhaps the most insidious risks facing businesses these days, however, come from evolving legal rules, as we have observed in the case of environmental liability and asbestos exposure. The Comprehensive Environmental Response, Compensation and Liability Act, the 1980 Superfund hazardous substance clean-up legislation, introduced strict liability that may involve several entities jointly for cleaning up hazardous waste sites. As a consequence of this new legal reality, a business could have been in full compliance with all applicable laws at the time of the waste disposal, or simply be the current owner of an existing site, yet still be strictly liable for the costs of clean-up. Even partial contributors to the site are fully liable for the entire cost of clean-up, due to joint and several liability,² leading to the predictable prospecting for “deep pockets” by enterprising tort attorneys. These liabilities also may be inherited, which makes mergers and acquisitions problematic these days.

Asbestos exposure also provides an instructive example. Fifty years ago, most people had little understanding of the health risks associated with airborne asbestos fibers in the workplace, and exposure standards reflected this. Over time, however, it became increasingly clear that asbestosis (a close cousin of the black lung disease suffered

by coal miners) and mesothelioma (an untreatable cancer of the lung or stomach lining that is both swift and invariably fatal) were associated with workplace exposures. The result has been an explosion of litigation (estimated potential: 1.3 to 3.1 million claims) with expected asbestos liabilities of \$200 billion, of which \$78 billion will be borne by the affected companies and the rest by their insurers (Parloff 2002).

Litigation has already destroyed the primary producers of asbestos—Johns-Manville, Unarco, and Raybestos Manhattan all declared bankruptcy long ago—and has moved on to bankrupt companies that merely purchased asbestos products, including Babcock & Wilcox, Owens Corning, GAF, and W.R. Grace. Currently in the crosshair of asbestos litigation are Georgia-Pacific (involving gypsum products), 3M (for allegedly failing to warn that the dust masks wouldn't work if improperly used), and Ford (for exposures related to the asbestos used in brakes). Federal-Mogul Corp., an automotive supplier, recently sought Chapter 11 bankruptcy protection because of an asbestos liability inherited from its 1998 acquisition of T&N PLC of Manchester, England, a company that had used asbestos in a separate building supplies business. At the time of the acquisition, Federal-Mogul set aside \$2.1 billion in cash to cover the anticipated claims, a sum that in retrospect seems to have been nowhere near enough.

Daniel S. Sobczynki, the former Director of Corporate Insurance for Ford, put it best: “The highest potential risks are those that are unidentified and unmanaged. It is critical to evaluate your risks and to learn from the lessons of others,” he says. “The problem of learning from personal experience is that it gives you the lesson after the test has been administered” (*Financial Times* 1999).

MITIGATION AND CONTROL

After the risk exposure has been assessed, the next step is to consider how one deals with it. Continuing with our street-crossing example, one possibility would be to avoid the risk entirely and not cross the street at all (a wise strategy if the road in question were, say, Interstate 94 at rush hour). Alternatively, if we decide to proceed, the question might be the following: do we jaywalk and cross the street now, or

stroll down to the traffic signal and wait for the green light? Each of these alternatives represents an economic decision, weighing the cost of the strategy against the potential benefits.

Generically, mitigating a risk exposure entails the identification of tactics either to reduce the probability of a bad outcome, or to reduce the magnitude of a loss, should a bad outcome occur. The former types of activities, referred to as *loss prevention* measures, would include the cross-at-the-intersection option discussed above, or, in a more mundane industrial setting, the inspection of electrical wiring to reduce the probability of an electrical fire. Indeed, most of the risk mitigation strategies that come easily to mind are designed to keep us out of trouble in the first place—don't put the gasoline can next to the furnace, don't smoke in bed, lock your doors before you retire for the night. *Loss reduction*, on the other hand, describes the class of risk mitigation activities designed to reduce the magnitude of a loss, should one occur. The standard example here would be the installation of sprinklers in a warehouse, which doesn't reduce the probability of a fire starting but, rather, mitigates the damages that result from the fire.

The explosion of boiler number six at the River Rouge powerhouse occurred during a maintenance shutdown. As far as can be determined, a valve unintentionally left open allowed natural gas to flow into the boiler, which was quickly ignited by the electrostatic scrubbers located in the boiler's chimney.

In retrospect, it appears that the tragedy stemmed from a lack of attention paid to issues of risk mitigation during routine episodes of maintenance. Not only was the act of shutting down the boilers rare, but apparently there were no written procedures or checklists to guide the process. Employees who had not been trained in shutting off the boilers and who had last received an equipment manual in 1997, had to shut off over 30 (unlabeled) natural gas valves throughout the powerhouse complex. They missed one, and the rest is history.

We make trade-offs in our personal and business lives between the burden of risk exposure and the cost of risk mitigation. Financing the costs associated with a bad outcome becomes the question. In personal settings, the risk financing strategy generally adopted is that of risk shifting to a third party, usually an insurance company (think about the collision and liability insurance on your car, homeowner's insurance, or the warranty on a new appliance). The problem with this type of risk

transfer, though, is that it creates what is known in economics as a “moral hazard.”

A colleague of mine kept a sailboat moored off the end of his dock on Long Island Sound. One day, during casual conversation, I asked about his strategy for dealing with storms and the like—as a boat owner myself, I was aware (risk identification and quantification) of the effects of heavy wave action on a boat banging against a dock. He responded that he wasn’t worried because he had insurance and he never took the boat out of the water until the end of the season. The problem here, of course, is that if one is fully insured against a loss, then one has no incentive to take (privately costly) actions to reduce one’s risk exposure. Insurance companies, not surprisingly, have figured this out.

When my teen-aged son finally made enough money to purchase a car, it turned out that the machine of his dreams was a 1994 Camaro Z28, with a 5.7 liter V-8 engine and 270 horsepower. You might think that no insurer in their right mind would write coverage in a situation like this, but you would be wrong. An automobile insurer in Michigan was willing to provide liability coverage at a finite premium. But, there was a catch—no coverage for collision damage.³ Effectively, he has a 100 percent deductible if he wraps the car around a tree.

This retained risk has “incentivized” my son to drive carefully. This is generally the trade-off that you will find in your personal and professional risk financing decisions—increased investment in risk elimination reduces the premiums you pay per dollar of coverage, but the down side is that you are exposed to more risk.

CATASTROPHE PLANNING

Accidents do happen despite the best intentions and most effective efforts to forestall such eventualities. And the response to the bad news is probably the most critical component of any *loss reduction* strategy.

In the immediate aftermath of the Rouge River powerhouse catastrophe, William Clay Ford Jr. dispatched his personal aide, with credit card in hand, to track down the victims’ families and do whatever was required to help out. The company worked with its suppliers to procure

electrical switching equipment and to obtain portable boilers for steam. Detroit Edison built an outdoor substation—in a week—to supply the power necessary to get the Rouge River complex back on line. The result was a triumph in loss reduction—a potentially catastrophic business interruption scenario truncated to a one-week hiccup on the production line.

There are many other examples of the importance of catastrophe planning, good and bad. For example, back in 1986, when a still unidentified individual replaced the painkiller in several bottles of Tylenol capsules with cyanide, the result was the death of an innocent consumer. Johnson & Johnson, the maker of Tylenol, didn't attempt to deflect blame (after all, they hadn't adulterated the capsules) or otherwise temporize. They immediately recalled all the capsules from store shelves—even those that were clearly untainted—and then designed the generation of tamper-proof containers still in use today. This is a textbook loss-reduction strategy—timely, aggressive, and (while costly in the short run) effective.

In contrast, consider the strategy of Johns-Manville, once the world's biggest producer of asbestos, which, as we noted earlier, collapsed under the weight of litigation from asbestos claims in 1982. Johns-Manville's apparent decision to ignore the risks of asbestos exposure to its workers, long after the evidence indicated that management may have suspected a link between asbestos exposures in the workplace and worker health, resulted in lives ruined and lost. The cost to Manville and its shareholders was ultimately that of corporate bankruptcy.

Dan Sobczynski offers some sound advice: “Either manage the risk, or it will manage you,” he says, “and, when it does, the loss will happen when you are least prepared” (*Financial Times* 1999).

Notes

1. Students of history will recall that Winston Churchill was almost killed by a speeding taxi in New York City during the 1930s. Accustomed to cars driving on the left side of the road, he looked the wrong way while crossing the street, a clear failure in risk identification and quantification.
2. Joint and several liability means, in practice, that even a 1 percent ownership stake in the property can lead to liability for 100 percent of the clean-up costs if

the owners of the other 99 percent interest are financially unable to pay their share.

3. Actually, they would provide such coverage, but at an annual premium effectively equal to the book value of the car!

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