

## **Enterprise Risk Management**

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## Introduction

Enterprise Risk Management is a relatively new term that is quickly becoming viewed as the ultimate approach to risk management. Consultants are advertising their ability to perform enterprise risk management. Auditors are examining how to incorporate enterprise risk management approaches into company audits.<sup>1</sup> Presentations are being made on this topic at many actuarial, risk management and other insurance meetings.<sup>2</sup> Seminars devoted to this topic are being conducted to explain the process, provide examples of applications and discuss advances in the field. Papers on enterprise risk management are beginning to appear in journals and books on the topic are starting to be published.<sup>3</sup> Some universities are even starting to offer courses titled enterprise risk management. It appears that a new field of risk management is opening up, one requiring new and specialized expertise, one that will make other forms of risk management incomplete and less attractive. This paper will explain what enterprise risk management is, why it has developed so quickly, how it differs from traditional risk management, what new skills are involved in this process and what advantages and opportunities this approach offers compared to prior techniques.

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<sup>1</sup> See the Institute of Internal Auditors website for an extensive list of references and discussion of enterprise risk management.

<sup>2</sup> See the CAS website, and particularly the presentations by Friedel, Kawamoto, Miccolis, and Miccolis and Shah.

<sup>3</sup> See Davenport and Bradley (2000), Deloach and Temple (2000), Doherty (2000), Guthrie, et al (1999), Lam (2000) and Shimpi (1999).

## Definition of Enterprise Risk Management

Enterprise risk management is, in essence, the latest name for an overall risk management approach to business risks. Precursors to this term include corporate risk management, business risk management, holistic risk management, strategic risk management and integrated risk management. Although each of these terms has a slightly different focus, in part fostered by the risk elements that were of primary concern to organizations when each term first emerged, the general concepts are quite similar.

According to the Casualty Actuarial Society (CAS), enterprise risk management is defined as:

"The process by which organizations in all industries assess, control, exploit, finance and monitor risks from all sources for the purpose of increasing the organization's short and long term value to its stakeholders."

The CAS then proceeds to enumerate the types of risk subject to enterprise risk management as hazard, financial, operational and strategic. Hazard risks are those risks that have traditionally been addressed by insurers, including fire, theft, windstorm, liability, business interruption, pollution, health and pensions. Financial risks cover potential losses due to changes in financial markets, including interest rates, foreign exchange rates, commodity prices, liquidity risks and credit risk. Operational risks cover a wide variety of situations, including customer satisfaction, product development, product failure, trademark protection, corporate leadership, information technology, management fraud and information risk. Strategic risks include such factors as completion, customer preferences, technological innovation and regulatory or political impediments. Although there can be disagreement over which category would apply to

a specific instance, the primary point is that enterprise risk management considers all types of risk an organization faces.

A common thread of enterprise risk management is that the overall risks of the organization are managed in aggregate, rather than independently. Risk is also viewed as a potential profit opportunity, rather than as something simply to be minimized or eliminated. The level of decision making under enterprise risk management is also shifted, from the insurance risk manager, who would generally seek to control risk, to the chief executive officer, or board of directors, who would be willing to embrace profitable risk opportunities (Kawamoto, 2001).

Basically, though, enterprise risk management simply represents a return to the original roots of risk management, a field that was first developed in the 1950s by a group of innovative insurance professors. The first risk management text, presciently titled *Risk Management and the Business Enterprise*, was published in 1963, after six years of development, by Robert I. Mehr and Bob Hedges. As initially introduced in this text, the objective of risk management is, "to maximize the productive efficiency of the enterprise." The basic premise of this text was that risks should be managed in a comprehensive manner, and not simply insured.

The initial focus of risk management was on what is now termed hazard risk. This specialty area developed its own terminology and techniques for addressing risk. Financial risks began to be addressed much later, and by a separate business segment of most organizations. This field also developed its own terminology and techniques for addressing risk, independently of those used in traditional risk management. Each specialty area also developed different methods for reporting the risks the organization

faced within each area. Since the hazard risk manager and the financial risk manager both generally reported to a common position, frequently the treasurer or chief financial officer of the firm, the different, and separate, approaches to dealing with risk created a problem. Potentially, each area could be expending resources to deal with a risk that, in aggregate, would cancel out within the firm. Also, the tolerance for risk applied in each area could be vastly different between hazard risks and financial risks. These discrepancies provided the impetus for developing a common terminology and common techniques for dealing with risk. In addition, this common approach could then be applied to other risks, such as operational and strategic risks, that could adversely affect the organization. This common approach to dealing with all risks that a firm faces is the heart of enterprise risk management, and represents an encompassing application of Mehr and Hedges objective," to maximize the productive efficiency of the enterprise."

### Historical Development

Risk management has been practiced for thousands of years.<sup>4</sup> One can imagine a proto-risk manager burning a fire at night to keep wild animals away. Early lenders must have quickly learned to reduce the risk of loan defaults by limiting the amount loaned to any one individual and by restricting loans to those considered most likely to repay them. Individuals and firms could manage the risk of fire through the choice of building materials and safety practices, or after the introduction of fire insurance in 1667, by shifting it to an insurer. However, it wasn't until the 1960s that the field was formally named, principles developed and guidelines established. Robert Mehr and

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<sup>4</sup> For an excellent overview of the treatment of risk through the ages, see Bernstein (1996).

Bob Hedges, widely acclaimed as the fathers of risk management, enumerated the following steps for the risk management process:

1. Identifying loss exposures
2. Measuring loss exposures
3. Evaluating the different methods for handling risk
  - Risk assumption
  - Risk transfer
  - Risk reduction
4. Selecting a method
5. Monitoring results

Initially, the risk management process focused on what has been termed "pure risks." Pure risks are those in which there is either a loss or no loss. Either something bad happens, or it doesn't. The states of possible outcomes in a pure risk situation do not allow for any outcome more favorable than the current position.

A typical example of a pure risk is owning a house. Your house may burn down, be hit by an earthquake or be infested by insects. If none of these, or other, unfavorable developments occur, then you are in the no loss position. This is no better than where you started, but no worse either.

The other classification of risk is "speculative risk." In a speculative risk, there is the possibility of a gain. For example, investing in the stock market generates the possibility of a loss (the stock could go down in value), the possibility that the value would not change (the stock price remains where you bought it), and the possibility of a gain (the stock price could increase).

Traditional risk management has focused on pure risks for several reasons. First, the field of risk management was developed by individuals who taught or worked in the insurance field, so the focus was on risks that insurers would be willing to write. In fact, some risk managers job duties are limited to buying insurance, an unfortunate

limitation since many other options are readily available and should be explored.

Another reason for the focus on pure risks is that in many cases these represented the most serious short term threats to the financial position of an organization at the time this field was founded. A fire could quickly put a firm out of business. Efforts to reduce the likelihood of a fire occurring, or to minimize the damage a fire would cause, or to establish a contingency plan to keep the business going in the event of a fire, or to purchase an insurance policy to compensate the owners for the damages caused by a fire, were easily seen to be beneficial to the firm. Finally, there were simply not a lot of reasons or options for dealing with financial risks such as interest rate changes, foreign exchange rate movements or equity market fluctuations, when this field was first developing.

At the time the field of risk management first emerged, interest rates were stable, foreign exchange rates were intentionally maintained within narrow bands and inflation was not yet a concern to most corporations. Thus, financial risks were not a major issue for most businesses. Indeed, the field of finance was primarily institutional at the time. Although Markowitz had proposed portfolio theory (Markowitz, 1952), the Capital Asset Pricing Model had not yet been developed. The mathematics for quantifying financial risk were not sufficient to put these risks in the same framework as most pure risks. The primary risks of the time were hazard risks: the risk of fire, windstorm or other property damage, or liability. Environmental risks had not yet developed into significant losses. Pensions were, at this point, neither guaranteed nor regulated.

Given the primary risks facing businesses were hazard risks, the initial focus of risk management was on these types of risks. Risks were quantified, the evaluation of

different methods of dealing with risk was advanced and standardized, and an extensive terminology for managing risk was developed. Such terms as maximum possible loss (the largest loss that could occur) and maximum probable loss (the largest loss that is likely to occur) were introduced to help define risk exposure. Probability and statistical analysis were used to estimate the range of likely losses and the effect of adopting steps to mitigate these risks.

Risk managers did their job quite effectively. Firms almost universally handled their hazard risk in an appropriate manner. When they didn't, such as the MGM Grand Hotel that found it was not adequately insured for liability coverage after a major fire, new methods of handling risk, in this case retroactive insurance, were developed (Smith and Witt, 1985). Rarely did companies face financial ruin as a result of failure to manage their hazard risks effectively.

Beginning in the 1970s, financial risk became an important source of uncertainty for firms and, shortly thereafter, tools for handling financial risk were developed. These new tools allowed financial risks to be managed in a similar fashion to the ways that pure risks had been managed for decades. In 1972 the major developed countries ended the Bretton Woods agreement which had kept exchange rates stable for three decades. The result of ending the Bretton Woods agreement was to introduce instability in exchange rates. As foreign exchange rates varied, the balance sheets and operating results of corporations engaging in international trade began to fluctuate. This instability affected the performance of many firms. Also during the 1970s, oil prices began to rise as the Organization of Petroleum Exporting Countries (OPEC) developed agreements to reduce production to raise prices. Later in the same decade, a policy



shift by the U. S. Federal Reserve to focus on fighting inflation (a result of oil price increases) instead of stabilizing interest rates led to a rapid rise, and increasing volatility, of interest rates in the United States, and had a spillover effect in other nations as well. Thus, volatility in foreign exchange rates, prices and interest rates caused financial risk to become an important concern for institutions.

Although financial risk had become a major concern for institutions by the early 1980s, organizations did not begin to apply the standard risk management tools and techniques to this area. The reasons for this failure were based on the artificial categorization of risk into pure risk and speculative risk (D'Arcy, 1999). Since fixed income assets, investments denominated in foreign currency and operating results that were affected by inflation or foreign exchange rates all had the possibility of a gain, they represented speculative risk. Risk managers had built a wall around their specialty, called pure risk, within which they operated. When a new risk area emerged, they did not expand to incorporate it into their domain. To do so would have required learning about financial instruments and moving away from the type of risks commonly covered by insurance. This would have been a bold move, but one that the innovative thinkers who developed risk management would have espoused. This failure was costly to organizations, and to the risk management field. With the emergence of enterprise risk management, traditional risk managers will be pushed into a wider arena of risk analysis, one that incorporates financial risk management and other forms of risk analysis. Thus, the refusal to expand into financial risks did not prevent risk managers from having to learn about financial risk management, it simply delayed it by a few decades.

## A Primer in Financial Risk Management

The basic tools of financial risk management are forwards, futures, swaps and options (Smithson, 1998). These contracts are all termed derivatives, since their values are derived from some other instrument's value. Forwards are contracts entered into today in which the exchange will take place at some future date. The terms of the contract, the price, the date and the specific characteristics of the underlying asset, are all determined when the contract is established, but no money changes hands when the contract is initiated. At the specified date, each party is obligated to consummate the transaction. Since each forward contract is individually negotiated between the two parties, there is considerable flexibility regarding the terms of the contract. However, since forwards are contracts between the two parties, the risk of failure to perform exists, in the same manner that credit risk is a factor in any loan. In financial markets, this risk is termed counterparty risk. Also, since the contracts are specialized agreements between two parties, the contract is not liquid and can be very hard to terminate prior to the specified date if conditions were to change for one or both of the parties.

Futures contracts were developed to address the credit risk and liquidity concerns of forward contracts. Similar to forwards, futures are entered into today for an exchange that will take place at some future date. The terms of the contract are determined when the contract is entered into and no money changes hands when the contract is initiated. However, there are several significant differences between forward and futures. First, a clearinghouse (a firm that guarantees the performance of the

parties in an exchange-traded derivatives transaction - Hull, 2000) serves as an intermediary to the contract. Each party is contracting with the clearinghouse, not with the other party. Thus, the risk of nonperformance is significantly reduced. Next, in order to reduce the risk of default, several financial requirements are introduced. Each party must post collateral, termed margin, with its broker. The amount of the margin that must be posted initially is determined for each futures contract (initial margin). Also, each day futures contracts are "marked-to-market" with cash payments flowing from one party to the other based on changes in the value of the futures contract. Thus, if the price of a futures contract increases by \$500, then the party that is short the contract (has sold the asset) pays \$500 to the party that is long the contract (has bought the asset). These funds come out of, and flow into, the respective margin accounts. If the margin account, falls below a predetermined value (maintenance margin), then a deposit must be made into the margin account to restore it to the initial margin level.

Swaps are agreements between two parties to exchange a series of cash flows based on a predetermined arrangement. Early swaps were based on exchanging a series of payments based on different currencies. For example, one company would pay a predetermined sum in Korean won and the other party would pay in US dollars each quarter for several years. Often the value of the exchanges would be netted (the respective values of each payment would be determined, and one party would pay the counterparty the difference in values). The most common swap today is an interest rate swap in which one party pays a fixed interest rate and the other pays a floating interest rate based on a set index such as the London Interbank Offer Rate (LIBOR). However, swaps can also be based on commodity prices or equity values. Similar to forwards

and futures, swaps do not involve a payment by either party when the transaction is initiated.

The final basic tool of financial risk management is an option. An option provides the right, but not the obligation, to engage in a financial transaction at a predetermined price in the future. The owner of the option has the choice about consummating the transaction. The seller of the option is required to fulfill the contract if the buyer chooses. Since an option represents one-sided risk, there is an initial cost to purchasing an option, which is termed the option premium. Options can be based on equities, bonds, interest rates, commodities, foreign exchange rates, or any other financial variable. A call option provides the right to buy the underlying asset at the predetermined price; a put option provides the right to sell the underlying asset. Although all options have these general characteristics, many specialized forms of options have been generated to produce a wide variety of different payoffs.

### Introduction of Financial Risk Management

Forwards, futures and options had all been traded based on non-financial assets long before they were adapted to deal with financial risk. Swaps were not introduced until 1981, when the first currency swap was announced (Smithson, 1998). However, it did not take long after financial risk began to affect institutions for a wide array of financial risk management products to be generated to help corporations deal with financial risk. Foreign exchange futures were first offered in May, 1972. Interest rate futures began trading in October, 1975. Options on U.S. Treasury bonds were introduced in October, 1982. Options on foreign exchange rates were introduced in

December, 1982. Additional futures, swaps and options, as well as combination products, quickly followed. These tools allowed financial institutions and other corporations to manage financial risk in the much the same fashion that they used for pure risks.

Unfortunately, these tools were not always used wisely or effectively. Since financial risk management was generally not handled by the traditional risk management department, many of the standards for managing risk were not followed in this area. In 1994 alone, due to an unexpected rise in interest rates, the following losses from derivatives occurred (Smithson, 1998):

- Codelco, Chile's national copper trading company, lost \$207 million
- Gibson Greetings lost \$20 million
- Procter and Gamble lost \$157 million
- Mead lost \$7 million
- Air Products lost \$60 million
- Federal Paper lost \$19 million
- Caterpillar lost \$13 million

Even more serious losses from the misuse of derivatives include (Jorion, 2001, Holton, 1996):

- Barings Bank went bankrupt in 1995 as a result of \$1.3 billion in losses in futures and options trading based on the Nikkei 225 and Japanese bonds
- Metallgesellschaft lost \$1.3 billion on oil futures contracts
- Orange County lost \$1.8 billion in 1994 from leveraged interest rate contracts
- Daiwa lost \$1.1 billion from unauthorized derivatives trading
- Sumitomo lost \$1.8 billion from concealed trading in copper and derivatives on copper by the head trader

In many cases, these losses occurred due to the failure to follow common risk management practices, such as not having transactions verified by an independent authority, not setting limits to potential losses or failure to understand the risks to which

the organization was exposed. Managers and boards of directors were, in some cases, reluctant to question individuals who were providing, or at least reporting, impressive profits in a new area of financial transactions, and were willing to provide authority to these individuals without adequate oversight. The fear was that the normal level of oversight, if exercised in these areas, would drive a person with extraordinary talent away from their firm. Thus, they were lured into risk areas they neither understood nor would have accepted.

Imagine the approach that would have been taken if a traditional risk manager, newly hired by a firm, claimed to be able to provide insurance coverage through a self-funding strategy at half the price that the current providers were charging. What if this risk manager wanted to take control of the funds for managing risks and wanted to be the person in charge of handling, and reporting, all monetary transactions involving this fund, but would not provide details about the fund to the company? Despite the apparent cost savings, I doubt that any firm would be foolish enough to disregard its oversight process in this situation, or to provide this person with performance bonuses based on the apparent cost savings. Traditional risk management has developed a series of checks and balances to prevent such obvious abuses. Financial risk management did not initially have this level of expertise. One reason for this failure is because traditional risk managers abdicated the area of speculative risk, exposing many organizations to disastrous losses.

The basic rule of risk taking, whether it is hazard risk, financial risk or any other form of risk, is that if you do not fully understand a risk, you do not engage in it, regardless of what profits are claimed or reported. This basic rule is, unfortunately,

violated by individuals consistently. Promises of impressive returns entice many individual investors to participate in fraudulent investment schemes. Unfortunately, many corporations fell into this trap as well.

The losses of the mid-1990s led organizations to realize the importance of financial risk management. The financial instruments that were developed to deal with financial risk were complex, and often only understood by those in the financial areas of the firm. Thus, the use of these tools to manage financial risk was generally not coordinated with the approach used to manage other risks. This lack of coordination resulted in a number of problems, including the development of a different terminology from that used in traditional risk management, different measures of risk and different goals. For example, traditional risk managers frequently focus on the probable maximum loss, the largest loss that could reasonably be expected to occur. If that loss exceeds the ability of the firm to cope with, then steps are taken to manage that risk, by transferring some of the risk to other parties, by reducing loss severity through loss control steps or other standard practices. Instead of adopting this approach, financial risk managers developed a measure termed the Value-at-Risk (VaR). This value indicates the loss that the firm would expect to have occur over the selected time interval (for example, daily) the selected percentage of the time. Thus, the daily VaR at the 1% level is the loss that can be expected to occur once every 100 days. This is not the largest loss that is likely to occur, so it does not provide the same level of information as probable maximum loss. The daily VaR at the 5% level, which is expected to occur once every 20 days, is smaller than the 1% value. VaR indicates what losses to expect, not what losses could occur. Even the time frame is different, as

the traditional risk manager is likely dealing with loss probabilities over an annual basis, or over the term of an insurance contract, while VaR is often based on daily or weekly price movements.

Another difference between hazard risk and financial risk is the degree of independence among separate elements. In hazard risk management, risks are frequently independent of each other. Thus, the calculation of the number of accidents that a pool of vehicles is likely to be involved in during a year is determined by assuming that each accident is independent of every other accident. Financial risks, on the other hand, are not considered to be independent. In many cases, the correlation between different financial transactions forms the basis of the risk management strategy.

Financial risk management considers the relationships among different financial variables to construct hedges. For example, a firm exposed to long term interest rate risk might use futures on short term instruments, due to the high correlation between short and long term interest rates, to hedge their interest rate exposure. Financial risk management approaches can lead to difficulty when the historical relationships between financial variables shifts. For example, the hedge fund Long Term Capital Management lost 92 percent its value (approximately \$4.5 billion) in 1998 when historical patterns between variables, including yields on U.S. and Russian bonds, changed significantly.

Thus, the Board of Directors and other managers that are determining the overall risk management strategy of the firm are likely to receive different types of information on financial risk and on hazard risk. The risks are different, the terminology is different and the measures of risk are different. This makes the task of coordinating the firm's overall exposure to risk more difficult. In addition to desiring a common approach to



hazard and financial risks, these decision makers have also envisioned incorporating other forms of risk, including strategic and operational, into the same approach. It is this vision that has led to the creation of enterprise risk management.

### Other Factors Leading to Enterprise Risk Management

A number of other factors have also contributed to the development of enterprise risk management. Recent advances in computing power provide the powerful modeling tools necessary to perform sophisticated risk analysis for hazard risks, such as catastrophes, for financial risks, such as interest rate movements, and for other risks. Also, the availability of extensive data bases of financial and other information allows users to examine historical information to determine trends, correlations and other relationships among variables that is essential to enterprise risk management.

Insurers are also developing an expertise in, and a focus on, financial risk management. Some insurers are beginning to provide policies that coordinate financial and pure risk. One insurer has offered a policy that provides protection against foreign currency losses within its insurance coverage (Banham, 1999). Another insurer provided protection for a utility in which the amount of coverage is a function of rainfall, which affects utility income (Taylor, 2001).

Insurers are beginning to utilize the financial markets themselves through the securitization of insurance risk. Several types of insurance securitization have been developed (ISO, 1999). The first was the use of exchange traded derivatives. Both futures and options on catastrophe risk have been traded on the Chicago Board of

Trade. Trading in futures began in 1992 based on an index of catastrophe losses paid by a number of insurers reporting to ISO. In 1995 the index was changed to catastrophe losses reported by Property Claim Services, and trading in options was instigated. Although neither of these instruments is traded currently, their existence provided an impetus for insurers to learn about financial risk management tools and encouraged subsequent development of other approaches. The second approach is through contingent capital. One form of this is termed a Cat-E-Put, or catastrophe-equity-put. Under this contract, an insurer purchases a contract under which the counterparty agrees to purchase equity in the firm, at a predetermined price, in the event of a catastrophe as defined in the contract. This is, essentially, a put option that is triggered by a catastrophe. A third type of securitization is termed risk capital, in which an insurer, through an intermediary, issues debt on which the repayment of interest and principal is dependent on catastrophe loss experience. The debt is not fully repaid if a certain level of catastrophic losses occur. As a result of these innovations, insurers have been able to tap the capital markets to help spread catastrophic losses. The successes in this area are encouraging additional growth into the financial risk management field.

Insurers and risk managers have a significant role to play in the field of financial risk management. From the point of view of the firm, the risk of a fire that costs the firm \$1 million has the same impact on the firm's financial position as a loss in its bond portfolio of \$1 million. Protection is available against both of these risks. A coordinated approach to an organization's risk would be preferable to a segmented approach.

After the shocks of mismanaged financial risks, the failed investments in interest rate derivatives, Nikkei 225 stock index futures, and the later success that financial risk management has had in reducing such exposure, corporations have begun to question whether other risks can be handled in a similar, integrated approach.

### The Skills Required for Enterprise Risk Management

Although enterprise risk management represents a return to the roots of risk management, in order to be involved with enterprise risk management, traditional risk managers will need to obtain some additional skills. The starting point is to learn the terminology of finance and financial risk management. Due to their importance as potential investments and the growing use of this form of financing, often involving insurance guarantees, the role of asset backed securities should be given special attention. Although new instruments for financial risk management are constantly being generated, they can generally be broken down into their basic components of forwards, futures, swaps and options to be more easily understood. Traditional risk managers also need to learn about VaR in order to engage any comprehensive risk management process. Knowledge of portfolio theory as a method for dealing with correlated risks is also critical. Simulation and modeling are also important aspects of enterprise risk management. The ability to locate, and exploit natural hedges, those conditions that affect different aspects of an organization in offsetting ways, is vital as well. For example, telephone companies have a natural hedge against major disasters (Molnar, 2000). When a disaster strikes, the company will suffer a loss to its property, but the higher volume of telephone traffic that typically follows a major disaster will help

offset this loss. However, the basic approach of identifying, measuring, evaluating, selecting and monitoring risk remains the same. The primary challenge to traditional risk managers is to examine all risks that an organization faces, and not just focus on those that are insurable.

Since enterprise risk management involves so many different aspects of an organization's operations, and integrates a wide variety of different types of risks, no one person is likely to have the expertise necessary to handle this entire role. In most cases, a team approach is used, with the team drawing on the skills and expertise of a number of different areas, including traditional risk management, financial risk management, management information systems, auditing, planning and line operations. The use of a team approach, though, does not allow traditional risk managers to remain focused only on hazard risk. In order for the team to be effective, each area will have to understand the risks, the language and the approach of the other areas. Also, the team leader will need to have a basic understanding of all the steps involved in the entire process and the methodology used by each area.

In assessing the potential losses an organization could experience, many items not covered under hazard risk or financial risk emerge. The company could suffer a significant loss if the chief executive officer were to step down and an adequate replacement could not be found. If the reputation of one of the company's key products is tarnished by a serious loss (Firestone tires, for example), the company could incur significant monetary losses. If the firm is found liable for underpaying taxes by losing a tax dispute, the required payment could be extremely large. A labor dispute could severely impact a firm's operations. A failed merger could have repercussions that puts

the firm into a worse financial position than it was in before the negotiations commenced.

Although these risks are both present and significant, the ability to quantify such exposures is far less sophisticated than the approach that can be used for most hazard and financial risks. The lack of data and the difficulty in predicting the likelihood of a loss or the financial impact if a loss were to occur make it hard to quantify many risks a firm faces.

One feature of enterprise risk management is the consideration of offsetting risks within a firm. Catastrophe losses are one example. A major hurricane increases the losses of an insurer, but after most disasters people are more likely to purchase insurance against future catastrophes. Thus, future earnings increase, which can offset, on an enterprise risk management approach, the increase in losses the firm has to pay.

The steps of enterprise risk management are quite familiar to traditional risk managers. Shawna Ackerman, a consultant at MHL/Paratus Consulting, lists these steps as (Ackerman, 2001):

- Identify the question(s)
- Identify risks
- Risk measurements
- Formulate strategies to limit risk
- Implement strategies
- Monitor results
- And repeat...

Another consulting firm lists the steps as (ARI 2001):

- Identify risk on an enterprise basis
- Measure it
- Formulate strategies and tactics to limit or leverage it
- Execute those strategies and tactics

## Monitor process

The steps of enterprise risk management are the same, expect for minor changes in wording, as those first enumerated by Mehr and Hedges in 1963. Enterprise risk management is risk management applied to the entire organization. The basic approach, the goals and the focus of enterprise risk management are the same as those that have worked so effectively for traditional risk managers since the field was first developed.

## Conclusion

The impetus for enterprise risk management arose when the traditional risk manager and the financial risk manager began reporting to the same individual in a corporation, commonly the treasurer or chief financial officer. Each risk management specialty had its own terminology, its own methodology and its own focus. However, each dealt with risk the firm was facing. It quickly became apparent that a common approach to risk management would be preferable to an individual approach and an integrated approach preferable to a separatist approach. The evident success of first hazard risk management and later financial risk management has encouraged managers to try to include these and other forms of risk in an overall risk management strategy. Whether this approach succeeds will depend on the ability of those involved in the separate risk categories to develop an integrated approach and extend it to other areas of risk. This is not truly a new form of risk management, it is simply a recognition that risk management means total risk management, not some subset of risks. The new focus on the concept of enterprise risk management provides an opportunity for

risk managers to apply their well established and successful approaches to risk on a broader and more vital scale than previously. This is an excellent opportunity to advance the science of risk management.

## References

- Ackerman, Shawna. 2001. The Enterprise in Enterprise Risk Management. *Casualty Actuarial Society Enterprise Risk Management Seminar*.
- ARI Risk Management Consultants. 2001. Enterprise Risk Management: The Intersection of Risk and Strategy. <http://www.riskadviser.net/Cases/case.htm>
- Banham, Russ. 1999. Understanding the Skepticism about Enterprise Risk Management. *CFO Magazine*. April 1, 1999.
- Bernstein, Peter L. 1996. *Against the Gods: The Remarkable Story of Risk*. John Wiley and Sons, Inc. New York.
- Casualty Actuarial Society Websites:  
<http://www.casact.org/research/ermsurv.htm>  
<http://www.casact.org/CONEDUC/specsem/erm/2001/handouts/handouts.htm>
- D'Arcy, Stephen P. 1999. Don't Focus on the Tail: Study the Whole Dog! *Risk Management and Insurance Review*. 2(2):iv-xiv.
- Davenport, Edgar W. and L. Michelle Bradley. 2000. Enterprise Risk Management: A Consultative Perspective. *Casualty Actuarial Society Discussion Paper Program* p. 23-42.
- Deloach, James and Nick Temple. 2000. *Enterprise-Wide Risk Management: Strategies for Linking Risk and Opportunity*. Financial Times Management.
- Doherty, Neil A. 2000. *Integrated Risk Management*. McGraw-Hill New York.
- Friedel, Wolfgang F. 2001. Enterprise Risk Management - Fad or Fact? *Casualty Actuarial Society Enterprise Risk Management Seminar*.
- Guthrie, Vernon H., David A. Walker and Bert N. Macesker. 1999. Enterprise Risk Management. 17<sup>th</sup> International System Safety Conference. ABS Group Inc. Risk & Reliability Division and United States Coast Guard Research and Development Center (vguthrie@abs-group.com; dawalker@abs-group.com; bmacesker@rdc.uscg.mil).
- Holton, Glyn A. 1996. Enterprise Risk Management. *Contingency Analysis*. ([http://www.contingencyanalysis.com/\\_frame/frameerm.htm](http://www.contingencyanalysis.com/_frame/frameerm.htm))
- Hull, John C. 2000. *Options, Futures, and Other Derivatives* (Fourth Edition). Prentice Hall. Upper Saddle River, NJ.
- Insurance Services Office. 1999. *Financing Catastrophe Risk: Capital Market Solutions*.



Institute of Internal Auditors. 2001. Risk Management Readings ([http://www.theiia.org/ecm/guide-ia.cfm?doc\\_id=1604](http://www.theiia.org/ecm/guide-ia.cfm?doc_id=1604))

Jorion, Philippe. 2001. *Value at Risk* (Second Edition) McGraw-Hill New York.

Kawamoto, Brian. 2001. Issues in Enterprise Risk Management: From Theory to Application. Casualty Actuarial Society Spring Meeting.

Lam, James. 2000. Enterprise-Wide Risk Management and the Role of the Chief Risk Officer. *Erisk* March 25, 2000. Erisk.com

Markowitz, Harry M. 1952. Portfolio Selection. *Journal of Finance* 7:77-91.

Mehr, Robert I. and Bob A. Hedges. 1963. *Risk Management in the Business Enterprise*. Richard D. Irwin, Inc. Homewood, IL

Miccolis, Jerry and Samir Shah. 2000. Enterprise Risk Management: An Analytic Approach. Tillinghast - Towers Perrin Monograph.

Molnar, Michele. 2000. More Companies Embrace Enterprise Risk Management. *Office.com*.

Shimpi, Prakash A. 1999. *Integrating Corporate Risk Management*. Swiss Re New Markets

Smith, Michael L. and Robert C. Witt. 1985. An Economic Analysis of Retroactive Liability Insurance. *Journal of Risk and Insurance* 52:379-401.

Smithson, Charles W. 1998. *Managing Financial Risk: A Guide to Derivative Products, Financial Engineering, and Value Maximization* (Third Edition) McGraw-Hill New York.

Taylor, Gary. 2001. New Developments in Enterprise Risk Management in the Energy Industry With a Specific Focus on the Weather Risk Management Market. Casualty Actuarial Society Spring Meeting.

Enterprise Risk Management – Understanding and Communicating Risk Appetite. Organizations encounter risk every day as they pursue their objectives. Risk appetite – the amount of risk organizations are willing to accept in pursuit of their objectives – is an integral part of an effective ERM system. This thought paper aims to help organizations develop, better articulate, and implement – risk appetite. – Deloitte’s Enterprise Risk Management Model. Risk culture Risk strategy and appetite Risk governance Risk resources/infrastructure External disclosure Risk monitoring and reporting Risk identification Risk assessment Risk management. Oversight Tone from the top. Systems People Process Technology. Quantitative Enterprise Risk Management specialization of the ISMA Master’s CS program. Duration of studies: 15 months. Awarded degree: Professional Master in CS. Qualification: Quant Developer. Language of studies: English. Form of studies: 100% online (on the basis of the Moodle platform). Master in Quantitative Enterprise Risk Management is the world class professional qualification in the field of financial engineering.