

EDUCATIONAL INSIGHTS

DESIGNING AN ENTERPRISE RISK MANAGEMENT CURRICULUM FOR BUSINESS STUDIES: INSIGHTS FROM A PILOT PROGRAM

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ABSTRACT

The latest financial crises have highlighted the centrality of managing risks across organizations. Internationally, Basel II/III, The Volcker Rule of the Dodd-Frank Act, and Vickers' Ring-Fence all propose stronger management of risk across banks and greater oversight of executive compensation to mitigate generic risk. Given this situation, it might be assumed that academia would also view risk as a central concern for its business programs. It seems not. There is a little evidence that academic curricula are being specifically designed to address this issue. This article examines an Enterprise Risk Management curriculum delivered to graduate student cohorts over 3 consecutive years. Four criteria were used to develop the new curriculum. First, it should take a holistic view of risk; second, the theories related to risk needed to be transformed from individual to group level; third, the dynamics of risk due to market factors needed to be understood; and finally, the way firms respond to crises needed to be observed and embedded in the curriculum.

INTRODUCTION

Risk management has traditionally been synonymous with insurance (Mehr and Hedges, 1963; Witt, 1986; Garven, 2007). Over time, the complexity of products and the market competition generated regulatory responses, such as Basel and Solvency.¹ The insurance industry was unable to provide adequate coverage for the new degree of risks (e.g., credit risk of the structured financial products) due to the lack of capacity and

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¹ The banking and insurance products, for example, collateral debt obligations (CDOs) and credit default swaps (CDSs), which are essentially the bundle of risks with the features of shifting risk and opportunities from one investor to another. These products are complex as they are designed with several layers of risks that are difficult to understand both in terms of measurement and

insurability criteria (Sigma, 2001, 2006). The result was that businesses began moving to capital and derivative markets (Hunter and Smith, 2002).

Following this trend, higher educational institutions (HEIs) developed courses to teach theories of risk management and their application in practice but these remained in the traditional academic silos (Dorfman et al., 2006). Meanwhile, in the businesses themselves these types of risk were located with middle management, and not considered as threatening to the survival of the businesses. However, the fallacy of this view became apparent with the bankruptcy of several large corporations, for example, Maxwell, World-Com, and Enron (Stiles and Taylor, 1993; Rosen, 2003) in the nonfinancial sector, and Barings, LTCM, and so on (Hogan, 1997; Jorion, 2000; Stein, 2000) in the financial sector. The sources of these emerging risks are not limited to traditional business functions and failures but range from sudden stock market crash to natural catastrophes, pandemic, technological, political, terrorism, systemic, reputational, and corporate social responsibility failures. The 2007 financial crisis and the subsequent and continuing global ramifications merely added weight to this development (Jorion, 2009). More businesses began to realize that risk affected them holistically but there remained artificial boundaries between different types of risk (Dickinson, 2001; Crockford, 2005; Gordon et al., 2009). Eventually, a more holistic approach emerged in the guise of Enterprise Risk Management (ERM) (Dickinson, 2001; Ward, 2003; Gates, 2006; Hoyt and Liebenberg, 2011). However, despite such developments in practice, HEIs continued with traditional segmental risk management curricula concentrating on insurance, financial engineering, security, or environmental silos.

The professional bodies (e.g., Institute of Risk Management, Institute of Actuaries, Society of Actuaries [CAS, 2003]) are progressing with this development but owing to their practice-based focus they naturally tend to be less interested in the theoretical aspects of ERM. In order to produce experts in ERM, HEIs and professional bodies need to update their risk management curricula from segmental to holistic.²

Continual revelations concerning the inadequacy and incompetence of risk avoidance functions within the corporate world indicate that there is an urgent need for risk professionals who understand the concept of risk in its entirety. The overarching purpose of the pilot program studied for this article was to update the risk management curriculum in the HEIs from a segmental to an interdisciplinary and holistic perspective. To that end, the framework (curriculum) of an ERM course for business studies and its delivery are analyzed as a case study.

management techniques. In insurance, the catastrophic bonds, which are designed to transfer large-scale natural catastrophe risks, are also complex in terms of riskiness associated with them. Over time, the Basel (in banking) and Solvency (in insurance) regulatory domains were designed to address these complexities.

² Several HEIs, for example, Red McCombs School of Business of the University of Texas at Austin; J. Mack Robinson College of Business of the Georgia State University; Terry College of Business, University of Georgia; Poole College of Management of NC State University; Stanford University in the United States; and Bournemouth University and the University of Kent in the United Kingdom have been offering courses on ERM for the last few years. Within the domain of professional bodies, the Society of Actuaries in the United States and Institute of Actuaries and Institute of Risk Management in the United Kingdom are the pioneers of providing ERM professional modules.

The article is divided into four sections. In the first section, the literature of risk management is briefly discussed covering the disciplinary understanding of risk, the impact of risk behavior in decision making, and essential elements of promoting risk management as a mainstream subject of academic discipline. The second section, which is the central component of this article, describes the design, delivery, and results of an innovative ERM module in the form of a case study. The proposed ERM curriculum itself is structured into four broader topics (building blocks), that is: philosophical and theoretical understanding of risk, internal risk arising from organizational complexities, risk from the external market influence, and crisis management. The lessons learned from the practical understanding and scope for further development of the proposed curriculum are discussed in the third section. The final section draws the conclusions.

LITERATURE REVIEW

Although no genuinely holistic curriculum for risk management exists in learning and teaching, a few studies have attempted to design risk management courses. Long (1961), for example, identifies the scope of risk studies that highlight important features in developing a risk management course in a broader perspective beyond insurance. He admits that “establishment of a special course addressed directly to risk in the enterprise system might help students (and instructors) better to understand the substance of business and economics treated in subsequent courses.” A similar view is forwarded by Garven (2007). Moreover, Beck (2004) proposes some tentative thoughts to overcome the obstacles to the evolution of risk management as a discipline. Nyce (2002) provides thoughts on integrating the enterprise risk concept across various disciplines using a Delta Air Lines case study. More recently, Hoyt et al. (2010) emphasize and propose a framework to teach risk management using integrated case studies. Garvey and Patrick (2011) describe the insights of using prediction market technology to encourage risk management decision making. Notwithstanding, these authors still view risk from their own sectorial perspectives and their works suffer from artificially narrow disciplinary perspective of risk (e.g., insurance) to different degrees.

Discipline-Based Understanding of Risk

A further problem for a holistic approach to risk management is the uneven understanding of the constructs of risk in various branches of social science. Each branch advocates a different primary unit of analysis. Economists, for example, can view risky behavior at the individual level, while strategists tend to focus on group activities, and sociologists concentrate on risk as a social phenomenon—and, within each unit, exist further substrata.

Financial Economics. As an example, within financial economics risk is embedded in the three distinct branches of financial economics, that is: mathematical finance, asset pricing models, and corporate finance (Whelan et al., 2002). In mathematical finance, pricing of risk is dealt with under the applied discipline of computational finance. The Black–Scholes model, for example, is familiar as a computational tool to price option contracts and risk within the framework of the efficient market hypothesis (EMH). The second branch (i.e., asset pricing) studies the factors that drive the price of financial assets. In this branch, risk is defined as the degree of volatility of security prices and expressed in terms of its standard deviation. The total risk of the firm is divided into

systematic risk and unsystematic risk (Bettis, 1983; Aaker and Jacobson, 1987). The neoclassical finance theories, for example, portfolio theory, capital asset pricing model, arbitrage pricing theory, and so on, were developed to measure risk associated with asset (or security) pricing (Fama and French, 2004). Finally, corporate finance focuses on capital structuring, investment management, and dividend policy. In this branch, risk is considered an essential element of corporate valuation, diversification, and dividend discount modeling. Agency theory, which has application in several branches of social science, explains risk preferences of agents (i.e., managers) in dealing with the interest of the principal (i.e., the owners) and also between stockholders and bondholders in a corporate setting (Eisenhardt, 1989). This overview of the understanding of risk in financial economics enables measurement of the risk exposure of assets and liabilities (i.e., effects); it does not necessarily identify and describe the causes of risk.

Strategic Management. In the strategic management literature, risk is widely understood as the uncertainty associated with sources of macrolevel environmental (political, regulatory, social, and natural instability) and organizational (e.g., strategic choice) variables impacting corporate performance including the inadequacy of information of these variables. This is different from the microlevel operational understanding of the outcome of the uncertainties, that is, volatility in stock price, interest rate, credit collectable, employee behavior, and so on (Miller, 1992). It acknowledges that while market forces shape the risk behavior of rational investors in finance, the perception of policy makers and decision makers constructs the phenomena of risk in formulating and implementing corporate strategies. The definition of risk in strategic management differs fundamentally from that accepted in economics (Miller and Bromiley, 1990, 1992). Strategists define risk as close to uncertainty within organizational context from a forward-looking (*ex ante*) perspective. The strategists emphasize risk as a matter of managerial judgment. They view risk as a multidimensional construct and define strategic risk as the risk associated with strategic choices in managerial decision making (March and Shapira, 1987). The issues of managers' preference in risk taking and its implication for firms' performance dominate the risk research of strategic management (Bromiley, 1991). Strategic management explores risk issues in relation to the interaction of people and organizations (Chatterjee et al., 2003). Furthermore, it also incorporates environmental influences and changes. However, despite strategists' preference for multiple risk measures, the discipline is still dominated by a stakeholder perspective, distinguishing it from the shareholder perspective of economics (Bromiley and James-Wade, 2003).

These discussions on the disciplinary perceptions of risk suggest that unlike the narrow understanding of risk in finance and economics, risk is clearly an interdisciplinary construct in strategic management (Miller, 1998; Wang et al., 2003). As such, the key focus is on the role of risk and behavioral judgment in managerial decision-making issues and their implications for the performance of the entire firm.

Social Phenomena. For risk management studies, the most pertinent element of a more sociological approach deals with managerial decision making (Baird and Thomas, 1985). The behavior of an economic agent and the firm has historically been utilized as an essential factor of decision making in both economics and strategic management. However, a concept of risk analysis and decision making outside of economics and finance is

provided by Pate-Cornell and Dillon (2006). The topic (risk aversion) tends to dominate in the analysis of an individual's behavior in the presence of uncertainty. Unlike Knight (1921), management scholars interchangeably use the notion of risk and uncertainty to describe the lack of predictability associated with environmental and organizational variables (Miller, 1977; Jauch and Kraft, 1986).

Assumptions of risk aversion are dominant in the construction of utility theory and modern portfolio theory although strategists continue to argue that utility and risk (variance) are two different concepts and the decision-making process for individuals is fundamentally different from that of firms. Practically, managers do not always make decisions based on the mathematically derived probabilities and associated expected values. While the experts rely on the severity and frequency of a loss as a consequence of a decision, the policy makers take the political, social, and ethical dimensions into account in addition to technical aspects when making policy decisions (Bradbury, 1989). In fact, measurement of risk aversion at the firm level is problematic as the stakeholders (e.g., shareholders, managers) usually have conflicting interests and stakes in the firm. However, the strategists still use the conclusions of prospect theory to explain the behavior of a firm in terms of risk and return relationship at the firm level (Head, 1973) in spite of the evidence provided by behavioral finance scholars (Kahneman and Tversky, 1979). Although all three dimensions of risk—that is, economics, personal, and social—influence a decision-making process and they are fundamentally inseparable. Consequently, a holistic treatment of risk should be the key focus of designing a modern risk management curriculum.

Why Is Risk Management Not a Mainstream Academic Discipline?

Although risk management is taught in silos—that is, financial risk management, insurance risk management, environmental risk management, and so on—risk management itself is not yet recognized as a mainstream discipline in the academic world. The literature review exposed three interrelated barriers that appear to prevent the growth and professionalization of risk management as a discipline (Beck, 2004). They are (1) legal mandate to the recognition of the profession, (2) demonstration of value to the decision makers while fulfilling the organizational objectives, and (3) inclusiveness of risk management with virtually all mainstream academic disciplines (e.g., economics, finance, accounting, law, management, etc.). Risk is, therefore, a part of almost every discipline and within each there are a variety of versions of what constitutes risk management across those disciplines.

Legal Mandate. Industry failures often highlighted the significance of risk management. For example, corporate scandals such as Enron, WorldCom, 2007 Banking Crisis, drove stricter corporate governance in the area of financial reporting (e.g., SOX, UK Combined Codes, Walker Review, Volcker Rule, Vickers's Ring-Fence [Chow and Surti, 2011], etc.).

As a consequence, directors of public companies are now required to disclose the risks to their corporations in the annual reports. The recent Walker's review on banks and bank-like institutions (e.g., life insurers) in the United Kingdom is another step in promoting ERM and the role of chief risk officers (CROs; Walker, 2009). In essence, the inspiration for ERM came in the late 1990s from the Conference Board of Canada, Towers Perrin, and AS/NZ 4360. The COSO Enterprise Risk Management framework provides a foundation

for ERM (Moeller, 2007). However, it has been criticized for placing more emphasis on the system and compliance aspects but not enough on the dynamics of risk, in particular, opportunities.

At the regulatory level, the capital adequacy regulations in the banking and insurance sectors are structured to capture more risks in determining the amount of regulatory capital. The design and implementation of these regulations require internal risk models of the firms where consideration of the firm's risk appetite and risk tolerance of business lines from a holistic perspective are essential (Grable and Lytton, 1999). In the meantime, United Kingdom's Financial Services Authority (FSA) has advocated the holistic management of risk in the financial sector. The Volcker Rule of the Dodd-Frank Act in the United States, and Vickers' Ring-Fence in the United Kingdom also emphasize the significance of management of an organization's overall risk at the board level (Chow, 2011). The effort of aggregation of risk has increased further since the 2007 financial crisis (Financial Stability Board, 2008; Jorion, 2009). Rating agencies, in particular S&P, have adopted ERM as an essential criterion of evaluating the financial strength of both financial and nonfinancial companies.

Unconvincing Demonstration of Value. A connection between risk management activities of corporations and the value of their economic activities are often claimed by practitioners and some academics (Hoyt and Liebenberg, 2011). However, there is little empirical proof of such claims other than a few works of finance scholars. Froot et al. (1994) claim that risk management reduces the expected cost of financial distress, such as transaction cost and bankruptcy. Others (Smith and Stulz, 1985; Rawls and Smithson, 1990; Stulz, 1996) contend that proper risk management reduces conflict between shareholders and bondholders and reduces corporate tax liabilities through cutting the rate of risk for buyout debts. Notwithstanding, these claims are mostly based on theoretical works without confirmatory practical evidence. Furthermore, it is argued that as these studies are mostly based on EMH, they are unlikely to reflect reality (Ball, 2009). Consequently, it is difficult for the risk management function to demonstrate the tangible value it adds to the firms' operation (Hoyt and Liebenberg, 2011). Nevertheless, risk management is still seen as an essential tool of managerial decision making, both at operational and strategic levels, even with the loose evaluation of risk and benefit.

Inclusiveness of Risk Management With Other Academic Disciplines

The central disciplines in business and management education all contain both conceptual and practical understanding of risk as an essential element of that discipline. Risk is present everywhere and managerial decisions, irrespective of industry and discipline, cannot be optimal without considering the risk associated with them. The contradiction is that such pervasiveness actually hinders risk management developing into a mainstream academic subject. Human beings appear to be attracted to specificity, and the mainstream disciplines (e.g., economics, finance, psychology, law, etc.) are built on their unique philosophy and value. Interestingly, risk, as discussed earlier, is embedded in all major disciplines and each discipline characterized risk according to their own perspectives. Consequently, there are few attempts by academics to integrate the economic and management techniques to manage risk, such as Miller advocates with the integration of scenario planning and real options (Miller and Waller, 2003). As a result,

risk management continues to be seen as a process-oriented compliance function. This may be why an agreed understanding of risk and its dynamics is rare across academic disciplines.

The challenges and barriers to risk management becoming a mainstream academic discipline as discussed above provided the author with the four criteria to be considered when developing the curriculum of ERM for business studies. To recount, these were (1) any curriculum of ERM should take a holistic view of risk in terms of both economic and management perspectives, (2) the theories related to risk need to be transformed from individual to firm (i.e., group) level perspective, (3) the dynamics of risk due to the changes of market factors (e.g., legal, regulatory, consumers' test, etc.) with respect to time need to be understood, and, finally, (4) the way firms respond to crisis needs to be observed and embedded in the curriculum.

THE CASE STUDY

Designing and Delivering an ERM Module to the Students

Bournemouth University validated a full-time module entitled "Enterprise Risk Management" for an MSc Finance with Risk degree that was first offered in the 2008–2009 academic year. The aim of the module was to develop practical, theoretical, and critical understandings of risk and risk management for present and future managers in a holistic format.

An initial search for other risk management courses offered by universities and professional bodies at the international level revealed little in the way of best practice to guide the design process. Most of the risk management courses found were silo and disciplinary based (e.g., financial risk management, quantitative risk management, corporate risk management, crisis and security risk management, etc.). It was decided that the syllabus should include the development of a basic understanding of the role of risk in management and business functions (i.e., marketing, finance, operations, and management of people and projects).

The focus would be on the inquiry and creative thinking capability of managers in risk identification; assessment, including measurement and modeling; transfer; and financing while bringing together theory and practice (Clarke and Varma, 1999). The ERM module was among the usual suspects of business and financial economics, accounting and finance, international investment management, contemporary business issues, governance and ethics, and writing a research project within the MSc Finance with Risk Management degree. All units included some elements of risk management, at least in isolation, while the ERM unit took a holistic view of risk as considered in each individual unit.

A total of 37 students attended this full-time face-to-face delivery in the 2008–2009 cohort and it was continued in 2009–2010 with a slightly higher class size, which rose to 49 in 2010–2011. The students are admitted in two sessions (i.e., February and October) of the masters course and the ERM unit runs once a year (i.e., second semester), combining the students from both sessions. Among the participants, some students had neither formal academic knowledge nor had they taken previous courses on risk management as an academic subject.

The intended learning outcomes of the ERM unit are (1) handling the complexities associated with identifying, modeling, measuring transferring, financing, reporting, and

monitoring risks; (2) comprehending the dynamics and dependencies of several types of risk and the complexity associated with integrating them in a single framework; and (3) understanding the role of a CRO and the challenges in developing an ERM system within an organization. The entire syllabus of ERM consists of 10 sessions and was designed under the four broader topics, which are closely associated with the four building blocks of the ERM curriculum as seen in Table 1.

The relationship between session topics with the four broader topics of ERM is seen in Table 2.

Several subtopics were then allocated and discussed under the above four primary topics. The following paragraphs describe and discuss session topics and subtopics with relevant explanation on the subject matter.

Building Block Topic 1: Philosophy of Risk and Associated Theoretical Understanding

The delivery of this topic aimed to provide a philosophical understanding of risk from a business perspective. The concept of risk was discussed from psychological, economical, and neuroscientific viewpoints through the conceptual lenses of associated theories of risk management.

Session 1: Foundation of ERM. The delivery began by describing the different definitions of risk (e.g., finance, insurance, and managerial) as used in the literature of social science subjects. The most conventional definition of risk that views the difference between the expectation and actual outcome (in both danger and opportunity sense) was considered as the working definition throughout the delivery of the unit. The fundamental difference of conceptualizing risk through several disciplines and their consequences on firms' performance was also discussed.

Sessions 2 and 3: Theories of ERM (Parts 1 and 2). These two sessions discussed several risk and decision theories (e.g., utility theory, portfolio theory, prospect theory, and agency theory) including the related concepts (e.g., risk aversion, risk attitudes, risk perceptions, risk appetite and tolerance, at both the individual and firm levels). The discussions were then summarized to develop a framework of ERM, where enterprise risk was defined from two particular perspectives: first, the total risk of the firm obtained by integrating financial (i.e., market, credit, liquidity, etc.) with operational, strategic, legal, and reputational risks, and second, the significant risks characterized by low frequency and high severity (i.e., Black Swan type losses) with the potential to threaten the survival of the firm. These two approaches were identified as the strategic view and the practical (operational) view of ERM, respectively. A discussion on strategic risk was also initiated to describe its significance on the long-term survival of the firm. While strategic risk was described as the risk associated with the policy-making decisions that may result in a long-term devastating effect on the business, the operational risk arises from implementing the strategy. Furthermore, the concept of reputational risk was emphasized as a growing area of potential research. The students were reminded that ERM should be an interdisciplinary subject with its theoretical foundations emerging from both economics and management theories.

TABLE 1

Overcoming the Challenges of Developing Risk Management as a Mainstream Subject With the Building Block of the ERM Curriculum

The Three Barriers to Implement the Building Blocks in the Real World			
The Four Building Blocks as the Foundation of an ERM Curriculum	Legal Mandate and the Recognition of Risk Profession	Demonstration of Value for Managing Risk	Inclusiveness of Risk Management Other Academic Disciplines (e.g., Economics, Finance, Accounting, Law, Management, etc.)
A holistic view of risk in terms of both economic and management perspective	Promotion of risk management from departmental managers jobs to top management's agenda	The role of ERM has been emerging as independent business procurement and management. Historically, value can be demonstrated by uniqueness.	Within the organization understanding on organizations key risks and their management is everybody's job.
Theories related to risk need to be transformed from individual to firm (i.e., group) level perspective	Risk needs to be understood from both economic and management perspectives. The economic theories, which are mostly unaware of the market dynamics involving the human actions, need to be considered at the organizational level.	The understanding of risk at the organizational level needs a cultural change to support corporate objectives.	A common understanding and language of risk at the organizational level can be achieved by aligning individuals' interest with corporate strategy and organizations' overall goals.
The dynamics of risk due to the changes of market factors (e.g., legal, regulatory, customers' test, etc.) need to be understood	The response of society through regulation to the financial crisis is evident in the global financial sector.	The competitive environment accommodates the dynamic market factors. The organizational ability is demonstrated in its performance.	The competitive forces push the organizations to think beyond the disciplinary silos.

(Continued)

TABLE 1
(Continued)

The Three Barriers to Implement the Building Blocks in the Real World			
The Four Building Blocks as the Foundation of an ERM Curriculum	Legal Mandate and the Recognition of Risk Profession	Demonstration of Value for Managing Risk	Inclusiveness of Risk Management Other Academic Disciplines (e.g., Economics, Finance, Accounting, Law, Management, etc.)
The way firms respond to crisis needs to be observed and embedded in the curriculum	The response of firms during real-world crisis provides risk management lessons.	Those firms identify and understand their business risk and implement appropriate risk management actions survive during crisis.	In crisis, risk affects the organization holistically and does not necessarily maintain the artificial disciplinary boundaries.

Building Block Topic 2: Role of Risk in Dealing With Organizational Complexities

The discussion under this topic addressed economics, management, and organizational behavior in one framework. The risk, which arises as a result of the difference of opinion and expectation between the policy makers (e.g., board and CEO) and the policy implementers (i.e., managers), is placed at the center of this topic.

Session 4: Risk and Capital (Part 1). In an economic sense, a firm's capital is considered a buffer against the adverse consequences of risk. The extreme or long tail (i.e., low frequency and high severity) losses were described as a consequence of inadequate management of enterprise risk. While the previous sessions had dealt with risks that arise inside of the firm, these sessions dealt with the risks that arise outside of the firm, in particular, the capital markets. Several computational techniques of risk modeling and measurement and simple measurement (e.g., VaR, TVaR or Expected Shortfall, etc.) including their assumptions and applications were covered. The statistical concepts associated with this discussion were covered in the weekly seminars. The concept, purpose, and structure of regulatory and economic capital were briefly introduced pending their computation and application in Sessions 7 and 8.

Session 5: Risk and Capital (Part 2). While teaching the techniques and uses of risk modeling and measurement, the students were made aware that risk is a construct or state of human mindsets and the quantitative approach is merely an attempt to express a relevant

TABLE 2
 Broader Topics and Associated Session Topics

The Four Broader Topics	Sessions Numbers	Topics
Philosophy of risk and associated theoretical understanding	1	Foundation and definition of ERM
	2 and 3	Theories of ERM
Role of risk in dealing with organizational complexities	4 and 5	Risk and capital
	6	Risk and corporate governance
Role of market agents in monitoring risk management of the organizations	7	Risk and regulations
	8	Capital adequacy regulations for banks and insurance companies
Risk financing and crisis management	9	Risk transfer and financing techniques
	10	The cause and effect of 2007 global financial crisis
		Risk management case study The emerging role and responsibilities of chief risk officer

mindset through a mathematical formula subject to various constraints and assumptions. The 2007 credit crunch and the subsequent global financial crisis provide ample evidence of the fallibility of quant models. Consequently, modeling risk, either mathematically or mentally, has obvious limitations and such exercises are unable to match the *ex post* event results. The root problem is that all scientific models take the results of a cause (i.e., the ultimate losses) as an input in deriving model algorithms to forecast future losses (i.e., outputs). Consequently, the opportunities for inaccurate outputs are obvious. The students were, therefore, cautioned that the ultimate challenge of risk modeling exercises, and management, is predicated on what is actually an impossible task—telling the future. As Greenspan (2008) writes, “But risk management can never reach perfection. It will eventually fail and a disturbing reality will be laid bare, prompting an unexpected and discontinuous response.” The quantitative risk modeling community often bypasses this inconvenient truth by using computer programs built on statistical forecasting tools such as “Monte Carlo simulation,” which take a wide range of output results associated with a wide range of hypothetical causes and produces a range of output attaching a level of probability. In this sense, students were asked to test mathematical algorithms for developing and running simulation models and then analyze their limitations using real-life scenarios. This reality check (common sense) approach remained a theme throughout the program.

Session 6: Risk and Corporate Governance. The operational risk was taught broadly within the framework of agency theory (Wiseman and Catanach, 1997). In this context, both the economic and management perspectives of corporate governance were clarified. It was explained that while the corporate governance literature focuses on economics and finance, the management literature focuses on the risk preferences of the managers in serving the interest of owners (i.e., the agency problem). As such, the students were asked to reflect that while financial risk can be a product of external factors, operational risk is mostly shaped by internally driven firm-specific culture, organizational structure, systems, and people. The relation in between risk and corporate diversification was described from the perspective of strategic management research (Miller and Bromiley, 1990; Bromiley et al., 2001).

Building Block Topic 3: Role of Market Agents in Monitoring Risk Management of Organizations

Financial services entities operate under strict (supposedly) regulatory regimes. Simultaneously, other market agents (i.e., rating agencies and financial analysts) provide independent opinion on the performance of financial products and businesses. To survive, banks and insurance companies need to comply with the prescribed capital adequacy regulations.

It is, therefore, important to clarify for the students the distinction between risk and corporate governance. From a risk management perspective, corporate governance fulfills two functions. First, it ensures compliance with regulations and policies; second, it attempts to ensure the integrity of the internal parties (i.e., shareholders and employees) in running their businesses. However, in terms of ERM, the understanding and assessment of risk is the core element in managerial decision making. Without this dimension risk management would merely be a compliance function. To a certain extent, it has tended to become just that, and an understanding of this situation is crucial to a holistic understanding of risk issues.

Sessions 7 and 8: Risk and Regulations—Capital Adequacy Regulations for Banks and Insurance Companies. The structure of three pillars of capital adequacy regulations for banks (Basel II/III) and insurance companies (Solvency II in Europe) including its components were outlined in these two sessions. Considering the limited mathematical skill of the students the sessions did not deal with the overly technical details of the regulation. However, sufficient references and study guidelines were provided for interested students, who wanted to focus more on these areas for future study (e.g., dissertation). In addition, the scope, purpose, and methodology of stress testing and scenario analysis in both banking and insurance sectors were discussed with seminar exercises.

Building Block Topic 4: Risk Financing and Crisis Management

Given that risk can never be entirely eliminated even with an optimal and effective risk financing strategy, crisis management must be an integral part of all risk management strategies. Crisis management is ultimately associated with the corporate responses in emergencies arising from surprising events. This topic emphasizes that risk management policies and procedures under an ERM regime should be designed with the capability to absorb shocks during periods of systemic turbulence. Crisis management is a short-term

management action under the broader scope of ERM to rescue and guide the business toward survival. It is characterized by the need for speedy decisions.

Session 9: Risk Transfer and Financing Techniques and the Cause and Implications of the 2007 Financial Crisis. The four ways of offloading risk onto the market are (1) transferring (i.e., buying insurance, reinsurance), (2) diversification (business lines, geographical), (3) mitigation (through internal control and outsourcing), and (4) polling (writing a part of the entire risk or coinsurance).³

The structure, use, and misuse of these instruments are embedded in the discussions in this session.

The crisis management topic was addressed within the context of chaos theory (Thietart and Forgues, 1995; Khalil, 1997), a technique for treating problems as nonlinear, dynamic, and systemic. The 2007 financial crisis was used as a case study to extract issues such as the conditions and stages of a developing crisis, the relationship between crisis and recession, the principles and consequences of systemic risk in the financial sector, and the role and action of various agents including the actions of the Federal Reserve's and Bank of England's bailout strategies to mitigate crisis. In addition, the effect of crisis on the structural changes of regulatory regimes and financial markets were emphasized. Furthermore, the influence of the media on the crisis and methods of handling the media to mitigate reputational risk were discussed. In this context, the students were tasked to read recommended texts such as Khattab et al. (2007).

Session 10: Risk Management Case Study and the Role of CRO. Although no single case study was found that adequately mirrored the holistic concept of risk management developed in the previous sessions, the Aabo article concerning implementing ERM in Hydro One (Aabo et al., 2005) was found to be close enough to be used in the 10th session. It describes the design and implementation of ERM in practice, with a demonstration of challenging factors for ERM and the ways of overcoming them effectively. In this context, the emerging role of CRO was described using a classroom simulation. Students were divided into groups and assigned the responsibilities of different functions (e.g., CEO, CRO, board of directors, etc.). They were asked to find the top 10 risks of the case study company and suggest appropriate risk financing and management strategies within an ERM environment. These topics had been covered in previous sessions.

Sessional Support

In the weekly seminar sessions, the students were divided into groups to provide effective tutorial support. The seminars were utilized to solve numerical problems using EXCEL and @Risk software. For example, seminars related to Sessions 4 and 5 included risk quantification and modeling exercises using @Risk software. In that instance, two

³ In insurance, the term "risk polling" means the sharing agreement of underwritten risks between two and a group of insurers either at equal or several proportions. While a small poll exposed the participated pool members to higher credit risk, a large pool reduces the credit risk through diversification.

exercises (Hoyt et al., 2007; Lie, 2011) were solved in the seminars with some modifications in line with the contents of the session. In addition, risk management software (i.e., @Risk) was utilized for loss forecasting and computation of risk. Furthermore, four industry experts, including CROs were invited to share their practical ERM experience with the students in guest lecture series.

Recommended Study Materials

It was a challenge to select and adopt core textbooks for the unit. In the market, there is no single book that covers the entirety of the sessions' topics. Moreover, the theoretical foundation of the holistic concept of ERM that the unit examines is yet to evolve. Consequently, the students were encouraged to use the full range of databases available both through the University's Library and through the entirety of the Internet. Various textbooks were also recommended in addition to comprehensive session slides and notes.⁴ Furthermore, several websites and journal articles from relevant disciplines were also recommended for reading. Students were also encouraged to bring their own findings to the calls which enabled the group to build their own ERM database.

Assessment

The progress of the participating students is assessed by 100 percent coursework. In the first 2 years of introducing the unit (i.e., 2008–2009 and 2009–2010 cohorts, respectively), the achievement of each participant was assessed based on a short classroom presentation and a maximum 2,000-word written coursework assignment at the individual level contributing 15 and 85 percent marks, respectively. The assessment criteria were modified for the 2010–2011 cohort with two additional MCQ tests. In this modified format, 15 percent of the total marks were allocated for group-wide oral presentation, 15 percent for two MCQ tests at the individual level, and 70 percent for written group-wise coursework report. The cases were allocated in the first session for the oral presentation and preparation of coursework. The change (i.e., the introduction of MCQ tests) was to enhance students' engagement and participation in the session topics both inside and outside of the classroom. MCQ tests were little and often used to ensure engagement.

The primary learning objective was for the students to fully understand the interdisciplinary and holistic concept of ERM. The secondary objective was that they should be able to frame that knowledge in an organizational setting. As Kurland et al. (2010) argue, "Interdisciplinary courses offer students opportunities to make connections

⁴ Strategic Risk Management Practice—how to deal effectively with major corporate exposures by Andersen and Schroder (2010); Strategic Risk Taking: A Framework for Risk Management by Damodaran (2008) covers the management perspective of ERM. In addition, Risk Management and Financial Institutions by Hull (2012); Integrated Risk Management: Techniques and Strategies for Managing Corporate Risk by Doherty (2001); The Art of Risk Management: alternative risk transfer, capital structure, and the convergence of insurance and capital markets by Culp (2002) cover the economic, financial, and insurance perspectives of risk. Moreover, COSO Enterprise Risk Management: Understanding the New Integrated ERM Framework by Moeller (2007) covers a conceptual understanding of ERM. Furthermore, Introduction to Financial Models for Management and Planning by Morris and Daley (2009) was adopted to teach the model building techniques in a practical environment.

between otherwise seemingly disparate fields as well as to recognize limitations of any one approach.”

Other, embedded objectives were to: (1) understand the requirements of both qualitative and quantitative perspectives of risk management and balance them accordingly, (2) understand the role of risk management in running a business as a whole, and (3) understand how to bring the diverse perspectives of risk across the organization in providing a common language of risk. In summary, the students needed to be able to apply their understanding of how to embed risk management in the business models of any firm.

It was observed that the students struggled to complete the coursework as individuals. The lack of skill on both sides of ERM meant that some individuals were not able to deal with all of the qualitative and quantitative requirements of the coursework. Consequently, in the third year (i.e., 2010–2011 cohort) students were allowed to complete the coursework in five-member teams. In addition to combining several skills, the technique was partially aimed to give the students scope to work in a team that they will face in the work environment. The marking scheme of the coursework was accordingly modified to award 10 percent for the personal contribution of an individual student in addition to 90 percent toward the group work.

Students' Feedback on the Lessons Delivered in 2010–2011 Intake and Evidence of Success

An online survey was conducted to capture participating student's feedback on the delivery of the ERM unit. Of the 49 students in this particular cohort, a total of 36 students responded in the survey. In terms of ethnic background, 82 percent were of Asian origin, and among the rest, South American and African hold 9 percent each.

In terms of academic background, the majority of students are from finance and economics disciplines (27 percent each) followed by accounting (18 percent), and others have a background in engineering, hospitality management, and business management as seen in Figure 1. Regarding the structure and quality of the coursework, 59 percent of the students found the coursework innovative, challenging, and needing substantial thought and skill to complete. However, the remaining 41 percent found it traditional and not much different than they previously learned from other courses. Moreover, 56 percent students preferred coursework to be done in groups and the remaining 44 percent liked to complete it individually. The students thought that their mathematical skill in modeling and measurement of risk had developed after completing the course, as seen in Table 3.

While asking students' interest in the delivered sessions, it was revealed that a majority of students found lecture numbers 4, 5, 7, and 8 most interesting compared to others (18.20 percent each). As added earlier, one of the assessment criteria of students' evaluation for this unit is whether the participating students understand and were able to demonstrate the notion of ERM and the limitations of managing risk in silos in real-world scenarios. The survey questionnaire was redesigned accordingly to bring out the actual understanding of the students after attending the unit.

The assessment result shows that nobody achieved below 50 percent marks. Altogether five students achieved above 50 and below 60 percent, and the majority of students, (i.e., 37) achieved marks between 60 and below 70, which is recognized as pass with merit.

FIGURE 1
Students' Academic Background

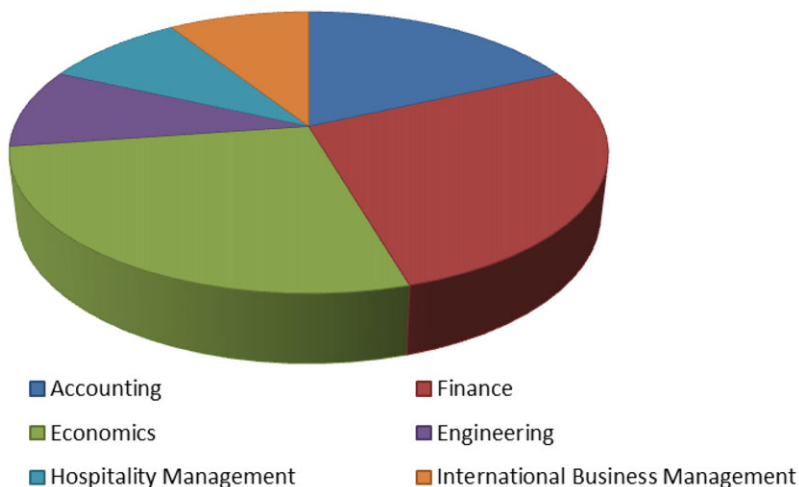


TABLE 3
Students' Mathematical Understanding on Risk Measurement and Modeling Problems

Survey Question: What Is Your Level of Mathematical Understanding on Risk Modeling and Quantification Problems?	Very Strong (%)	Strong (%)	Moderately Strong (%)	Neither Strong Nor Weak (%)	Weak (%)	Very Weak (%)
Prior to attending unit	0	4	22	45	22	7
After attending the unit	4	29	59	4	4	0

In addition, six students achieved 70 percent and above marks and were rewarded distinction on this unit. Among all, the top score was 72 percent and only one student was dropped from the course.

The survey result illustrates that they were confident in understanding the subject, and the result of the coursework appeared to substantiate the view.

LESSONS AND SCOPE FOR FURTHER DEVELOPMENT OF THE CURRICULUM AND ADAPTION IN OTHER SCHOOLS

Delivering an ERM course in the classroom and evaluating the coursework of the students is challenging. The ERM curriculum brings various risk-related topics from several disciplines and attempts to present them in a consistent framework. It is important that the ERM-adopting schools should introduce a cultural change in understanding risk in its totality and choose the curriculum contents in order to bring a balance between the downside and upside risks. Ideally, a tutor needs to have interdisciplinary knowledge

in designing session topics and texts. The tutor either should have practical knowledge from working as a risk management professional in the industry or at least have been, or is, attached to the professional risk management institutes to ensure an awareness of contemporaneous risk management issues.

The curriculum of ERM designed here aims to inform students of the boundary of one specific view on a topic either from economics, management, or strategy. For example, the understanding of classical finance theories, the EMH in particular, was criticized for the 2007 financial crisis. However, students need to understand the limitations of EMH (Ball, 2009). Similarly, sophisticated financial models certainly develop an understanding of endemic business risks. The underlying assumptions, which are designed to capture certain hypothetical scenarios, can be wrong, and ERM should also consider the risks associated with the risk models themselves. As Deighton et al. (2009) argue, “Blind adherence to a model may be worse than no model at all.”

Where to From Here?—Overcoming the Challenges

Institutions that wish to introduce ERM courses will need to overcome several challenges, including, but not limited to, the following.

Lack of Initiative and Resources. As mentioned earlier, a truly holistic ERM needs faculty willing to reject a silo approach. The lack of interaction between paradigms by risk professionals (i.e., economists and strategists) was cited as an example. However, in reality, industry needs knowledge to be interdisciplinary, albeit that they too are usually siloed in the same way as academe. Notwithstanding, risk is a dynamic subject and the delivery of risk management topics must be informed by the latest research output on the subject. It may be that the first step should be the development of “risk” as an accepted academic discipline in its own right.

Uneven Knowledge on Risk. One immediate problem for the tutor is the complexity associated with handling a mixed group of students. The participating students often come with varied backgrounds with uneven (sometimes diverse) knowledge on risk. In the ERM unit run by the author, the majority of students had no prior academic knowledge on risk nor had they studied any subject where risk was referred to in detail. Tutors will need to tackle knowledge diversity through designing the study materials balancing the qualitative and quantitative risk issues so that they are understood by general students but simultaneously giving scope to the students who want to follow a more technical route. This was the rationale behind covering so many topics in sessions. The learning outcomes of each session topic were targeted at a level where a certain (or minimum) technical understanding was required. Practically, a majority of the students’ knowledge and requirements fell within this minimum standard. Additional support was provided to students who wanted to follow the technical route offering extra laboratory hours.

Bridging the Gap Between Theory and Practice. Business is all about taking risk and the institutions that understand and manage risk efficiently ultimately secure competitive advantage. Academics should engage more with industry practitioners and produce applied research on ERM topics. Considering the practical nature of ERM topics and to

meet the market demand, the study materials need to be updated regularly to balance the theory and practice in the risk literature. An additional topic entitled “contemporary issues on risk” can be added to the session series. This particular topic focuses on the gap between theory and practice of risk management and provides knowledge to minimize this gap.

CONCLUSION

Businesses are being failed by silo notions of risk management underpinned by silo notions as to what defines risk. Managing risk is about diagnosing problem areas in advance, assessing their effects on overall business goals, planning in advance to solve those problems using available resources, and providing contingency plans to overcome any undesirable events during the course of transaction. This article has proposed a general framework for an ERM curriculum. The ultimate objective is to enable students to consider and manage all risks to an organization holistically. It is clear from the literature that financial economics primarily provides knowledge on the quantification and modeling element of risk management, only measuring that which can be measured. As such, this approach does not consider the subjective (behavioral) elements associated with human intervention at both the individual and organizational levels of risk taking. In contrast, strategic management does reference the behavioral context but struggles to offer precise and specific solutions of any immediate problem.

We found that the disconnection between risk management and strategic management hinders an understanding of the holistic concept of risk in business studies. We argued that risk management is not a mainstream discipline for three key reasons: (1) legal mandate to recognize this as a profession, (2) demonstration of value to the decision makers while fulfilling the organizational objectives, and (3) inclusiveness of risk management with other academic disciplines.

We illustrated that these constraints are constantly moving owing to the reshaping of both regulatory development and greater understanding of the decision makers’ dilemmas dependent upon recent organizational failures. We found that even combining the risk management knowledge contained in the economics and finance literature is incomplete and unable to explain the overall risks of a business. They focus on the outcome of risk events (e.g., volatility of stock values) rather than on the factors that cause the volatility (Bernstein, 2000).

Consequently, we proposed that the ERM curriculum should be based on the fundamental concept of strategic management literature. Since most types of risk that businesses face are not easy, or indeed possible, to quantify, the curriculum should focus more on the understanding and analysis of risk and how to manage it in different scenarios. Importantly, we identified a need for more research in understanding the role and characteristics of risk in business and crisis situations, in particular. The risk community has not fully understood the dynamics of risk in crisis and adverse situations and this is a major constraint in the development of the risk management literature and, consequently, the curriculum. Managers need to understand the limitation of risk modeling and quantification in real-world business decision making.

Since risk is a dynamic phenomenon and an uneven understanding of risk is not unexpected across the business functions, the leadership role of risk managers is essential to

develop and implement an ERM program. In an ideal world everybody is a risk manager and businesses should not need specific risk leadership. However, in the real world individuals can be risk averse or risk takers, and businesses do need a central risk management unit to drive risk awareness and a risk management culture across the organization.

Consequently, an ERM curriculum should focus on producing CROs who hold a broad knowledge of uncertainty associated with the business and develop techniques to balance the upside and the downside effects of risk for the long-term sustainability of the organization. The framework developed for the three cohorts in the pilot program accommodates the constraints and challenges for risk management as a mainstream academic subject. The curriculum proposed in this study might also be used to develop an ERM unit for an MBA degree with greater focus on contemporary issues, problem structuring, and problem solving surrounding the dynamics of risk and uncertainty.

The ERM curriculum as described in this article provides a guideline that has been piloted for the last 3 years. The recreation of an ERM course at any HEIs depends on the fields of expertise and academic interests of the relevant staff who are contracted to design and deliver the course in the classroom. We predict that the debate on ERM, whether it follows a finance and economics perspective or a strategic management perspective, depends on the academic strength and strategic market of the school. However, the fundamental understanding of ERM is to think and manage the organizational functions holistically. Consequently, understanding the principles of management and systematic thinking in decision making should be an essential component of all ERM courses. This means that risk management courses either in finance, economics, or management fields should take an enterprise view of risk beyond their disciplinary silos. Equally, the principles of behavioral decision making should be embedded in the ERM curriculum. For the benefit of any readers who might consider creating an ERM course, the two coursework assignments prepared to assess students' progress are provided in the Appendix. In addition, two up-to-date lists of articles, one focusing on the management perspective of risk and another on the financial and economics of risk, can be obtained from the corresponding author upon request.

APPENDIX: THE COURSEWORK ASSIGNMENTS

ERM Coursework – 1

Enterprise Risk Management takes a holistic view of all significant risks of a firm. This means that corporations are gradually moving from silo (or fragmented or departments) type of risk management toward a truly integrated and enterprise-wide risk management. With this evolution of enterprise-wide risk management (hereafter called as "Enterprise Risk Management"), a Chief Risk Officer (who was previously designated as Corporate Risk Manager) claimed that, "In a dynamic environment there is a growing awareness of 'risk literacy.' The concept of risk literacy is traditionally defined as 'knowledge of probability and statistics.' But to be truly useful in practice, the concept also needs to address the psychological biases that lead to judgmental risk (or decision errors)." All it means is that the managerial judgments in business decision making cannot be replaced by quantitative risk models.

Write a research report to justify the above statement with your analysis and results for the allocated Case Study firm. The report should include, but not be limited to, your understanding on the following five topics:

- (a) A description of the theoretical foundation and structure of an Enterprise Risk Management (ERM) program;
- (b) A practical model of ERM and the way core risks were identified, quantified, and integrated in your Case Study with actual or imaginary data (in case of unavailability of actual data);
- (c) Whether or not the psychological biases were accommodated in risk models for enterprise-wide level business decision making, and if so, how;
- (d) The potential value that ERM could add to your Case Study [if fully adopted as per your structure in (a) above] in mitigating losses that had occurred during the 2008 global financial crisis and onwards, and how; and
- (e) The relevance of the ERM structure that you have developed in (a) above for other financial services firms beyond your Case Study (i.e., generalization of your theatrical ERM model).

ERM Coursework—2

In the risk management literature, there appears two key ways of defining enterprise risk. Research forwarded by financial economists defines enterprise risk (i.e., ER) as the integration of market, credit, liquidity, and operational risks. However, the management and strategic researchers define ER as the gap between what is expected or planned for, and what actually happens. Consequently, the techniques of managing enterprise risk entitled as Enterprise Risk Management (i.e., ERM) differ between these two groups of professionals. Whereas the financial researchers prefer to manage ER using financial instruments (e.g., hedging), the strategic researchers advocate behavioral and controlling techniques (e.g., corporate governance, regulations, etc.). Above the debate of establishing the appropriate technique of managing ER, a massive mismatch between what is expected (or planned) for, and what actually happens is clearly evident in many financial firms (banking, in particular) in the aftermath of 2008 financial crisis. In addition, the remuneration culture (i.e., reward system) in Banking is often criticized behind the widening gap. You will be allocated a case study to research the relevant phenomena as described above.

Using the allocated case study you are required to comprehensively research to answer the key question, i.e., how could an ERM address mismatches in rewards and overall espoused organizational goals?

Your work should consider the theoretical foundation of ERM including (but not limited to) the risk-return/reward trade-off in the managerial decision-making context as seen in both financial economics and strategic management literature.

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