UC Irvine

UC Irvine Previously Published Works

Title

Can Strategic Risk Management Contribute to Enterprise Risk Management? A Strategic Management Perspective

Permalink

https://escholarship.org/uc/item/295119d6

Authors

Bromiley, Philip
Rau, Devaki
McShane, Michael K

Publication Date

2014-10-20

Copyright Information

This work is made available under the terms of a Creative Commons Attribution-NonCommercial-ShareAlike License, availalbe at https://creativecommons.org/licenses/by-nc-sa/4.0/

Peer reviewed

eScholarship.org Powered by the California Digital Library
University of California

Enterprise Risk Management: Review, Critique, and Research Directions[1]

Philip Bromiley
Dean's Professor of Strategic Management
Merage School of Business
University of California, Irvine
Irvine, CA 92697-3125
Tel: 949- 824-6657

Michael McShane
Anil Nair
Department of Business Administration
College of Business and Public Administration
Constant Hall 2030
Old Dominion University
Norfolk, VA 23529-0220
Tel: 757-683-6096
Fax: 757-683-5639

and

Elzotbek Rustambekov
College of Business
Bryant University
Smithfield, RI 02917

Bromiley, P., McShane, M., Nair, A. and Rustambekov, E. (2015) Enterprise Risk Management: Review, Critique, and Research Directions, *Long Range Planning*, 48: 265-276.

[1] We would like to thank Professors Mike Stein, Arun Kumaraswamy, the editor (Rob Grant) and an anonymous reviewer for comments on earlier versions of the paper

Enterprise Risk Management: Review, Critique, and Research Directions

ABSTRACT

Many regulators, rating agencies, executives, and academics have advocated a new approach to risk management: enterprise risk management (ERM). ERM proposes the integrated management of all the risks an organization faces, which inherently requires alignment of risk management with corporate governance and strategy. Academic research on ERM is still in its infancy with articles largely in accounting and finance journals, but rarely in management journals. We argue that ERM offers an important new research domain for management scholars. A critical review of ERM research allows us to identify limitations and gaps that management scholars are best equipped to address. The paper not only identifies how management scholars can contribute to ERM research, but also points out why ERM research (and practice) needs management research for its development. (127 words)

Keywords: Risk, Enterprise Risk Management, ERM, Management Theories

INTRODUCTION

Enterprise Risk Management (ERM) proposes that firms address all of their risks comprehensively and coherently instead of managing them individually. The Harvard Business Review listed ERM as one of the "breakthrough ideas for 2004" . Rating agencies, professional associations, legislative bodies, regulators, stock exchanges, international standards organizations, and consultants have vigorously urged firms to adopt ERM . Heeding such calls, leading financial services firms were some of the early adopters of ERM. Yet, the difficulties experienced by some of those firms during the 2008 financial crisis have cast doubt on the efficacy of ERM. For example, Countrywide Mortgage, praised in 2007 by the Institute of Internal Auditors as an exemplar of ERM, faced bankruptcy in 2008.

While many ERM articles have appeared in the business press, academic research on ERM is still in its infancy. Moreover, such academic research has appeared largely in accounting and finance journals and rarely in management journals. The research in finance and accounting emphasizes tools that apply only to risks with well-defined statistical properties. Moreover, the tools offered in finance and accounting research are often mathematically complex, too obscure for most managers, and have limited application outside finance. With the exception of Miller and Miller and Waller , an integrated approach to risk management by management scholars has been rare. Furthermore, regrettably, the evolving discussion about ERM has not been informed by relevant work in management on risk, strategy management, organizational change, and other relevant topics.

Practitioners recognize the lack of good information on the management of ERM. Fraser, Schoening-Thiessen and Simkins's survey of risk managers found:

> ". . . virtually all literature is silent on how to deal with the myriad cultural, logistical, historical challenges that exist and are unique to all organizations…Many of the articles describe what the process should look like and how it should function but there are few that provide details of how to get to that step. Many of the articles use great overarching statements that seem very much like motherhood statements. There was a distinct lack of information on how to bring all the silos together… The impact of corporate culture on ERM implementation and practices is not well addressed in the literature."

These omissions combined with the fragmentation of ERM research and the failures of high profile ERM adopters during the 2008 financial crisis motivate this paper. The paper addresses two questions. To cut through the conflicting discussions about ERM, and to clarify the scope and meaning of ERM, we start with a basic question: "*What is ERM?*" To answer this question comprehensively and accurately, we review extant ERM research to identify ways researchers and practitioners define and operationalize ERM. This review provides the foundation for our second question: *How can management research inform ERM theory and practice*? To answer this question we draw from the extensive micro/macro management research on risk, agency, strategy, decision making, and organizations. The paper identifies areas where management research can contribute to the development of ERM research and practice.

WHAT IS ERM?

Authors and regulators disagree on exactly what constitutes ERM. As evidence of this disagreement, Tables 1 and 2 provide definitions and descriptions of ERM from various sources. One of the larger distinctions is between those who see risk as largely defined independently of firm objectives (e.g., Miccolis (2000), AS/NZS (1995). and S&P (2008)) and those who explicitly defined risk in terms of achievement of organizational objectives (e.g. IIA (2001) and COSO (2004)). Another major distinction is between those who see risk as largely a problem to be mitigated (e.g., S&P (2008) and RIMS (2011)) and those who see risk as a potential source of

value creation (e.g., Tillinghast-Towers Perrin (2001) and CAS (2003a)). Addressing the variety of definitions and implementations of ERM, Power urged caution, asserting that ERM is an "umbrella concept"; managers should not ". . . assume that ERM refers unequivocally to a coherent set of practices". As regulators pressure firms to integrate risk management into corporate governance, new risk categories and definitions have been created leading to the "risk management of everything" , which Power ultimately concluded had resulted in the "risk management of nothing."

Insert Tables 1 and 2 here

ERM Research: Conceptual Roots

To understand the ambiguity surrounding ERM's objectives and implementation, we begin with a review of the history of ERM in the practitioner and academic literature. Historically, firms have managed different kinds of risk separately. This fragmentation of risk management occurred because different functions within a corporation handled different parts of risk management. For example, finance often addressed risks associated with currency or interest rate variations, insurance handled natural catastrophes and liability, and operations managed quality and safety risks. In such an environment, each function developed tools and practices largely independent of others.

Beginning with Kloman's , "The Risk Management Revolution," many practitioners have advocated a coordinated approach to risk management. Kloman described concepts coming out of Europe from the mid-1970s to the early 1980s that we now associate with ERM. For example, Gustav Hamilton, a risk manager in Sweden, argued for "a new and collective view of risks" . Orio Giarina at the University of Geneva proposed that risk management should reinforce strategic capability. Crockford argued for multidisciplinary risk management rather than risk

management siloed and "fragmented among a number of sects." Bannister and Bawcutt proposed that risk management requires multiple disciplines[2] working together to manage "future uncertainty." The term Enterprise Risk Management appears to have begun with Holton [3].

In engineering, Haimes called for "the evolution toward a more holistic approach," which Haimes terms as "total risk management." Haimes proposed a systems engineering approach with risk management an important part of the "overall managerial decision making process, not a separate, vacuous act." He advocated a move from single-objective decision making to multiple-criteria decision making to aid in achieving holistic and cross-disciplinary risk management. Haimes proposed that risk management decisions should influence the "optimal allocation of the organization's resources."

For many years, mainstream finance questioned the need for corporate risk management arguing that the stockholders only care about systematic risk (beta), so investing resources to reduce unsystematic risk was wasteful . However, in recent years, finance scholars have developed arguments justifying the management of unsystematic risks, largely associated with the idea that unsystematic risk imposes costs on the firm. In academic finance, Shapiro and Titman discussed the "benefits to integrating risk management activities in a single framework, and Stulz proposed that academic theory expand beyond the traditional risk management (TRM) goal of "variance minimization" with its focus on the downside of risk. He argued that firms should reduce exposure to risk in areas where they have no comparative advantage, while exploiting risks where they have an advantage. Drawing on Stulz , Schrand and Unal advocated "coordinated risk management" and found that corporate managers tended to hedge exposure to

[2] The disciplines include "probability theory, economics, operations research, systems theory, decision theory, psychology and behavioral science."

[3] In 1993, James Lam at GE Capital became the first person to use the title of "chief risk officer" (CRO), even before the term "enterprise risk management" was being used (Lam, 2003, page xv). The CRO title is used in later academic studies as an indicator of whether a firm is practicing ERM. Between 1995 and 1998, Lam was responsible for setting up the "enterprise-wide risk management program" at Fidelity Investments.

activities likely to earn low returns, such as investments in efficient markets, and increase exposure to business activities in which they enjoy comparative information advantages.

While Colquitt, Hoyt, and Lee called for "integrated risk management," the first academic papers using the term "enterprise risk management" appeared in 2001. Dickinson stated that ERM emerged as a corporate concept in the mid-1990s and defined ERM as a "systematic and integrated approach of the management of the total risks a company faces." D'Arcy and Brogan offered one of the first definitions of ERM:

> 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 [Casualty Actuarial Society , 2003].

ERM discussions emphasized the integration of different types of risk . Thus, firms began to merge insurance and financial risk management approaches, developing alternative risk financing where firms used capital markets to transfer insurable type risks via insurance-linked securities, such as catastrophe bonds and weather derivatives. For example, Harrington et al (2002) described United Grain Growers (UGG) purchasing a policy that combined coverage for both hazard and financial risks.

ERM: Emerging Consensus

Despite the ambiguities and disagreements (illustrated in the Tables 1 & 2) about what constitute ERM, a consensus has begun to emerge about the core elements of ERM. First, ERM assumes that managing the risk of a portfolio (the corporation) is more efficient than managing the risks of each of the individual subsidiary (parts of the corporation or activities). In a stock market analogy, trying to mitigate the risk of each stock in a portfolio (e.g., by options that limit potential loses) is both costly and unnecessary if what we care about is the risk of the portfolio.

For example, a corporation could have one division that is hurt if the euro rises and another that is hurt if the euro declines; at the corporate level, these two risks might cancel out making corporate performance insensitive to variation in the value of the euro.

Second, ERM incorporates not only traditional risks like product liability and accidents, but also strategic risks such as product obsolescence or competitor actions. Thus, every substantive decision within the firm involves risk management concerns. Often the largest risks a corporation faces lie in strategic areas where lack of relevant historical data prevents accurate estimation of probabilities.

Third, ERM assumes that firms should not just look at risk as a problem to mitigate; firms with a capability in managing a particular risk should seek competitive advantage from it. For example, while energy prices could form a substantial risk for many firms, a firm with a particular skill in predicting and managing such prices could profit either by using the skill directly to invest in energy or by selling advisory services.

The emerging consensus on core elements of ERM provides an opportunity for scholars to engage in more critical research on ERM adoption and effectiveness.

ERM Research: Empirical Findings

In recent years, a small scholarly literature has emerged that has examined ERM adoption and effectiveness. Some studies have investigated what determines firm risk management activities. Liebenberg and Hoyt found that more leveraged firms tend to appoint chief risk officers (CROs), an indicator of risk management efforts. Pagach and Warr found that firms with more leverage, higher earnings volatility, poorer stock performance, and a CEO whose compensation increases with stock volatility were more likely to have a CRO. Using survey data,

Beasley, Clune, and Hermanson found ERM implementation related to the presence of a CRO, firm size, and whether the firm was in the insurance or banking industry.

Investigations of the relation between ERM and performance have used different proxies for ERM with mixed results. Measuring the quality of risk management by the ratio of the standard deviation of sales to the standard deviation of return on assets, Beasley, Pagach, and Warr found that the market reaction to a firm hiring a CRO was not significant overall, but did find significant reactions for some firms. In contrast, Hoyt and Liebenberg found a positive relation between firm value and the appointment of a CRO. Gordon, Loeb, and Tseng found that the relation between ERM and firm performance depends on how well ERM implementation matches firm-specific factors. McShane, Nair and Rustambekov found Standard & Poor's ERM rating associated positively with firm value but the relation flattened out for firms receiving higher ERM ratings. McShane, Zhang, and Cox found insurance companies coordinated risk management by hedging investment risk to take on more underwriting risk (core-business risk).

The growing empirical research in ERM is not without limitations. For the most part, these studies ignored endogeneity (that is, firms do not randomly adopt ERM). A simple example of the problem of endogeneity would occur if high performing firms adopted ERM more than low performers. This could result in a positive association of ERM and performance even if ERM had no influence on performance. Endogeneity and related methodological issues and the mixed results found in current research make it impossible to draw a general conclusion about ERM's effectiveness. The extant research also has insufficiently addressed inter-firm differences in ERM. Mikes found heterogeneity in the understanding and implementation of ERM, with firms differing in their emphasis on formally quantifying risk versus using qualitative

"measures" of risk. Mikes and Kaplan proposed a contingency framework and called for research that would lead to the development of a contingency theory of ERM.

The empirical literature on ERM has also been slow to address many of the core practitioner concepts. Regulations and recommended procedures use vague terms like "risk culture" and "risk appetite". For example, COSO defines risk appetite as, "The broad-based amount and type of risk that an entity is willing to accept in pursuit of its mission, vision, strategic objectives, and value goals." Prescriptions on risk management often talk about firms adopting appropriate "risk cultures". S&P evaluates risk cultures using 'internal transparency of the risk management process', and by evaluating the 'staffing and structure of the risk management team' and the 'influence that risk management team has with the top'. However, exactly what risk appetite means, whether firms even have a consistent risk appetite, and whether risk management processes have the intended effect on firm risk levels have been largely ignored.

MANAGEMENT RESEARCH & ERM

The above review identified some of the limitations and challenges in ERM research and practice. We now turn to the second question that motivated this research: *what can management scholarship add to the study and practice of ERM?* Recent work in management on risk has focused largely on corporate level risk and performance. However, earlier work took a more micro approach emphasizing both individual risk propensities and group decision-making regarding risk . Both streams of literatures have the potential to contribute to research and practice of ERM.

Management research would assist risk management through a path somewhat different from that taken by accounting and finance. Accounting and finance scholars often define

optimal conditions and then offer tools consistent with those conditions. In contrast, management scholars emphasize understanding how firms behave and, sometimes, the association of such behaviors with performance. However, a demonstrated connection to performance is not essential for scholarship to offer important insights. For example, while the scholarly literature emphasized risk as variation in returns, March and Shapira (1987) and Shapira (1995) found managerial conceptions of risk emphasized the size of the potential loss and often did not consider it a probabilistic concept. A technique that has desirable outcomes when risk is measured by variance in returns could have quite different outcomes when used by managers who see risk as size of potential loss or in some other way.

We begin our discussion by considering how management scholarship can clarify the objectives of ERM. Later sections identify the role that management research can play in issues central to development of ERM research and practice: understanding managerial concepts and models of risk, measuring risk, temporal dynamics in risk management, implications of level of analysis on ERM research, ERM implementation, and assessing risks in strategic settings.

Objectives of ERM. The argument that ERM should add value to the firm leads to the use of standard corporate performance criteria such as return on assets or Tobin's Q to evaluate risk management. To the extent that ERM pays off primarily in exceptional times, using on-going accounting performance to evaluate risk effectiveness may understate its value. Both accounting and stock-based performance measures have an additional difficulty; how do we treat for-profit organizations that explicitly state they have objectives beyond accounting or stock returns? If a firm's management considers both risk and return as legitimate dimensions of performance, then risk management could work even though it did not increase returns. This opens a wider debate

over the objectives of the firm. Unlike scholars in finance and accounting, management scholars have entertained the proposition that firms have objectives beyond profits or shareholder wealth .

Management scholars may address how managers define corporate goals, how stated goals influence goals-in-practice, and how stated and in-practice goals tie into risk management. Prescriptively, management scholars may address how managers should define corporate goals including goals related to risk management.

Managers' Conceptualization of Risk. Research on firm-level ERM often uses singular proxies for risk. In reality, executives face diverse risks including market risk, competitive risk, supply chain risk, political risk, and exchange rate risk; a single strategic decision may involve multiple types of risk that occur at different times during execution. While ERM asks managers to aggregate these into a corporate risk portfolio, if managerial conceptions of risk differ across these different kinds of risk, aggregation is problematic.

Following March and Shapira (1987) and Shapira (1995), researchers need to develop deeper understandings of what managers mean by risk. Work on management schemas and top management perception suggests we should expect that groups in organizations probably share risk concepts but risk concepts probably vary dramatically across parts of the organization and across organizations. Financial managers who deal in currency risk (where risk is quantified and can have positive and negative outcomes) probably use different risk concepts than managers who deal with supply chains or conformance to government regulations (where risk is often not quantifiable and is largely negative).

Management scholars could use both qualitative and survey approaches to understand how managers conceive of risk. Qualitative research can help us obtain richer understandings of managerial conceptions of risk; surveys can help more systematically elicit dimensions

considered by managers in their evaluation of risk. In both cases, comparisons across organizations or across divisions within organizations can help us understand how risk definitions vary. Until we understand managerial concepts of risk better, we can expect frustrating and unproductive conversations between scholars and managers using different risk concepts.

Measurement of Risk in ERM. Almost all risk management processes require specification of the magnitude of risks. How managers measure risk raises both normative (how they should measure risk) and positive (how they actually measure risk) issues. The centrality of risk measurement to ERM creates a wide variety of topics for management research.

Objective risk vs Subjective Risk. To study how managers measure risk requires the development of scales that assess how managers measure risk – the extent to which it is a downside-only concept, level of quantification, etc. Defining and measuring how managers' measure risk offers an opportunity for management scholars. Due to their emphasis on archival data, scholars in finance and accounting have much less training in measurement issues than management scholars. How managers assess risk may differ from objective measures of risk (March and Shapira, 1987). Objective and subjective measures of risk can serve different purposes in ERM research. While we might use objective measures of risk to assess the outcomes of risk-related behaviors, we need managerial perceptions of risk to explain managerial behavior. Managers make decisions based on what they believe . Perceptions often differ greatly from "objective" measures of risk. A significant line of management research has attempted to understand why managerial perceptions of firm environments differed greatly from objective measures of those environments . For example, in bank lending and insurance underwriting, managers repeatedly make risk assessments, record the risk assessments, and

outcomes. One would expect that such an approach would facilitate improvements in risk assessment by comparing assessments to outcomes. Interestingly, even in such settings, management risk assessments exhibit systematic biases from an objective risk estimate . Such studies can help understand the why (and the extent to which) managerial assessments of risks are congruent with (or unaligned with) objective risks.[4]

Over-Confidence and Measurement. The extensive literature on individual's judgments of probabilities finds that individuals usually underestimate the amount of uncertainty they face . For example, if asked to give the limits within which a variable will fall X% of the time (termed a subjective confidence interval or CI), individuals usually select insufficiently wide ranges. Deaves et al. report the 90% CI's of financial market practitioners in Germany for the German market index DAX six months ahead included the actual value between 40% and 70% of the time. Russo and Schoemaker found 90% CIs of business managers captured the true value between 42% and 62% of the time, while 50% CIs had included the true values about 20% of the time.

Individuals at the top of corporations probably have even greater confidence in their judgments than the normal individual, and so perceive less uncertainty. March and Shapira noted that managers downplayed risks they undertook because of their confidence in influencing the situation to achieve the desired outcome. Can-do managers do not dwell on potential problems; they believe they can overcome them when they appear. Management selection processes may systematically pick optimists; or managers may learn to behave optimistically, a pattern consistent with learned optimism . Such orientations could vary by function; internal auditors may be less optimistic than people in sales. Management scholars could examine how

[4] For example, people perceive air travel or nuclear power generation as riskier than car travel or coal power generation despite substantial evidence to the contrary .

selection and promotion processes within organizations vary across levels/functions and they influence managerial confidence, optimism, and how managers assess risk. Such research on optimism, confidence, and hubris may help ERM practitioners calibrate their risk assessments better.

Consistency of Preferences and Group Effects. ERM scholars should not assume individuals or organizations make consistent risk judgments or have consistent risk preferences. MacCrimmon and Wehrung measured the risk preferences of over 500 American and Canadian managers using 13 different techniques. The techniques included hypothetical gambles, cases with gambles in them, personality measures, and reported behaviors (like quitting a job without another job lined up). While the multiple measures using a given technique correlated highly, they found almost no association between risk preferences using one elicitation technique and risk preferences with another elicitation technique, even when the objective situation evaluated did not vary.

Risk judgments and preferences become even more complex as groups (for example, top management teams, and boards of directors) are involved. Organizational scholars have extensively examined how groups influence choice . The literature on group think suggests that pressures for consensus tend to rein in managers who can conceive additional dangers; managers seldom gain much from raising obstacles. Risk assessment in an ERM context forms an appropriate and interesting domain to continue such work.

To summarize, the measurement of risk presents a variety of research opportunities for management scholars including (i) development of appropriate risk measures for ERM, (ii) understanding the connections between managerial assessments of risk and objective measures

of risks, (iii) inter-personal and inter-organizational variation in risk assessments, (iv) difference between individual and group effects on risk measurement.

Managerial Models about Risks. Both the identification of risks and their mitigation depend on the models, both implicit and explicit, that managers use. In areas like prevention of industrial accidents, where events are well defined, repeated, and extensively analyzed, models are probably somewhat accurate. In contrast, for many important risks, managers lack formal models, data, or time to estimate parameters and so must rely on judgment . This leads to two research directions: understanding the causes of the risks themselves and understanding managerial beliefs about such causes.

In some domains where data and modeling are feasible, individual managers or firms are unlikely to do the analysis. For example, empirical understanding of the risks created by having different durations on a bank's borrowing and lending cannot come from analysis of one bank – it requires analysis across multiple banks over time. Alternatively, understanding the risk implications of acquisitions depends on classification schemes for acquisitions and analysis using data on many acquisitions, both of which managers and firms may lack. In such cases, management scholars can help by generating understanding of the underlying causal mechanisms.

Management scholars have a particular advantage in studying how managers think about the causes of risks. March and Simon argued managers operate within implicit models of the world. Weick argued that managers operate in "enacted environments" – their perception of the environment depends on a variety of individual and organizational factors. For example, we often see higher levels of agreement within firms and significant disagreement across firms in how managers see industry changes, or how they categorize competitors in the industry .

Additional related work has considered how managers choose to classify events as threats or opportunities . We should expect that a variety of factors including firm history, structure, performance, along with individual factors including management backgrounds and incentives interact to influence the risks managers identify and how they understand such risks. Understanding managerial mental models (of cause and effect) are of particular importance for hard-to-measure types of risk.

Temporal Dynamics of Risk. Risk changes with time . For example, in the sub-prime lending market short-term risk (measured by many loan originators by default rates in the first three months) had little association with longer-term risk — a factor that according to some experts played a role in the 2008 financial crisis. Or, consider the example of outsourcing — where firms contract out activities such as manufacturing or IT — to suppliers. Outsourcing may involve minimal short term operational or supply chain risks but could lead to high long-term strategic risks due to spillover of firm's know-how, or development of core rigidities that constrain adaptation . This time varying nature of risk ties to the management literature on managerial time horizons . Risk inherently involves future outcomes. Management scholars might productively integrate concerns from the time horizon literature into their understanding of managerial risk taking.

Level of Analysis. Management scholars have studied how substantively different phenomena may exist as we move to different levels of analysis . For example, we could examine a single loan officer's lending, branch bank lending, overall lending by a bank, or lending by the banking system. Lending decision at each level has risk associated with it, but the risks may not aggregate in an obvious way. Thus, risk at the loan officer's level depends on an individual's assessment of potential borrowers and the actual risk of those borrowers. In contrast, risk at the

banking system level may depend on regulations, average house prices across the country, changes in interest rates, and even risks of national default by other countries. While lower levels of the system cannot be ignored, risk at higher levels does not necessarily reflect a simple aggregation of the lower levels .

The above discussion points to two implications for risk management. First, scholars should not casually project results from individuals onto organizations. Even where the aggregate relations appear similar, different causal mechanisms may occur. For example, scholars have sometimes used individual-level psychological theories, instead of organizational-level theories to explain the finding that firms take more risk when their performance falls below their aspiration levels . From both academic and practical standpoints, we need to know whether individual risk preferences or organizational processes determine a behavior.

Second, organizational researchers should examine whether the constructs managers use function as corporate-level variables. Of particular interest in the level of analysis domain is the usage of terms like corporate risk culture and corporate risk appetite. Both practitioners and regulators use ‘corporate risk culture’ and ‘corporate risk appetite’ in ways management scholars may find problematic. ERM usage assumes corporations can impose consistent risk cultures and risk appetites both across the organization and at differing levels of the hierarchy. Whether corporations actually have consistent risk cultures and appetites is an empirical issue that merits consideration. Furthermore, the concept of culture is problematic; Barley notes that “Culture is a notoriously difficult concept to define.” Organizational culture had a brief period of high activity in management scholarship, but became less fashionable due to definitional problems. As culture appeared to be a portmanteau concept, researchers replaced it with its constituent terms. In the ERM literature, culture has other, problematic meanings. For example, Brooks et

al. defines culture as "what determines how decisions are made in an organization" and goes on to say "a strong culture is one in which decisions are made in a disciplined way taking into account considerations of risk and reward on an informed basis." Here strong culture has by definition a positive connotation, in contrast to organizational approaches where strong culture is associated with the magnitude of the impact of cultural variables on behavior .

In short, ERM presents a variety of levels-of-analysis research issues for management scholars including (i) what do 'risk culture' and 'risk appetite' mean, (ii) do firms have consistent risk cultures and risk appetites at different levels of the company and across divisions, (iii) how firms aggregate lower level risks in assessing corporate risk, and (iv) how these factors influence managerial and firm behavior.

Implementing ERM. ERM implementation also provides a rich setting for management scholars. Studies of ERM implementation may consider two very different questions: adoption and implementation.

First, what determines whether a firm adopts ERM? The adoption of other business practices has been shown to depend on factors that include regulatory pressures, industry norms, the practices of firms on which the firm's board members serve, etc. . At least part of the impetus to implement risk management comes from external actors. The US Securities and Exchange Commission now requires publicly held companies reveal how they manage risk and the incentives for risk taking by senior management. Rating agencies such as S&P have started to consider risk management in their ratings of insurance companies. Studies in a variety of disciplines have examined how firms respond to external pressures, including regulatory changes. For example, Plambeck and Weber looks at how managerial interpretations influenced firm responses to the European Economic Community. In this context, scholars can

examine how the regulatory framework and its enforcement interact with firm characteristics to influence risk behaviors. The implementation of ERM globally offers management scholars an opportunity to study how a large, international population of firms responds to similar but not identical external pressures. In ERM, we have variations in regulatory environment along with variations in firms and host countries interacting to influence corporate behavior. However, because all the changes have some very similar bases, we have a limited heterogeneity in the underlying intent, making comparative studies particularly promising.

Second, how do firms effectively implement ERM? Several interesting lines of inquiry derive from prior work in strategic management and organizations that could inform research on ERM implementation. For example, corporate governance scholars could examine the role of boards, ownership concentration, and executive compensation in ERM implementation . While finance and accounting scholars have studied corporate boards, their emphasis on agency theory has restricted their view to emphasize boards' control function and ignored their advice function . Some firms have set up a separate risk management committee of the board to relieve the already overburdened audit committee of that role. Management scholars are well suited to study how changes in board structures and board processes influence firm risk behavior. Research could also examine how the corporate governance framework of the organization, including executive incentives, balances the competing risk preferences of various stakeholders and impacts ERM implementation . For example, division incentives and evaluation systems often encourage divisions to work toward division goals rather than maximizing corporate performance (termed sub-goal optimization); such systems can dramatically influence the outcome of efforts to implement ERM . In the mortgage-backed securities area, incentive plans that allowed traders to receive tens of millions of dollars in annual bonuses (without the potential for commensurate

personal losses) made it sensible for traders to take massive risks. Even a "good" risk management system may have difficulty constraining such highly motivated employee behaviors, particularly if the final arbiters of disagreements (senior management) have similarly aggressive incentives.

Organization theorists recognize that numerous facets of the organization including career structures, processes, norms, and organizational structure influence behavior. Whereas much of the accounting literature emphasizes either agency theory or direct controls, management scholars have a history of understanding more complex issues in motivation. For instance, Devers, McNamara, Wiseman & Arrfelt developed a framework relating risk and organizational structure. Does a more centralized or decentralized approach to ERM serve better in its implementation? How does the appointment of Chief Risk Officers (CROs) influence firm ERM implementation? How does organizational hierarchy impact ERM implementation? For instance, management scholars have identified the phenomenon of "uncertainty absorption;" uncertainty that was recognized at the lower levels drops from the discussion as choices move up the hierarchy . The experts who built Wall Street's risk models may have recognized many potential limitations, but the details of those limitations may have disappeared in the retelling. Scholars should consider how uncertainty absorption and the legitimacy of formal models influence ERM implementation.

The ERM field has taken a naïve view of organizational change. The academic literature largely assumes that appropriate incentives or objectives will result in organizations adopting appropriate risk practices. Indeed, few if any accounting and finance scholars study how firms implement change. However, management scholars have a history of organizational change studies that could inform risk management. Management research recognizes that organizational

remedies can worsen problems they are supposed to fix (see, for instance, Chapter 2 of March and Simon). The disastrous outcomes for the most sophisticated risk managers in the sub-prime meltdown (and Wall Street firms) suggest that risk management models are not a panacea and may be part of the problem. Checkley's study of institutional funds investing in venture capital firms found that risk management by individual actors, that is, the institutional investors, actually increased systemic risk for the group. Advocates have implicitly assumed that firms will use "better" tools in ways the originators intend, and that the tools will influence firm behavior in obvious, desirable, ways. The massive literature on organizational change clearly demonstrates the shortcomings of such assumptions . Simple-minded attempts at organizational change often result in complex, unforeseen dynamics. Thus, implementation of ERM offers a new and important area in which to study organizational change management.

Strategic Management and ERM. A firm's overall strategy and strategic choices significantly influence firm risk . The uncertainty associated with high-level strategic choices poses challenges for ERM. The literature shows that macro-organizational factors significantly influence firm-level risk-taking, both in amount and profitability . If underlying strategic choices strongly influence firm-level risk, then risk management efforts at lower levels may have limited value. Researchers may need to consider how aggregate strategic choices interact with ERM procedures. Thus, research on many substantive strategies like acquisitions and diversification could continue with a new emphasis on the risk management issues involved. In addition, researchers will need to understand how the overall process of risk management interacts with firm attributes and the other facets of a firm's strategy to influence firm performance . Indeed, for strategy scholars, demonstrating that active risk management influences actual risk and performance constitutes an essential precondition to future study. Given the field's concern with

the endogeneity of firm strategic choices, understanding the influence of risk management on performance will require understanding (or at least controlling for) the factors that cause a firm to adopt ERM and influence how firms implement ERM.

Much of the extant ERM literature assumes that strategic decisions largely occur in the strategic planning process . In contrast, strategy scholars have turned away from formal strategic planning, ostensibly because most strategic decisions occur outside the formal process. If strategy scholars are correct, then the ERM emphasis on risk analysis in formal strategic planning is misguided. Resolving these differences requires empirical evidence.

CONCLUSION

This paper reviewed the academic and practitioner literatures on risk and ERM to develop suggestions on where and how management scholars can contribute to ERM research. Management scholars have particular methodological and theoretical bases that can complement ERM research in finance and accounting. The move to holistic risk management offers opportunities for a wide variety of management scholars to address issues on which they have substantial foundational knowledge and relevant techniques. If they follow up on such opportunities, they can contribute both to fundamental understanding in management scholarship, and to important practical problems. We hope that this review will whet the appetite of management scholars and provoke them to engage more fully in risk management research.

However, for management scholars to contribute to ERM requires a different focus than past management research on risk. Much of the management and strategy literature on risk tried to explain differences in firm risk over time and across firms. To contribute to the ongoing ERM discussion, management scholars need to take a more prescriptive stance and pay more attention to the effectiveness of different practices and activities. Such a stance would align both with

historical studies on planning systems and organizational change management and with recent efforts to increase engaged scholarship among management scholars .

Practitioners need to understand how different individuals and groups within organization define risk, potential biases in risk assessment, and challenges in implementing risk management initiatives. These challenges offer opportunities for firms to look internally at these issues, and collaborate with scholars to produce engaged scholarship. Practitioners should note that this paper has taken a somewhat cautious view of the benefits of ERM. This reflects a bias toward empirical evidence; until research conclusively demonstrates ERM actually has the outcomes its advocates claim, a skeptical view is justified. Studies are yet to demonstrate consistent benefits from ERM. Recent history also raises doubts about the effectiveness of risk management as previously practiced. In the economic downturn caused by the sub-prime crisis in 2008, the most sophisticated practitioners of risk management (e.g., the Wall Street banks) suffered most heavily, causing tremendous damage to the US and international economies.

Overall, ERM offers a new domain for management scholarship where management scholars can find interesting and theoretically important questions that also have important implications for practice.

REFERENCES

Table 1: ERM Definitions and Descriptions from Academic Journals

Dickinson	ERM is a systematic and integrated approach of the management of the total risks a company faces.
D'Arcy and Brogan Casualty Actuary Society	ERM is 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.
Harrington, Niehaus, and Risko	ERM is the idea that emerged in the late 1990s that a firm should identify and (when possible) measure all of its risk exposures—including operational and competitive risks—and manage them within a single unified framework in contrast to the silo approach to risk management.
Meulbroek	Integrated risk management is the identification and assessment of the collective risks that affect firm value, and the implementation of a firm-wide strategy to manage those risks.
Barton, Shenkir, Walker	Enterprise-wide risk management shifts risk management from a fragmented, ad hoc, narrow approach to an integrated, continuous, and broadly focused approach.
Verbrugge	ERM is corporate-wide, as opposed to departmentalized, efforts to manage all the firm's risks—in fact, its total liability structure—in a way that helps management to carry out its goal of maximizing the value of the firm's assets. It amounts to a highly coordinated attempt to use the right-hand side of the balance sheet to support the left-hand side—which, as finance theory tells us, is where most of the value is created.
Liebenberg and Hoyt	Unlike the traditional "silo-based" approach to corporate risk management, ERM enables firms to benefit from an integrated approach to managing risk that shifts the focus of the risk management function from primarily defensive to increasingly offensive and strategic. ERM enables firms to manage a wide array of risks in an integrated, holistic fashion.
Kleffner, Lee, McGannon	In contrast to the traditional "silo" based approach to managing risk, the ERM approach requires a company-wide approach to be taken in identifying, assessing, and managing risk.
Miller and Waller	Integrated risk management is consideration of the full range of uncertain contingencies affecting business performance.
Sobel and Reding	ERM is a structured and disciplined approach to help management understand and manage uncertainties and encompasses all business risks using an integrated and holistic approach.

Table 2: ERM Definitions and Descriptions from Standards Setting Organizations, Industry Publications, Industry Associations, Consulting Firms, and Rating Agencies

	Risk management is the culture, processes and structures that are directed towards the effective management of potential opportunities and adverse effects.
Holton	ERM is about optimizing the process with which risks are taken.
Banham	Goal of ERM is to identify, analyze, quantify, and compare all of a corporation's exposures stemming from operational, financial, and strategic activities.
Arthur Andersen (Described in Deloach and Temple)	ERM is a structured and disciplined approach [that] aligns strategy, processes, people, technology and knowledge with the purpose of evaluating and managing the uncertainties the enterprise faces as it creates value….It is a truly holistic, integrated, forward looking and process-oriented approach to managing all key business risks and opportunities—not just financial ones—with the intent of maximizing shareholder value for the enterprise as a whole
Miccolis	ERM is a rigorous approach to assessing and addressing the risks from all sources that threaten the achievement of an organizaiton's strategic objectives.
Deragon	ERM simply seeks to manage interrelationships systemically, in order to minimise variation, reduce inherent risks, and increase positive synergies.
Tillinghast-Towers Perrin	ERM is generally defined as assessing and addressing risks, from all sources, that represent either material threats to business objectives or opportunities to exploit for competitive advantage.
Institute of Internal Auditors	Enterprise risk management is a rigorous and coordinated approach to assessing and responding to all risks that affect the achievement of an organization's strategic and financial objectives.
Casualty Actuary Society	ERM is 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.
Committee of Sponsoring Organizations (COSO)	ERM is a process, effected by an entity's board of directors, management and other personnel, applied in strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risk to be within its risk appetite, to provide reasonable assurance regarding the achievement of entity objectives.
S&P	We see ERM as an approach to assure the firm is attending to all risks; a set of expectations among management, shareholders, and the board about which risks the firm will and will not take; a set of methods for avoiding situations that might result in losses that would be outside the firm's tolerance; a method to shift focus from "cost/benefit" to "risk/reward"; a way to help fulfill a fundamental responsibility of a company's board and senior management; a toolkit for trimming excess risks and a system for intelligently selecting which risks need trimming; and a language for communicating the firm's efforts to maintain a manageable risk profile.
ISO 31000	Risk management is coordinated activities to direct and control an organization with regard to risk.
Risk and Insurance Management Society (RIMS)	ERM is a strategic business discipline that supports the achievement of an organization's objectives by addressing the full spectrum of its risks and managing the combined impact of those risks as an interrelated risk portfolio.