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**UNIVERSITY OF SOUTHAMPTON**  
**FACULTY OF SOCIAL SCIENCES**  
School of Management

**Exploring the understanding, motivation, design, challenges and  
performance of Enterprise Risk Management in the insurance industry:  
an empirical study on four major European Re/insurers**

by

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Thesis for the degree of Doctor of Philosophy

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FACULTY OF SOCIAL SCIENCES  
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**EXPLORING THE UNDERSTANDING, MOTIVATION, DESIGN, CHALLENGES AND  
PERFORMANCE OF ENTERPRISE RISK MANAGEMENT IN THE INSURANCE INDUSTRY:  
AN EMPIRICAL STUDY ON FOUR MAJOR EUROPEAN RE/INSURERS**

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**ABSTRACT**

The key objective of this research is to explore the scope and the extent to which insurance companies manage risks holistically. The objective is achieved through a naturalistic investigation of the understanding, motivation, design, challenges and performance of Enterprise Risk Management (ERM) in the insurance industry. The research begins by describing the broad context of risk management from an interdisciplinary perspective and the literature is used to develop a theoretical framework of ERM. Then the ERM initiatives of four major European re/insurers were empirically investigated. These are used to develop a practical framework of ERM. Then the theoretical and practical frameworks were compared and contrasted and a number of propositions were developed and discussed. These provide a substantive theory of ERM. In the literature review it was found that most research on ERM in the insurance sector is developed from financial and economic perspectives, precluding the strategic aspects of risk particularly those involving aspects of organisational behaviour. The thesis argues that risk needs to be considered from a broader perspective beyond disciplinary silos in order to achieve a holistic view on risk and risk management. This argument was developed conceptually by few authors such as Dickinson (2001b), Mehr and Hedges (1963, 1974), Meulbroek (2002a, 2002b), Power (2004a, 2004b, 2005b) and Ward (2003a). The empirical findings of this study support this argument and the study is the first in-depth academic study of ERM in insurance. The research concludes that: there exists an uneven understanding of ERM across the insurance industry and the main reason is that risk is conceptualized in different disciplinary silos. Leadership of CEO and regulations turned out to be the key driving forces of ERM. The design of ERM in insurance companies was found to be similar across the industry. However, implementation of ERM varies extensively depending upon the organisation's business model, market, expertise, and culture. There exists little understanding amongst insurance companies of how to measure the performance of ERM. Importantly, ERM was not found to be a new phenomenon, rather it is a natural evolution of risk management. The forces leading to the development of ERM include the increased sophistication of market and business and the increased awareness of risk, which in turn compelled insurers to unfold the complexity of risks. It is found that the insurers are more concerned about the dynamics of risk, for example, the volatility attached to assets and liabilities rather than their static values. The initiatives towards Solvency II and IFRS are the prominent examples. This, in fact, brought the concept of 'economic capital' into focus amongst insurers, regulators, rating agencies and other associated parties. Consequently, the emerging role of chief risk officer is interdisciplinary, which should reflect a broad body of knowledge both in general and technical terms.

One major achievement of this study is that it has been awarded the prestigious SIN Research Excellence Award for Insurance Scholarship in 2006. This was presented by The Geneva Association in partnership with the International Insurance Society with an understanding that this research might be of relevance for the insurance industry.

Keywords: financial risk, operational risk, strategic risk, enterprise risk, enterprise risk management, leadership, chief risk officer, risk communication, risk modelling, risk measurement, economic capital, regulations, interdisciplinary, stakeholders.

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Madhusudan Acharyya  
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# CHAPTER 1

## INTRODUCTION TO THE THESIS

Page 1-8



## CHAPTER 1

### INTRODUCTION TO THE THESIS

#### 1. Introduction

This chapter provides an introduction to this thesis by providing a brief overview of the research topic and an outline of the structure of the thesis. In order to achieve these objectives firstly the context of Enterprise Risk Management (ERM) is explored. Thereafter, the motivation for the research and its aims are briefly explained. Finally, the structure of the thesis is described.

#### 2. Context

Enterprise Risk Management (ERM) interests a wide range of professions (e.g., actuaries, corporate financial managers, underwriters, accountants, internal auditors). However, current ERM solutions often do not cover all risks because they are motivated by the core professional ethics and principles of these parties who design and administer them. In a typical insurance company all such professions work as a group to achieve the overriding corporate objectives. Risk can be defined as factors which prevent an organisation in achieving its objectives and risks affect organizations holistically. The management of risk in isolation often misses the big picture of risk. It is argued here that a holistic management of risk is logical and is ultimate destination of all general management activities. Moreover, risk management should not be a separate function of the business process; rather, managing downside risk and taking the opportunities from upside risk should be the key management goals. Consequently, ERM is believed to ideally be an approach to risk management, which provides a common understanding across the multidisciplinary groups of people which make up the organisation. ERM should be proactive and its focus should be on the organisations' future. However, organisations often struggle to see and understand the full risk spectrum to which they are exposed and as a result they may fail to identify the most vulnerable areas of their total business. The effective management of risk is truly an interdisciplinary exercise, which requires a holistic view of the business.

Whatever name this new type of risk management is given (the literature refers to it by diverse names, such as Enterprise Risk Management, Strategic Risk Management, and Holistic Risk Management) the ultimate focus is management of all risks faced by the organization. Risk is an integral part of each and every action of the organisation in the sense that an organisation is a basket of contracts associated with risk (in terms of losses and opportunities). The idea of ERM (which is what this study will use to refer to and all embracing form of risk management) is very simple and logical, but implementation is difficult because it involves a wide stakeholder community which in turn involves groups from different disciplines with different beliefs and understandings based on their own professional ethics and norms. Indeed, ERM needs theories (which are the interest of academics) but seeing the evolving nature of the topic a grand theory of ERM (which invariably involves an interdisciplinary concept) is far from having been achieved. Consequently, for practical purposes, what is needed is to the development of a framework (a set of competent theories) and one of the key challenges of this thesis is to establish the necessary features of such a framework to promote the practice of ERM.

### **3. Criticism of the literature, motivation and significance of the study behind the research**

ERM in the insurance industry (financial services in a broader sense) has traditionally been a quantitative (mostly finance) driven approach and less descriptive in terms of its totality. Consequently, ERM has not typically covered all risks that an insurer faces. Taking a broader perspective of risk and risk management, this study noted increasing criticism from different parts of the organisations (excluding finance) about the quality of ERM as a holistic means of managing risk. This is simply because interests of parts of the organisation (other than finance) were often not addressed by such as a silo focus of ERM which has been traditionally practiced within the insurance industry.

Consequently, the literature suggests that there exists no clear understanding of, and of framework for, ERM (both in practical and theoretical terms) amongst different parts of the financial community.

In addition to the need to involve interests of all disciplines within ERM, a key challenge for ERM remains how to bring together the quantitative aspects (e.g., risk measurement and modelling) with the qualitative aspects (e.g., risk governance) into a common framework. This study intends to explore these emerging issues within insurance industry in terms of five dimensions; in particular, in terms of the understanding of what constitutes ERM amongst staff at all levels, what are seen as the key drivers (or motivation) for developing ERM, how ERM systems are designed, the key challenges facing insurance companies in the successful implementation of ERM and how they measure the performance of ERM.

Evidence is gathered from four major European re/insurance companies and this provides first hand experience of staff from a range of disciplines within these organizations that are directly/indirectly related to ERM. In addition, expert opinions of a group of industry observers are used to provide an outsider view of the topic. The judgemental view of the researcher is also used to draw some theoretical propositions regarding ERM, which might help the stakeholder community to take a fresh view of ERM beyond disciplinary silos. Since the key criticism of silo-based risk management is that it often exposes insurers to a lack of clear vision of their overall risk profile and risk tolerance.

In addition to studying the ERM initiatives of four Case Study Companies, the key strength of this research is that it brings together the work undertaken by different bodies such as academics, practitioners, regulators, and rating agencies in a single document (whereas currently these remain segregated in the literature). A number of common themes have emerged from the integrated view of the various literatures while bringing them together in this study. They include (i) an interdisciplinary perspective on managing risks, (ii) a unified risk-capital model, (iii) an accumulation of quantitative risk

management with the overall risk governance system and (iv) putting risk management at the centre of the strategic decision making and performance evaluation process of the organisation..

This has provided solid ground for future researchers (from both the academic and practitioner community) to explore ERM in the future. Since this study is one of first to provide a holistic view of the problem, the approach and methodology (ranging from the literature review to data analysis and presentation of findings) is different from many academic studies of the subject. Indeed such a difference is intentional but it was driven by the reality of conceptualizing and solving the problems that the study considers.

#### **4. Research themes and research objective**

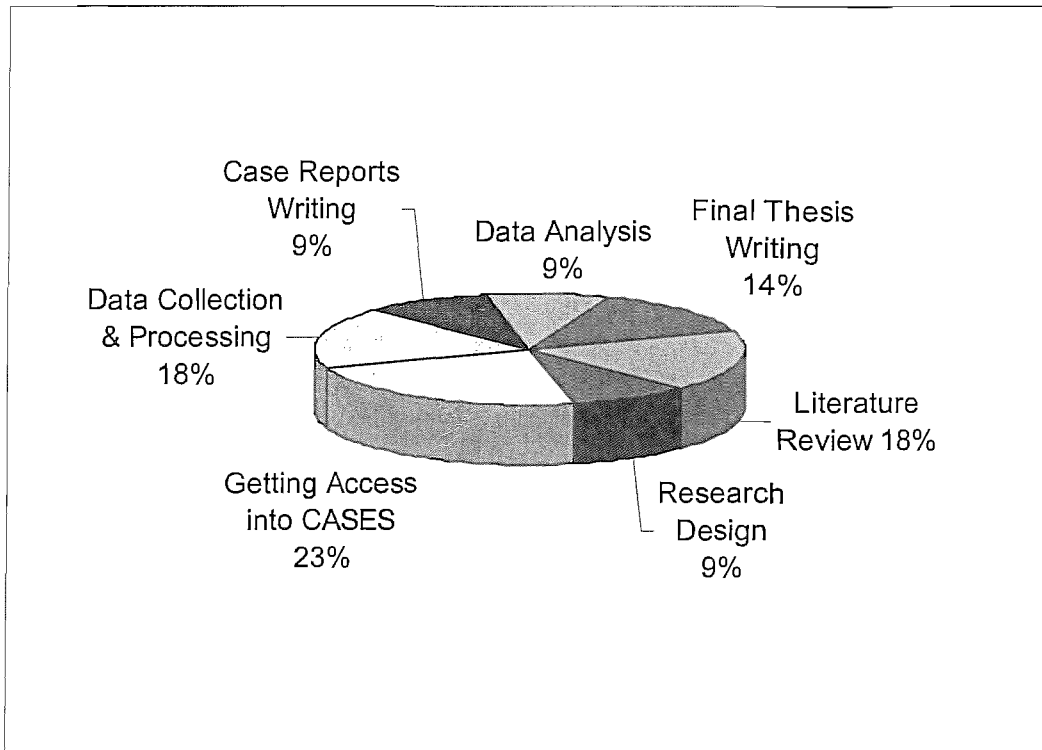
Insurance companies face risks from multiple sources including both financial and non-financial. However, they often manage risks in disciplinary silos, taking little or no holistic view. No academic study has yet investigated to what extent insurers' are motivated to, and manage risks in a holistic manner. This research intends to study the issues related to the enterprise-wide treatment of insurers' risk. The primary objective of the study is to answer the question: "to what extent is there scope for insurance companies to manage risks holistically". The secondary objectives are to explore why and how insurance companies attempt to manage risks holistically and what are the challenges and benefits of such a holistic approach to risk management.

#### **5. Apportionment of time for the research**

The research was conducted on a full time basis and took about 43 months to complete (from October, 2002 to June, 2006) without any break. Most of the time was spent in gaining access to the Case Study Companies and collecting data from these companies (around 41% of the total time spent). This arose because the organisation's main concerns related to the time commitment to the study required of executives and most importantly the guarantee from the researcher of maintaining confidentiality of the information. The apportionment of time for the research is summarized in Figure 1(1). The amount of work

involved with the CASES is reflected in the four case study reports which are provided in the APPENDIX.

**Figure 1(1): Allocation of time for the research (estimated)**



Both the revision of literature and collecting and processing data took about 18% of the total time. Designing the research took about 9% of the total time which includes selection of CASES and proposal design and interview questionnaire design. Finally, about 14% of the time was spent in writing up the thesis.

## 6. Structure of the thesis

Figure 2(1) illustrates the structure of the thesis, which is organised into six chapters plus an APPENDIX, which contains four CASE<sup>1</sup> reports.

Chapter 1 sets the context of the research, explores the significance of the study, the motivation for the research, the research objectives and the structure of the thesis.

<sup>1</sup> From now and onwards CASES will be used to mean the four cases included in the study.

Chapter 2 extensively reviews the literature concerning ERM. It contains six sections. The first section explores the concept of risk. An interdisciplinary outlook of risk from the perspective of the disciplines of psychology, sociology, economics and finance is described. Some financial theories relevant to risk are also considered. The second section introduces the concept of risk management and both traditional and modern risk management are explored. The concept of ERM evolves from this discussion. An overview of past research concerning ERM done by various practices were developed and the key findings are summarised. The third section explores insurance economics, where some basics of insurance (e.g., type of insurers' business, the underwriting cycle, and the relationship between the insurance market and capital markets) are discussed. Moreover, the current state of risk management in the insurance industry and the risk management process is explored. The fourth section addresses some key issues in insurers' risk management from a technical and operational perspective. The fifth section covers recent regulatory changes and their implications for organisations. The role of the CRO within the organisational structure is also discussed. The sixth section develops, what appears from the literature, to be an effective framework of ERM (this is referred as the 'theoretical ERM framework'). In addition, the set of research questions explored in this study are identified.

Chapter 3 focuses on the research methodology employed in the study. It starts with a revision of research objectives, identifies the gaps in literature and develops more formally the research questions to be explored in this study. Thereafter, the research paradigm and different types of academic research are discussed in order to identify the most appropriate research paradigm and style of research required to answer the research questions identified earlier. This is followed by discussion of research strategy and research methods (including data analysis) for this study; in fact this study follows the Case Study methodology under an interpretivist paradigm.

Chapter 4 presents an analysis of data collected from the CASES and draws some conclusions based on this. It is divided into seven sections. The first section provides an overview of the four CASES included in the research.

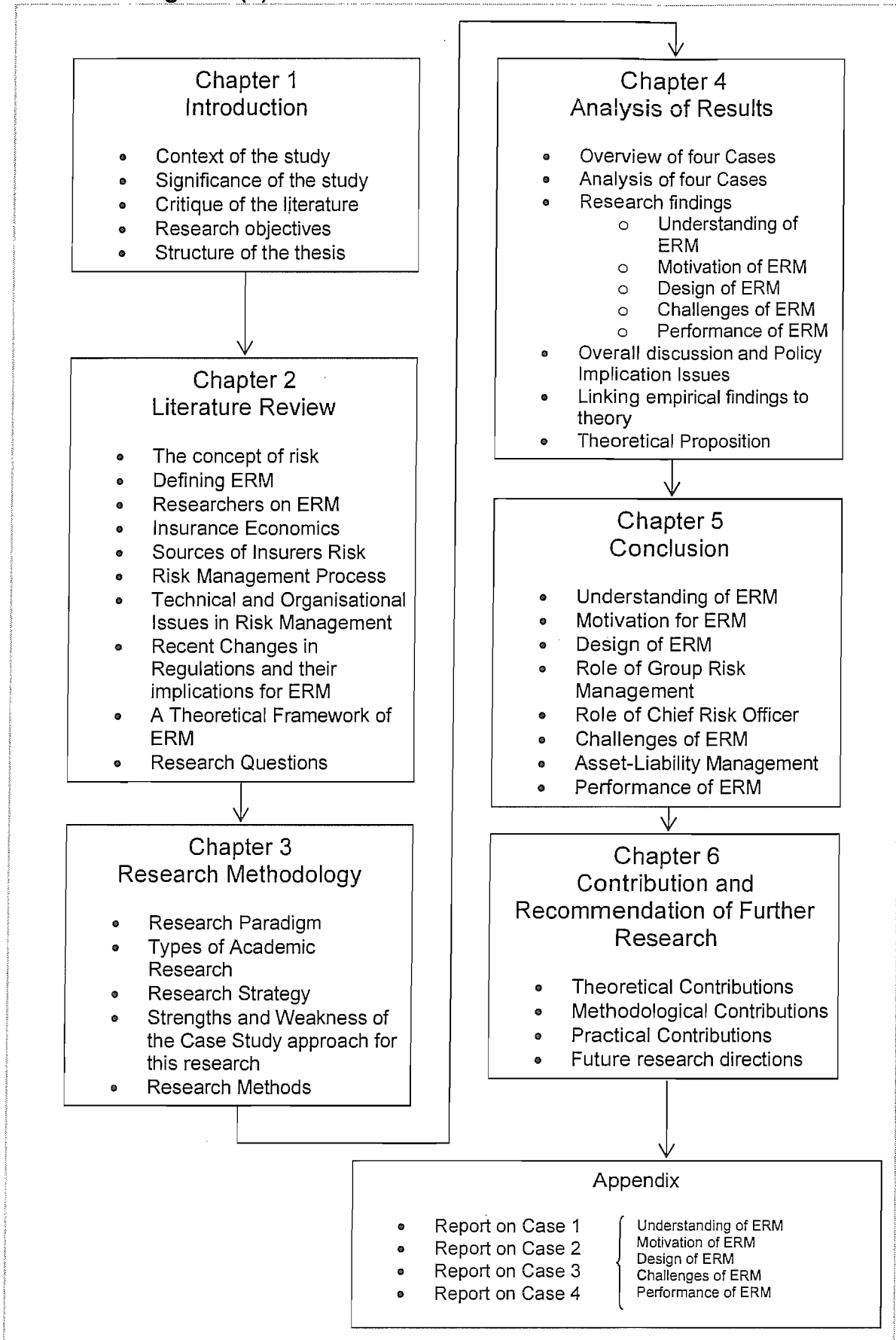
Sections 2 to 6 analyse the key findings of five dimensions of (i.e., the understanding, motivation, design, challenges to implementation (operational and technical), and the measurement of performance of ERM). The seventh section explores policy implications arising from the preceding analysis and several propositions are made on the basis of the analysis of the Case Study results.

Chapter 5 presents the conclusions of the research in terms of the five dimensions of the study. Chapter 6 identifies the contribution of the research and suggests some future research directions.

Finally the APPENDIX includes the four CASE reports, which provides the key sources of information for the data analysis and the findings as presented in Chapter 4.

The following Figure 2(1) illustrates the structure of the thesis.

Figure 2(1): Flowchart on the structure of the thesis





## CHAPTER 2

# LITERATURE REVIEW

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## CHAPTER 2

### LITERATURE REVIEW

#### 1. Introduction

The literature of risk management is vast but inconsistent meaning that it is based on specific disciplinary perspectives. There is no universally accepted definition of risk and therefore risk management. Consequently, a holistic perspective of risk management is more an issue of both general and strategic management. The objective of this study is to locate risk management beyond disciplinary boundaries as an organizational issue in the case of both general (day to day functional) and strategic (top level and policy) decision making. Incidentally, this literature review is broad and it intends to cover issues from an interdisciplinary perspective. As stated earlier, the focus is on the organization as a group of different disciplinary functions and actions. It is intended to develop a theoretical framework of Enterprise Risk Management (ERM) to obscure the hidden linkages of different attitudes, perceptions, functions, actions, and tools in relevant to manage risks of insurance companies.

Although the issues that directly refer ERM are limited in the literature, the study reveals that there exists in the literature that can be utilized to explore ERM. In such a multidimensional body of literature about ERM, the study identifies five dimensions: understanding, motivation, design, challenges and performance of ERM. The following Table 1(2) summarises the knowledge developed from the literature. The information is presented in a multidimensional framework suggested by Ward (2003a).

It was attempted to structure this literature review under each notions but difficulties were found because of the close overlapping characteristics and interrelations among the factors. Consequently, the review is structured under five sections which are concept of risk, understanding of enterprise risk management, insurance economics, risk management tools and techniques, and recent changes in regulations. A framework of ERM was then developed from the information as seen in the studied literature. This helps to identify and analyze gaps in the literature, which are then used to develop research questions for empirical investigation.

**Table 1(2): Key issues of ERM in the literature**

	What	Why	When	How	Who	Where
<b>Understanding</b>	ERM was seen as a heterogeneous subject with uneven understanding of stakeholders.	Being an evolutionary concept, no consistent industry practice of ERM exists.	Risk is inherent to all transactions and actions. ERM is the approach of managing risks holistically.	ERM helps financial firms in many ways but maximization of shareholder value is the key.	Three key groups of people viz. risk takers, risk owners, and risk observers expressed concern about ERM.	The understanding differs across the management hierarchy of the organisation and across disciplines.
<b>Evolution</b>	A range of factors for example, regulation, innovation, market competition, leadership, and so on originally motivated insurance companies to develop ERM.	The driving forces are not isolated rather they are closely interrelated.	The practice of ERM was first seen in mid-1990s.	The leadership of the CEO with the support of Board of Directors was shaped by the ERM initiatives of insurance companies.	The practical approach to risk management in capturing opportunities in the event of protecting downside is the key characteristic in the evaluation of ERM.	ERM is believed to be a top-down approach to take control over the risk that an organisation holds.
<b>Structure</b>	ERM is built on two key building blocks: operational and technical. The former includes risk awareness, risk culture <sup>1</sup> , risk perception and so on. However, the latter includes economic capital, allocation of capital and performance evolution.	The structure of ERM differs across practicing companies depending on their business model and the nature of risk they face (or underwrite).	The elements of the ERM interact well when risk is seen from a specific disciplinary perspective. However, they can give maximum output when they are done with an interdisciplinary perspective.	The business models of the organisations and market culture where they operate influence the design of ERM.	The effective role of technical profession (for example, finance, actuaries) plays the key role in structuring ERM.	The structure of ERM remains in the centre of organisations' strategic decision making process.
<b>Challenges</b>	Both operational and technical challenges exist in implementing ERM. Whilst risk communication and a common risk language are key operational challenges, risk measurement and calculating diversification benefits (taking their correlations into account) are key technical challenges.	The elements of operational challenges are interrelated and the same is true for technical challenges. Moreover, they are inclusive and dependent on each other.	The key challenge for implementing ERM holds when the shareholder model comes together with the risk governance model.	There are common practices that exist in the industry to overcome the challenges but their level of sophistication varies extensively.	Overcoming both operational and technical challenges of ERM needs cross disciplinary actions, which often rests on Group Risk Committee [through CRO].	The initiatives of industry managers in overcoming challenges conflict when they apply their perception and understanding on risk and risk management.
<b>Performance</b>	The performance of ERM should be aligned with the organisations' success in achieving its corporate objectives.	Since ERM involves a range of disciplinary perspectives, the measurement of ERM needs an interdisciplinary focus.	A lot of benefits such as competitive advantage and adding shareholder value are seen as the advantages of ERM. However, there is limited knowledge conveying the potential dangers of ERM.	A range of tools for example, scenario thinking, balanced scorecard, and so on may be employed to measure the benefits of ERM.	Measuring the performance of ERM is not a central issue in the current practice of ERM.	Investigation of two prospective situations, ex-ante and ex-post of events is necessary.

<sup>1</sup> S&P defines risk management culture as "the degree to which risk and risk management are important consideration in all aspects of corporate decision making" (Towers Perrin, 2006).

The review of the literature yielded over 100 articles, listed alphabetically by author in bibliography attached. The chapter is divided into six sections.

## **2. Structure of the chapter**

Section 1 attempts to give a broader picture of risk. It defines different disciplinary views of risk and to find how are they interrelated, or influence each other.

Section 2 attempts to clarify the meaning of risk management in both the traditional and modern sense, which then leads to the development of the enterprise approach to managing risks. The theoretical concept of enterprise risk, and henceforth enterprise risk management, has been established and their working definition is prepared, which in turn guided the rest of the study. The recent research efforts of various organizations towards ERM have been discussed.

Section 3 seeks to understand the economics of insurance in terms of the core principle of the business. It includes various issues; for example, the operational structure of the insurance company and how risk management functions are interrelated, and the economic variables (for example, underwriting cycle) that influence the insurance business. Various types of risks (including their sources) related to insurance business and how are they managed (the risk management process) are also discussed.

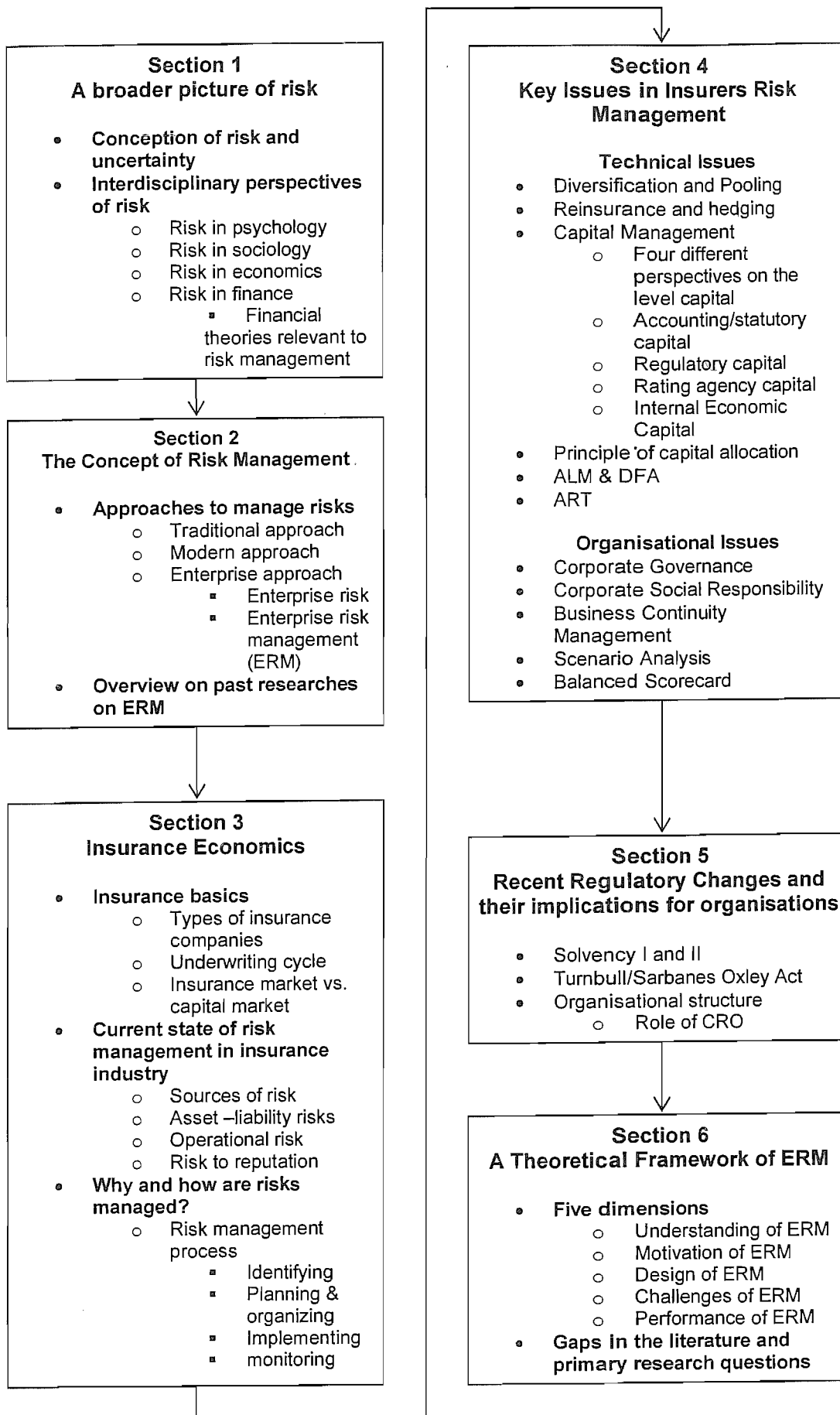
Section 4 deals with the technical aspect and organizational aspect of risk management in the insurance industry. The technical aspect covers various issues such as diversification, reinsurance, hedging, capital management, asset-liability management, and allocation of economic capital. The organizational aspect includes corporate governance, scenario analysis, and business continuity management.

Section 5 deals with the recent regulatory changes in relevant to ERM, where solvency regulations and corporate governance rules are discussed. In addition, the evolving role of the CRO is explored.

Section 6 summarizes the key issues of the above five sections and attempts to find the gaps in the literature. Furthermore, a theoretical framework of ERM has been developed, which leads the progress of the study. It finally proposes the research questions for the study.

Figure 3(2) illustrates the above descriptions of this section in a flowchart (see the next page).

Figure 3(2): Flowchart of the sections of Literature Review



## SECTION 1

### A BROADER PICTURE OF RISK

This section includes two broader issues: (i) the conception of risk and uncertainty and (ii) interdisciplinary perspective of risk. These two issues are interrelated as the ERM, being a holistic subject, takes an interdisciplinary perspective while conceptualizing risks. They will be discussed in turn.

In the literature there are a range of views in differentiating risk from uncertainty. The following paragraphs provide an overview to assist in the conceptualization of risk and uncertainty for the purpose of this study.

#### 1.1. Introduction

There is not universally accepted definition of risk existing in the literature and the differences occur in the context and purpose of use. The study considers risk in a broader sense and it is important at the beginning of the study to clarify the spectrum of risk to be considered for this purpose. Although risk and uncertainty are related concepts, there exists ample debate about their meaning.

Consequently, it is important to clarify what the terms mean. The following paragraphs intend to clarify the meaning of risk<sup>2</sup> with relevance to uncertainty<sup>3</sup>. It emerged that risk is a narrow concept under the broader category of uncertainty. Various works have been quoted and analyzed to draw out their central meaning. The second part begins with the categorization of risk and then compares and contrasts the disciplinary perspectives of risk. It is found that although risk affects organisations holistically<sup>4</sup>, disciplinary boundaries do not acknowledge it.

#### 1.1.1. Risk and Uncertainty

The general weakness of all these debates suggests that the existing literature on risk and uncertainty<sup>5</sup> much emphasis on the technical or single dimensional (that is., a particular event or circumstance) although the foundation is social or multidimensional (Macgill, 2004, Miller, 1992). In the traditional sense, risk is a state of an event whose implication (or outcome) is measurable in numerical terms. However, uncertainty is a state of mind, whose implication (or outcome) is

<sup>2</sup> Things will happen [Plato (427-347 BC)]

<sup>3</sup> Things might happen

<sup>4</sup> Suggesting that risk management involves all parts of the organization (Mehr, 1974).

<sup>5</sup> Analogous to vulnerability (as seen in the manufacturing system): see Haimes (2006)

not measurable. Further complication arises when risk bears the meaning of either hazard or loss (Hardy, 1924, Knight, 1921) and opportunity<sup>6</sup> or gain (in upside sense). Such complication gains further momentum when risk means both downside and upside (Rayner, 2003) when it is termed as speculative risks (Haller, 1978). Different terms for example, change (Crockford, 1976), chance (Haynes, 1895, Kalecki, 1937, Knight, 1921, Wood, 1964), ambiguity (Renn, 2003, Renn, 2004), certainty, complexity (Renn, 2003), possibility and probability (Rennie, 1961), subjectivity (Renn, 1992) or degree of belief (Holton, 2004b, Pfeffer, 1956), objectivity, state of mind (Pfeffer, 1956), state of world (Cool, 2001, Pfeffer, 1956) and so on have been introduced to establish different arguments and counterarguments. Nevertheless, the root cause of all arguments and counterarguments were concentrated in two words, subjective<sup>7</sup> and objective<sup>8</sup>.

Although risk is variously defined, central to all definitions is the absence of certainty (Young, 2000). Consequently, risk in its broader sense is closer to uncertainty (Ward, 2003b). Since an in-depth investigation of this topic is beyond the scope of this research, this study clearly defines risk, which includes both loss and gain (opportunity) as measurable outcomes (at least in probabilistic<sup>9</sup> terms) within the domain of uncertainty. The study argues that from the philosophical point of view, risk management aims to understand the diverse world of uncertainty and thus convert uncertainty into risk as much as is possible. However, the challenge is how to transfer uncertainty to risk because risk cannot be separated from uncertainty. In fact, there always exists an subjectivity around risks depending on the most important factor, which is time (Bernstein, 1999), where the longer the time, the closer is risk to uncertainty. This is why investing in bonds over a longer duration generates a higher rate of return. The concept is illustrated in the following Figure 4(2). This is developed in line with the arguments suggested by (Pountney, 2000) and (Renn, 1998), although no logical categorization of uncertainty exists in the literature (Renn, 1992). However, the

<sup>6</sup> The chance of something good happening

<sup>7</sup> based on peoples' perception/opinion and exists where there is a lack of objectivity/measurability (Wiening, 2002)

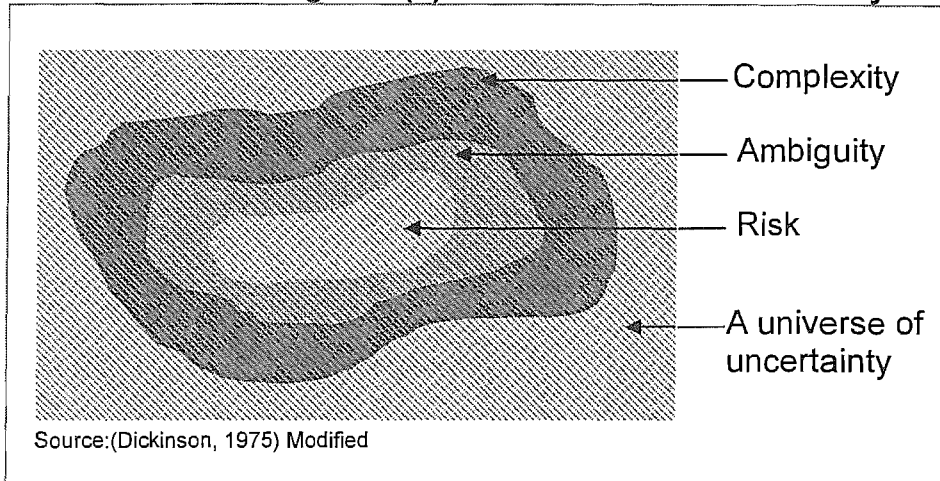
<sup>8</sup> Measurable facts based on data (Wiening, 2002)

<sup>9</sup> There are ample debates in the literature on objective probability and subjective probability as seen in the works of Knight (1921), Keynes (1921), Kolmogorov (1933). According to objective interpretations, probabilities are real, which may be discovered by logic or estimate through statistical analyses. However, the subjective interpretations conceptualize probabilities as human beliefs (Holton, 2004). However, critiques also available for such understanding of probability.



following paragraphs intend to categorize uncertainty, because this will help the level of understanding of risk management of studied insurance companies.

**Figure 4(2): Three states of uncertainty**



In line with the understanding of the above conception of risk and uncertainty, Figure 4(2) suggests two further stages, ambiguity and complexity between risk and uncertainty. The core issue is that all uncertainty cannot be set on the probability framework (Dickinson, 1975). The uncertainty represents the whole area of knowledge, which is either known or unknown. The complexity is a subset of uncertainty, which represents the partially known in the vast area of the unknown, although subjectively, but subjective probabilities cannot be applied. In this sense, complexity, where there is scope for the modelling of a specific situation (for example, a flood in a particular region) although the remaining area (for example, global warming) remains unknown. Such a modelling approach excludes a lot of things even subjectively known to build up a better understand of complexity in the face of reality. This is essentially a knowledge generation and management task. The second state is ambiguity, which means even when it is possible to reach a definite conclusion about something, where complexity is resolved; it may still be difficult to find out what that actually means. Ambiguity is a disturbing element in the universe of uncertainty and as Bedford (2001) suggests: "ambiguity must be removed before we can meaningfully discuss uncertainty". For example, two separate events such as an earthquake in Japan and a hurricane in Florida are two random (independent) events and therefore there is no need to set aside capital separately for these two uncorrelated events

(diversification<sup>10</sup> benefit) but even then it is difficult to convince the regulators because they are reluctant to accept it. In other words, ambiguity represents uncertain situations where subjective<sup>11</sup> and empirical<sup>12</sup> probabilities can be applied. Finally, risk represents an uncertain situation of known from a large area of known, where subjective, empirical (statistical) and logical<sup>13</sup> probabilities can be applied. All these three states of uncertainty (complexity, ambiguity, and risk) including the remaining areas represent the universe of uncertainty, where lack of information prevents any probabilistic assessment.

After careful analysis of various definitions, the study comes to the following conclusion in defining risk. This definition of risk will be used throughout the study.

Risk (a subset of uncertainty) is the statistical measure of the degree to which the actual outcomes may differ from (or fail to meet) the anticipated or expected outcomes.

It is very important to mention here that uncertainty is a dominating concept for this study, which is conceptualized as a world of unknown, where risk is conceptualized as known in unknown<sup>14</sup>. In practice, there is no universally accepted measurement tool of risk; however, following are some which are relevant to this study. Moreover, no mathematical formula has yet been developed to measure uncertainty because of the subjective nature of the concept<sup>15</sup>.

### 1.1.2. Measurement of risk

Literature suggests two key measurement systems of risk. First is the probabilistic measurement (Blume, 1971, Fishburn, 1984, Ruefli, 1999) and

<sup>10</sup> Diversification is the basic principle of insurance business, as it considers into two levels: within risk types and across risk types. The key of calculating diversification benefit is dependencies (or concentration) between risks. It is important for calculating required capital and risk margins on the top of the technical provisions (Bomhard, 2005)

<sup>11</sup> The subjective approach to probability provides a framework for analyzing both clearly unique and joint uncertainty situations where a decision maker can make numerical probability statements.

<sup>12</sup> The empirical approach to probability seeks to interpret the abstract concept within an empirical framework.

<sup>13</sup> The logical approach to probability considers the concept of deductive logic (in abstract term). A decision maker is able to subdivide all possible outcomes of an event into a number of equally likely [mutually exclusive] elements.

<sup>14</sup> The concept is analogous to the argument asking the question: is the earth is flat or round? It may appear flat to someone who walks on few kilometers or gives a close look. However, it is theoretically a spherical shape to somebody else, who navigates by ship or plane or takes a helicopter view.

<sup>15</sup> In fact, risk is a statistically assigned value of uncertainty. Such distinction between risk and uncertainty is important because uncertainty provides infinite value. However, commercial organizations operate in real world, where value is assigned statistically (finite value) and analysis of cost and benefit of all its operations are necessary.

second is the percentile measurement (Drzik, 2005, Kaye, 2005, Linsmeier, 2000). While the reduction of volatility is the primary objective of risk management, the variance is the principal measure of risk in the probabilistic sense<sup>16</sup>. However, variance is an appropriate measure of risk under certain conditions, which are (i) for the utility function  $f(x)$ ,  $f'(x) > 0$  and  $f''(x) < 0$ ; and (ii) return distribution is normal (Beave, 1970, Ruefli, 1999). However, financial firms in practice use percentile measurement techniques<sup>17</sup> (for example, VaR and TVaR/mean-VaR) to avoid “lower-tail outcomes” while preserving upside potential (Stulz, 1996). VAR enables the firm to put a value against a predicted specific loss with a level of confidence in a specific time horizon, thus heavily depending on parameters, data, assumptions, and methodology. However, there are many uncertainties around VaR surrounding percentile and time or risk horizon (Bate, 2006, Beder, 1995, Culp, 1998, Kaplanski, 2002, Knobloch, 2005, Power, 2004a).

## 1.2. Conclusion

In summary, the above discussion distinguishes risk from uncertainty and provides a definition of risk. Uncertainty is set as the universal concept, where risk is a subset, which can be measured in probabilistic term. Moreover, two more levels, complexity and ambiguity, were suggested to lie between risk and uncertainty. Finally, the tools of measuring risk were discussed.

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<sup>16</sup> Markowitz defined the riskiness of a portfolio of assets (stocks) in terms of the variance of the portfolio of returns (Beave, 1970)

<sup>17</sup> They are also probability-based

## **2. Interdisciplinary perspective of risk**

Risk is an issue of each and every discipline. The following paragraphs provide an interdisciplinary view and attempts to establish their relations.

### **2.1. Introduction**

It is already mentioned that risk means different things to different disciplines and within different situations. During their operation, business deals with different situations and it is important they are handled by those in the relevant discipline. Consequently, it is important to clarify how a risk is perceived and categorized. The body of knowledge that will be developed in this discussion will investigate how various disciplines exclusively handle risks. This will also contribute to identifying the similarities and differences in their risk perception and management actions.

The following paragraphs will examine how different key disciplines view risk. Considering the focus of this study on the insurance sector, more emphasis will be given to the focus of finance on risk. Finally, an attempt will be made to develop an interdisciplinary perspective of risk.

Interestingly the literature provides very confusing statements in categorizing risks. In fact, there is no universally accepted understanding on this issue. Early literature tended to talk about risks focusing on the business as a whole. The initial categorization starts with the sources; for example, static (provide the chances of loss only) and dynamic (offer the chances of gain in addition to loss) thus suggesting pure risks and speculative risks (Knight, 1921, Mehr, 1963). Losses arising from physical damage out of property and assets, fraudulent activities of managers and others, consequences of legal and unlawful proceedings, and fatal injuries were classified as pure risks. However, gain and loss arising from management activities/actions, and political embellishment/turmoil were classified as speculative risk. Moreover, the categories of speculative risks were further dismantled into sub-categories, such as risks arising from management activities/actions, which were then divided into market, financial, and production risks (Santomero, 1997). Moreover, risks arising from political reasons focused mainly on regulatory changes in the reforms of

government actions in linearization and globalization including domestic violence (Mehr, 1963).

## **2.2. Risk in different disciplines**

The objective of the investigation under the umbrella term 'interdisciplinary'<sup>18</sup> is to see how risk is viewed by different disciplines and to identify the similarities and differences. An interdisciplinary concept of risk is important because in reality organisations employ people from different disciplines and they act as a team to achieve the corporate goal, where a body of interdisciplinary knowledge is necessary. Four major disciplines, economics, finance, psychology, and sociology have been included in the discussion. It is assumed that maximisation of profit<sup>19</sup> and maximization of wealth<sup>20</sup> concern business enterprises (Grant, 1994).

### **2.2.1. Risk in Psychology**

While economics assumes individual's risk preference as a function of probabilistic beliefs, psychology explores human judgment and behaviour systematically that form such beliefs (Rabin, 1998). Psychologists look for the patterns of human reactions to the context, reference point, mental categories, and associations that influence how people make decisions (Shiller, 2003). The psychological approach to risk draws upon the notion of loss aversion (Kahneman, 1979) that manifests itself in the related notion of 'regret'. It suggests that decision makers tend to follow simple rules of thumb when evaluating risky situations. According to Willett (1921); "risk affects economic activity through the psychological influence of uncertainty". Psychological research has also acknowledged that a manager's attitude to risk taking is likely to be modified by the recent performance of his or her decisions relative to some critical reference point such as a success or survival target (March, 1987, Rippl, 2002). It suggests that managers will often see risk as a multidimensional concept which can not be reduced meaningfully to a single quantitative treatment (March, 1987) and tend to

<sup>18</sup> The words 'interdisciplinary' and 'interdisciplinary' are used interchangeably in this study. It is intentional but the objective is to examine integrated knowledge of various disciplines.

<sup>19</sup> The maximization-of-profits objective is a more popular assumption in economics than finance. To meet this objective, the financial manager takes only those actions that contribute to overall profit (Gart, 1994).

<sup>20</sup> Maximization-of-wealth objective refers to the maximization of the market value of the firm's stock. In other words, the objective of the firm is to maximize stockholder value. This approach recognizes the effect of risk, dividends, and growth on the market value of the stock (Gart, 1994).

utilize an array of risk measures to assist them in their decision-making process (Rippl, 2002). Risk perception<sup>21</sup> plays a central role in the psychological research on risk and risk management. The key concern is how people perceive risk and how it differs with the actual outcome of any risky events (Johnson, 1975c). The economical and psychological research provides some fundamental conceptual knowledge of how emotions are linked to decision making (Elster, 1998, Loewenstein, 2001, Pixley, 2002, Slovic, 2004). However, sociology suggests general assumptions of how emotions are socially framed (Zinn, 2004).

### 2.2.2. Risk in Sociology

Sociology is the study of society. In sociology risk is a socially constructed phenomenon and defined as a strategy<sup>22</sup> referring to instrumental rationality (Zinn, 2004). The sociological literature on risk is dominated by two central concepts, firstly, risk and culture proposed by (Douglas, 1982, Douglas, 1992) and secondly, risk society proposed by (Beck, 1992, Beck, 1999). In Beck's world of risk society, the politics of risk definition are extremely important. In his view, risk has become a major force of political mobilization; often replacing references to, for example, inequalities associated with class, race, and gender. Beck's major critique is that modern science is unable to discuss (or analyze) risks because it falls into the trap of its own language, institutionalization and politics. Beck finds that the new concept of risk and risk society combines society and nature, social sciences and material sciences, the discursive construction of risk and the materiality of threats, which were once mutually exclusive (Taylor-Gooby, 2006). The approach Douglas adopts entails risk as a culturally given way to respond to threats to the boundaries of a group, organization or society, and its definitions of reality and ways to maintain social order (Masuda, 2006, Rippl, 2002, Smith, 2006, Zinn, 2006). In addition, some other works for example, Bauman (1991) suggest a broader concept of uncertainty, such as modernization, beyond the narrower view of risk society. The process of reducing risks in sociology is to a level deemed tolerable by society and assures control, monitoring and public communication.

<sup>21</sup> Risk perception is the conceptualization of risk which often involves the attitude, knowledge, context, and capacity of an individual or a group of individuals (Johnson, 1975b).

<sup>22</sup> Alignment of firm with its external environment.

### 2.2.3. Risk in Economics

The economic theory of risk (in particular macroeconomics) is concerned with estimating the individual's attitude<sup>23</sup> towards risk and, in particular, the extent to which individuals are risk averse<sup>24</sup> and how that risk aversion changes with wealth. The [expected] utility theory<sup>25</sup> serves as the basis of an individual's risk preference<sup>26</sup> (Johnson, 1975b). In each and every field of economics, risk represents an important dimension of the decision-making environment. The basic conceptual foundation of economic theories entails that decisions are made, not on expected monetary outcome, but on the subjective utility of those outcomes. This states that people are generally risk averse<sup>27</sup>, and that risk aversion decreases with increasing wealth. Risk aversion is a subject of wide interest in economics due to the initial works of (Friedman, 1948) and later extended by (Markowitz, 1952). Economists use the word risk to measure a range of possible outcomes, which may occur at some future time (Pountney, 2000).

### 2.2.4. Risk in Finance

Originally within the field of economics<sup>28</sup>, finance is a study of the management of funds. In finance, the definition of risk in finance is straight forward and unproblematic. The beta<sup>29</sup> of the firm, as derived from the portfolio theory<sup>30</sup>, is the key to the conception of risk in finance literature. The financial theory of risk is defined as the variability in return. According to the original work of Williams (1938), the classical finance theory indicates that investors should invest in maximum return making securities (Pearson, 2003), which is recognized as the foundation of Markowitz's portfolio theory<sup>31</sup>. The main focus is that the risk arises from both asset and liabilities including the risk of mismatching. The overriding objective is to earn money for the shareholders (Crockford, 1976) through

<sup>23</sup> As applied to internal human mental processes and positioning, attitude refers to chosen responses to situations (Hillson, 2005)

<sup>24</sup> Who prefers less risk to more risk for a given expected return (Beave, 1970).

<sup>25</sup> The theory holds that decisions are made, not on expected monetary outcome, but on the subjective utility of those outcomes. This states that people are generally risk averse, and that risk aversion decreases with increasing wealth.

<sup>26</sup> The theory states how people ought to make decisions, not how they are made today (Aven, 2004)

<sup>27</sup> Economic theory assumes that the investors are risk averse. This implies that the higher the perceived risk associated with the security, the higher the return required by investors.

<sup>28</sup> Finance was emerged as a subject independent of economics during the 20<sup>th</sup> century (Holton, 2004).

<sup>29</sup>  $\beta$  (beta) is the systematic (or unavoidable or non-diversifiable) risk of the security and measures the securities sensitivity to the volatility of the market.  $\beta$  represent a portion of the variance of the security's return that can't be diversified away by increasing the number of securities in the portfolio. That's why  $\beta$  is called non-diversifiable risk.

<sup>30</sup> Portfolio theory is perceived as a collection of models, which describe how investors may balance risk and reward in constructing investment portfolios (Holton, 2004).

<sup>31</sup> Mean-variance theory and Markowitz's portfolio theory represents the same thing for this study.

hedging (Rawls, 1990, Smith, 1985, Stulz, 1984). The key distinction between the financial approach to risk and the economic approach is that finance literature is based on normative<sup>32</sup> (or prescriptive) theories, which seek to identify the best decision based upon objective financial criteria while assuming that perfect information is available to all parties. However, the economic approach is based on positive (or descriptive) theories<sup>33</sup>, which take into account the behavioural factors that cause a normative criterion to be modified (Iqbal, 2005, Tversky, 1975). The classical discussion of risk theory [in finance] neglects all disturbing elements while assuming that human conduct maintains a degree of regularity [against psychological principle], which does not actually prevail (Willett, 1901).

The discussion above is summarized in the following table:

**Table 2(2): Disciplinary perspective of risk**

	Economics	Finance	Psychology	Sociology
Base unit	Expected utility	Expected value	Subjective expected theory	Perceived fairness and competence Shared values
Predominant method	Risk/benefit analysis Maximization of wealth	Capital allocation and performance evaluation  Risk/return analysis Maximization of shareholder value	Psychometrics	Surveys and structured analysis
Scope of risk concept	Universal	One dimensional	Individual perceptions	Social-cultural interests

<sup>32</sup> A normative theory says how to make decisions strictly within a mathematical framework. It does not replace a management review and judgment process of results produced by a formal analysis (Aven, 2004).

<sup>33</sup> A descriptive theory suggests how people actually behave, but these theories cannot replace normative theory.



				Multidimensional
Major application	Decision making Policy making and regulation	Financial services	Policy making and regulations Conflict regulation (mediation) Risk communication	

Source: Renn (1992): Modified

In this context, it is important to examine finance theories relevant to risk management. The knowledge to be developed from this discussion will help to explore the risk management actions of organizations in later stages of this study.

#### 2.2.4.1. Finance theories relevant to risk management

It is found that the financial approaches of risk management are relevant to four interrelated theories. They are:

Portfolio Theory; Markowitz (1952)

Capital Asset Pricing Model; Sharpe (1964) and Lintner (1965)

Modigliani-Miller (1958) propositions

Option Pricing theory; Black and Scholes (1973)

The traditional approach to risk in finance literature is based on mean-variance framework (Helliar, 2001) under the principle of the normative theory of portfolio choices (Markowitz, 1952). He suggests that a rational investor<sup>34</sup> should analyze portfolios based on the mean and on the variance of their rates of return.

However, his mean-variance model is valid for well-diversified portfolios, which is not appropriate for an individual-specific security. Risk is defined as the standard deviation of rate of return, where the return presents a normal distribution. This approach was however extended to capital budgeting when Sharpe (1964) and Lintner (1965a) suggested Capital Assets Pricing Model (CAPM) They proved that under certain conditions of equilibrium the rate of return for a specific security could be expressed as a function of the risk-free rate, the market return and the beta of the security. In addition, the foundation of CAPM, and VaR are based on the calculation of mean-variance portfolio returns (Pearson, 2003). Strategic

<sup>34</sup> An investor who behaves in a way that is consistent with expected utility maximization.

management researchers, in concentrating on finance, link the performance of the enterprise in terms of stock returns (beta), financial ratios (ROE; ROA) and income stream uncertainty (Miller, 1990). Systematic risk and unsystematic risk are used as standard measures of 'total risk' for stock market returns<sup>35</sup>. The term 'beta' (which represents the sensitivity of the return on a firm's stock to general market movements) in CAPM model is considered as a measure of risk in a given portfolio of stocks (Markowitz, 1952). The financial economics researchers for example, (Bowman, 1980, Fiegenbaum, 1988) used prospect theory (Johnson, 1975c, Kahneman, 1979) to explain risk-return relationships (Miller, 1990). The performance of the firm in turn linked to firm's default risk (Party, 2002, Shapiro, 1986). CAPM is widely adopted in financial firms including insurance (Cummins, 1976). Using the framework suggested by Markowitz (1952), Sharpe and Lintner (1965), Black and Scholes (1973) suggests option<sup>36</sup> pricing theory, which promoted the massive growth of hedging<sup>37</sup> instruments. A hedged position is effectively a matched position. It is suggested that the theory of finance can and should be rigorously applied to the study of the insurance firm (Garven, 1987). The financial theories are based on the principle that says "no risk – no reward" (a good strategy for aggressive companies), but organisations, in particular, adequately solvent companies think carefully in developing their investment strategies, which can be explained by the law of diminishing marginal utility<sup>38</sup>. Since financial management decisions involve a trade-off between risk and return (Bannister, 1999), it is the ultimate objective of financial managers to obtain the best return possible at an acceptable level of risk (Gart, 1994). Despite wide-

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<sup>35</sup> Modern finance theory argues that the risk of a security relevant to investors is the non-diversifiable (or systemic) risk, not the total risk. The other portion of total risk, called diversifiable (or non-systematic) risk, can be eliminated by diversification of both the underwriting portfolio and the investment portfolio (Gart, 1994).

<sup>36</sup> An option provides the holder with the right to buy or sell a specified quantity of an underlying asset at a fixed price (called a strike price or an exercise price) at or before the expiration date of the option.

<sup>37</sup> this indicates a no lose situation.

<sup>38</sup> The law holds that in the choice between a certain return, and the same expected return on a risky investment, the rational (basis or axioms of what is said in the theory), risk-averse investor will choose the risk-free investment. However, the converse is also true suggesting that risky investments need to generate a larger expected return than risk-free investments in order to attract investors (Bonduelle, 2000).

scale reorganization of mean-variance theory, its application is limited (Michaud, 1989) because of the accurate, reliable and uniform historical data (Jobson, 1982).

The mean-variance model of Markowitz suggests that a rational risk averse investor selects securities based on the risk-return trade-off that maximizes his expected value of returns given a level of risk. In Markowitz's framework, diversification eliminates unsystematic risk leaving the systematic risk among securities untouched. Sharpe (1964), Lintner (1965) and Mossin (1966) focused on this systematic risk to extend Markowitz's (1952) portfolio theory in their development of CAPM. In the CAPM, only systematic risk (beta) is relevant in determining an individual security's return. Prima facie, high return is exclusively explained by high systematic risk.

Financial approach to risk management often concentrates on three interrelated concepts of modern financial theory (Cummins, 1999, Fatemi, 2002).

Shareholders do not care for firm's risk management initiatives (narrowly focused)

Arguments supporting the corporate risk management

Information asymmetry

The first concept relates to three interrelated theories. One is the law of diminishing marginal utility and the other is Markowitz's Portfolio theory (mean-variance framework). The utility theory suggests that a rational (risk-averse) investor <sup>39</sup> selects securities based on the risk-return trade-off that maximizes his expected value of returns given a level of risk (Williams, 1938). Alternatively, investors require higher returns for investing in more risky projects. However, this is not equally true for all risks. This brings Markowitz's portfolio theory (mean-variance framework) into the picture. It is argued that diversification eliminates unsystematic risk leaving the systematic risk among securities untouched. An investor who holds a diversified portfolio of investments will need to earn a return on each investment which compensates risks correlated with the portfolio as a whole (Bonduelle, 2000). This suggests the concept of systematic risk. Moreover,

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<sup>39</sup> An investor who behaves in a way that is consistent with expected utility maximization

investors diversify away from those risks associated only with a particular investment (unsystematic risk) by holding a portfolio. Thirdly, the Modigliani-Miller paradigm, which suggest that buying and selling options contracts (risk management) cannot alter a company's value since individual investors can always trade such contracts themselves to manage their risks (Froot, 1993, Hommel, 2005). The ultimate objective of portfolio selection is to derive an optimal allocation of wealth across a number of assets (Pástor, 2000). Consequently, investors ignore any additional return as a reward of bearing such (unsystematic) risk. The conclusion, based on portfolio theory, is that unsystematic risks (risks specific to an investment) should not affect the expected returns that an investor with a well-diversified portfolio of investments would expect. That is why investors do not value a corporation's risk management efforts. Sharpe (1965), Lintner (1965b) and Mossin (1966) focused on this systematic risk to extend (Markowitz, 1952) portfolio theory in the development of the Capital Assets Pricing Model (Black, 1972, Merton, 1973). In the CAPM, only systematic risk (beta) is relevant in determining an individual security's return. The second concept relates to how organizations manage risks based on two key reasons. Firstly, risk is costly. Risks, if not managed, could cause distress and even bankruptcy, in a worse case scenario. Secondly, adding value of the firm<sup>40</sup>. The third approach is related to the assumptions of the propositions of Modigliani-Miller (Modigliani, 1958). These imply that, based on certain assumptions, a firm's value and cost of capital are based on the expected cash flow and risks of its real net assets but independent of its financial structure (Culp, 2003, Mackenzie, 2005).

#### 2.2.4.2. Valuation/Discounted Cash Flow

One of the central concepts in finance regarding risk is 'value'. The discussion is very important for this study because from the finance perspective the ultimate objective of risk management is value creation. The value of an organization (or investment) is calculated by its discounted future cash flows and value is created when the return of investments exceeds the cost of capital (Banks, 2004, Bonduelle, 2000, Copeland, 2000b)<sup>41</sup>. This is the ultimate worth of financial

<sup>40</sup> Maximizing the value of the firm is often the overriding goal of financial organizations. This is to provide investors with the highest possible return of their investment.

<sup>41</sup> Krvavych (2006) defines organizations' value as the discounted future dividends.

actions in a risk and return framework (the greater the risk, the less the return). Mathematically speaking, the value of any project is the net present value<sup>42</sup> of a series of cash flows<sup>43</sup> of the project, adjusted for risk. Following is the basic valuation model:

$$V_0 = \frac{CF_1}{(1+k)} + \frac{CF_2}{(1+k)^2} + \dots + \frac{CF_n}{(1+k)^n}$$

where,

$V_0$  = present value of the asset

CF = cash flow expected at the end of year t,

k = discount rate, and

n = time period

From the financial perspective, the most important reason for risk management is to protect the future net cash flows (Fatemi, 2002). In fact, future cash flows are not guaranteed because of volatility (higher or lower than forecast).

Consequently, future cash flows are risky. This is the origin of [financial] risk management of financial services as they call it simply risk management.

Arithmetically, discounted cash flow (DCF) analysis involves calculating a discount rate<sup>44</sup> (which accommodates the volatility surrounding the cash flow) and using this to generate a series of discount factors to be applied to expected future cash flows (Bonduelle, 2000) as seen in the above formula. The CAPM is the generally accepted approach to calculating the discount rate, which considers beta as a measure of the degree of correlation between movements in an individual company or stock return, and the returns on the market as a whole. However, CAPM is irrelevant in terms of the contribution to the riskiness of the portfolio as a whole as the calculation does not involve measuring the total variability of returns of an individual company or stock (Bonduelle, 2000).

Consequently, specific risk is not reflected in calculating the required rate of return. This suggests that standard deterministic discounted cash flow analysis is

<sup>42</sup> The net present value of each cash flow is found using an appropriate discount (writing down) rate. The result indicates the money worth today on a risk-adjusted basis. Calculation of present value is problematic because of uncertain forecasted cash flow stream (Miller, 1998)

<sup>43</sup> returns that a project is expected to produce.

<sup>44</sup> Discount rate accommodates two components; (i) time value of money, and (ii) systematic risk associated with the investment.

not strictly appropriate where future cash flows are contingent on future market conditions and decisions. Instead, real options<sup>45</sup> technique is applied.

The above discussions establish that the modern financial perspective of risk is not a stand-alone approach; rather it is clearly a combination of three disciplines (finance, economics, and sociology). Moreover, financial organizations are closely associated with the society, where the social treatment of risk plays a vital role, in particular, in the agenda of corporate social responsibility.

**Figure 5(2): A interdisciplinary perspective of risk in business**

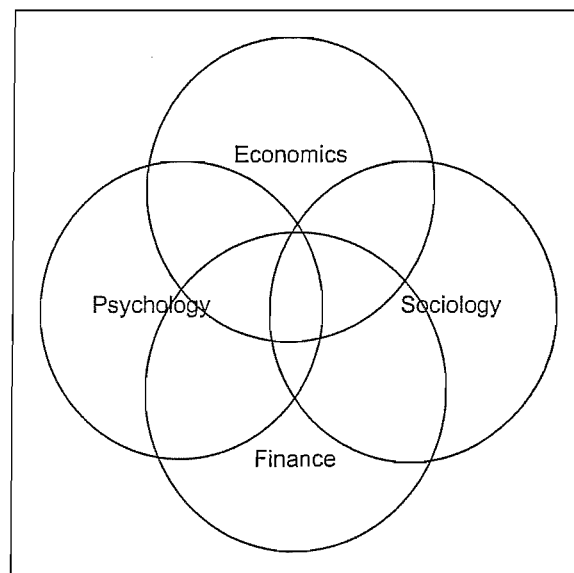


Figure 5(1) conceptualises the interdisciplinary perspectives of risk, where the influence of one discipline to another is illustrated. While one discipline focuses on people, another focuses on a system (or model). One important issue as Hillson (2005) argues is the human factor (for example, judgment, insights, intuition, experience, and so on)<sup>46</sup>, and an element of CRS (Critical Success Factor)<sup>47</sup>. They are necessary but not sufficient. Valuation of investment (or firm or project) is an example. The calculation of valuation as used by finance and economists as seen above is subject to many assumptions. They know that and

<sup>45</sup> Real option valuation (broadly defined) provides a basis for explicit valuation of the opportunities (options) derived from the ability to make or revise decisions in response to changing circumstances. The term 'real options' reflects the analogy between financial options and management flexibility to respond to events in an uncertain world.

<sup>46</sup> It comes in different forms. Hillson (2005) suggests three levels. First, *individual factors*, such as competence, capability, skill, knowledge, stress levels, motivation, emotion, and cultural background. Second, *group factors*, including interpersonal issues, leadership style, hierarchical power, communication approach, coordination, supervision, empowerment, task focus. Third, *organizational factors*, like corporate ethos, politics, standards, previous experience, market positioning, senior management style, systems and procedures.

<sup>47</sup> They are essential but not the key and direct contributors to success. In their presence, the opportunity (chance of success) increases, but risk (chance of failure) increases in their absence.

try to overcome them but a great deal of subjectivity exists. The explanation of the other two fields (sociology and psychology) helps to provide clue to others (economics, finance) to deal with the subjective element, based on the fact that people are the most important contributor to the effectiveness of risk management. However, the key concern of the sociological and psychological researcher on the finance and economic perspective of risk is that the commercialization of risk distorts the natural characteristic of uncertainty built in peoples' beliefs in terms of organically defined values and concerns (Beck, 1992, Beck, 1998, Beck, 1999, Boholm, 1998, Campbell, 2006, Douglas, 1986, Douglas, 1992, Stirling, 1998). Moreover, the building blocks of quantitative models assume that risks in a static setting trigger severe problems in conceptualizing risk in a real and dynamic environment, which in fact links to the context where it develops (Wilkinson, 2003a). However, the traditional finance perspectives started to recognize the influence of human element, which led to the development of behavioural finance during 1990s integrating the application of psychology and insights from sociology (Shiller, 2003). This multidisciplinary perspective of risk will be utilized in Chapter 6 while discussing the theory of ERM.

### **2.3. Conclusion**

The section discussed four disciplinary approaches to risk and found that their views/perceptions are different from each other. However, economics and finance provide closer opinion but their perception about risk often varies with the view of other two disciplines. The key distinction is in perceiving risk and valuing risk. Risk to sociological and psychological researchers are imaginary phenomena (subjective) which is closer to uncertainty. However, the economists and financiers view took a deterministic (objective) perspective and concentrated on formulating a measure to draw a conclusion to achieve their specified objectives. Alternatively, sociologist and psychologist focus a great deal on the exploration of various elements of risk to achieve an invisible objective, but economists and financiers do not go so much for exploration; rather they intend to grab the reality of risk in terms of numbers, because this helps them to clarify the problems surrounding risks. They progress along a very specific path, whatever essential element fits into the path they accept. In summary, a suitable

combination of an interdisciplinary view of risk can help the financial firms to achieve their corporate objectives.



## SECTION 2

### THE CONCEPT OF RISK MANAGEMENT

#### 1. Introduction

The above discussion summarizes that risk and subsequently risk management<sup>48</sup> means different things to different people depending on their disciplines (Zech, 2001). Traditionally, the key objective of risk management is controlling of risk and minimizing the losses arising from risks (Mehr, 1963, Olson, 1982). The literature suggests that the development of risk management originally grew out of insurance during the 1950-60s (Bannister, 1999, Dickinson, 1997a, Pountney, 2000, Young, 2000) to manage pure risks<sup>49</sup> (for example, fires, floods and natural catastrophes). However, the management of so called financial risks (that is, speculative risks) was limited within the function of general management<sup>50</sup> under the heading of business risk (Mehr, 1963). During the 1970s the financial view of risk management received greater attention giving birth to the concept of financial engineering (Aven, 2004, Bannister, 1999, Cool, 2000, Dickinson, 2005a, Henderson, 1978), which basically introduced a huge momentum in the practice of risk management as a unique discipline (D'Arcy, 2001, Liebenberg, 2003, Nielson, 2005). However, the study finds that both approaches were fragmented (or silo or one dimensional) and do not consider the multidimensional perspective of risk. This section firstly compares and contrasts the traditional and modern approaches to risk management. It then conceptualizes the Enterprise Risk Management from these discussions. It then discusses the recent research efforts of various agencies and organizations on ERM.

The following paragraphs will look into the traditional and modern approaches to risk management. The discussion will then be extended to define enterprise risk management.

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<sup>48</sup> The objective of risk management is two fold. One is purely to minimize the loss (or remain at breakeven), and the other is to obtain the gain while protecting losses. However, in the former the classical example is insurance where the ultimate situation is 'no gain – no loss' and this is guaranteed (except the case of insurers' default). However, the later case is complex, and two situations may arise. Firstly, the intention to obtain the gain without protecting the loss (e.g., investing the stock market for a portfolio of shares). Secondly, the intention to obtain the gain with protecting the loss (e.g., derivative market: hedging), which uses both investment and insurance mechanism simultaneously.

<sup>49</sup> <sup>49</sup> See Kloman (2003a) and Dickinson (1997a), Shimpi, (2005), D'Arcy (2001), Valsamakis (2002); Crockford (1982); Deloach (2004); (McNeil, 2005)

<sup>50</sup> The general management perspective towards risk management requires integrating risk [exposures] considered in the strategy field (for example, competitive, input supply, market demand, and technological risks) with asset-liability (or financial) risks (Miller, 1998).

## 2. Various approaches to manage risks

The following paragraphs describe various approaches in managing risks as seen in the literature.

### 2.1. Traditional approach to manage risk

Traditionally, organisations practice risk management fragmentally either at the level of each business line or segment (Martiniere, 2003). They have different objectives. The objective of H&S (Health and Safety) risk management is to prevent harm and injury to employees and others. Similarly, the objective of crisis management is to minimize damage and interruption to the business when losses do occur (Pountney, 2000). The strategy was defensive and aligned to protect the organisation from harm which may be caused by hazardous events. Purchasing insurance was the key protection of risk for corporations (Haller, 1978). Nevertheless, the key focus is to protect or control the downside (negative) affect (Mehr, 1963) under the broader concept of insurance and risk management.

### 2.2. Modern approach to manage risks

Indeed risk management is a dynamic process because it depends directly on the changes of both the internal<sup>51</sup> and external<sup>52</sup> environment of the organization (Frame, 2003, Tchankova, 2002). Due to the innovation of financial market during 1970s, the concept of risk management was commercialized from purely loss to both loss and gain. Most of the work under the banner of modern risk management is done within finance as a part of corporate decision making<sup>53</sup>. In this context, risk management was regarded as an identifiable subset of the theory of finance (Bernstein, 1998, Pountney, 2000). The focus was on safeguarding the firm's assets and earning capacity from sudden losses. Works focusing on this approach came under various areas of financial risk management (Cummins, 1999); corporate risk management (Bartram, 2000, Culp, 2002, Cummins, 2001, Doherty, 1985, Fatemi, 2002, Froot, 1993, Laux, 2005, Smith, 1993, Tufano, 1996), integrated risk management (AIRMIC, 1999, Doherty, 2000, Lisa, 2002, Miller, 1992, Miller, 1998b, Miller, 2003, Raully, 2000, Shapiro, 1986, Shimpi, 2001, Ward, 2001); modern risk management (Field, 2003) and Enterprise [wide/capital] Risk Management (Aabo, 2005, D'Arcy, 2001,

<sup>51</sup> Government regulations, actions of competitors, demographic trends, act of nature, economic environment.

<sup>52</sup> Irrelevant objectives and inaccurate strategy, people, process, politic.

<sup>53</sup> The AIRMIC survey showed that in 1998 some 48.1% (1981: 13.2%) of respondents (risk managers) had a reporting line to the financial function of their organization (Carter, 2000)

Davenport, 2000, Deloach, 2000, Galloway, 2000, Harrington, 2003, KPMG, 2001, Lam, 2003, Mark S. Beasley, 2005, Miccolis, 2001b, Michael R. Williams, 2001, Stanley, 2005, Walker, 2002, Wang, 2002). Recently, (Mikes, 2005) attempted to differentiate between some of them.

It is important to note that the definition and objective of risk management in the above two approaches are uneven mainly due to 'moral hazard'<sup>54</sup> (Bernstein, 1998, Giarini, 1999) in the economic benefits of risk-related pricing of policyholders (Diacon, 2005). However, they have a common focus on the risk type. Moreover, they vary in terms of operation as the traditional approach follows the function management in having routine steps which are planning, organization, co-coordinating, controlling and monitoring (Easterby-Smith, 2002). However, the modern approach is more about corporate financial decision making in addition to routine functions (D'Arcy, 2001). Furthermore, the trend in traditional risk management was limited to problem solving rather than innovation. In fact, it was considered as a source of cost but not a profit (or knowledge) generating function. In addition to these two generation of risk management, Nielson (2005) argues for a third generation of risk management.

The above discussion summarises that the traditional approach to risk management is more insurance (pure risk) focused and the modern approach is more finance focused (speculative risk). However, neither considers all the risks that a financial organisation faces in aggregation. The following discussions will focus on the emerging concept of holistic risk management.

### **2.3. Enterprise approach to manage risk**

Risk management is not, and should not be, limited to the assessment of exposure to losses and the application of appropriate financial risk management practices such as insurance and hedging instruments (Beasley, 2005, Miller, 1992, Walker, 2002). The need for risk management can no longer be exclusive to finance or insurance department, it must be organization-wide (Beasley, 2005, Young, 2000). Risk management is an integral part in the process of strategic decision making of corporations (Dickinson, 1997b, Horlick-Jones, 2002).

However, risk management is an integral part of setting the corporate objectives,

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<sup>54</sup> Moral hazard refers to unobservable changes in the insured's behaviour (intentionally cause, exaggerate, or be indifferent about a loss) after the purchase of insurance.

and formulating and executing corporate strategy (Deloach, 2000, Hopkin, 2002). Furthermore, it is a means of protecting the organization from bankruptcy due to sudden and unexpected events (Pountney, 2000). Following the above two perspectives of risk management, a new dimension emerged in the 1990s (Dickinson, 2001b, Drzik, 2005) focusing on the enterprise itself rather than risk type/categories (Kloman, 2003b). This concept is quite old (Grose, 1987, Mehr, 1963, Mehr, 1974, Rennie, 1961) but the application is new. Risk management is not seen as a separate or distinct function, but a natural part of all business and operational activities. The overall aim of the enterprise approach to risk management is to attain an optimal balance between risks and returns rather than elimination or reduction risks (Aabo, 2005).

### **2.3.1. The meaning of Enterprise Risk**

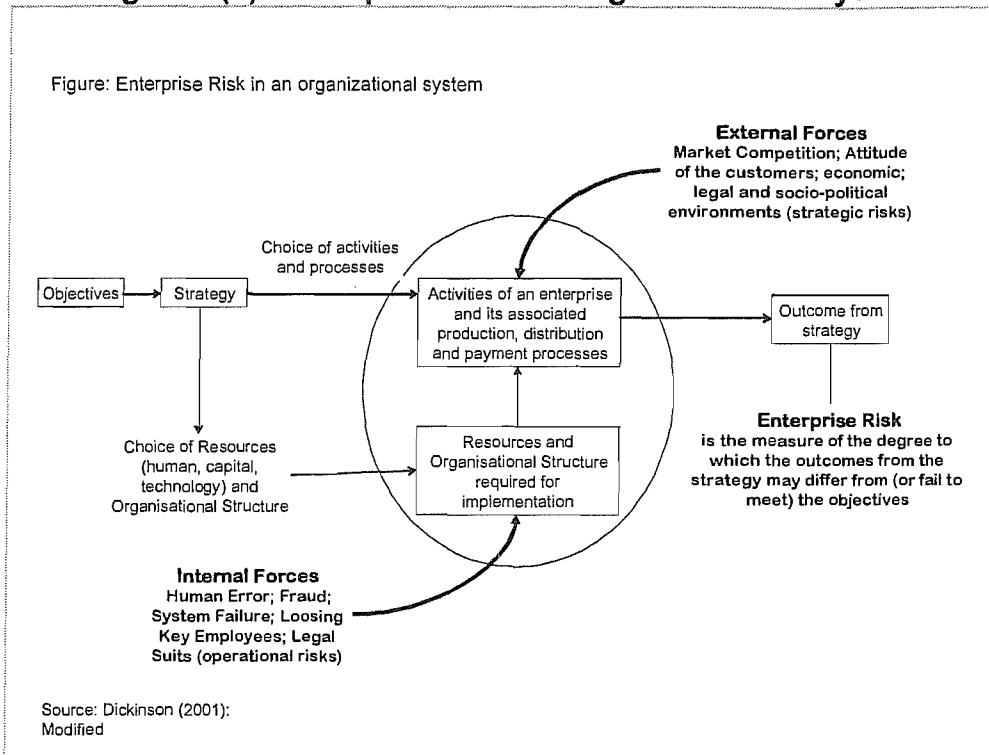
The understanding of enterprise risk as seen in the literature is inconsistent. At the very technical level enterprise risk is the integration of key risks (insurance, financial, operational and hazard). Another perception of enterprise risk focuses on extreme risks<sup>55</sup> (natural and man-made disasters having massive accumulated potential) that hit the bottom-line issues (existence) of the organisation. These two perceptions put much emphasis on the risks surrounding the organisation. However, the third perception pays greatest attention to the enterprise, that is, its self-knowledge. According to (Haller, 1978), “[an enterprise] decides the nature and extent of what it [the enterprise] offers in the market in compete autonomy but must also bear the consequences, especially the failure of its decisions, itself”. However, political and socioeconomic changes constantly influence the enterprises to act with full potential and freedom, however, there remains “an area which lies between enterprise success and enterprise failure; in brief: enterprise risk (Haller, 1978)”. This perception is rightly echoed by (Dickinson, 2001b), who argues: “From the time of commencing business an organisation assumes risks either willingly or unwillingly while operating, both in its internal (for example; human error, fraud, system failure, production breakdown, diversification, culture, process, and people) and external environments (for example; competitive forces, consumer tests, economic, legal and socio-political, technological advances, reputation)”. This statement suggests that, risk to an enterprise originates from all of its activities, both financial and

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<sup>55</sup> Characterized by the highest degree of uncertainty and the lowest degree of repeatability.

operational via a set of internal and external factors. Figure 6(2) illustrates the argument. It grounds the arguments from a system thinking approach, where there is an input and an output causing both success and failure (Checkland, 1981, O'Donnell, 2005).

**Figure 6(2): Enterprise Risk in Organizational System**



Such arguments emphasise the fact that the organisational success and failure at the holistic level is much more important than individual risk; for example, insurance, financial, operational and so on. Consequently, such fragmentation of risks creates artificial (and also dangerous) barriers to the concepts of enterprise risks. In fact, all types of risk are interrelated (or have a great influence on each other) and they affect the organisation holistically. The concept of enterprise risk takes a holistic view above the artificial fragmentation of risk. As such, the study accepts the following strategic definition of enterprise risk as suggested by (Dickinson, 2001b):

“Enterprise risk is the measure of the degree to which the outcomes from the corporate strategy may differ from (or fail to meet) the corporate objectives<sup>56</sup>.”

<sup>56</sup> Mehr (1974) suggests four levels of objectives of a corporation, these being overall (or general) objectives, specific objectives, operable (operational) objectives; and standard objectives.

The most significant characteristic of this definition is that it clearly focuses on the organization itself (Close, 1974, Essert, 2002) rather than risk. Nevertheless, the transformation of this theoretical understanding operationally suggests the following definition:

“Enterprise risk is the resultant sum of all risks of a business enterprise irrespective of type, nature<sup>57</sup> and source”.

In this organizational definition the term ‘resultant’ is added to mean that the interactions (or dependencies) among risks need to be considered to define enterprise risk.

Another characteristic is fitted in the alignment of enterprise risk management strategy and its organization with corporate strategy and organizational objective (Pountney, 2000). Consequently, settling the corporate objectives and choosing the strategy in line with these objectives gets the top priority of ERM. This is the crucial issue and Mehr (1974) suggests that the specific objectives of risk management include: (i) providing assurance in the face of uncertainty (pre loss situation); (ii) survival (post loss situation), (iii) supporting the efficiency and growth (where profitability is the immediate measure of achievement), and (iv) corporate social responsibility.

However, the corporate objectives of an enterprise are usually set in line with the preference of its shareholders (Dickinson, 1997b)<sup>58</sup>.

### **2.3.2. Defining Enterprise Risk Management**

Many definitions of ERM exist in the literature. After careful consideration, the study concludes that the definitions are context driven and within the specific context neither is actually wrong. However, the band of the context is broad and it ranges from functional to strategic. Clearly, the perspective of the above definition of enterprise risk is strategic, which focuses on the organization itself, giving rise to a strategic definition of ERM<sup>59</sup>. In this sense, ERM is an integral part

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<sup>57</sup> risk is a multidimensional concept and most decisions involve several forms of risk

<sup>58</sup> Such a statement contradicts with others who believe that ignoring the expectation of stakeholders may bring a loss of reputation (Davies, 2002).

<sup>59</sup> The problem of defining ERM is two fold. First, the definition covers everything, which is easy to conceptualize but difficult to implement. Second, it misses something important, which proves the definition incomplete.

of managing all the corporate objectives of the corporation (Dickinson, 1997b). As such, the study defines ERM as:

“ERM is the management of enterprise risk”

Clearly, the definition is universal as it is essentially a holistic idea above traditional disciplinary boundaries (Power, 2004a) . The word ‘dynamically’ is added to ensure the adoption of the changes in the business environment in the ERM model continually (O'Donnell, 2005). Figure 7(2) illustrates the distinction between different views of ERM as described above.

Figure 7(2): Level of understanding of ERM

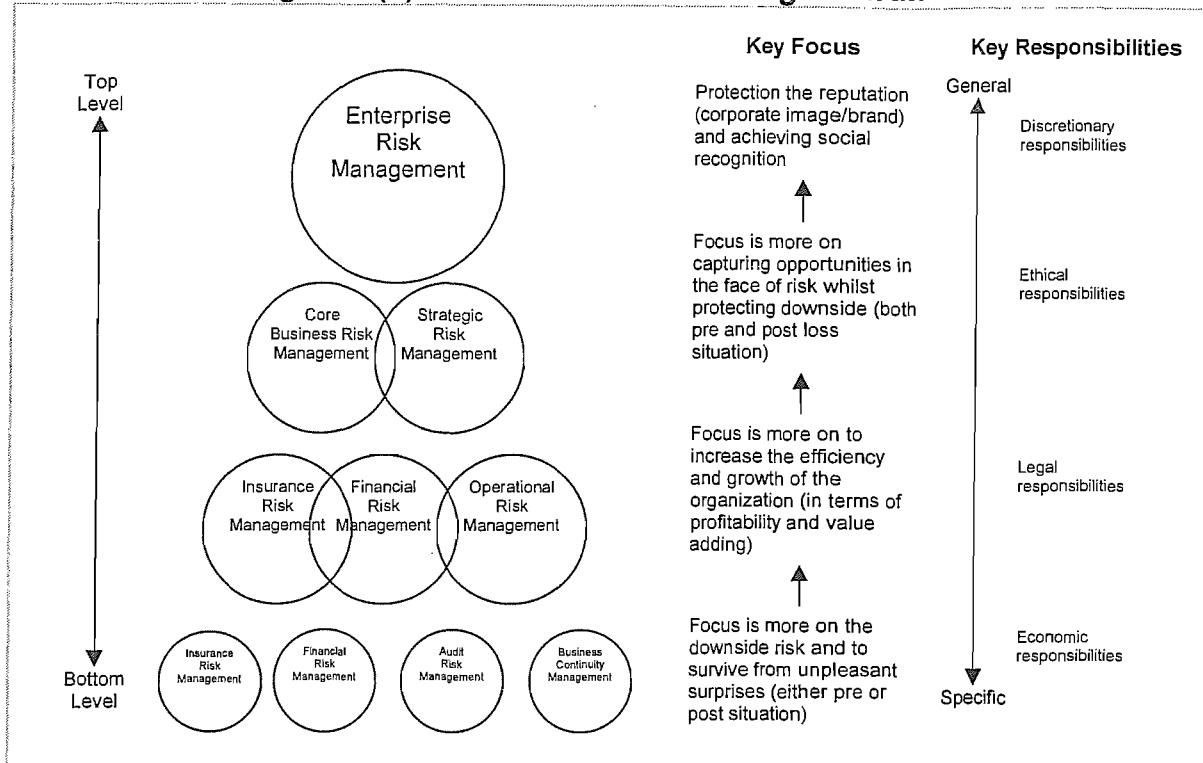


Figure 7(2) illustrates various understandings of enterprise risk. At the bottom (first) layer all risks are managed in isolation. They are more functional (or operational). Going upwards, there exists some overlap among the risks management functions, and also consolidation of audit risk management and business continuity management forming operational risk<sup>60</sup> management. The third layer continues further consolidation and exhibits the overlapping of core business risk management and strategic risk<sup>61</sup> management. And finally the top layer exhibits enterprise risk management what the study focuses on. The diagram also shows the perception of ERM as held by different professionals, which categorizes the definitions from operational (bottom) to strategic (top). The diagram suggests two approaches in measuring enterprise risk. The first (bottom) uses the measurement in terms of the probability of loss, whereas the top adopts the approach of the variation of outcome from the corporate objectives. The figure 7(2) also illustrates the different levels of corporate objectives (see the right side). It assumes that ERM should embrace all four levels of objectives in

<sup>60</sup> Result of ignorance (but not uncertainty)

<sup>61</sup> The source of strategic risk is broader and includes the inability to implement appropriate business plans and strategies, make decisions, allocate resources or adapt to changes in the business environment (Tripp, 2004). It is assumed that the components of strategic risk are those macro factors often economic/political and domestic/international that affect the value of the firm (Fatemi, 2005).



combination (where social recognition<sup>62</sup> goes at the top (Wade, 2003)), although they often overlap and only then will it be assumed that a full implementation of ERM has happened<sup>63</sup>. The evolution of ERM needs to be conceptualized from the bottom up, where it moves from specific to general objectives<sup>64</sup>. This is also in line with four specific social responsiveness e.g., economic, legal, ethical, and discretionary (Carroll, 1979). Works on this concept (or similar concepts) have been published under various terms; system risk management (Grose, 1987), integrated risk management (Christopher Clarke, 1999, Miller, 1998a, Ward, 2003a), strategic risk management (Christopher Clarke, 1999, Dickinson, 1997b, Drew, 2006, Huovinen, 1999), holistic risk management (Hopkin, 2002), enterprise risk management (Aabo, 2005, Dickinson, 2001b, Kleffner, 2003, Kloman, 2003b, Miccolis, 2001c, O'Donnell, 2005). The application of ERM is evident from integrating insurance risks and commercial risks during the 1990s by major organizations (Bannister, 1999, Dickinson, 2001b) through forming captive insurance companies. In the non-financial sector, concepts similar to ERM are also evident, for example, Hazard Totem Pole<sup>65</sup>. The application is seen in space missions, and in the design of subway system in capital cities (Grose, 1987).

It is clear that enterprises face risks from both internal and external sources (Dickinson, 1975) and their combination presents a holistic and complex situation in terms of technical, economic and socio-cultural/political issues (Chicken, 1998). Therefore, enterprise's actions towards managing risks must consider issues from all three sources. The design of an ERM system ignoring any of the factors is clearly incomplete.

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<sup>62</sup> Social recognition can be achieved through corporate social responsibility (CSR), which means the explicit commitment of the organization to systematic consideration of the social and cultural issues (for example, human rights, labour and community relations, and supplier and customers relations). The objective is to create long-term business values (Wade, 2003). CSR is an emerging topic of corporate governance.

<sup>63</sup> This criteria (or scale) will be used to determine the level of sophistication (or achievement) in ERM of any particular organization throughout the study.

<sup>64</sup> "Answering quickly and easily may be dangerously incomplete" – Mehr (1974).

<sup>65</sup> The concept of Hazard Totem Pole is designed to identify, evaluate, and control the space mission in putting astronauts into orbit around the earth.

### 3. An overview in past researches on ERM

The following discussions will look into published works of various organizations focusing on the related concepts of ERM. The findings will provide important guidelines to design the empirical study and also in analyzing the empirical findings.

It is learnt that the concept of ERM gained momentum during the 1990s mainly due to the initiative of big consulting firms. Over time, academic researchers have liaised with those industries interested in working on ERM. The following discussions intend to acknowledge their work and contributions in progressing ERM as a subject.

#### 3.1. Tillingshast-Towers Perrin

Tillinghast-Towers Perrin, a major consulting firm conducted an in-depth study on insurers ERM. They define ERM as “optimization of the dynamic relationship between risk and value throughout the insurance enterprise”. They published a monograph in 2001 entitled “Creating Value Through Enterprise Risk Management – A Practical Approach for the Insurance Industry” following a focused benchmark survey in 2000 among 66 insurance executives (chief financial officers, chief actuaries, and chief risk officers) around the world (Miccolis, 2000)<sup>66</sup>. It addresses the key questions for insurers to develop and implement an ERM strategy. It is a five-stage strategy development process. The risk assessment process establishes the complete risk environment by considering both financial and operations risks. Manageable risks are assigned to appropriate managerial levels. Strategic risks are quantified and included in the financial analysis. Alternative financial and operational strategies are overlaid on the risk environment and modelled using an extension of existing financial models. Strategies are evaluated in consideration of both policyholders’ and owners’ interests. Policyholders’ interests are reflected by establishing capital based on economic capital (to be discussed in depth later) considerations (for

<sup>66</sup> The survey revealed that the survey respondents share a common understanding of ERM. A number of financial variables viz. earning growth, revenue growth, and return on capital was identified the most dominant business issues facing insurers, where the role of ERM is necessary. Furthermore, a comprehensive ERM framework facilitates improved communication of information within and outside (e.g., reinsurers, rating agencies, capital markets, industry analysts) of the organization. The study identified the operational risk (technology, distribution channel, reputation) as the most important risk. Most of the respondents were found dissatisfied about the progress of ERM in terms of tools and processes (Miccolis, 2000)

example, using Economic Cost of Ruin – ECOR) (Davenport, 2000, Wang, 2002). Attribution methods consistent with the method used to establish overall capital (using ECOR ratio) are used to attribute capital to business segments as a charge for protection against insolvency. Owners' interests are reflected by evaluating each combination of strategies in terms of its impact on growth, return on capital and consistency of results (Perrin, 2000). Although, the evaluation process is quantitative but it often relies on the expert judgement of decision-makers (Shimpi, 2005).

The framework provides a logical framework for the strategy development process under ERM. This is indeed a major contribution to the literature. The following section analyses some alternative approaches of ERM techniques, for example coherent risk measurement, risk appetite, and capital allocation as suggested by other authors. In addition to this framework, they published some surveys on the topic examining adding value through risk and capital management (ThillingastTowersPerrin, 2004).

### **3.2. PricewaterhouseCoopers (PwC)**

PwC seems active in ERM issues. In 2004, they published a report titled "enterprise-wide risk management for the insurance industry: Global Study<sup>67</sup>" based on a global survey. The survey identifies ERM as a process of managing uncertainty to protect shareholder value<sup>68</sup> (Copeland, 2000a). It however indicates that an effective ERM framework offers a set of organizational issues, namely, alignment of the key fundamentals of governance and organization, standards and policies, risk measurement methodologies, systems and tools. The survey also identifies the key major challenges (calculating risk appetite, economic capital, culture, communication<sup>69</sup>, and so on) in implementing ERM. In addition to this survey, PwC conducted some other surveys (including the Global CEO Survey 2004,) relating to this topic.

<sup>67</sup> Available on [www.pwc.com/financialservices](http://www.pwc.com/financialservices)

<sup>68</sup> The shareholder value (SV) is represented by the present value of the economic profits from future business. Mathematically, shareholder value = [Market Value of Assets – Economic Value of Liabilities] + Franchise Value (Pablo, 2001). Alternatively, SV is the present value of all future cash flow, less the value of debt (Gleibner, 2005).

<sup>69</sup> Risk communication deals with articulating the results of 'risk assessment' and 'risk management' to the interested stakeholders both internally and externally (Selim, 1999)

### 3.3. Ernst and Young

Ernst and Young conducted a survey in 2003 among 100 insurance companies mostly in US base to investigate how life, property & casualty, health and multi-line insurance companies use risk measurement for capital management decision making. The survey found various ERM related issues, which are mostly limited to the holistic risk and capital management framework. Automation/streamlining, resources, data limitation, and cultural acceptance were found to be key challenges. The survey also showed that CROs, being top-level executives, are increasingly becoming responsible for evaluating and consolidating accountability for risk measurement and management functions (Ernst&Young, 2004).

In addition to the above three firms, others such as Deloitte, published “2004 Global Risk Management survey<sup>70</sup>” to investigate the progress of ERM and the role of CRO.

### 3.4. The institute of Internal Auditors

In late 2000, The Institute of Internal Auditors Research Foundation<sup>71</sup> and Tillinghast-Towers Perrin<sup>72</sup>, in co-operation with the Conference Board of Canada<sup>73</sup> initiated a study to investigate the meaning, current state, action, available tools, techniques and future of ERM. The study conducted a multi-industry global survey among the chief financial officers, chief audit executives, chief corporate counsels, and chief risk officers (Miccolis, 2001c). The study defines ERM as a “rigorous and coordinated approach to assessing and responding to all risks that affect the achievement of an organisation’s strategic and financial objectives. This includes both upside and downside risks”.

### 3.5. COSO

The Committee of Sponsoring Organizations of the Treadway Commission<sup>74</sup> (COSO) issued its framework under the title “*Enterprise Risk Management—Integrated Framework*”, in September 2004. COSO defined ERM as: “...a process, affected by an entity’s board of directors, management and other personnel, applied in strategy setting and across the enterprise, designed to

<sup>70</sup> Available on [www.deloitte.com/dtt/research](http://www.deloitte.com/dtt/research)

<sup>71</sup> The mission is to be a recognized worldwide leader in sponsoring and disseminating research on risk management, control, and governance process.

<sup>72</sup> A part of Tillinghast-Towers Perrin, one of the world’s largest independent consulting firms.

<sup>73</sup> An independent, not-for-profit applied research institute

<sup>74</sup> COSO describes itself as “a voluntary private sector organization dedicated to improving the quality of financial reporting, through business ethics, effective internal controls and corporate governance.”

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." The framework focusing on the process-driven approach towards risk and risk interrelations (O'Donnell, 2005), aimed to enable organizations to develop an standardized ERM in order to establish best practices and benchmark the critically important issues of risk management through dialogue with a broader category of stakeholders (Ballou, 2005). The criticism of COSO ERM framework is that it focuses heavily on the downside risk and puts much effort in developing mitigation actions (Kloman, 2005).

### **3.6. Causality Actuarial Society (CAS)**

The Casualty Actuarial Society (CAS) is presently promoting research in enterprise risk management and capital management. The focus of their measurement and modelling driven approach focuses on analyzing, integrating, and optimizing the financial and insurance risks held by a financial institution or insurance company, so that capital may be efficiently deployed and consistently allocated, across the enterprise (Wang, 2002).

The CAS Advisory Committee on Enterprise Risk Management (ERM) recommended a conceptual "ERM framework," emphasizing that ERM should not solely be employed for defensive purposes, that is, to protect the firm's capital base against the "downside" of unexpected losses. ERM should also be employed for proactive purposes, that is, to help manage the entire risk portfolio (including both assets and liabilities), and, ultimately, to enhance shareholder value (Babbel, 2005, KPMG, 2001, Strongin, 1999). It is believed that the pivotal role of ERM in "value creation" will become more evident in the near future (Copeland, 2000a). The CAS conceptual "ERM framework" outlines a risk-management process as analysing and quantifying risks, by obtaining and calibrating a probability distribution of outcomes for each major identified risk; then integrates these major risks, by combining their outcome distributions and fully reflecting their correlations and portfolio effects; then assesses and prioritizes these risks by determining the contribution of each major identified risk to the firm's aggregate risk profile, and, in terms of their potential positive or negative impact to the firm's capital base; and then optimizes the firm's aggregate risk profile, so that capital may be efficiently deployed and consistently allocated,

across the global enterprise (CAS, 2003, Grundl, 2002, Myers, 2001, Tsanakas, 2003).

CAS views ERM as more of a discipline than a strict methodology. The challenge of their focus towards ERM is to develop integrated actuarial and financial models while understanding and modelling the interaction between risk components (CAS, 2001, Wang, 2002).

### **3.7. Rating Agencies**

Achieving and maintaining a high rating is a priority of re/insurance companies (Punter, 2002). Major rating agencies, in particular, Standard&Poors (S&P) are working to adopt ERM in their rating criteria. S&P recently announced that five areas, on the basis of the performance of insurers, will be evaluated (Ingram, 2005, Ingram, 2006, Standard&Poors, 2006). They include (i) risk management culture; (ii) risk controls; (iii) extreme risk management; (iv) risk and economic capital models; and (v) strategic risk management. However, maintaining a high capital level is not a substitute for ERM and insurers with high capital must show its risk management capability to safeguard such capital. Other rating agencies such as A. M. Best, Fitch Ratings etc. are strongly considering ERM as a element of their rating criteria. The current approach of S&P involves an extensive dialogue with insurance companies and drawing conclusions for rating purposes without using any of their own static model (Ingram, 2006a, 2006b). However, Fitch has developed their own model titled 'prism' to test the strength of insurers' financial capability (Mohrenweiser, 2006a, 2006b). A. M. Best also progressing to develop its internal capital model titled 'Best's Capital Adequacy Ratio' (Mosh, 2006). Although, their perception to ERM varies considerably, their focus commonly concentrates on three rating areas (e.g., capital strength, operational performance, and business profile) of insurance companies (Towers Perrin, 2006).

### **3.8. Australia/New Zealand Risk Framework**

A interdisciplinary taskforce of Standards Australia and Standards New Zealand publishes the first risk management standard AS/NZS 4360: 1995 (revised in 1999 and 2004). This provides a generic outline of the risk management process (Wilmot, 1999) bringing together various sub-disciplines (Kloman, 2005). It

defines risk management as "the culture, processes and structures, which are directed towards the effective management of potential opportunities and adverse effects." Further, the standard provides the first practical prescription for implementation of ERM using generic examples (Aabo, 2005).

### **3.9. The Geneva Association**

The Geneva Association<sup>75</sup> jointly with its members commissioned a research program in 2003 to promote the understanding of ERM and the role of the CRO (Stahel, 2005b). An action-focused network entitled "The CRO Forum" had been formed, comprising an action-focused network of thirteen major European insurance companies and financial conglomerates with the objective to identify concrete issues of urgency and to finance research studies to clarify the issues related to the research topic. The results of these studies are made available to wider audiences through the ART (Annual Round Table) of Cross meetings and the CRO Assemblies (Stahel, 2005c). A benchmark study was initiated in late 2004. The study provides a qualitative benchmark towards Solvency II for the insurance regulators to assess internal models (Filipovic, 2005). Investigating the risk and capital management practices of thirteen insurance companies coupled with the responses of some European regulatory bodies, the study noted a number of obstacles in the development and use of internal models. The study also concluded some important recommendations on the current debate of ERM (Hele, 2006).

### **3.10. AIRMIC**

Being a professional organization of risk managers of various industries in the United Kingdom, the view of AIRMIC (the Association of Insurance and Risk Managers in Commerce) towards risk management is holistic. Under the title of integrated risk management, AIRMIC focuses risk management activities under the practice of general management. A publication titled 'Integrated Risk Management' provides the guidelines for risk managers in their day-to-day functioning (AIRMIC, 1999). According to them "risk management should be a

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<sup>75</sup> A unique non-profit world-wide organization formed by some 80 Chief Executive Officers of the most important insurance companies in Europe, North America, South America, Asia, Africa and Australia. Its main goal is to research the growing economic importance of insurance activities in the major sectors of the economy. Homepage: [www.genevaassociation.org](http://www.genevaassociation.org)

central part of any organisation's strategic management" (Gamble, 2002), which can only be done by taking an interdisciplinary perspective.

### 3.11. Regulatory Agencies

In addition, the initiative of some regulatory agencies such as the Financial Services Authority (FSA) in the United Kingdom<sup>76</sup> and Australian Prudential Regulatory Authority<sup>77</sup> must be mentioned. The recent risk-based regulations (McCarthy, 2006) help the organisations to develop their ERM. A FSA publication (FSA, 2003) surveyed the risk management practices of the UK insurers<sup>78</sup>. Another paper (Simon, 2003) identified that inefficient management is the key sources of risks. KPMG also conducted a survey (KPMG, 2004) under the title 'Risk and Capital Management for Insurers'.

## 4. Conclusion

The key aspect of all works done by different organizations and institutes as described above is that they concentrated on ERM either from the view of one profession (for example, finance, actuarial, accounting/internal auditing, and so on ) or a mixed profession without making any distinction among them. Consequently, the studies either demonstrated the view on ERM from a single profession ignoring the concern of others, or make no distinction between the professions accepting that the various disciplinary people hold the same view. However, such constraints are not realistic as views on ERM differ from one profession to another but interestingly professionals working within an enterprise contribute to ERM, and there needs an in-depth analysis on how to optimize the ERM system by the participation of the interdisciplinary professionals. This is because risk affects the enterprise holistically, which can only be managed efficiently and effectively with a holistic framework in the participation of interdisciplinary professionals.

<sup>76</sup> Available on [www.fsa.gov.uk](http://www.fsa.gov.uk)

<sup>77</sup> Available on <http://www.apra.gov.au/>

<sup>78</sup> The survey was conducted in 2002 in 39 firms. It was aimed to understand the approaches adopted and recent development in risk management practices and structures in UK insurance firms. The survey concluded a number of interesting findings. Appetite for risk (and risk tolerance) in terms of available resources was found as a central issue in organizations' risk management initiatives. The survey also identified that the use of models for underwriting, reserving and capital requirements are increasing. However, FSA intends to utilize this effort in the assessment of firms' individual capital requirements (FSA, 2003).



## SECTION 3

### INSURANCE ECONOMICS

#### 1. Introduction

This section introduces the concept of risk and risk management in the insurance sector. The objective is to note the economics of insurance to progress the empirical study and analyse results. It firstly describes the structure of insurance and how it operates and the related issue of its operation in the economic system. How an underwriting cycle works and its implication for insurers' operations, in particular investment and pricing policy, are discussed. It secondly investigates the sources of risk of a typical insurer how they are being managed in practice.

#### 2. Insurance basics

Risk management is the core function of insurance companies. The insurance industry<sup>79</sup> plays a vital role in keeping the economy viable (Peirce, 1961). Insurers reduce risk following the principle of expected utility theory and Markowitz's portfolio theory. Insurers also gain by investing premium (Krvavych, 2006) they receive from the policyholders (Connor, 1996, Kunreuther, 1985).

##### 2.1. Expected Utility Theory and Prospect Theory

Two theories: Expected Utility Theory<sup>80</sup> (EUT) and Prospect Theory<sup>81</sup> (PT) explore insurers' risk management activities (both in a downside and upside sense). Interestingly, PT presents a critique of EUT. EUT states that a firm with performance above the average for its industry should be risk averse (Hershey, 1980, Schoemaker, 1979) and should be only willing to accept an increase in income stream risk if an investment opportunity offers high expected return (Kahneman, 1979, Miller, 1990, Neumann, 1994). However, insurance companies invest simultaneously mitigate risks (in downside sense) through sharing, pooling, reinsurance etc. and also try to take the opportunity (upside sense) while investing in the capital market. The weakness of EUT is that it can not explain such behaviour of insurers (i.e., 'why insurance companies are often

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<sup>79</sup> The term 'insurance industry' refers to both insurance and reinsurance companies.

<sup>80</sup> An economic theory

<sup>81</sup> A psychological theory

simultaneously attracted to both mitigation and exploit opportunities of risk?'). In solving such a complex problem the Prospect Theory (PT) assumes that utility comes from the returns in terms of the fluctuation of value (gains and losses) but not from the net value of assets (Barberis, 2001). The theory states that individuals (and so the organisations) are less willing to gamble with profits (thus take decisions quickly) than with losses (Kahneman, 1979, 1992). In other words, EUT deals with the value of the wealth (assets) but PT deals with the volatility (i.e., profit and loss) attached with the value of the wealth<sup>82</sup>. One argument of insurers' simultaneous involvement with capturing upside of risk while managing downside (in particular for non-mutual insurance companies) is to satisfy both its owners and policyholders simultaneously. In fact, the owners of the capital (investors) want the organisation to run with zero capital whereas policyholders like to see more and more capital in the balance sheet. The real challenge for insurance companies is to make a balance in the face of their (shareholders and policyholders) demands (expectation).

The principal functions of an insurer in order to remain a viable agent in the market are two fold: organizing the pooling and sharing process (Arrow, 1991, Valsamakis, 2002, Willett, 1901). This involves the estimation, collection and investment of premiums, and the investigation and payment of claims. In addition, this involves ensuring the additional capital is available to meet an unexpected situation, should it arise, when the collective outgoings from the pool (in terms of claims and expenses) exceed its total income from premiums and investment earnings (Bernstein, 2000, Diacon, 2005). Recently, reinsurers started to transfer risks in the capital market through securitization (Banks, 2005, Cowley, 2005) by catastrophe bonds (Coomber, 2006). In addition to its own security, insurance provides security to its clients' businesses by supplying off-balance-sheet capital (MacMinn, 1987, Mayers, 1982).

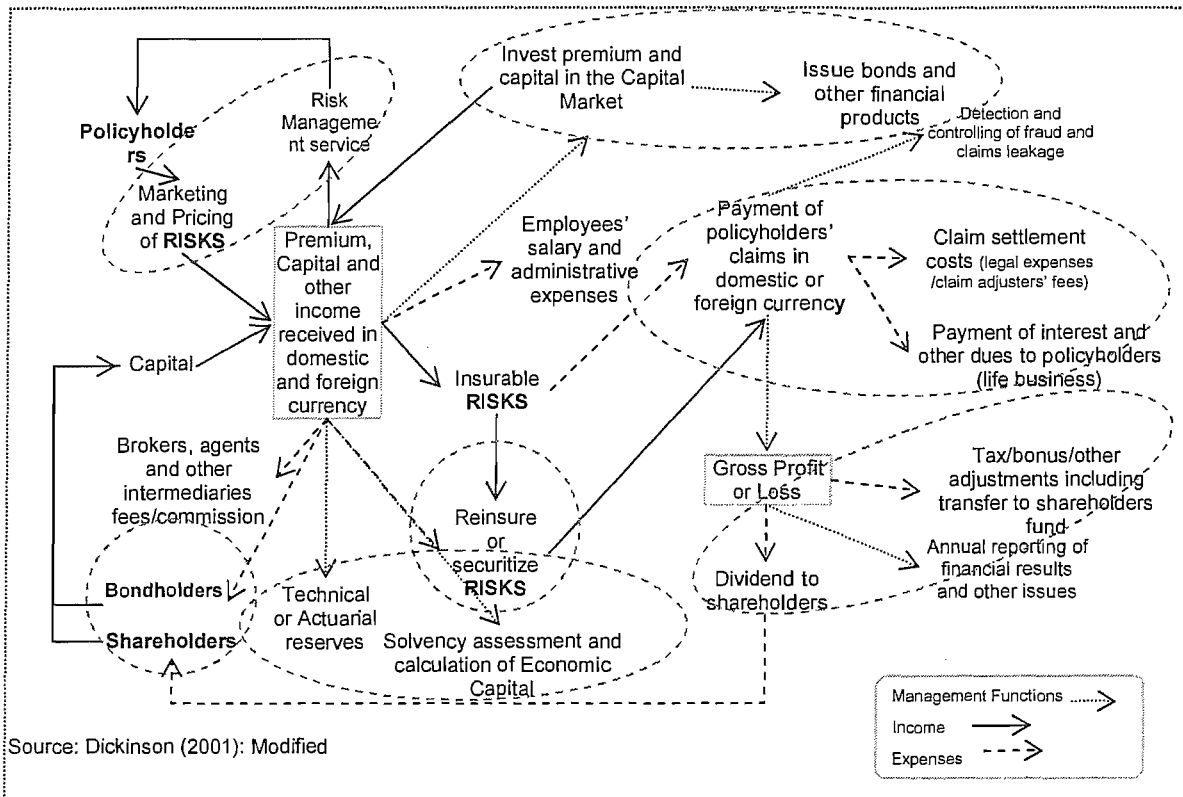
Figure 8(2) illustrates the key stages in the operation of an insurance company. The objective of this figure is to demonstrate the complex but interdependent activities of a typical insurance company. The conceptual understanding of various operations will help the study to understand how risks affect the

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<sup>82</sup> This concept is important and also provides a foundation of the 'economic value' principle. Moreover, this is probably the basis of ERM.

insurance activities and where opportunities exist. How the various parts of this diagram interrelate is explained below.

**Figure 8(2): Operational structure of an insurance company**



As a core business process, insurance companies collect premiums from policyholders (individuals and organizations) upfront and invest them in the capital market at the highest possible return and at appropriate levels of risk under strict regulatory control (Gart, 1994). The figure also illustrates the key functions of various departments of a typical insurance company. The key objective of reinsurance is to achieve an optimum retention of risk after removing the picks of exposure per risk and catastrophes. This is to protect the capital from being drained out in case of catastrophic events. Underwriting is the process of accepting risk. In essence, it creates a fund out of which some people's losses are paid and the process of underwriting is to create a balanced portfolio by accepting enough risks that can pay the losses, pay the expenses and have a more profitable balance left. The claims department does the administrative work of handling losses including detection and prevention of fraud. In fact, the claims department works very closely with the underwriting department. The accounting department handles premiums and claims. The finance department looks after

the company's investment, capital and reserves. The actuarial department does all sort of things like providing projections and statistics to everyone – underwriters, reinsurers and management – in order that the financial planning and underwriting rates, reinsurance rates can be decided. Actuaries are specialized in taking past and existing data and extrapolating the required information and extending that forward. The legal department look at the legal issues of policy forms and dealing with regulators. The information technology and business continuity department work closely to make disaster recovery plans. The risk management department is a new concept, which is involved in the coordinating functions of a wide range of risk related issues. The boundaries show the practice of risk management in segmentation.

### **3. Types of insurance companies**

There are two main types of insurance company, stock insurers and mutual insurers. Stock insurers are owned by stockholders and mutual insurers are corporations owned by their copyholders. Moreover, they are further categorized as life insurers and non-life (property and liability) insurers. In addition, there are reinsurers who operate as insurers of insurers. Although, risk management functions vary among life and non-life insurers, particularly in the technical functions, the study will not differentiate much between them.

Insurance activities are broadly divided into life and non-life insurance, and firms specializing in either category face different risks. Specifically, these two types of activities require firms to hold different technical provisions, by virtue of both prudent business practices and regulatory mandates. For life insurance companies, technical provisions typically are the greater part of their liabilities. Thus, the dominant risk arising from life insurance activities is whether their technical provisions are adequate, as measured using actuarial techniques (Long, 1956). For a non-life insurance company, technical provisions are less observed than for life insurance companies. The different balance between technical provisions and capital for non-life insurance companies reflects the greater uncertainty of non-life claims. The need for an additional buffer for risk over and above provisions accounts for the larger relative share of capital in non-life insurance companies' balance sheets. Regarding funding risk, insurance activities are different from other financial activities because they are pre funded by premiums; for this reason, insurance companies do not rely heavily on short-

term market funding. Life insurance companies have a big portion of their assets in the investment portfolio held to support their liabilities (Stephen, 2001). Hence, whether or not the investment portfolio generates sufficient returns to support the necessary provisions is a major financial risk. Investment risks include the potential loss in the value of investments made and therefore include both market and credit risk. These investment risks traditionally have been managed using standard asset-liability management techniques, such as imposing constraints on the type and size of investments and balancing maturity mismatches between investments and liabilities. The basics of the insurance business consists of establishing risk portfolios that are sufficiently diversified to benefit from the effects of the law of large numbers<sup>83</sup> and thus limit the probability of suffering a loss on the cost of claims they agreed to cover (Martiniere, 2003).

#### **4. Underwriting cycle**

Insurance business is cyclical, which is described by the underwriting cycle. There is no generally accepted view of what causes the cycle but researchers identified at least three reasons; these are the. disequilibrium between supply and demand (capital market context) (Berger, 1988), external shocks (Interest rates, regulatory and accounting lags, catastrophic losses), and general business influences (general business cycle, risk management practices) (Berger, 1988, Lamm-Tennant, 1997). A second interpretation of insurance underwriting cycles relies on the “mass psychology” of underwriters. During profitable years, insurers grow optimistic and compete strenuously for new business (Fung, 1998). Since capacity is limited only by financial and psychological constraints, not by physical plant and equipment, supply expands (Gron, 1994). Demand is inelastic, so premium growth means attracting business from other insurers. Severe competition in a mature market requires insurers to lower prices to gain market share (Berger, 1988) (Bloom, 1987, Butsic, 1989). Profits soon decline, due to low rates and the poor quality of some risks. Underwriters become pessimistic, curtail their acceptance of marginal applicants, and file for rate increases. Profits remain low until insurers re-underwrite their business and the new rates take effect (Gron, 1994). Eventually, the rate increases, more careful underwriting leads to increased profits, and the cycle starts anew (Cummins, 1987, Tennyson,

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<sup>83</sup> From the perspective of the law of large numbers (which is regarded as the principle of diversification) is that what an insurance company carries is far less than the sum of individual risk of the insurers and the disproportionate becomes greater with the increases of the underwriting portfolio (Willett, 1901; Dickinson, 1975).

1991). The underwriting cycle offers particular challenges in the property-casualty insurance business (Grace, 1995). Reinsurance provides partial solution to managing capital adequacy across the underwriting cycles. However, the capital base cannot be totally protected from the cyclical risk and insurers must ultimately ensure that they maintain sufficient capital to meet the downturns when they arise (Wilson, 1981). Certainly, one of the key challenges in developing RBC methodologies is to provide a realistic assessment of the potential impact of various cyclical effects on the capital needs of the business (Allwood, 2003). Underwriting cycle causes insolvency (Butsic, 1989). The declining and volatile stock market along with low interest rates forced re/insurers<sup>84</sup> to concentrate on underwriting (the core function). Consequently, the techniques of underwriting risks becomes sophisticated with a fall in price (Schanz., 2004) as a result of the underwriting cycle (Cummins, 1991, Doherty, 1992).

### **5. The relation between insurance market and capital market**

All these discussions suggest a growing relationship between the insurance market and the capital market. Despite some underlying similarities, there are considerable differences between them. The key difference is the adequacy of information available to the investors/intermediaries. Traditionally, a capital market is more transparent than an insurance market. Lack of efficiency is also an issue. However, the relationship between these two markets is explained/reflected by the underwriting cycle (Freeman, 2000). Moreover, insurers themselves find difficulties in capturing the notion of the cycle. Combined ratio<sup>85</sup> is a key indicator of insurers' (non-life) profitability. Furthermore, the amount and cost of capital needed to underwrite businesses also provide significant information with which to judge the ultimate profitability. However, these two variables depend on the amount of risk the company holds to run the business, including its capacity to manage such risk and the regulatory framework as well (SwissRe, 2006a). The innovation of Alternative Risk Transfer (ART) products brings insurance market and capital market closer (Banks, 2004, Cowley, 2005, Hausler, 2005, Punter, 2000, Shimpi, 2002, Shimpi, 2001).

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<sup>84</sup> The term "re/insurer" means both insurers and reinsurers

<sup>85</sup> Performance measure based on undiscounted business-year view, which mathematically calculated in adding three dependent variables viz. claims ratio (claims incurred as a percentage of premiums earned); expense ratio (underwriting expenses as a percentage of premiums written) and policyholder dividend ratio (dividend to policyholders as a percentage of premiums earned)

## 6. Current state of risk management in the insurance industry

This chapter deals in particular with the risk of the insurance companies. The key sources of risk of a typical insurance company are discussed. Moreover, the current practice of risk management in the insurance industry is explored.

As risk carriers insurers intermediate risks directly. They undertake risk management as a part of their day to day business process mainly through diversification and the law of large numbers enhanced by a range of other techniques for example, risk pooling, reinsurance and so on (IAIS, 2003). These techniques are applied for the risks they underwrite as their core business activities. This is particularly so for the insurance enterprises. However, like other financial institutions<sup>86</sup>, insurers are exposed to financial risks (Santomero, 1997) and operational risks (Darlap, 2006). The traditional industry approaches to manage financial risks (credit, interest rate, currency, underwriting, investment and reinvestment risks) are dynamic financial analysis, asset/liability management (ALM), risk and capital management (RCM), dynamic capital adequacy testing (DCAT) and dynamic solvency testing (DST) (Miccolis, 2001b). However, no formal approach has yet been developed to measure operational risks (people, technology, and distribution, political and regulatory risks) (FSA, 2005) although some are working with Fuzzy Logic (Shah, 2003) and the Bayesian network (Neil, 2005).

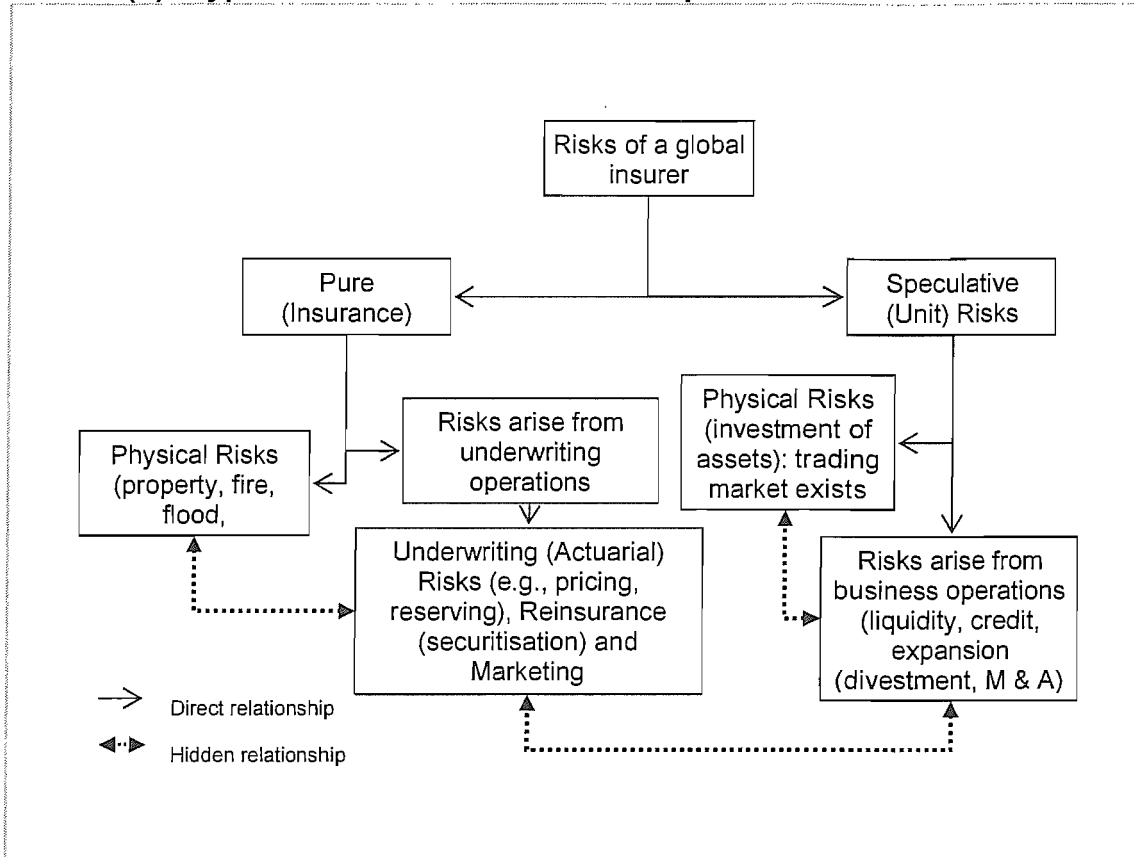
## 7. Risks for Insurance companies

Figure 9(2) illustrates the sources of risk to a global insurer. This summarises the categorisation of risks as found in sources of literature. As seen in the diagram, risks are initially divided into two parts, pure risks and speculative risks. The sources are both physical and operational. As mentioned earlier, they are treated very fragmentally having a little or no relation to each other, and the thesis puts them under the headings of

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<sup>86</sup> Financial institutions are corporations or organizations that interface between suppliers of funds (saving) and users of funds (investment or compensation).

Table 9(2): Types of risk for insurance companies



traditional and modern risk management. They however arise from two main functions of a typical insurer, underwriting and investment.

Underwriting gives rise to pure risk and the investment gives rise to speculative risk. Because these two functions are not distinct anyway, these two sources of risk are very closely interrelated (a case can be seen in the underwriting cycle as described earlier) and often overlap. Misunderstanding of this critical point could cause much confusion in classifying risks and managing the risks thereof. In fact, finding their interrelations is easier, rather than distinguishing between them. However, it is argued that physical risks are clearly separable (for instance, a typhoon in Florida would not affect the stock market, at least in the short term) (Santomero, 1997). However, the counter argument is that a man-made catastrophe (like September 11 incident) affects the capital and money market as evident during 2002 and afterwards. In fact, it is the operational parts of the risks that are interrelated but not necessarily the physical parts as seen in the diagram. The interesting point is that practice of risk management in the physical part is quite a strong and matured area. However, the sophistication of managing risk on the operational side, in particular, when they come under a joint framework, it really needs in-depth consideration and investigation. One of the approaches is



asset-liability management, which considers only the quantitative aspects of such interrelations. In addition, the behavioural aspect, which is an important part of risk management, is yet to be as sophisticated.

### 7.1. Sources of risk from insurers' operations

Clearly the key sources of insurers' risk are their business activities. Business risk is the threat that an event or action will adversely affect the ability of insurers to achieve their business objectives and execute their strategies successfully (Andersen, 1995, Young, 2000). There are different approaches to categorising insurers' risks; however the key ones are the financial view and the operational view. However, there are two important sources - internal and external. From the financial perspective, asset-liability risks have a dominant role. The following paragraphs describe them.

### 7.2. Asset-Liability (A-L) risks

As a part (sub-set) of enterprise risk, asset-liability risks arise from the core activities (underwriting and investment) of insurance companies. These risks arise not just from asset management (investment and credit risks) and from liability management (unexpected incident/perils such as hurricanes, earthquakes, asbestos, and so on initiating large claims), but also from the interaction between financial assets and financial liabilities (maturity/duration mismatching between assets and liabilities for various reasons, such as the adverse movement of the foreign exchange rate, interest rate fluctuations, inflation and so on) (Briys, 2001). A-L risks also vary between life insurers and non-life insurers and also their mitigation actions as shown in the following table 3(2).

The A-L risks also give rise to the risk of credit and liquidity risks. Credit risk is the risk that a change in the credit quality of a counterparty (for example, reinsurer) is unwilling or unable to fulfil its contractual obligations (Jorion, 2000). Unlike reinsurers, the policyholders are not a key source of credit risk because insurers receive the premium upfront. Liquidity risk refers to the risk

**Table 3(2): Asset Liability Risks for Insurers**

Type of A-L risks	Non-life	Life
Liability risks	Large claims payment due to adverse development of loss potential.	Long-term promises to pay in the event of premature death (life insurance) or longevity (life annuities and pensions)
Asset	Volatility of investment	Not much concerned with volatility of investment

risks	prices and lack of marketability of investments  Potential default of investment holdings	values because most of the investment are bonds.  Potential defaults on investment holdings  A concern with inflation risks for long term saving contracts, including pensions
Maturity risks	No major problem as insurance companies can choose assets to meet the time profile of their liabilities	
Currency (FX) risks	A potential problem for insurers having global business (much insurance involves international transactions)	Little currency risks because most international life insurance is carried out through overseas branches and subsidiaries which currency match their local assets and liabilities. However, some currency risks are voluntarily taken by investing domestic liabilities in overseas assets.
Interest rate risks	Little problem since non-life insurance contracts do not pay interests	A major problem because life insurance and annuity contracts contain implicit guaranteed rates of interest

Source: (Dickinson, 1997b): Modified

that an insurer will be required to sell assets at an amount less than their market value in order to meet immediate liquidity needs (Lam, 2003).

### 7.3. Operational risk

Originally the source of operational risk is fraudulent activities and errors in infrastructures and controlling mechanisms. However, the Basel II definition, which binds the banking sector, takes a different view on operational risk (Brink, 2001, Hoffman, 2002) with a narrow and bounded focus (Power, 2004b). The insurance industry, in practice, uses the following definition of operation being used by the banking industry: that operational risk is “the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events (Basel, 2005)” is widely accepted in the insurance industry (FSA, 2005, Shaw, 2002). This definition includes legal risk (but is not limited to exposure to fines, penalties, or punitive damages resulting from supervisory actions, as well as private settlements) and excludes strategic and risk reputation. However, the concept of operational risk within a broader scope is new (Foot, 2002, Laker, 2005, Scandizzo, 2005) (Power, 2005b) and its implication in the area of strategic management is yet to evolve in the insurance industry (Chorafas, 2004) including quantification of operational risk (Tripp, 2004).

#### 7.4. Risk to reputation

Reputation is an intangible asset of organisations and is an absolutely illusionary concept (Davies, 2002). It is a collection of many things, where perception, expectation and belief of the stakeholder<sup>87</sup> concerning the present and past activities of the organisation are the key. Risk to reputation means the chance of losing the stakeholders confidence and trust on the organisation (Schwamm, 2005). A survey<sup>88</sup> ranked the loss of reputation as the highest threat to the business of 1000 top UK organisations. It takes a long time to build reputation but it can erode quickly (Power, 2004b). The role of the mass media is considered significant in an organisation gaining or losing reputation (Rayner, 2003). From this perspective, management of the risk to reputation is in fact the management of media (Davies, 2002). A positive communication<sup>89</sup> strategy is a key defence in managing risk to reputation (Argent, 2005).

In addition, there is underwriting risk (pricing and reserving) which arises due to the insurance cycle, which in turn happens due to the external causes beyond the control of management. However, there is a set of reasons that drives external causes and key to these are changes in political (for example, bargaining power of suppliers of resources and distribution channel), economic (such as regulations) and socio-cultural environment (for example, preference of customers), changes in technological environment and geo-physical environment (such as natural catastrophes), and demographic environment (for example, mortality and ageing population). Finally, all of these give rise to market competition (Gray, 1998), which poses threats to insurers' business (Pressman, 2006, Schwamm, 2005).

#### 7.5. Why manage risk?

There are a number of reasons why an insurance company should manage risks. Most of them are not directly evidence-based. Ultimately, risk is costly, and this can be demonstrated specifically when risks are valued. The corporate environment is uncertain and that is why the organisations need to manage risks to achieve their objectives (Valsamakis, 2002). In a certain world risk

<sup>87</sup> An organization's stakeholder is a group of people who are affected by the organization and its ability.

<sup>88</sup> The AON Biennial Risk Management and Risk Financing Survey (2005) available on [www.aon.com](http://www.aon.com)

<sup>89</sup> Zimmerman (1987) suggests three goals of risk communication. They are: (i) to educate [people] for the purpose of changing perceptions, attitudes, and beliefs about risk and consequently achieving behaviour modifications toward risk; (ii) to build consensus; and (iii) to educate (or disclose) information without expectation about quality of learning or ability to influence.

management is meaningless (Bernstein, 1998). However, uncertainty, in the real field, concerns organisations and risk management is ranked as the most important objective of financial executives (Rawls, 1990). The arguments supporting this are dominated by single-disciplinary research (Beck, 2004), which is clearly finance-based, suggesting economic reasons, i.e., maximization of shareholder value (Rappaport, 1997)<sup>90</sup>. Key to this is to reduce the expected cost of financial distress or bankruptcy and expected tax liability (Smith, 1985), and to create greater competitive advantage in improved investment decision making (Doherty, 2000, Fatemi, 2002, Meulbroek, 2002a, Rawls, 1990, Stulz, 1996). Above all, the managerial risk aversion is a big issue (Kaen, 2005, Santomero, 1997). Nevertheless, risks are costly because they are uncertain and are incurred regardless of whether or not the losses materialized (Mehr, 1963) thus providing a trade-off of between ex-ante and ex-post (win-win) situations .

In fact, the motivation of shareholder value model of ERM is built on the conception that [corporate] risk management adds value to the organisation through the above four five which are reducing transactional cost; reducing corporate tax; co-ordinating financial investment policies; raising efficiency of financial controlling; and selecting optimal risk portfolio (Tufano, 1996).

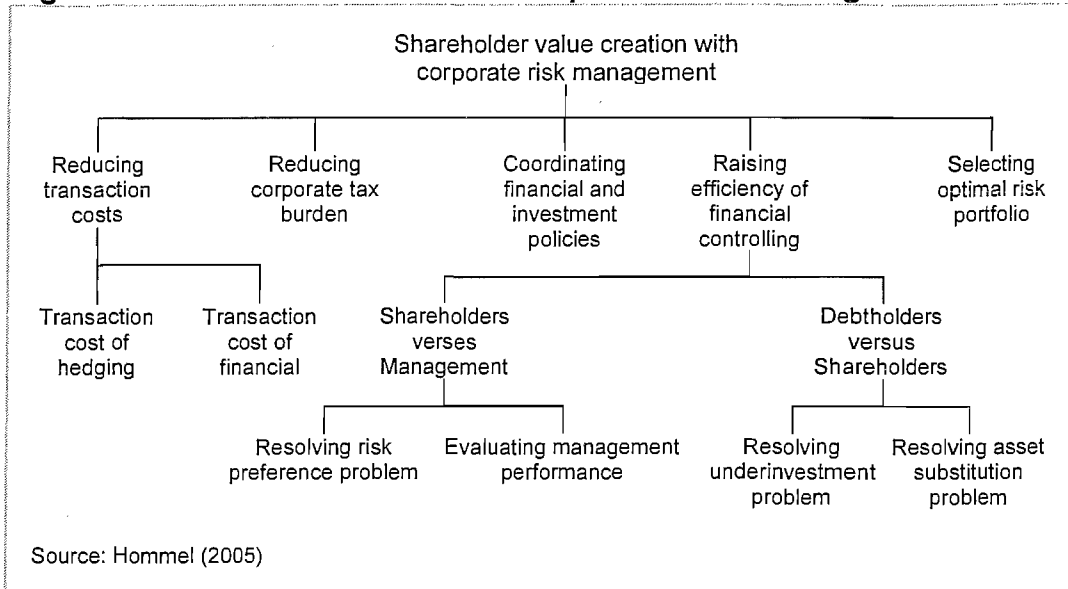
### **7.6. How are the risks managed?**

Traditionally the risks are managed in silos. A-L risks are managed by the finance department, investment risks by the treasury department, underwriting risks jointly by the underwriting and actuarial department, and regulatory risks by the compliance department. Because of the lack of transparency,

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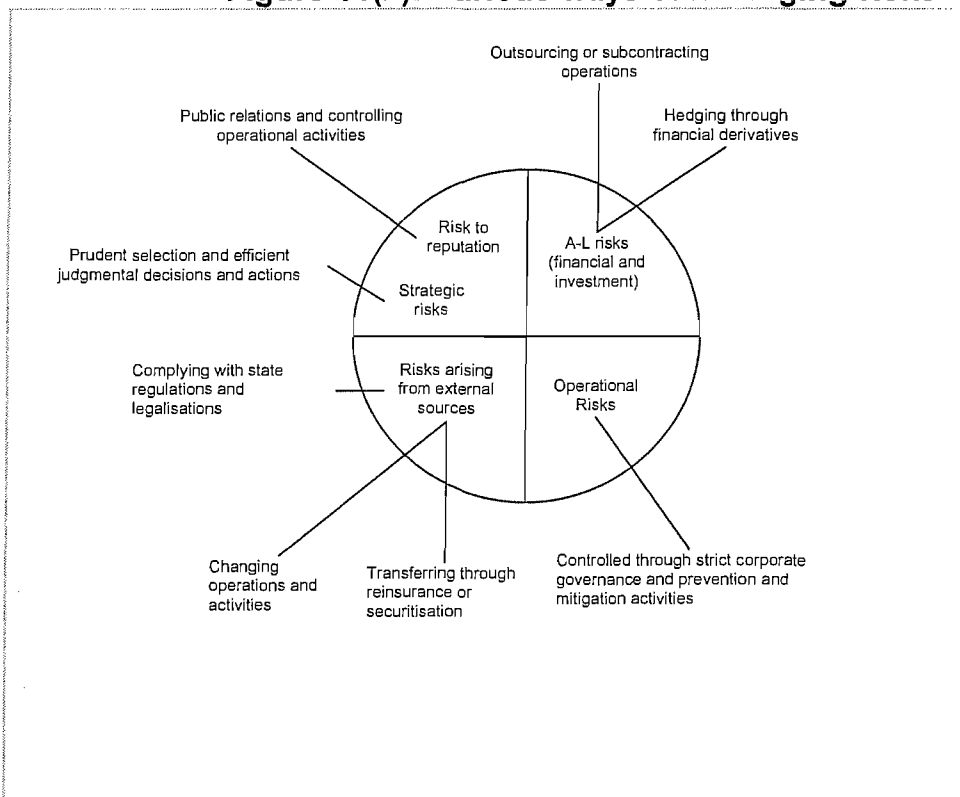
<sup>90</sup>From the financial perspective the maximization of firm (shareholder) value is the ultimate objective of all risk management objectives (Fatemi, 2002).

**Figure 1: Economic reasons for Corporate Risk Management**



management of risk to reputation and strategic risks are the responsibility of senior managers irrespective of departments. Figure 11(2) illustrates it concisely.

**Figure 11(2): Various ways of managing risks**



Source: Dickinson (2000): Modified

It is clear from the diagram that different risks global insurers are managed in isolation. It is likely that such fragmental ways of managing risks loses the

benefits of capturing interactions of both risks and duplication of actions. One example is outsourcing of asset risk management, this is based on the principle of managing the risks internally where the organisations have a comparative advantage and transfer all others to a third party, who are in a better position to bear them (Verbrugge, 2003).

Table 4(2) suggests how asset liability risks are managed traditionally.

**Table 4(2): Management of Asset Liability Risks for Insurance Companies**

Type of A-L risks	Non-life	Life
Liability risks	Reduced through careful underwriting and through reinsurance. Also managed through hedging using derivative products especially liability swaps.	
Asset risks	Volatility of investment prices are managed by changing investment policy and using interest rate derivatives  Potential default of investment holdings are managed through portfolio diversification.	The inflation risk is reduced by investing in index-linked bonds and company shares whose returns are correlated with inflation in the long term.
Maturity risks	Choosing assets to meet the time profile of other liabilities.	Reduced by having asset maturity structure less than liability maturity structure.
Currency (FX) risks	Reduced by currency matching of investing in same currency as claims are payable	Not a big issue.
Interest rate risks	Not a big issue.	Reduced by holding fixed rate bonds which are duration matched.

Source: (Dickinson, 1997b): Modified

### 7.7. Why manage total risk?

There is no strong argument (supported by evidence) in managing total risks. However, finance literature provides some evidence to manage financial risks<sup>91</sup> in totality (systematic risks and unsystematic risks). This includes a range of benefits such as exploiting full advantage of all internal diversification opportunities, value maximisation, investment decisions, decreasing tax, minimising costs of minimising financial distress, encountering financial distress and monitoring conflicts between agents<sup>92</sup> (Doherty, 2000, Lamm-Tennat, 1999, Stulz, 1996). Moreover, risk management reduces the cost of risk by means of

<sup>91</sup> The term 'financial risks' is used interchangeably with asset-liability risks in this study

<sup>92</sup> Shareholders, rating agencies, security analysts, policyholders, security analysts, policyholders, and employees.

natural hedging (RiskValueInsights, 2001). The ultimate objective is to add shareholder value<sup>93</sup>. All these arguments suggest that risk management adds firms' value (Meulbroek, 2002a, Meulbroek, 2002b).

### **7.8. Practice of risk management in insurance companies**

In the non-financial enterprises, risk relates to security, which is defined as the protection of property and persons. It [security] comes alongside the core management functions including production, sales, finance, planning, and accounting (Fayol, 1916). As mentioned earlier, risk, in insurance terminology, traditionally refers to the thing which is insured, for example, a defect attached to a property or danger in the life of a human being (Pountney, 2000). Nevertheless, insurance companies deal with risk in all of their internal management functions, which comprise production, planning and marketing. In other words, they are typically a warehouse of risk (property, liability and life). Moreover, all insurance products are essentially seen as the bundle of risk, which produces further risk (and also opportunities) for insurance companies in their business operations. Consequently, there is a growing realization among insurers of the positive side, which establishes risk management as the core function of all insurance companies. Moreover, such realization of insurers converts risk from an unwanted to a wanted event, although gaining more and more confidence in the world of uncertainty remains a continuous effort.

## **8. The risk management process**

The following paragraphs deal with the logical sequence of handling risks, which includes various steps of risk management. It is found that the cycle is not standard but there are some common elements in various approaches.

### **8.1. Steps of the standard risk management process**

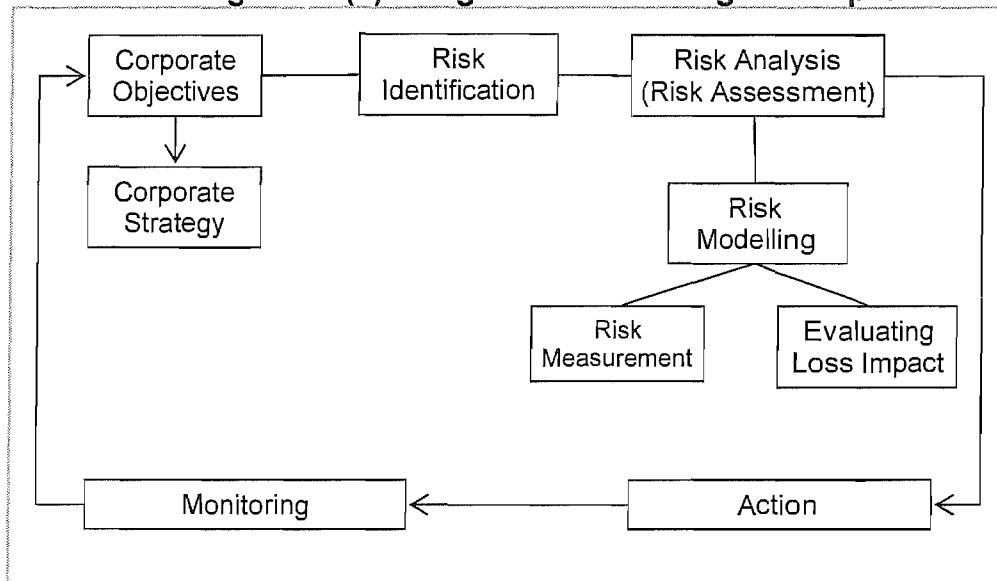
The risk management process is a series of operating stages, which includes business decisions and managerial actions (Cumming, 2001). The key difficulty of all risk management processes<sup>94</sup> is to determine where to start and where to stop. In the literature the steps of risk management as suggested by various authors (Aabo, 2005, Damary, 1976, Zech, 2001) are limited to four steps (Banks, 2004, Miccolis, 2002b, Miccolis, 2003a, Shimpi, 2006) (see figure 12(2)).

<sup>93</sup> This concept is related to the principle-agent relationship as conceptualized in the agency theory of economics. These two groups of people have different set of objectives and they also face different realities (Mengle, 2003).

<sup>94</sup> The process is mainly a structure in achieving the goal. It provides a framework to do something systematically and ease the management and control.

However, they often miss one key step, which the study finds is setting objectives although some authors, such as (Bernstein, 1999, Deloach, 2000, Hopkin, 2002) discussed it arguing: “first, we can restrict our decisions to those over whose outcomes we have some control, that is, where we can manage the probability of loss.” Although omitted exclusively, the organisations do think inclusively about it while talking about risk landscape, risk profile or risk register<sup>95</sup> (Mahoney, 1999). Whatever the case, the first step of any risk management plan is to develop an understanding the philosophy of the various types of risks that businesses faces and to allocate the managerial responsibilities for them (Banks, 2003, Mehr, 1963). While the size of the loss is a big issue, the capacity for bearing that size is another.

**Figure 12(2): Stages of risk management process**



Two dominating issues are important to measure the performance of risk management. First, the cost associated with whole risk management actions. Second, the benefits it offers to the business.

### 8.1.1. Risk Identification

Risk identification is a dynamic process which reveals risks and their sources (Tchankova, 2002, Williams Jr., 1998). The aim is to identify all foreseeable risk (uncertainty) that may affect the corporate objectives both positively and negatively (O'Donnell, 2005). Human attitude plays an important role in

<sup>95</sup> Risk register is a document where details of the priority significant risks are recorded in a consistent format to facilitate the successful management of these risks (Hopkin, 2002).



identifying potential risk (Hillson, 2005). The identification of risk is considered as the foundation of the risk management process. Failures in identifying all [key] risks<sup>96</sup> correctly could leave the enterprise vulnerable, and the implication may be financially devastating (Pountney, 2000).

The identification and measurement of risk is basically a physical treatment enquiring its existence and state (instance at a particular time) in terms of propensity (predictability) and size (Macgill, 2004). However, risk tolerance<sup>97</sup> is a social treatment questioning the acceptability in terms of the organisation's existing knowledge (risk appetite). In this context, the modelling is mainly just setting the state of risk into the existed knowledge in terms of accepted choices considering alternative scenarios or phenomena.

### **8.1.2. Risk assessment and analysis**

After identification of potential risks as described above, the next step is to prioritize them for further action in line with the corporate objectives. The objective of this step is to assess the threats and opportunities. The assessment and analysis can be both qualitative<sup>98</sup> and quantitative<sup>99</sup>. They include modelling and measurement of risk. Observing and calculating the interdependence among risks is an important issue.

### **8.1.3. Modelling risks**

The ultimate goal of modelling is to measure the risks, and which subsequently has two-fold objectives. One is the estimation of the probability of occurring loss producing events and their potential severity and the other is calculating its impact in achieving the objectives of the organization (Pountney, 2000).

The literature suggests four types of risk models commonly used in the insurance industry (Filipovic, 2005); scenario based models, static factor models, covariance models and stochastic factor models.

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<sup>96</sup> Risk scorecard (an illustration of all the risks facing an organization in a structured manner) is being used by some organizations in order to identify all risks and also other organizational issues, such as identification of corporate objectives, stakeholder expectations, and their key dependencies (Hopkin, 2002).

<sup>97</sup> Banks (2003) defines risk tolerance as: "how much it [an organization] is willing to lose as a result of its stated risk activities". The calculation of risk tolerances follows a set of guidelines that establish levels of acceptable and unacceptable exposures to any given category of risk (Aabo, 2005).

<sup>98</sup> Describing and understanding their characteristics.

<sup>99</sup> Mathematical extrapolation of their propensity and outcome.

Traditional modelling techniques do not work well with complex systems because there is an elemental incompatibility between their underlying assumptions and the nature of complex systems. Traditional modelling techniques rely on the essential assumption that, statistically, the future will look like the past. The inherent flaw in this methodology is that the future does not, in fact, proceed linearly from the past. Traditional modelling techniques also assume that the input data is both complete and evenly distributed. They look at individual risks, examining one aspect of the universe of risks at a time (Michael, 2002). Yet it has become clear that it is not possible to understand the whole picture of risk and threats by simply examining its parts. It is no longer appropriate to manage different risks independently. Fortunately, advances in computer science and analytical modelling in recent years have produced new, powerful complexity-science-based tools for risk valuation and management. However, to date these advances have not yet penetrated the area of actuarial science (Smith, 2003).

The external forces constituted by the economic, legal and political as well as the social environments are dynamic. Consequently, enterprises must revisit the corporate objectives to ensure that they are relevant and responsive to the changing environment (Pountney, 2000)

Models specify how the system is structured and the nature of interaction among components provides a basis for understanding patterns of behaviour created by the system. Modelling involves (a) identifying key system components and determining how those components behave, (b) defining the structure of the system by mapping relationships among components, and (c) determining that the resulting model provides a faithful representation of how individual processes accomplish their function by interacting within the structure of the system (Horlick-Jones, 2002, Liebwein, 2005). Consequently, modelling can articulate system design by organizing a group of functionality interrelated elements into a representation of the complex whole (O'Donnell, 2005). Indeed, a model is only as good as the underlying data (Danielsson, 2002, Miccolis, 2001a).

In modelling risk, the objective is to model each of the risk factors (random variable) facing the organisation (Liebwein, 2005). It takes into account the

interdependence between these different factors for aggregation purposes and for obtaining the probability distribution of real capital (Market, 2002).

#### 8.1.4. Risk measurement

The objective of risk measurement is to facilitate risk reporting and control decisions (Culp, 1998). Although there are differences, in the literature in particular, the quantitative approach often - confuses risk measurement with risk management (Cumming, 2001). Traditional risk measurement techniques, such as standard deviation (or volatility), are one-dimensional focusing on a single risk. However, an insurance enterprise daily faces multiple risks. Further, insurance risks often have skewed distribution and non-linear tail correlations, suggesting that the standard deviation is inappropriate (Wang, 2002). The dilemma then becomes how to expand the perspective to include and evaluate multiple risks. Actuaries have developed new models intended to address precisely this question (Smith, 2003).

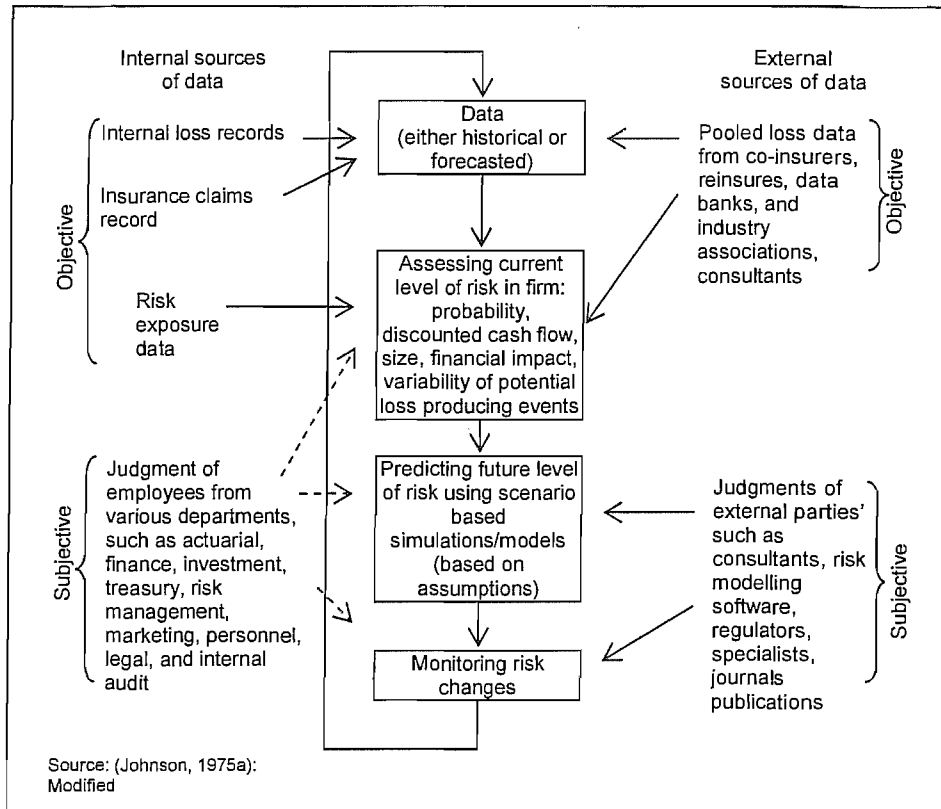
Most of the risk measurement techniques in finance, economics and accounting are based heavily on historical probabilities (McGoun, 1995). Organizations attempt to quantify risk to get a transparent picture of risk, which then makes risk management easier (Mengle, 2003). A real push of measuring<sup>100</sup> risk was evident after a volatile economic environment back in the 1980s, which exposed the financial institutions to the possibility of sudden and unanticipated losses (Mengle, 2003). The invention of the concept of VaR presented an extraordinary revolution in risk measurement initiatives. In banking, VaR is a common risk measure for the downside risk under the probability of ruin concept (Danielsson, 2000). However, single period VaR approaches were found inadequate by insurance companies (Miccolis, 2000). TVaR is an enhancement of VaR concept.

One important aspect of risk measurement, which is not covered in the above discussion, is the subjective judgment, which is often ignored or not adequately considered in risk measurement process. Figure 13(2) illustrates the role of subjective judgments in measuring risks.

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<sup>100</sup> The thesis uses the terms 'risk quantification', 'risk calculation' and 'risk measuring' interchangeably.

**Figure 13(2): The involvement of judgments in the process of risk measurement**



The central message of figure 13(2) is that subjective judgment of people involved in the process of risk measuring is necessary even in the face of adequate hard data.

### 8.1.5. Risk interdependency

In the modelling process, the companies attempt to break down the aggregate risk into different risks that are interdependent on one another. This approach can be taken quite a long way and may result in a very large number of risks being taken into account. Nevertheless, it is not always possible or practical to break down the aggregate risk into totally independent risks. Consequently, most models take any interdependencies into account. Generally speaking, this interdependency is described by estimating the correlation coefficient between the risks. As a rule, the coefficients are estimated empirically and often "on the say of experts". Some levels are occasionally defined arbitrarily (for example, four levels that would correspond to: no correlation; low correlation; strong correlation; full correlation) (European Commission, 2002). Tail correlation in extreme events can be much higher than the overall average correlation (Wang, 2002).

Santomero (1997) suggested the following four ways in which a typical insurance company manages its risks:

Underwriting standard and reports  
Underwriting authority and limits  
Investment guidelines and strategies  
Inventive schemes

#### **8.1.6. Risk response**

The aim is to handle risks in terms of appropriate<sup>101</sup> strategies in order to minimize/avoid threats and to maximize/exploit opportunities (Hillson, 2005).

To some authors like Frame (2003) the above steps of the risk management process constitute the risk management framework.

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<sup>101</sup> The human attitude to risk (whether a risk averse seeker, or neutral) is an influential factor in determining the response strategies.

## SECTION 4

### KEY ISSUES IN INSURERS' RISK MANAGEMENT

#### 1. Technical issues

This section describes the technical issues that are significant in managing risks of insurance companies.

##### 1.1. Diversification and pooling

These are well known risk-controlling and mitigation methods for insurance companies (SwissRe, 2006b). The underlying principle is “not putting all eggs in one basket”, especially if the basket is to be sent abroad (Mehr, 1963). This works under the principle of the “law of large numbers”. The expectation is that if one venture goes sour, the other will make up the loss. However, sufficient knowledge about risk, the market, and controlling mechanisms is a precondition for successful diversification as it may increase operational risk. Mathematically, a successful diversification is framed against the fact that the risk of the portfolio will be less than the sum of the risks of the individual components (Lintner, 1965b). It is important to note that if the risks in the portfolio are less than perfectly correlated with each other, only then will the diversification be meaningful (Mengle, 2003). In addition, the principle of diversification focuses on Markowitz's mean-variance theory (Pearson, 2003). By pooling the policyholders' risks to both the insurance and capital markets, insurance companies (in their intermediary role) play an important role in stabilizing the economy. In addition, other methods including “general average” and “deductible” are also followed to control risks.

Examining the current evidence in the insurance industry, there are two focuses of diversification: the risk and the business itself. Clearly, diversification increases operational risk. It is a temptation for insurers to spread into other business areas. As a result, it is more likely that the attention and management effort may divert away to the ancillary business, which may be detrimental to its core expertise. The objective of insurance underwriting is to spread risk in an uncorrelated manner (Alink, 2004). Diversification is clearly an important risk management tool, in particular, catastrophe risks where geographical

diversification is absolutely necessary, but the transaction cost associated with diversification, although an important issue is often neglected (Wang, 2002).

Moreover, insurability<sup>102</sup> of risk is a key issue in insurers' risk management efforts (Pountney, 2000) to produce an stable underwriting portfolio.

Risk pooling and reduction lie at the heart of the insurance mechanism and, as with risk pricing, occur at two levels. First, in aggregating many individual risk exposures, insurers rely on the law of large numbers to permit them to make reasonably accurate estimates as to the pool's overall losses. Although they cannot predict which of the insured will sustain losses, they do not require this for the scheme to function efficiently. Second, insurers also benefit from pooling through their investment activities (Pablo, 2001, Pfeffer, 1956). In providing funds to a broad range of enterprises, individuals and others, insurers diversify their investment portfolios. The default or bankruptcy of a few borrowers is likely to be offset by the many sound investments. The more stable and predictable an insurer's investment experience, the less it can charge for loans (Hancock, 2001).

### **1.2. Reinsurance and hedging**

Reinsurance and hedging are tools in risk diversification (Carter, 2000a). If ERM is considered as the management of all risks that an insurance company faces then it is necessary to look at the management of every aspect including cash flow, use of capital, balancing of risk against profitability and the management of the company as a whole. From such a broad perspective, reinsurance assists in achieving the objective of risk management in bringing gross company to net company through reinsuring (treaty and facultative: either proportionate or non-proportionate and so on ) to each line of business (Carter, 2000a). Reinsurance provides off-balance sheet capital to insurers (Acutis, 2001). Reinsurance allows a primary insurer to increase its premium volume by more than would otherwise be possible with a given amount of capital. Reinsurance also enables insurers to circumvent the effect of tax considerations and international insurance trade barriers (Blazenco, 1986). If the price of reinsurance decreases, reinsurance becomes more affordable for insurance companies and this will be reflected in

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<sup>102</sup> The insurability of a risk normally requires that the insurer can acquire a portfolio comprising a relatively large number of independent risks.

more capacity, price competition and at the end an increase in the loss and combined ratio (Rich, 2002). Insurance underwriters have worked to a simple principle for several hundred years: the greater the risk, the higher the premium. The use of derivative contrasts provides a hedging tool (Cummins, 2001).

The role of reinsurance as a risk management tool is clear. Since insurers transfer their tail risk (residual risks<sup>103</sup>) to the reinsurers, reinsurance is a diversification tool (Aufragne, 2002, Carter, 2000a). The capital allocation approach (described below) helps the design of optimal reinsurance programs. While reinsurance is certainly a substitute for capital, there are however anomalies in the pricing of reinsurance and the equivalent cost of capital (Allwood, 2003). Although pricing the insurance product depends on a number of factors, for example market competition, as well as the costs, the starting point should always be based on the costing of a product (D'Arcy, 1990). Securitization is one of the most important innovations of modern finance (Cowley, 2005). The securitization process involves the isolation of a pool of assets or rights to a set of cash flows and the repackaging of the asset or cash flows into securities that are traded in capital markets (Cummins, 2004).

### 1.3. Capital management

Capital is an ultimate measure of risk in insurance companies. This is because a certain level of capital [which an organization must always maintain] is being taken into consideration to declare an insurer solvent [for regulatory purposes]. In principle, insurance companies with higher risks in its book should hold a higher level of capital. Such regulatory bindings certainly establish a clear relationship between risk and capital, thus conceptualizing capital as a synonym of risk (Wang, 2002). Such a relationship between risk and capital suggests a role of risk management in the capital optimization (or corporate financing) process (Culp, 2003, Mengle, 2003). Consequently, risk management is a substitute for equity capital (Culp, 2001). Theoretically, the policyholders want to see the unlimited amount of capital in the balance sheet to ensure the greater security of their potential claims but the shareholders want the maximum return of their

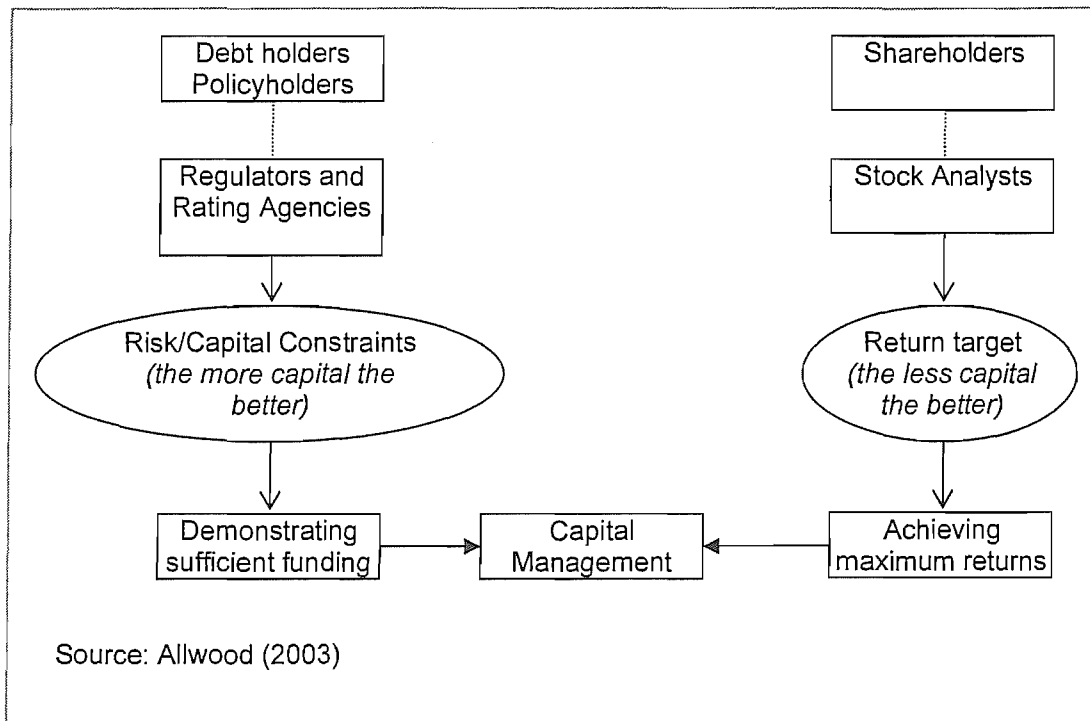
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<sup>103</sup> The concept of residual risk differs from the market risk. The market risk is the part of the variability of a stock's price due to changes in market prices generally. However, the residual risk is the variability due to the stock's price movements which are uncorrelated with the market. By combining shares in a portfolio, the residual risk can be diversified away leaving market risk in the portfolio (Bernstein 1987).



investment including the security of their investment for longer term (with the lowest level of capital). A KPMG survey identified the capital management<sup>104</sup> as the biggest problem in the insurance industry (KPMG, 2004). The key objective of capital management is to strike a balance between the need for the security of policyholders and the need for return (performance) from shareholders. This is illustrated in figure 14(2).

**Figure 14(2): Role of Capital Management**



The above figure illustrates that on one hand the enterprise faces the requirements of the debt holders and policyholders as their interests are looked after by regulators and rating agencies. On the other hand enterprise faces the demand of shareholders as their interest is looked after by stock analysts and the financial press. In such a conflicting situation, the role of the management through capital management is to bring a balance between these two groups.

#### **1.4. Different perspective in determining the level of capital**

The objective of this discussion is to understand different types of capital and develop a conceptual understanding of capital allocation. It is not the objective to study the technicality of the capital allocation.

<sup>104</sup> Pablo (2001) lists the following three issues key to risk and capital management. How much capital to hold? What type of capital? How to invest capital?

The management considers capital adequacy<sup>105</sup> both at the group level and the operational level and there are a number of different perspectives to examine it from. However, the following four approaches (beyond the statutory purposes) are the most common in the insurance industry (Korsvold, 2000):

Statutorily (or accounting) capital

Regulatory capital

Rating agency capital

Economic capital

### **1.5. Accounting/statutory capital**

The capital as shown in the balance sheet is the statutory capital. This is important for accounting purposes but is not an issue for capital management in financial decision making. It is static for a financial year and does not reflect the risk of the organization. Calculation of statutory capital is a backward looking (historical perspective) method, which poses many limitations to making forward looking statements. However, the risk based capital methodology is built on the forward-looking concept (Miller, 1998b, Bomhard, 2006).

### **1.6. Regulatory capital**

This is the required amount of capital from the regulatory perspective. The objective of the regulators is to reduce the probability of default to a defined, small probability, implying a fairly high level of capitalization. Previously, the regulatory capital was less risk sensitive. However, regulators both at the European level and the member country level changed the previous criteria through their risk-based regulatory regime (Dickinson, 2001c). This introduces the concept of the Risk Based Capital (RBC) system. The RBC is built on risk and it is dynamic (Bomhard, 2006). In essence, it can be seen as a basket of options containing a broad array of financial and business risks (Freeman, 2000). However, the application of RBC is two fold. Firstly, it is used as solvency<sup>106</sup> assessment criteria by regulators. In this capacity, an insurance company must hold a minimum level of capital at all times to remain solvent. Secondly, it is used

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<sup>105</sup> The level of capital

<sup>106</sup> Solvency can be defined to mean that an insurance company maintains the ability to meet its obligations as they are due, even though some claims arising from current operations will be settled a number of years in the future. For regulatory purposes an insurance company must always maintain a prescribed level of net worth. In a regulatory context, an insurance company is technically solvent if its admitted assets exceed liabilities by a margin at least equal to the minimum capital required by law (Gart, 1994).

by the management of the insurer as a mean of financial planning and control (Dickinson, 1997c).

### 1.7. Rating agency capital

Rating of their financial strength is an important issue for large insurers, in particular, reinsurers. Similar to regulators, rating agencies have also adopted the RBC concept in their criteria of ratings. Such initiatives are still in their early stages.

### 1.8. Economic capital<sup>107</sup>

This is a very broad and important issue in the current context because it better reflects the financial health and stability of the organizations<sup>108</sup> as opposed to the 'one size fits all' approach of regulatory capital. Before going into an elaborate discussion, it is necessary to define what economic capital means; however, because economic capital is company specific, no universally accepted definition exists. Conceptually, economic capital<sup>109</sup> is the amount of available capital [believed as] sufficient to cover all liabilities in a worst case scenario<sup>110</sup>, which may arise from unexpected market fluctuations, credit, and operational or insurance losses (Mikes, 2005)<sup>111</sup>. In effect, the total capital can be divided into three components: operational capital (minimum amount of capital to stay in the business), risk capital (additional amount of capital an organisation needs to cover the financial consequences of its business risks) and signalling capital (another additional amount of capital to assure the external stakeholders about the financial stability of the organisation). In this context, the economic capital is the sum of operational capital and risk capital (Shimpi, 2002). Shortly, the economic capital represents the level of capital that an insurance company would prefer to operate with, which is considered as individually optimal (Myers, 2001). The economic (firm specific) capital is basically the market generated capital requirement which is significantly different from the minimum (regulatory) capital (Mueller, 2004). The economic perspective is long range, and it views the firm as a portfolio of business (Brown, 2004). Unlike regulatory requirements, the market

<sup>107</sup> Economic capital is based on calculations which are specific to the company's risks, while regulatory or rating agency capital formulas are based on industry averages which may or may not be suitable to any particular company (Mueller, 2004). It is however argued that the most globally active financial corporations are in favour of bringing regulatory capital closer to economic capital (Nebel, 2004)

<sup>108</sup> The concept of economic capital was developed during the 1990s.

<sup>109</sup> Economic capital is also used as a risk measurement tool for any potential losses in percentile method (VaR)

<sup>110</sup> The worst case scenario is defined at a given risk tolerance level over a specified time horizon.

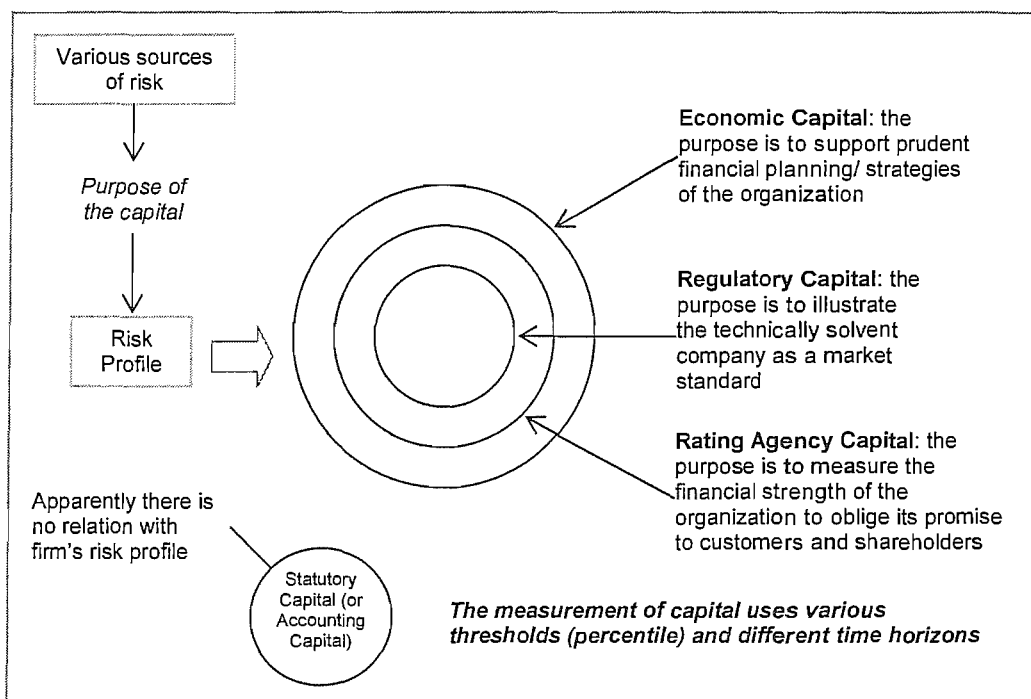
<sup>111</sup> No indication whether or how the company will survive/operate after meeting its all liabilities in worst case scenarios.

capital 'requirements' have two double-sided implications in the sense that the value of the firm declines if it has either too little or too much capital (Bergera, 1995). Economic capital is defined as the difference between the company's estimated market value of assets and the market consistent value of liabilities<sup>112</sup>(Lam, 2002). Economic capital is sometimes used to designate the minimum economic capital requirement as with the term 'solvency capital' (Market, 2002). The evolution and development of economic capital is based on the belief that the economic view of the world provides the most accurate picture of risk profile and capital adequacy (Filipovic, 2005).

The above four types of capital are different from each other and more importantly they serve different purposes as seen in Figure 15(2).

The key distinction between statutory capital and risk-based capital is that the former talks about the static world and the latter talks about the dynamic world (Willett, 1901). The regulatory capital is defined by the supervisors to provide certain protection to policyholders (CEA & CROF, 2006, IAIS, 2003, IAIS, 2005).

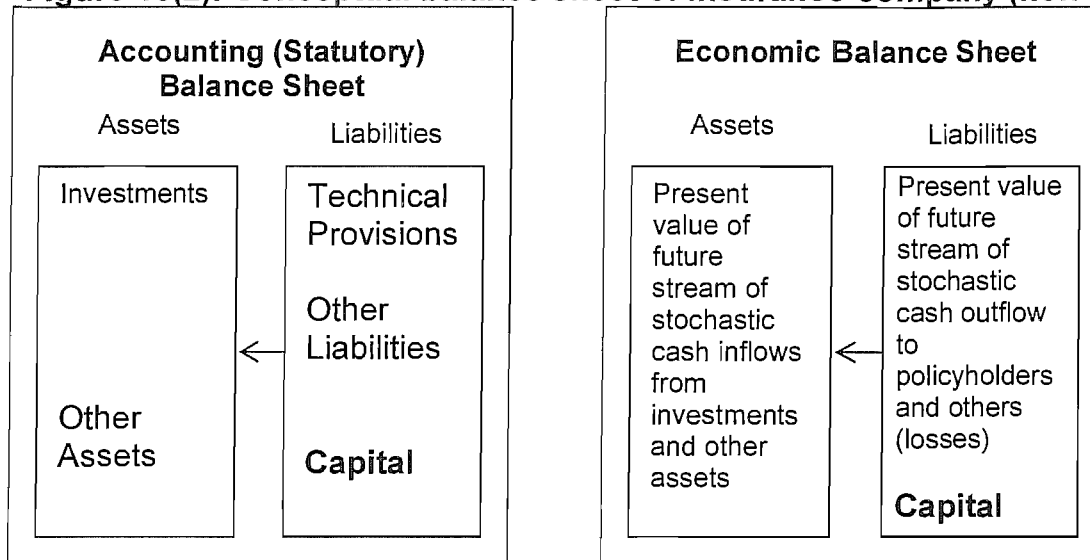
Figure 15(2): various types of [risk-based] capital



<sup>112</sup>The market-consistent valuation of insurance liabilities comprises expected future obligations under insurance policies discounted using the risk-free yield curve, taking into account the valuation principles e.g., completeness, best estimate principle, up-to-date information and transparency.

However, the economic capital is defined by the management based on its specific risk preferences (Bomhard, 2006, Dickinson, 1997c). The rating agency capital is defined by rating agencies to determine the financial strength of the insurers, which provides security messages to both customers and investors (Samanta, 2005).

**Figure 16(2): Conceptual balance sheet of insurance company (non-life)**



Source: (Dickinson, 1997c): Modified

Whereas the Accounting Balance Sheet is based on historical (backward looking) information, the Economic Balance Sheet is based on discounted cash flow technique (forward looking) (see figure 16(2)). It is the Economic Balance Sheet, which concerns the management of the insurance companies as a focal point of ERM through capital management. Although the recent changes in accounting standards, which IFRS suggest is a big issue for the reporting and presentation of balance sheet of insurers on fair value basis, this study does not focus on it. This is because the work regarding IFRS remains incomplete and there are many complexities surrounding it.. One of them is calculating the market value of liabilities, which are non-tradable (unlike assets) (Bloomer, 2005, CAS, 2004, Dickinson, 2003, Mayer, 2005, PwC, 2003). Moreover, ERM and IFRS although conceptually related, are practiced on two different frameworks within insurance companies. Moreover, they have different objectives.

### 1.9. Allocation of economic capital

Capital is the key to all risk management functions of insurance companies (Castries, 2005, Lewis, 1998). In the context of insurer's financial management, there are at least two purposes of RBC. Firstly, it determines the optimal level of capital. Secondly, it determines how this optimal level of the cost of capital<sup>113</sup> can be allocated to business units, lines or types. However, the determination of optimum capital is usually complex and highly subjective based on the following reasons (Myers, 2001). Theoretically, an optimal level of capital should include at least three factors (SCOR, 2003);

The overall risk (the riskiness of the activities) of the firm.

Financing future growth (organically or M & A)

Signalling the market about the financial strength of the firm

If the market is efficient, then it is comparatively easy to take these factors in to calculation because investors, in theory, hold same information and equally aware of the market. In fact, the market is not efficient and there is a lot of psychological, and behavioural factors, together with speculation that influence the market, which in turn hinders the organizational effort to maintain the status of the balance sheet under the assumptions it originally made (Demault, 2001). One example is a case criticized (Myers, 2001) in that it ignores the possibility of default as the losses are valued by assuming that the claims will always be paid (cash inflow > cash outflow). Here the capital is defined as the difference between the market value of assets and default-free present value of losses. Based on this assumption, more capital means more assets and this indicates greater assurance from the insurer to pay losses (Hancock, 2001, Zanjani, 2002). However, there is always a chance of default, where the losses and expenses may exceed the future value of assets. Thus Myers (2001) suggested the option pricing model in allocating economic capital.

In line with determining economic capital, the key objectives of capital allocation are measuring the performance of business (Grundl, 2002, Kielholz, 2000, Tsanakas, 2003, Valdez, 2003), advising the investors, regulators, and other

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<sup>113</sup> The cost of capital is equal to the rate of return that insurers have to pay for the equity (supplied by shareholders and other investors) they use. The terms 'the cost of capital', 'fair rate of return', and 'opportunity cost of capital' are used synonymously (Kielholz, 2000)

stakeholders about the financial strength of the firm, and developing a common basis for major decision-making (Andréason, 2000, Froot, 1998), including investment and underwriting strategies, and setting the corporate objectives (Erkan, 2003, Miccolis, 2002a, Sherris, 2004). The capital required is calculated on the basis of the risk threshold, for example, 1 event in 50 years. It means that the company can pay out for one total loss in 50 years. However, the objective of the enterprises is not only paying the claim but continuing the business simultaneously, thus requiring more capital (Allwood, 2003, Kulik, 2003)

This means that the actual optimal amount of capital is more than the capital necessary to finance the overall risks. This in turn affects the decision of allocation of capital based purely on a risk-return relationship following Markowitz's mean-variance framework (portfolio theory). When the return on capital exceeds the cost of capital, only then is the value creation is justified (Cummins, 2000). However, the difficulty is that this financial economic theory does not integrate the diversification of the portfolio of risks (Kulik, 2003). There are several methods available to determine the cost of capital but the following two are the key (Cummins, 2005, Kielholz, 2000, Korsvold, 2000, Mey, 2000, SwissRe, 2005). However, this topic has already been discussed in part 2 of section 1.

Capital Asset Pricing Model (CAPM): This is most widely used and simple technique of calculating the cost of capital<sup>114</sup> (Lintner, 1965a, Sharpe, 1964), based on the principle of Markowitz's portfolio theory (Markowitz, 1952). The key objective is to minimize the opportunity cost of capital from alternative investment strategies.

Discounted Cash Flow (DCF) Analysis: The model is based on the financial-theoretic proposition that the value<sup>115</sup> of any asset (or firm) is the present value of

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<sup>114</sup> In its simplest form, the formula is:  $k = r_f + \beta(r_m - r_f)$  where  $k$  = cost of capital,  $r_f$  = risk free rate of return,  $r_m$  = return on market equities,  $\beta$  = volatility measure, and  $r_p$  = difference between the risk free rate and return on equities (or the equity risk premium).

<sup>115</sup> The best measure of corporate performance

its cash flows<sup>116</sup>, where the discount rate is the appropriate cost of capital for the firm or project under consideration (Cummins, 2003, Sherris, 2004).

Theoretically, the overriding financial objective of any business is to maximise the shareholder value, which is the discounted value of all future cash flows (Korsvold, 2000).

It is important to note that similar to the CAPM, the DCF model uses market data on expected future return. However, there is no consensus as to the best approach between the two techniques (Kielholz, 2000). Although the DCF model produces similar results (Cummins, 1994) it is found that the DCF cost of capital technique produces results a little lower than the CAPM cost of capital.

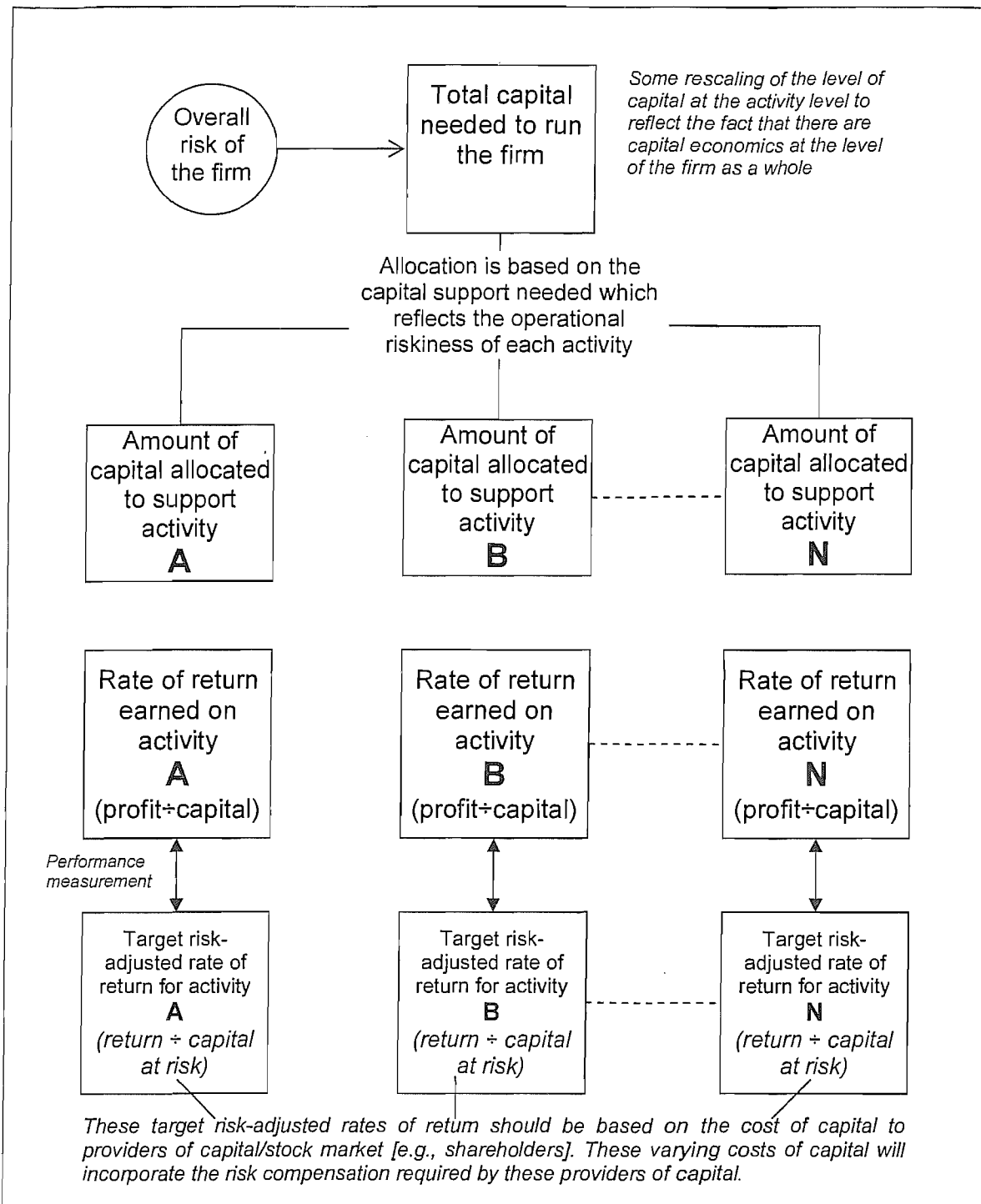
Whatever the technique, the purpose is to minimize the cost of capital and maximize the value at a given level of risk. Figure 17(2) illustrates the conceptual framework of allocating across different business lines and units in a typical insurance company:

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<sup>116</sup>  $V_0 = \frac{CF_1}{(1+k)} + \frac{CF_2}{(1+k)^2} + \dots + \frac{CF_n}{(1+k)^n}$ , where  $V_0$  = Present value of assets, CF = cash flow expected at the end of year t; k = discounted rate; and n = time period



Figure 17(2): A framework of allocating [cost of] capital



Source: (Dickinson, 1997c)

The key objective of modern financial capital management is to draw on and maintain a minimum level of capital that allows the organization to continue its existing businesses for a specified time horizon while matching assets with liabilities. Knowing the capital requirements of the firm is the first step to improved capital management. Excess capital, if any, can be transferred from treasury (risk-free) instruments, and redeployed for more productive returns. A shortfall in

capital can be rebalanced by infusions of fresh capital, purchases of reinsurance, or by trimming risks from the company portfolio (Wang, 2002).

The capital requirements of an insurance company should measure the aggregate risk of the company risk portfolio, by incorporating asset risks, liability risks, event risks, and operational business risks. Enterprise risk modelling must properly incorporate all of these disparate risks in order to present an accurate profile of firm-wide risk (Wang, 2002).

The objective of capital management is a core function of insurance companies. Most of the risk management functions are concentrated to capital management. The key objective is to ensure that the organisation is adequately capitalised at all times and able to maintain financial strength after a large loss event (Cummins, 1995). Moreover, meeting the capital requirements of all legal entities including managing the capital adequacy actively of the organisation and its legal entities, taking into account internal economic and accounting views, and rating agency and regulatory solvency models form other key objectives (Estrella, 2000, Lewis, 1998, Myers, 2001). In addition, capital management seeks to maintain an optimal capital structure, giving the organisation financial flexibility at optimal funding costs (Cummins, 1996, Demault, 2001). Most of the large insurers now operate according to a "one group, one capital base" principle when allocating funds (SwissRe, 1999).

### **1.10. Asset Liability Management and Dynamic Financial Analysis**

Asset Liability Management (ALM) is a set of strategies and procedures reduce the exposure to financial risk. Significantly increased interest rate volatility in recent years has resulted in concern over proper asset-liability management (Lange, 2004). The objective is to match the assets and liabilities (which actually means matching their cash flow schedule) although a complete matching is impossible (Forbes, 1987). As with finance, the risk is defined as the variability in return. The classical financial theory suggests that the greater the risk, the lower the company's capital growth rate. Essentially, risk reduces the rate of growth of the firm and that is why organisations need to manage risk. By matching assets with liabilities, ALM assists in reducing risk. In addition, ALM also helps in

developing strategies; it gives management maximum flexibility to respond to changes in the economic environment (Feldblum, 1989), which is one of the core issues of ERM .

Asset liability management plays a central role in managing financial risks, in particular, the balance sheet risks, of a typical life insurance company (Briys, 2001). It is important because of the long term exposure of life insurance businesses, and asset liability management concentrates mostly on the interest rate risk in life companies, as it is their key concern. In the case of non-life insurers, the big concerns are underwriting risks, in particular, property (as a result of catastrophes) and liability risks. Traditionally, underwriting risks are managed through reinsurance (preferably on each line of business). In addition, there are separate hedging activities for financial risks. They provide diversification opportunities. One of the objectives of ERM is to capture the diversification opportunities and offsetting effects between underwriting risks and investment risks (Babbel, 2001). The objective of ERM is to maximize the economic value<sup>117</sup> by optimizing the risk-return balance over the entire asset-liability portfolio (Kulik, 2003, Pablo, 2001). Managers are concerned about the corporate economic exposure because they identifies environmental contingencies (where the corporations operate) relevant to shareholder value creation (Miller, 1998b).

Dynamic Financial Analysis (DFA), which is a tool of financial risk management and decision-making, offers a consolidated quantitative analysis of insurers' underwriting risks and investment risks (Kaufmann, 2001). The term 'dynamics' reflects the uncertainty in modelling the risks of an insurance company (D'Arcy, 2004). Developed by actuaries, it is, in fact, a financial model based on large-scale computer simulations on the Monte Carlo setup (CAS, 1999). DFA (in the non-life insurance context) is synonymous with asset-liability management (in the life insurance context), as instead of concentrating only on interest rate risk ,DFA integrates market, credit, liquidity, operational, and business risks to achieve the

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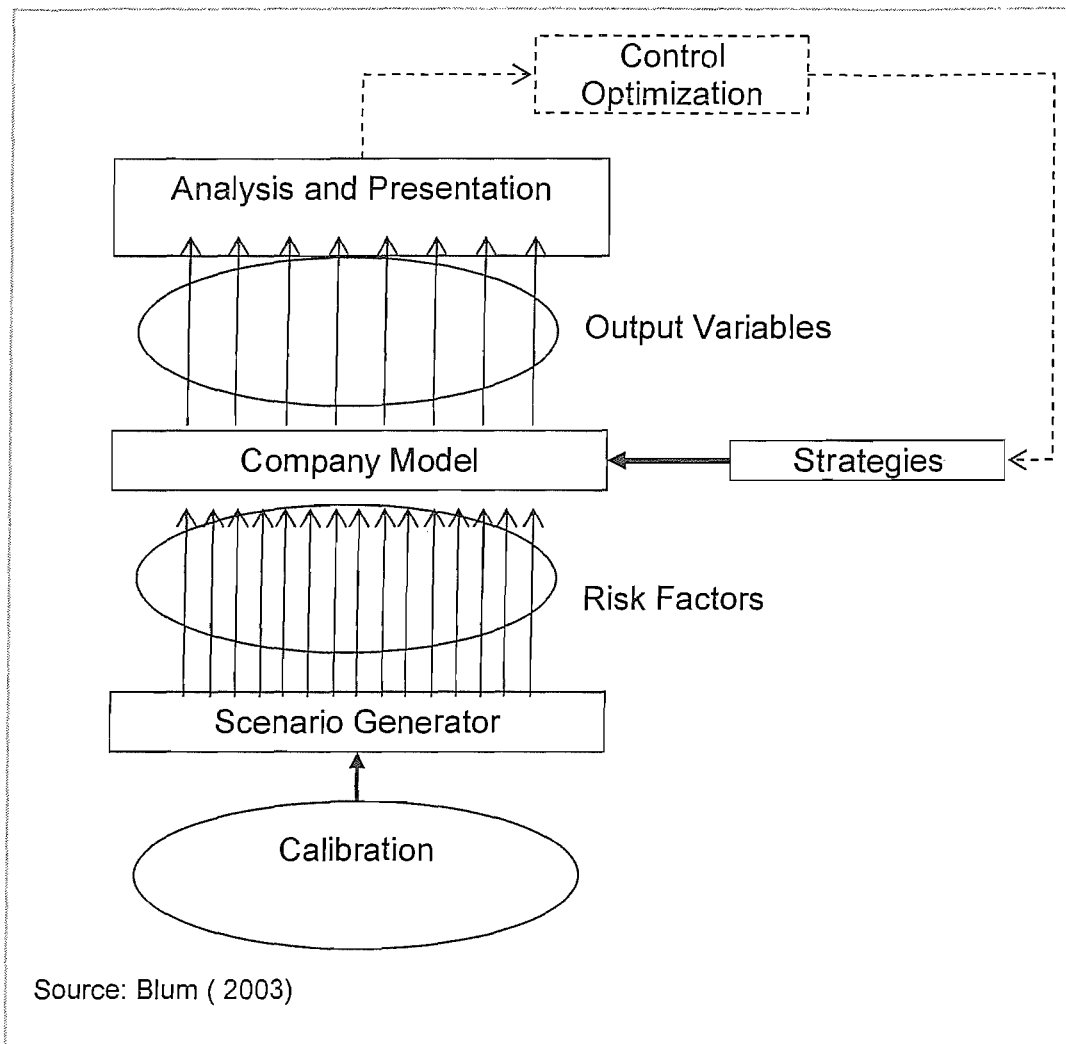
<sup>117</sup> Traditionally the value of an insurance company (i.e., the value of its assets and liabilities) was measured by the accounting methods mostly using historical data, which failed to reflect the true economic state of companies. The growing expectation is that in order to reflect the current economic situation, assets should be valued at market values and liabilities [cash flows of liabilities] according to best estimates after taking the time value of money into account in an appropriate manner (Pablo, 2001).

organisation's objectives (Rosen, 2002). In a typical non-life insurance company DFA facilitates the management in investigating the potential impact of their decisions for capital management, investment strategies, reinsurance strategies and strategic asset-liability management (Szkoda, 1995). Moreover, DFA is able to consider the impact of underwriting cycles' interplay between soft and hard market (as discussed in section 3) on the business over a long time horizon which in turn assists economic value creation rather than simply imitating the cash flow structures of the company.

Peter Blum and Michel Dacorogna (2003) provide an in-depth understanding of DFA. The following discussions present a brief outline of their work. Figure 18(2) illustrates the model:

The model starts with finding suitable parameters as an integral part of the DFA model. The process of finding these parameters is called 'calibration'. It then follows a scenario generation step using a Monte Carlo scenario generator. The scenario generator comprises stochastic models for the risk factors affecting the company. Risk factors typically include economic risks (for example inflation), liability risks (for example motor liability claims), asset risks (for example stock market returns), and business risks (for example underwriting cycles). The output of the scenario generator is a large number of Monte Carlo scenarios for the joint behaviour of all modelled risk factors over the full time range of the study (Blum, 2003).

Figure 18(2): A typical DFA Model



Each one of the scenarios is then fed into the Company Model that simulates the reaction of the company to the behaviour of the risk factors as suggested by the scenarios. The output of a DFA study consists of the results of the application of the company model, parameterized with a strategy, on each of the generated scenarios (CAS, 2000a). So each risk scenario fed into the Company Model is mapped onto one result scenario that can also be multivariate, going up to full pro forma balance sheets (CAS, 1999).

Given the Monte Carlo setup, there is a large number of output values (possible results), so that sophisticated analysis and presentation facilities become necessary for extracting information from the output. These can consist of statistical analysis (such as empirical moment and quintile computations) and graphical methods (for example empirical distributions), or also drill-down analysis, in which input scenarios that gave rise to particularly bad results are

identified and studied. The results can then be used to readjust the strategy for the optimization of the target values of the company (Blum, 2003).

The DFA model evaluates the efficiency of its current financial strategies and operational strategies (for example, M & A, entry and exit from a business through rebalancing of reinsurance structures or investment portfolios, or capital market transactions, and so on) on dynamic (on-going) basis and suggests improvements. In this way DFA can be an important part of the company's business planning and enterprise risk management set-up. Above all, the goals of DFA are to provide management with solid information about the interaction of decisions from all areas of company operations, a quantitative look at the risk-and-return trade-offs inherent in emerging strategic opportunities, and a structured process for evaluating alternative operating (CAS, 2000b, Schmeiser, 2004, Searby, 2003).

### **1.11. Alternative Risk Transfer solutions**

Alternative Risk Transfer (ART) is a new technique of transferring risk from the insurance market to the capital market. Its development was closely linked to the imbalance in demand and supply (in terms of size and insurability of the event) of re/insurance (Doherty, 1993) and the underwriting cycle. ART products are standardized to meet specific needs including captives<sup>118</sup> (Shimpi, 2001). Securitization of risks and non-traditional insurance products (for example, multiyear and multiline) are examples of bundling risks in holistically (Banks, 2004, Culp, 2005, Dickinson, 2001c, Harrington, 2002, Punter, 2000). Securitization of risk works according to the principle of risk sharing, which means spreading risk among many individual companies until the risk is negligible to any one company (Shiller, 2003).

## **2. Organizational issues**

In addition to the technical aspects of risk management, which are heavily dependent on technical tools and methodologies, there are also organizational aspects of risk management that focus on the structure of the organization and how the activities and responsibilities are carried out. These are discussed below.

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<sup>118</sup> Captives are kinds of insurance or reinsurance vehicles. They usually belong to a company or group of companies and mainly insure the risk of its parent companies. They are not active in the insurance industry.

## 2.1. Corporate Governance

Risk and control are the central components of any corporate governance<sup>119</sup> framework. This is built on the assumption that risk must be identified, assessed, and managed by the implementation through appropriate internal controlling system (Kleffner, 2003, Lam, 2003, Spira, 2003). The emerging role of internal auditors is closely attached to a holistic corporate governance system of any organization (Hilb, 2005, Selim, 1999a). Due the recent regulations, of the Turnbull Report<sup>120</sup> (1999) with reference to Cadbury Report<sup>121</sup> (1992) Greenbury Report<sup>122</sup> (1995), Hample Report<sup>123</sup> (1998) and the later Higgs Report<sup>124</sup>, Smith Report in the UK and the Combined Code<sup>125</sup> (1998: revised in 2003 and 2005:Treadway Report in the USA, Dey Report in Canada , the board of directors and the audit committees are bound by these, and are to be liable for any internal controlling failure of their respective organizations (Dickinson, 2001b). The initiative of the corporations in improving governance is closely linked to regulatory governance (Kielholz, 2005). The objective of the corporate governance is to ensure the presence of appropriate organizational processes and corporate controls to measure and manage risk across the company (Lam, 2003). However, an effective corporate governance requires a clear understanding of the roles and responsibilities of the board of directors and of senior management and their relationships with others within the corporate structure (TheBusinessRoundtable, 2005). Due to the complexity of the ownership structure and increased regulatory reforms, the corporate governance of large [life] insurers is complex (Dewing, 2006). In the presence of a proper corporate governance system, the business risk of any organization crystallizes (Drennan, 2001, Mackay, 2000). In relation to risk management (Drew, 2006) presents CLASS, a five factor model including culture, leadership, alignment, systems, and structure.

Regulatory compliance is also linked to the effort of enterprises in managing risks and is discussed below under the heading 'recent changes in regulations'.

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<sup>119</sup> Corporate governance is a mechanism (built on a set of rules), which is necessary to direct and control the management of an organization (Mallin, 2005). This is to ensure that directors manage the affairs of their company in the interest of the shareholders and community (Kaen, 2005).

<sup>120</sup> Concerned with management control and risk

<sup>121</sup> Provided the foundation of corporate governance in the UK pointing on the financial aspects of corporate governance

<sup>122</sup> Focused on executive remuneration

<sup>123</sup> A review of corporate governance recommendations

<sup>124</sup> Reviewed the role and effectiveness of non-executive directors

<sup>125</sup> Emphasis on mutual understanding of objectives between investors and management of listed companies

## **2.2. Social and ethical responsibility**

It is interesting to note that the risk management systems of insurance (also the financial services firm) often focus on financial risk and operational risks and do not adequately cover the strategic risks (Dickinson, 2001a), where social and ethical responsibility is a big issue (Dingfu, 2006).

## **2.3. Other techniques close to risk management**

The following paragraphs discussed the techniques close to risk management issues.

## **2.4. Scenario analysis**

Scenario analysis<sup>126</sup> encourages managers to envision plausible future states of the world and consider how to take advantage of opportunities and avoid potential threats. It is not about predicting the future but it is a multi-faceted thinking tool, which helps managers to view their shared concerns or opportunities systematically (Clemons, 1995). Scenario analysis can be used in many stages in the process of managing risks for example, risk identification, problem framing and strategy formulation. The key input of any scenario analysis process is 'common sense' (Wilkinson, 2003b) but a broader concept on the subject is essential. Scenario analysis can work even when sensitivity analysis becomes insufficient due to adequate reliable data. It is the framing of concepts and management philosophy.

The development of scenario analysis is closely associated with the risk of strategic planning and, more generally, the emergence of the field of strategic management. Scenario planning is carried out in both quantitative (for financial planners) and qualitative (for strategists) methods. Under the qualitative method participants discuss current trends and future prospects arising in a firm's external environment during a scenario planning process (Frame, 2003). In this sense scenario planning is a process for structured thinking in which stories are created that bring together factual data and human insight to create scenario 'plots' exploring imaginary or probable futures (Lindgren, 2003). Through scenario planning, the contingencies, uncertainties, trends, and opportunities that are often unanticipated can be identified, evaluated, and acted upon (Miller, 2003). Scenario development takes a top-management firm-wide perspective,

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<sup>126</sup> A creative, flexible, and out-of-the-box approach of strategic planning



seeks to grapple with the external environment in all its complexity, and avoids reducing qualitative richness to quantitative data. An important output form scenario planning is a shared understanding among business managers as to the key contingencies their unit faces (Lindgren, 2003). Whereas scenario analysis is a participative<sup>127</sup>, narrative<sup>128</sup> and externally focused<sup>129</sup> system-thinking<sup>130</sup> approach, its key shortcoming is that it fails to determine directly when investments in strategic flexibility (Schoemaker, 1995) add to firm value (Miller, 2003). In the quantitative field, the process of dynamic financial analysis involves testing a number of adverse and favourable scenarios regarding an insurance company's operation (CAS, 1999). Scenarios form an important part of risk models in insurance (Filipovic, 2005). More specifically, scenario analysis permits the fusion of quantitative analyses, where there are sufficient credible data. However, it focuses on qualitative estimates, where data are scarce (Kloman, 2003a, Paul-Chowdhury, 2001). Scenario planning provides a proper language for risk in financial organizations; this gives the plausible future for the economic environment (Desista, 2001, Ross, 2001) including the exploration of behavioural responses in potential changes in the market (Dickinson, 2001a). The scenario building process uses an integrative and interdisciplinary approach, which incorporates a wide range of viewpoints or perspectives to explore problems in researching and clarifying issues (Davis, 2002, Wilkinson, 2003b). Analysis of scenarios can minimize the affect of systemic risk<sup>131</sup> of regulations in identifying pitfalls or dangers. While the judgment based scenario exploration is a useful tool of risk identification and optimal strategy formulation, the computer assisted worst-case scenario modelling techniques are useful for quantitative approach of ERM (Dickinson, 1997b). Scenarios capturing various economic variables (for example, increasing interest rates and declining stock market) help to redefine the investment strategies of insurance companies (Rech, 1999). In the complex and ambiguous world of ERM, scenario planning could provide a balanced view on both risk and opportunities (Randall, 2005).

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<sup>127</sup> Insights are drawn from many sources, thereby adding rich details to envisioned futures and enhancing learning.

<sup>128</sup> Produces a series of stories about plausible future states that take into account the dynamic interactions of key stakeholders and the organization's role in creating the future

<sup>129</sup> Provides a framework to envision long-range opportunities and uncertainties in the organization's environment

<sup>130</sup> Encourages learning about the interrelations, including feedback effects, among key environmental variables

<sup>131</sup> Systemic risk arises because of increasing dependence on connected processes and technologies as seen in catastrophic events.

## **2.5. Business Continuity Management**

The objective of Business Continuity Management (BCM) is to lead people in all emergency situations, whether related to business or not, while keeping the business uninterrupted. BCM differs from crisis management and contingency management, where the former leads people through the decision-making situation and the latter applies to unexpected business related incidents in general including emergencies (Braunder, 1998). A recent survey conducted by Swiss Re (StrategyOne, 2006) revealed the threat of computer-based risks (for example, hackers, unauthorized disclosures, viruses and worms, piracy, disruption of electronic infrastructure, data storage and/or telecommunications), as the key concern of corporate executives. Business continuity acts with vulnerability. The general concern of business continuity managers is that the BCM draws insufficient attention to the organizations' management during good times (when no potential threats are visible). However, the concern appears at the top of managements' agenda during the period of actual threat or destruction. Consequently, business continuity management activities always suffer due to limited budgets and insufficient time and resources (Honour, 2004). In dealing with underwriting issues, such as, pricing, reinsurance and claims, insurance companies maintain records (or data) for many years. Any loss of records can cause intellectual control over claims portfolios, and may totally destroy the insurer (Kaye, 2004). Consequently, it is important to embed BCM in the ERM culture of insurers. Moreover, BCM is a growing topic in the regulators' agenda for regulating insurer's operational risk management issues.

## **2.6. Balanced scorecard**

The Balanced Scorecard (BSC) is a tool for controlling and reviewing corporate strategies while monitoring and managing the organizational performance in order to achieve corporate goals (or objectives) (Bulter, 1997, Kaplan, 1996, Littler, 2000). It is increasingly becoming an agenda item on corporate governance issues of corporations (Kaplan, 2004, Melville, 2003). It is found that ERM has evolved as an approach not only to manage risks but essentially to manage the whole business of insurers in an effective and efficient manner. Consequently, developing and implementing business strategies using the balanced scorecard measurement system and measuring the performance of an entire organization (Ahn, 2001, Maltz, 2003) is a significant concern of ERM. The

key difference between BSC and ERM is that BSC considers only key critical success factors<sup>132</sup> to control strategies but ERM in addition understands the characteristics of critical success factors and most importantly their interrelations, which is important to develop alternative strategies (Andersen, 2005). Moreover, BSC may be utilized to measure the performance of ERM (Ittner, 2003, Lohman, 2004, Otley, 1999) by reviewing the non-financial indicators (Veen-Dirks, 2002) .

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<sup>132</sup> Critical success factors are the limited number of areas of the business, in which the satisfactory results ensure competitive performance of the organization (Boynton, 1984).

## SECTION 5

### RECENT REGULATORY CHANGES<sup>133</sup> AND THEIR IMPLICATIONS FOR ORGANISATIONS

This section deals with the recent changes in the regulatory regime in capital management and corporate governance.

#### 1. Solvency I and Solvency II

It is evident that insurance regulators are paying closer attention to focusing on the ability of the industry in maintaining capital levels in proportion to the risk of the entire balance sheet (Schanz., 2004). Under the 'Solvency I'<sup>134</sup> regime, the calculation of the solvency margin is based on the index premium of claims, whereby the required minimum solvency margin (the guarantee fund) is the higher of the two results (Dickinson, 2001c, Dickinson, 1997c, Nebel, 2004). The system had many weaknesses, key of these being inadequate recognition of investment risks, inadequate treatment of reinsurance, and underwriting risks (Dickinson, 2001c). In order to remove some of the deficiencies a reform project was initiated by the Committee of European Insurance and Occupational Pensions Supervisors (CEIOPS), This is an advisory body within the European Commission with the aim of emphasizing the focus on accurate risk measurement either based on the standard approach or on the use of the internal capital model (KPMG, 2002, Medina, 2003, Nebel, 2004, OECD, 2003, Schmeiser, 2004, Trainar, 2006). The new solvency system is likely to contain three elements (referred to as 'Pillars'), which are analogous to the similarly-structured Basel II proposals for banks although they have many fundamental differences<sup>135</sup> (Basel, 2001, EUSolvencySubcommittee, 2001, Kupieca, 2005, Saldenberg, 2003, Trainar, 2006) . Pillar 1 focuses on quantitative aspects of solvency (largely calculating the capital requirement); Pillar 2 is concerned with qualitative measures (supervisory review) in terms of four major components which are asset-liability management, stress testing, sensitivity testing and

<sup>133</sup> The objective of regulations in the financial sector is three fold; customer protection, systemic stability, and market confidence (Nebel, 2004).

<sup>134</sup> This approach is provided by the European regulators under the single market policy. However, Risk Based Capital (RBC), which is the approach adopted by US regulators, is beyond the scope of this study because of its irrelevance.

<sup>135</sup> It is argued that Basel II and Solvency II have fundamental differences in their objectives. Basel Accord is intended to reinforce the soundness and stability of the international banking system through developing a market-consistent risk management practice for banks at the international level. However, Solvency II is intended to protect policyholders against the risk of bankruptcy facing every insurer in isolation.

internal modelling. Pillar 3 explores transparency and disclosure requirements (CEA, 2005, SwissRe, 2006b, Turner, 2006). At the moment Pillar 2 is the major issue for most insurers because its installing, group wide, a state-of-the-art system of qualitative risk management which comprises ALM, sensitivity testing, internal modelling and so on (Peakin, 2005, Trainar, 2006). Some European countries have already developed their own risk-based capital requirements (such as the UK and Netherlands) moving towards the direction of Solvency II.

It is important to mention here that the current approach of Solvency II is closely linked with the IFRS<sup>136</sup> (Dickinson, 2005b, Martiniere, 2005, SwissRe, 2004). However, both of them are under development and are expected to complete by 2010. The broader discussion of both issues is beyond the scope of this study.

## **2. Turnbull/ Sarbanes Oxley Act**

The key objective of all corporate governance related regulations is to increase public confidence in public companies through ensuring reliable corporate disclosure both in financial and operational activities. Consequently, corporate disclosure puts major efforts into promoting ERM (Selim, 1999b). The Turnbull Report (FRC, 2005) in the United Kingdom and Sarbanes Oxley Act: Section 404 (SOX) in the United States are two key sources of internal control (Power, 2004b). SOX requires an annual review of internal control and risk management policies and procedures as part of auditing listed public limited companies' annual statements (Sarens, 2006, Sutton, 2006). SOX largely influences the leadership of CEOs in promoting ERM in their organisations (Carpenter, 2004) from a control based perspective (Power, 2004a). The changes in the corporate governance regulations provided new direction to internal auditing profession in managing risk and knowledge management culture across organisations through risk-based auditing (Selim, 1999a, Spira, 2003). Further, they provided an alliance between governance, financial reporting, and risk management (Drew, 2006). However, the role of SOX in raising public confidence is yet not clear (Verschoor, 2005).

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<sup>136</sup> The international Accounting Standards Board (IASB) has developed a framework of accounting rules commonly known as International Financial Reporting Standard (IFRS). Along with the US Generally Accepted Accounting Principle (GAAP), IFRS emerging as a viable basis for international alignment of accounting regulations. Its complete adoption in the insurance industry in two phases is due in 2010.

### 3. The role of a Chief Risk Officer

Corporations previously had risk managers. Their main functions were buying insurance (Rich, 2002) and responsibility for day-to-day operational risk management functions (Valsamakis, 2002). A study conducted by (Ward, 2001) revealed that in addition to operational functions, risk managers are also involved in a wide range of activities including strategic roles. In insurance, the risk managers are conversant with legal aspects of insurance contracts (Mehr, 1963, Valsamakis, 2002). Historically, risk managers with a single risk function, either insurance or treasury, were responsible for assessing overall risk policy and strategy including its review and implementation with endorsement from the board (Dickson, 1982, Hopkin, 2002). In addition, corporate risk managers were responsible for profit maximization (Reavis, 1969, Rottman, 1971). As argued in Chapter 3, the evolution of ERM is a result of contributions from a set of core competencies within various disciplines, thus involving multiple risk functions. This means that whoever is particularly responsible for handling the key operation of ERM must have a common understanding of these core competencies as opposed to TRM (Lam, 2000, Lamser, 2000). In that sense the CEO is the only person who possessed such qualifications, leading ultimately to the role of CRO (Hopkin, 2002). However, this concept might not apply in financial institutions. There could be at least three reasons for a CEO to carry out the job of a CRO – workload, technicality or specialization and familiarity with people and internal facts. Consequently, it appears there is a growing tendency to appoint CROs in financial institutions to implement ERM (Dickinson, 2001b, Lam, 2001, Lam, 2003). The CRO is clearly a new and evolving position, which was triggered by the events of the early 21st century, to meet the real need for a closer supervision of business risks (Stahel, 2004). This vacancy could not be filled by traditional (and financial) risk managers just extending their role. However, the position and reporting structure of the CRO in the management hierarchy is a matter of debate. Some argue that the CRO should be a board appointee reporting to the board, while others believe the CRO should report to the CFO or the CEO (Butterworth, 2001). Whatever the reporting structure is, the CRO, in general, is directly responsible for establishing and implementing ERM across the organisation together with overall leadership, vision, and direction for ERM (Lam, 2003, Lee, 2005, Power, 2005a). A couple of surveys have been conducted by consulting firms and others to investigate the role of the CRO one

of which is: "A Composite Sketch of a Chief Risk Officer" in 2001. The surveys identify that CROs generally have high academic qualifications and related industry experience requiring mathematical, accounting and financial expertise, as well as communication of risk (Covello, 1986) and management skills. However, the CRO role or equivalent is spreading across industries under various titles, for example, director of risk management or global head of risk management. A recent survey by an Economist Intelligence Unit<sup>137</sup> highlights the significance of putting CROs at the top management level. This is to facilitate the formulation of group policy for distributing and offsetting those enterprise risks in and communication to individual managers as well (Stahel, 2005a).

Dickinson (2001b) suggests the following position of a CRO in the management hierarchy.

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<sup>137</sup> The Evolving Role of the CIO, by Alasdair Ross, EIU, May 2005.

Figure 19(2): The position and role of CRO in the organisation chart

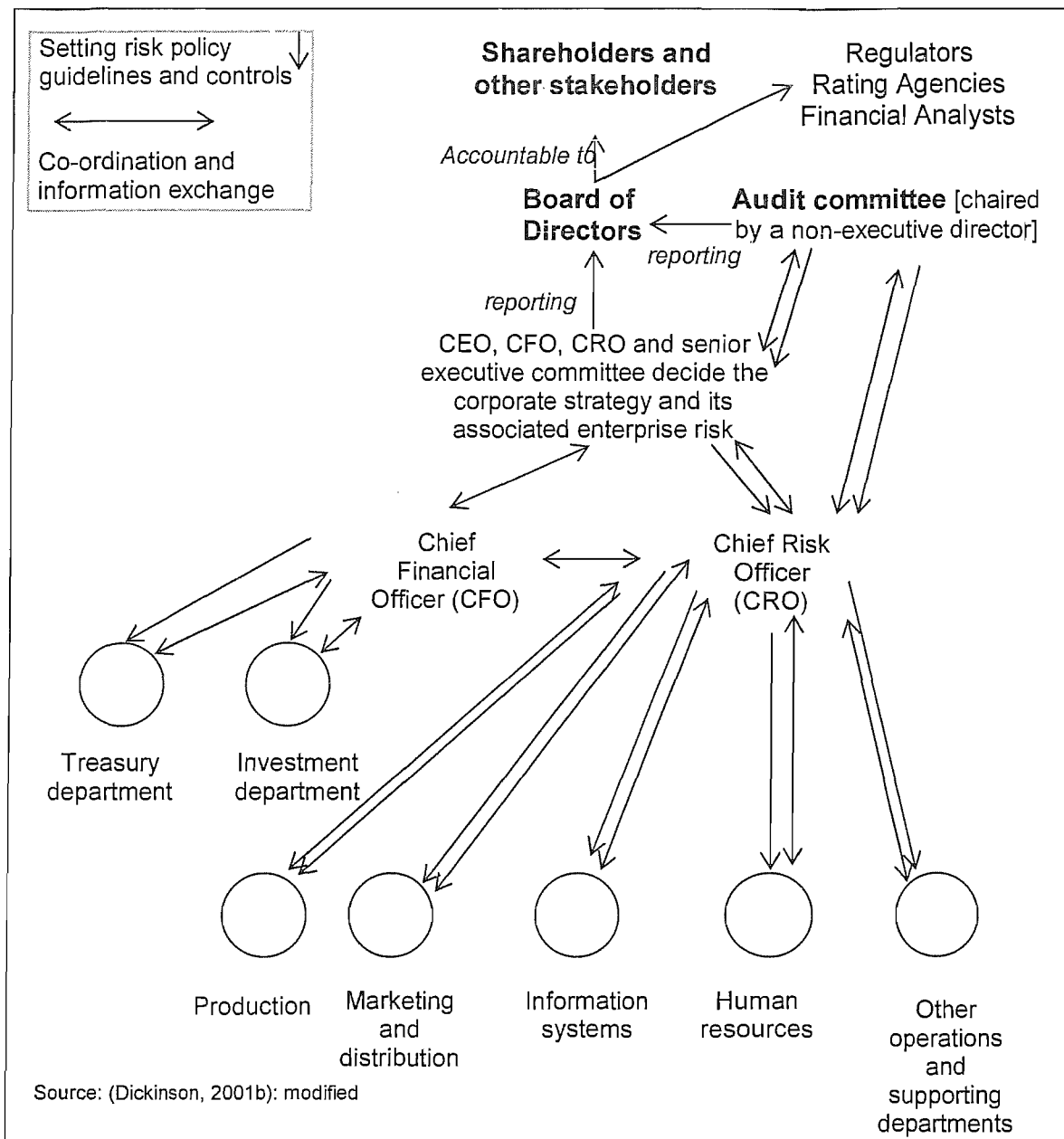


Figure 19(2) suggests the CRO as an independent position reporting directly to the CEO, where the CFO and CRO are peers with different functions (Aabo, 2005). However, the CFO is finance and accounting driven, with the responsibility of representing the company to the external parties such as stakeholders, rating agencies and financial analysts. However, the CRO has to be driven by economic value added functions thus bearing the responsibility of reserving to avoid pitfalls by smoothing out the overstretched financial results. In addition, CROs are responsible for developing risk management policies and compliance monitoring, enterprise risk modelling and the definition of sensitivities or enterprise risk tolerance (Aabo, 2005, Stahel, 2004). Placing the CRO at such a focal point at



the organizational hierarchy as seen in figure 19(2) illustrates a clear acknowledgement of the importance attached to the practice and values of ERM (Carter, 2000b).

In the presence of a wider risk management function the CEO is the ultimate CRO (Bannister, 1999, Damary, 1976, Pountney, 2000). It is still not clear if it is suitable for a CRO to understand the overall risk functions of the organization while sitting at the position where all the various functions of the organization converge. Nevertheless, a large part of the CRO's job entails seeking clues by asking questions, and communicating the results across the organization.

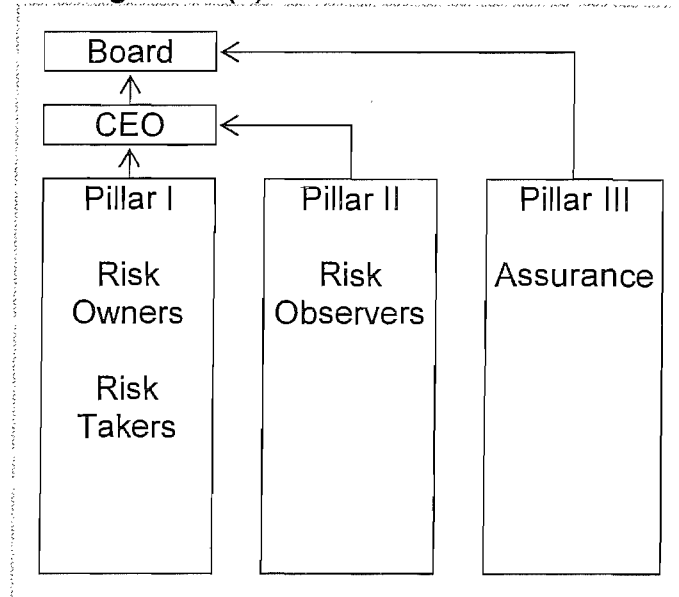
Co-ordination is a significant function of the new type of risk managers. As such they should have skills in a wide range of issues such as human resource management, communication, and vision strategy, and analytical and financial skills, as well as a clear understanding of the company's business and overall risk exposure (Reavis, 1969). This new position is increasingly called the CRO (Zech, 2001). The CROs are now being assigned to implement the ERM programme (Beasley, 2005, Lam, 2000, Liebenberg, 2003).

In the recent three pillar organizational structure shown in figure 20(2), three roles have emerged. They are risk owners<sup>138</sup>, risk takers, and risk observers. The structure illustrates the interplay of different people dealing with risk and clearly separates risk owning and risk taking from risk management. A further categorization of risk takers is seen as strategic risk takers and tactical (functional) risk takers. As Holton (2004a) suggests, the CEO and other senior managers act as strategic risk takers while formulating strategy that entails taking certain risks. However, local underwriters and investment managers, whose job is to implement the strategy, take risks while performing their defined functions. The risk observers neither take risks, nor do they own

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<sup>138</sup> Deloach (2004) states: "risk owners are responsible for coordinating and continuously improving risk strategy, process and measures enterprise-wide in accordance with established business objectives. They share knowledge and best practices, so the enterprise learns only once and captures intellectual capital". However, the promotion of the structure of risk ownership belongs to organizations' corporate governance agenda.

Figure 20(2): Governance structure



the risks, but provide an advisory service to other groups. The question of who bear the risks (risk owners or risk observers) still remains unanswered. It is increasingly argued that apart from the specialist (sector-specific) functions (Dearlove, 2003, Korn Ferry International, 2002, Mayers, 2000, Mehr, 1973, Muller, 1999, Santomero, 1997, Smith, 1993, Stulz, 1996), a CRO should be conversant with the general management functions (AIRMIC, 1999, Benton, 2001, Close, 1974, Copeman, 2003, Crockford, 1976, Damary, 1976, Davis, 1958, Long, 1956, Louisot, 2003, Mehr, 1958, Petroni, 2000, Thompson, 2000, Valsamakis, 2002).

There is a misunderstanding concerning various terminologies that leads to confusion among disciplines. One of them is the 'portfolio of risk', which comes within the definition of ERM (Miccolis, 2003b). The general understanding of most disciplines except finance is that ERM is the management of the 'portfolio of risk' that an organization faces (Beasley, 2005). It is presumed that the phrase is borrowed from finance where Markowitz's mean variance framework defines 'portfolio of risk (stocks)'. Although risks from the stocks is a subset of enterprise risk (Lam, 2000), its meaning differs extensively between the two perceptions (Darlapa, 2006). Indeed, enterprise risk and risk as used in the portfolio theory are two different concepts. The blind applications of portfolio theory could misguide insurers in business decision making, in particular, in diversifying into new businesses (Wang, 2004).

## SECTION 6

### A THEORETICAL FRAMEWORK OF ERM

#### 1. Introduction

As it was initially stated that the objective of the study is to conceptualize ERM as it grows organically, the theoretical framework should reflect this. Based on the discussions as included in the literature review, a framework of ERM can be proposed on the following dimensions (or unit of analysis).

Understanding

Evolution

Structure

Challenges

Performance

#### 2. Elements of the theoretical framework

##### 2.1. Understanding of ERM

The literature review classified ERM into four levels directly linked to the choice of corporate objectives (see figure 7(2)). The review however concluded that a robust ERM is only possible while risk is viewed as an interdisciplinary perspective (see table 2(2)) and when their interrelations are truly valued and captured. Whereas ERM is an art when it focuses on the entire organization from the general (also strategic) management perspective, it is a science when seen from the technical and silo disciplinary perspective. However, a complete ERM needs both. Because insurance companies deal with the risks of clients in addition to risk arising from both internal and external sources, risk management is the core function of insurance companies. From this perspective, ERM needs to be viewed from the general perspective keeping sufficient room for technical treatment for innovation and better management at least for the purpose of competitive advantages.

##### 2.2. Evolution of ERM

The literature suggests a range of sources that inspired insurers to reconsider their risk management initiatives with a shift from the fragmented to a holistic

perspective. Key are recent changes in the regulatory approaches (risk-based regulations) in supervising insurers (see Section 5), and the concerns of senior management (and board of directors) in the face of volatile economic circumstances that influence innovation and leadership to add shareholder value.

### **2.3. Structure of ERM**

While the design of ERM is a top-down approach, its implementation requires bottom-up consideration. In addition to quantitative issues of risk management, for example, risk measurement, risk modelling, calculation of various capital, and allocation thereof among businesses, the role human perspective towards risk and risk management is unquestionable (see figure 13(2)). Because the process of risk management involves people, so their attitudes and perceptions dominate the design of ERM. Moreover, insurance is a business of trust as premium is paid upfront (see figure 8(2)). The psychology of stakeholders, in particular, the managers, who design and executive ERM essentially requires studying and accumulating into the designing phases of ERM. However, the challenge in the design is the alignment of ERM with corporate objectives and strategy.

### **2.4. Challenges in the implementation of ERM**

Considering the role of qualitative and quantitative aspects in designing phases of ERM, the changes to ERM may come from both operational and technical perspectives of ERM. Whereas the technical challenges belong to the financial and actuarial disciplines, the operational challenges are much more relevant to organizational behaviour in the broader field of knowledge management. While adequate meaningful data is the key challenge of implementing ERM from the technical perspective, establishing the context and communicating the perception of risks across the organization and developing a common language of risk<sup>139</sup> and a risk aware culture are the key challenges of operational perspective.

Interestingly, they are not isolated issues but they often overlap. However, the central (or overriding) challenge of ERM from the organizational perspective is to position the technical aspects of ERM (the way ERM is growing) as the general management issue of insurers.

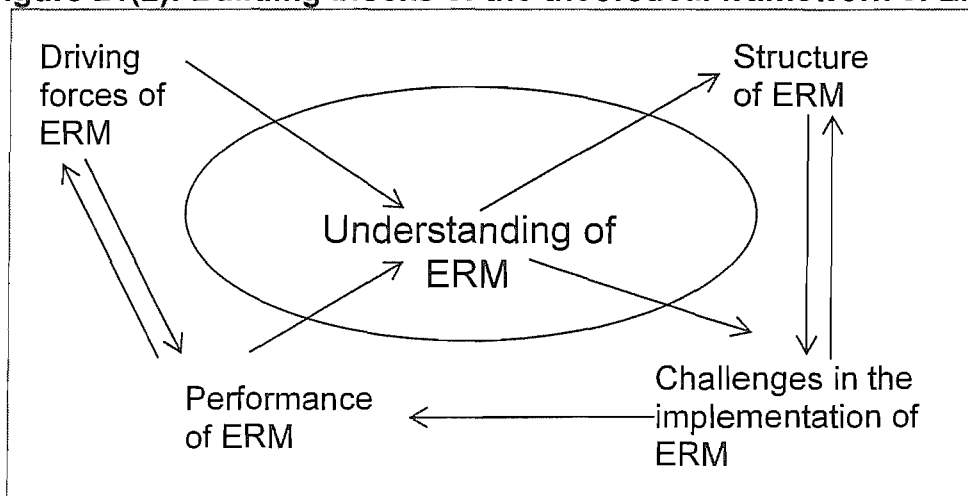
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<sup>139</sup> Deloach (2004) defines the common language of risk as “a tool for facilitating and sustaining an ongoing dialogue among the firm’s managers and employees about risk and the process affected by risk. Establishing commonality is vital because each individual has a different understanding and perspective of the business.”

## 2.5. Performance of ERM

In measuring the performance of ERM, the key question that arises from the literature is the time of evaluating the performance depending on either ex-ante or ex-post. As the understanding of ERM is of undertaking an advisory function in managing risks, the tangible factors in measuring the performance of ERM do not exist. Consequently, it is closely linked to the overall performance of the organization (which is often measured on post loss circumstances) as the key objective is to achieve the corporate objectives at the least possible cost (see figure 6(2)).

**Figure 21(2): Building blocks of the theoretical framework of ERM**



The above figure 12(2) illustrates the key building blocks of ERM as considered in the study. While suggesting the interrelations among them, it places the understanding of ERM at the centre. Drivers of ERM provide the input in conceptualizing ERM issues; the understanding in turn influences the initiative of managers in designing ERM. The strength and weakness of the design supported by the economic forces provide challenges to implement ERM. Finally, the performance of ERM (which is measured in the dynamic driving forces) influences the understanding and the cycle operates again and again.

## 3. Gaps in the literature

As the literature review reveals that ERM is an evolving field, there are in fact very few journal articles (academic study) that attempt to conceptualize ERM.

Although there is quite a large literature base, it is very scattered and more importantly they are focused in a mono disciplinary perspective. There have been no empirical studies until recently, when (Beasley, 2005) attempted to carry one out on ERM, but ultimately acknowledged its limitations saying:

“we acknowledge limitations in our research approach. First, we use survey data obtained from chief audit executives. The response rate to our survey instrument is not as high ..... Third, due to the limited data, we have not considered interactions among the independent variables ....”

In addition, the surveys conducted by professional firms and others as discussed above tend to focus on knowledge updating without giving much in-depth thought to ERM as an independent subject. Moreover, the respondents of all such surveys are senior level people, who provide a consultancy service to people, who actually take, own and manage risks. Consequently, such studies although interesting, are insufficient to provide a full picture of ERM.

It is therefore necessary to consider in depth the structure of o ERM from its origin to its performance in practice. In summary, an academic study needs to be designed in order to explore the following dimensions.

#### **4. Research Questions**

The gaps in the literature suggest the following five research questions. They are arranged under the five dimensions (unit of analysis) of the study.

##### **4.1. Understanding of ERM**

In exploring the understanding or ERM, the study should explore questions like: “how people perceive ERM? What is their conception? And “how do they differ?”

##### **4.2. Origin of ERM**

In searching for the motivation of ERM, the study should look for the key driving forces, which motivated insurers to consider ERM.

##### **4.3. Structure of ERM**

The study should examine the design of ERM including the core elements and their meaning.

#### **4.4. Challenges in implementing ERM**

Following the structure, the study should investigate the challenges in implementing ERM both in technical and operational issues and the way they deal with them.

#### **4.5. Performance of ERM**

The study should finally look for the performance of ERM, where a search of the components of measuring their performance and their complexities are important.

In brief, the primary research questions are as follows. However, they will be explored details in Chapter 3.

What is the understanding of the nature of ERM within the insurance industry?

What motivates insurance companies to develop ERM?

How do they structure ERM?

What challenges do they face in implementing ERM?

How do they measure the performance of ERM?

CHAPTER 3  
RESEARCH METHODOLOGY

Page 103-123



## CHAPTER 3

### RESEARCH METHODOLOGY

#### 1. Introduction

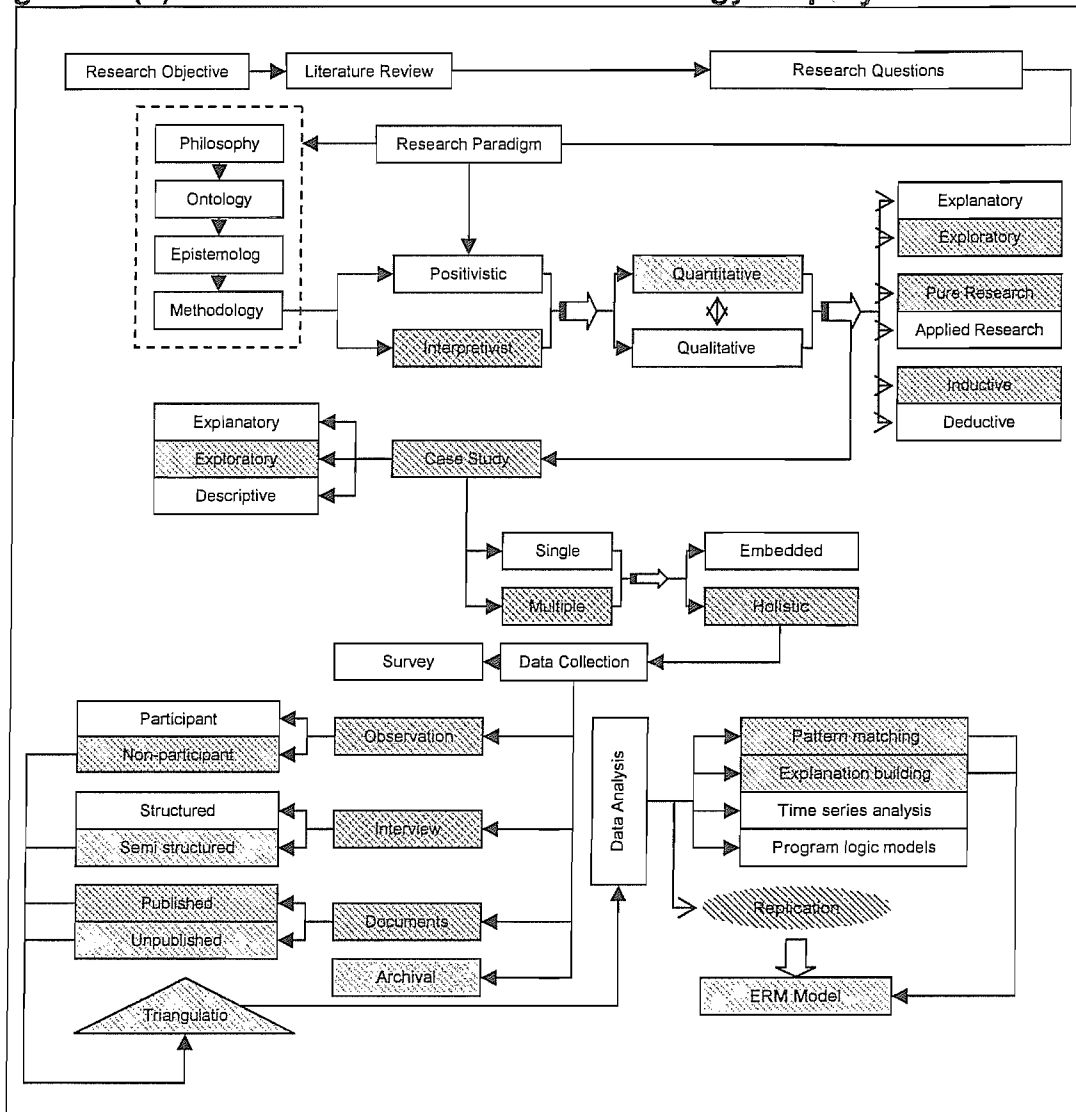
This chapter provides a methodological review of the investigation. The aim of is to find appropriate research tools that best fit with the research questions, the research context and the resources at hand for this study (Bickman, 1997). It presents a critical review of major research strategies typically used in business research. The philosophical perspective of the research and the methods chosen to investigate the research objectives are described. The limitations of the research design and problems faced in conducting this research are also explored.

The structure of this chapter is as follows.

Firstly, it provides a revision of the research objectives, gaps in literature and research questions from Chapter 2. Then it describes the research paradigm in general (positivist and interpretivist) and intends to connect the appropriate research paradigm for the study. Thereafter, various types of academic research (e.g., exploratory versus explanatory, quantitative versus qualitative, inductive versus deductive and applied versus pure) are discussed. Then the research strategy will be explored. Various strategies (e.g., grounded theory, action research and case study) were explained in terms of their aim and types. After careful revision of the research questions case study was found appropriate for the study. Thereafter, various research methods which often employed for the academic studies will be discussed. Various means of triangulation (e.g., interviews and questionnaire survey, observations, documents and archival records) were discussed. Various data analysis methods were also discussed but the 'pattern matching' obtained through sense making discussions was found appropriate for the study. Finally, conclusion will be drawn through a flowchart of all discussion.

Figure 22(3) illustrates a flowchart of this chapter and summarises the conclusions pointing the research methodology and methods adopted in this study among various alternatives.

**Figure 22(3): Flowchart of research methodology employed in the study**



The foregoing discussion suggests that under the methodological assumptions, the interpretivist paradigm mostly fits with the objectives of the study. This occurs because the findings which are generated through answering the research questions are tied to the cultural system of the organisations and their validity can not be tested across case study companies. A naturalistic view is regarded as essential because it is important to describe the context in terms of a wide range of variables. It is deemed necessary to employ a qualitative methodology because the

information which needs to be imputed to answer the research questions are rich, deep, and holistic in nature. An exploratory case study approach was found suitable because the research intends to establish an interdisciplinary background (or basis) for risk management and this will be used to produce propositions. The research is based on inductive reasoning because it moves from specific observation to broader generalization. The case study approach was considered appropriate to answer the research questions (beginning with why & how), which were in line with understanding ERM as an organisational issue (Lin, 1998). Multiple cases were chosen to facilitate generalization of results to theoretical propositions. Multiple sources of data (i.e., data triangulation: a combination of different data collection techniques to study a unique phenomena (Jick, 1979)) were deemed necessary (interviews, surveys, and documents) in order to bring out details of the staff's experience of ERM from the viewpoints of interdisciplinary respondents.

## **2. Reiteration of the gap in the literature**

The gap in the risk management literature associated with ERM is clear. Almost all theoretical work in risk management has been conducted in silos within a single disciplinary focus (e.g., finance, organisational behaviour, etc.). However, risk enters an organization from various sources beyond disciplinary boundaries. As a result its management requires holistic treatment. The response to risk both from practitioners and academicians has been a silo approach, driven by core professional ethics built on specialization. This had led to a dangerous perception of separation (Bannister, 1999). Consequently, the theoretical basis of risk management was developed in isolation without taking an interdisciplinary perspective (Dickinson, 1997, Mehr, 1963, Mehr, 1974). A particular theoretical perspective can blind researchers to other perspectives at its moment of application (Dobson, 1999). Consequently, the biggest practical challenge in promoting ERM may be the specialized focus, which is built on disciplinary silos. This suggests that a "tunnel vision" may be used to tackle risk management problems (Bannister, 1999). Moreover, the organization structure of many insurers (which is traditionally built on a vertical control system) does not allow interdisciplinary (or interdepartmental)

approaches and it could be argued that this structure needs to be replaced by matrix structure.

### **3. The objective of this research**

The rapid growth of global business activities make greater demands upon managers and decision makers operating in the complex business world. Business managers now require comprehensive knowledge about the elements of enterprise risk of their individual organization. There is no doubt that risk management in business life today constitutes an important part of an organisation's strategic management. Also in a day-to-day management, there is a need for crossing the borders between different divisions of an individual company. The literature review of this study explored the nature of Enterprise Risk Management (ERM) and the issues and problems (i.e., complexities) associated with its "design", "implementation" and "communication". These issues are underpinned by people, processes, tools and technology of the organization. In addition, the literature review explored the implications (or impact) of ERM both for existing and new business. The literature review developed an understanding of the key elements of a robust ERM system as suggested by previous authors and practitioners, in the form of a theoretical framework. A theoretical framework is a collection of theories and models from the literature, which supports the research study (Hussey, 1996). The objective of this part of the research was to develop a model of an effective ERM system. However, I am interested to investigate how ERM is embedding into day-to-day management processes including how risk data are accumulated and transformed into useful management information. The ultimate aim then of the empirical research is to compare the theoretical model developed from the literature with the approaches adopted by insurance companies in practice. In particular, I am interested to explore the motivation, trigger points, and the evolution of ERM in the insurance industry including the related problems associated with its design and implementation.

Finally, it is not the objective to criticize the over emphasis of any particular discipline in developing ERM, rather the ultimate aim is to show that there are many situations which require a cross disciplinary involvement (which is

practice seems neglect) to establish risk management as a holistic subject in its own merit. The idea is simple in many instances, for example, questions like “how much risk can an insurer afford?” needs a holistic (interdisciplinary) treatment involving risk and capital management, insurance management, human resources management, cultural change, etc. This approach integrates both subjective and objective phenomena to which insurers operate.

#### **4. Research questions: five dimensions of the research**

The study is limited to an exploration of five dimensions of ERM (e.g., understanding, motivation, design, challenges, and performance). They in fact serve the purpose of the unit of analysis in the study. They are briefly addressed below in terms of the findings from the literature. Also the research questions stemming from the literature are reiterated.

##### **4.1. Dimension 1: Understanding of ERM**

The aim is to investigate the understanding of ERM amongst re/insurance companies. It categorically and in particular, to explore how ERM is conceptualized in the insurance industry both by individuals and groups. Key research questions associated with this dimension are:

- What is the understanding of ERM in the insurance industry?
- How does such an understanding develop?

##### **4.2. Dimension 2: Motivation of ERM**

The second dimension focuses to exploring the motivation for adopting ERM in the insurance industry. The key research questions are:

- How did ERM evolve in the insurance industry?
- What are the key driving forces?

##### **4.3. Dimension 3: Design of ERM**

The third dimension is concerned with the design employed by ERM for insurers. The main focal point of the investigation is to identify the elements

which are regarded by insurers as the key of an effective ERM framework.

The key research questions are:

- What elements constitute an ERM framework and how do they relate to each other?
- What problems do management face in designing the framework and how are they overcome?
- How does risk culture and the risk governance process promoted within an ERM system employed by a re/insurer?
- What difficulties need to be overcome in respect of design to support the execution of corporate strategy?
- How is a dynamic boundary across all risk types within an ERM system established to reflect the corporate strategy and the external market environment?

It appears from the literature that capital regulations and recent changes in the corporate governance guidelines are the dominant drivers of ERM. However, globalization, merger and acquisitions across global insurers, competition (that forces insurers to develop go for new products, new markets) and changes in the world economy may have also led to the organic growth of ERM.

#### **4.4. Dimension 4: Challenges in implementing ERM**

The fourth dimension investigates the implementation and communication issues associated with ERM and the barriers (or complexities) suffered by insurers during the implementation process, including how they attempt to overcome these problems. It was evident from the literature that ERM implementing organizations were struggling with both financial issues (e.g., capital allocation, risk aggregation, risk financing/securitization etc.) and

operational issues (e.g., common risk language, natural hedge within the portfolio of risk of the enterprise, exploiting opportunity and determining risk ownership while implementing the model). This dimension is associated with the followings are the research questions:

- What problems do the re/insurers face in implementing ERM and how are they overcome?
- What tools are present in re/insurers ERM system to help overcome these problems? Are they effective? What problems are faced by insurers in identifying hidden risks and how are they overcome?
- Is there any correlation between operational risk and financial risk associated with into the entire portfolio of risks of the insurers? How does the correlation affect the integration of the two categories of risks? How risks are integrated (or aggregated)?
- How is the risk management strategy linked to the corporate (or business) strategy of a re/insurer? What are the policy implementation and communication issues that affect this linkage? What difficulties do re/insurers face in trying to achieve this?

#### **4.5. Dimension 5: Performance of ERM**

The final dimension is concerned with the means employed by re/insurers to measure performance of ERM whilst taking its strength and weakness (and also costs and benefits) into consideration. The literature suggests the ultimate benefit of ERM is the adding of shareholder value (from a finance perspective). However, this study is also interested to look at performance from the perspective of the view of other disciplines. The research questions associated with this dimension are therefore:

- What are the costs and benefits of ERM?
- How does the performance measured?

## **5. Research Paradigm (or Philosophy)**

A paradigm is essentially a worldview within which provides a whole framework of beliefs, values and methods within which research takes place (Denzin, 2000, Groenewald, 2004, Guba, 1990, Kuhn, 1970, Lincoln, 1985, Ryan, 1970, Stange, 1990). A research paradigm defines the many different ways of exploring a question that are considered legitimate for producing scientific knowledge (Tyson, 1995). A research paradigm is the foundation of building knowledge about human nature and society and represents researchers' basic beliefs about the world. These are reflected in the way the researcher designs the research, analyzes data and even the way they write thesis. Two key research paradigms have emerged from the literature (i) positivistic (scientific) and (ii) interpretivist (phenomenological or naturalistic).

The main assumptions of these two paradigms are categorized as ontological, epistemological, axiological, rhetorical and methodological (Creswell, 2003). Ontological assumptions deal with the nature of the reality. Consequently, the assumption address whether reality is objective and singular (or external) to the researcher or subjective and multiple (or socially constructed) and only understood by examining the perceptions of the human actors.

Epistemological assumptions are concerned with the study of knowledge. This involves assumption covering whether the researcher is independent from that being researched or whether the researcher interacts with that being researched. Axiological assumptions deal with the role of the values (i.e., whether science and process are value free and unbiased or value-laden and biased). In addition, axiological assumptions are concerned with the language of the research (i.e., whether the style is formal and based on set of definitions or informal and definitions evolve). Finally, methodological assumptions concern the process of research. These assumptions are associated with issues such as whether the research process is deductive (cause and effect) or inductive (the mutual, simultaneous shaping of factors), either static design (categorizes isolated before study) or an emerging design (categories identified during research process), either context-free (i.e.,



generalization leading to prediction, explanation and understanding) or context-bound (i.e., patterns, theories developed for understanding), either accurate and reliable (through validity and reliability) or accurate and reliable through verification (Hussey, 1996).

Whilst the positivist approach towards research assumes that a true explanation (cause of an event/social pattern) can be found (tested/verified) scientifically, the interpretivist approach does not seek an objective truth but rather seeks to unravel a pattern of subjective understanding (Roth, 2002). The differences between positivist and interpretivist research are highlighted prominent in the types of questions asked of the data and the types of conclusions drawn by researchers (Hussey, 1996, Lin, 1998).

In terms of the epistemological assumption: the researcher believes that the best way of understanding the phenomena of ERM is to view it in its context. Examining the literature of ERM, in particular, the quantification of risk, it is clear to the researcher that quantification is limited in nature, looking only at one small portion of reality; thus ignoring the full importance of the whole phenomena. The researcher believes that it is important to allow the questions to emerge and change them over time while becoming familiar with surrounding issues attached to the questions; rather than approaching measurement with the idea of constructing a fixed instrument or a particular set of pre-conceived questions. Moreover, the researcher holds a particular set of ontological assumptions about the world and the researcher does not assume that there is a single unitary reality apart, from our perception of risk. This is because the researcher believes that each of us experiences from our own point of view and so experiences a different reality. The researcher strongly believes that conducting research without taking this into account violates the fundamental view of the individual as a unique identity.

Taking the above discussion along with the research objective and research questions, it is argued that the study best fits into the interpretivist (or phenomenological) paradigm having a subjectivist view.

## **6. Types of academic research**

Academic research is mainly classified in terms of purpose, process, logic and outcome (Hussey, 1996). However, each category is further classified into different sub-categories. In terms of the purpose, research is categorized into exploratory and explanatory (or analytical). In terms of the process, research is classified into quantitative and qualitative. In terms of logic, research is classified into deductive and inductive. In terms of outcome, research is classified into applied research and pure research. Each of these distinctions is now explored in turn and the nature of the current research strategy is classified accordingly.

### **6.1. Exploratory and explanatory research**

In identifying the purpose of the research it is important to provide answers to the key questions such as “why the subject needs to conduct research”. The purpose can be framed as either exploratory or explanatory (or analytical). Exploratory research aims to look for patterns, ideas or hypothesis, rather than testing or confirming a hypothesis against empirical evidence, in which the data is based on observation or experience (Stebbins, 2001, Yin, 2002b). The focus is on getting insights and familiarity with the subject area for more rigorous investigation at a later stage. Exploratory research includes historical analysis through case study using both quantitative and qualitative data. In contrast, explanatory (or analytical) research aims to understand phenomena by discovering and measuring causal relations among them (Denzin, 2000, Yin, 2002a). Explanatory research forecasts the likelihood of a similar situation occurring elsewhere while identifying and controlling the variables in the research activities (Vaus, 2001). As the interest of the research is to explore the motivation of ERM in the insurance industry, including the related problems associated with its design and implementation, the research is more likely follows exploratory approach.

Here need a full explanation of why you believe your research is exploratory (one reason is that so little has been don't in real insurance companies in the past.

## **6.2. Qualitative Research and Quantitative Research**

In terms of the process (i.e., to provide answers to questions such as “how to collect and analyze data”) research can be divided into two parts: qualitative and quantitative.

According to Creswell (2003) “a qualitative study is defined as an inquiry process of understanding a social or human problem, based on building a complex, holistic picture, formed with words, reporting detailed views of informants, and conducted in a natural setting”. The findings of the qualitative research are not arrived at by statistical procedures or other means of quantification. This research is about persons' lives, lived experiences, behaviours, emotions, and feelings. Moreover, it is about organizational functioning, social movements, cultural phenomena, and interactions between social factors. The data are mainly concerned with the real views/opinions of persons and the analysis is interpretative (Strauss, 1999). The data are collected by hearing what others have to say, seeing what others do, and representing these as accurately as possible. It means gaining an understanding, while recognizing that researchers' bring their own views to the research situations and that these might be quite different from those of their respondents. In contrast, quantitative research focuses on the quantification of phenomena to produce findings using numerical data through an objective, formal, and systematic process (Black, 1999, Bryman, 2004, Bryman, 2003, Duffy, 1987, Saunders, 2002). Qualitative research questions often start with a how or a what as the initial focus (Gill, 2002, Phillips, 2005). The key distinctions between qualitative and quantitative researches fall under four dimensions (e.g., words versus numbers, subjective versus objective, and discovery verses proof) (Bryman, 1988, Cassell, 1994, Cook, 1979). In essence they hold fully different philosophical beliefs (Lincoln, 1985, Yin, 2002a).

The study is primarily qualitative because of the following reasons:

Firstly, the aim of the study, as operationalized by the research questions, is to achieve a complete story of ERM, which involves its detailed description. Little information exists, which permits the researcher to conceptualize the features of ERM. Moreover, the information necessary to address the research questions are mainly the views of the respondents, in terms of their words and statements, and more importantly they are subjective and context driven. Such characteristics prevent the researcher from constructing statistical models in an attempt to explain what is observed. Moreover, ignorance in terms of the information relevant to ERM restricts the researcher in fully designing the study in advance. In addition, the context of the data (i.e., how staff make sense of ERM in terms of their lives, experiences, and their structure of the world) is more important than the accuracy of the data in order to answer the research questions. Consequently, qualitative research is regarded as appropriate for the study.

### **6.3. Inductive Research and Deductive Research**

In terms of the logic (i.e., to provide answers to the questions such as “whether the researcher is moving from the general to the specific or vice versa”) research is classified into inductive and deductive research. Inductive research is a study in which theory is developed from the observation of empirical reality (Gill, 2002, Mintzberg, 1979). This means that general assumptions are induced from particular instances; this is moving from individual observation to statements of general patterns or laws. In other words, inductive research pushes the study to move from particular to general (observation – pattern – tentative hypothesis or propositions – theory). In contrast, deductive research is a study in which a conceptual and theoretical structure is developed and then tested by empirical observation (theory to data) (Orton, 1998). This means that the particular instances are deduced from general inferences in order to move from general to particular (theory – hypothesis – Observations – Confirmation) (Hussey, 1996). Ensuring that the style of research questions is commensurate to the research purpose it is evident that inductive research is more appropriate for the study. Moreover,

little has been written about the nature of ERM within insurance companies, and this is not sufficient to develop hypotheses. The study aims to explore and look at the problems relating to ERM so that insurance companies can try to develop some more general views on ERM from the observations of this study. Therefore, the building of abstractions, concepts, propositions (hypothesis), and developing a substantive theory of ERM is important.

#### **6.4. Applied Research and Pure Research**

In terms of the outcomes (i.e., to provide answers to the questions such as “whether the researcher is trying to solve a particular problem or make a general contribution to knowledge”), research is classified as applied and pure research (Easterby-Smith, 2002, Hussey, 1996). Applied research is designed to apply its findings to solve a specific and existing pragmatic problem (Hedrick, 1993). In other words, applied research develops a real world scenario, utilizing pure research. In this sense, applied research builds on selected findings from pure research (Bickman, 1997, Miller, 2002). Like pure research, applied research focuses on original investigation in order to acquire new knowledge (Yin, 2002a). However, it is diverted primarily towards a specific practical aim or objective (Easterby-Smith, 2002). In contrast, pure research is less specific in nature and is conducted primarily to improve understanding of general issues without emphasis on its immediate application. However, it is the most academic form of research, since the principle aim is to contribute to knowledge usually for the general good rather than to solve a specific pragmatic problem of one organization. More broadly, pure research intends to lead theoretical development without any particular application or use in view (Patton, 2002). Pure research analyses properties, structures, and relationships with a view to formulating and testing hypothesis, theories or laws. One of the criticisms of pure research is that it is carried out without looking for long-term economic or social benefits other than advancement of knowledge. The research questions in applied research are designed to produce comprehensive information on both the implementation (e.g., “what is” and “what is the difference between what is and what should be”) and the effects (e.g., “what caused what”) of an interaction. In other

words, questions to be addressed by applied study tend to be posed by individuals other than the primary researcher (Bickman, 1997).

Applied business research, and this includes insurance, is essentially problem solving rather than theory generating. This is largely because industries such as insurance are far too complicated to lend themselves to general theories. Insurance, by definition is an interdisciplinary industry involving a wide range of academic disciplines (i.e., marketing, human resource management, operations research, risk management). Applied research must similarly be interdisciplinary in order to understand and resolve the issues facing the insurance industry (Green, 2000). This supports the study of ERM as pursued in this thesis. However, the study also explores the structures and relationships associated with ERM with the aim of developing some general principles or hypothesis. In this sense the research could be defined as a pure research. Summarizing the above discussion and aligning it with the research objective and research question it can be concluded that the research falls between pure and applied research.

## **7. Research strategy**

In line with the research paradigm (i.e., interpretive) and the research questions, the following research methodologies are suggested by the literature:

### **7.1. Grounded theory**

Grounded theory is most accurately described as a research method where the theory is developed from the data (Glaser, 1967, Locke, 2001) in contrast to theory obtained by logico-deductive methods. This is an inductive [and ethnographic] approach exploring the issues from specific to general. The theory is grounded in the data, which is obtained through social research (Goulding, 1998). The three basic elements of grounded theory are concepts, categories, and propositions (Corbin, 1990, Glaser, 1994, Pandit, 1996).

## **7.2. Action research**

Action is a kind of applied research where the researcher attempts to develop results (or a situation) that are of practical value to the people with whom the researcher is working, and at the same time developing theoretical knowledge (Herr, 2005, Horlick-Jones, 2002, Horlick-Jones, 2001).

## **7.3. Case study**

The case study research method involves learning about a complex phenomena based on an in-depth understanding of that phenomena. The understanding is obtained by extensive description and exploration of analysis of that phenomena taken as a whole and in the context of specific organisation/s (Eisenhardt, 1989, Merriam, 1997, Stake, 1995, Yin, 2002b). The design of Case Study research is not totally isolated but often uses other methods (e.g., grounded theory) to some extent (Laws, 2006, Yin, 2002a).

The Case Study approach is selected for the current study and the reasons for this are explored below.

### **7.3.1. Aim of the Case Study**

Case studies provide a description of phenomena, which helps to develop theories (George, 2005). Case study research is often associated with theory development and used to provide evidence for hypothesis generation and for exploration of areas where existing knowledge is limited (Dobson, 1999). The case study provides "the most complete and detailed sort of presentation of the subject under investigation," made possible "by giving special attention to totalizing in the observation preconstruction and analysis of the objects under study" (Zonabend, 1992). It is the type of study most suited to understanding the way in which the subject under investigation by the researcher (sociologist or anthropologist) is defined or established within the meaning of the social actors, by the description of the object as the study develops (Yin, 1992). The Case Study makes it possible to understand the meanings social actors assign to their own experiences. The detailed, in-depth description rendered by the case study permit an understanding of the empirical foundations of the theory.

The case study approach therefore appears ideal for the current study since it can be used to present an account of the organisations' experience of ERM over a number of years. It can be used to record the events that managers had to deal with, such as changes in competitive advantage, and charts the managers' response, which usually involves the changing of the business or corporate level strategy (Stake, 1995, Yin, 2002b). Case study involves an explanation of the reality as seen through the eyes of the researcher. A case study attempts to provide a description of events (i.e., the lived experience) and may further attempts to test, challenge or develop theory (Eisenhardt, 1989). Case study research thus satisfies the three tenets of qualitative research, describing, understanding and explaining; and it is these three tenets associated with the use of ERM in re/insurance companies which this research seeks to explore.

### **7.3.2. Types of Case Study**

Case studies are classified as descriptive, explorative and exploratory (Creswell, 2003, Yin, 2002b). Descriptive case studies describe (or illustrate) interventions whereas explorative case studies (perhaps an extension of descriptive case study) explore situations where there is a little possibility of getting a single outcome. Its aim is to generate hypotheses for later investigation, rather than being illustrative. Finally, explanatory case studies go beyond description and explain casual relationships among variables while going beyond description (Tellis, 1997a). Explanatory case study design is appropriate for theory testing (Eisenhardt, 1989, Yin, 2002a, Yin, 2002b). The current research involves an attempt to describe the ERM system adopted by a number of re/insurance companies and to develop some general propositions regarding effective ERM system which can be tested by other researchers. Consequently, the research best fits the explorative CASE Study method.

### **7.3.3. Single versus multiple case studies**

One of the critical decisions for this study is whether to employ a single or multiple Case Studies. Single cases are used to confirm or challenge a theory, or to represent a unique or extreme case (Yin, 2002a, Yin, 2002b). Single Case Studies are also ideal where an observer may have access to a



phenomenon that was previously inaccessible. Single Case Studies can be either holistic or embedded, the latter occurring when the same case study involves more than one unit of analysis. Multiple Case Studies follow a replication logic (which involves generalizing to theory rather than empirical data) where a selection is made out of a population to include in the study (Eisenhardt, 1989, Lloyd-Jones, 2003, Yin, 2002a). Each individual case study consists of a "whole" study, in which facts are gathered from various sources and conclusions drawn on those facts (Tellis, 1997a, Tellis, 1997b).

A single case is incapable of providing a generalizing conclusion (Yin, 2002a, Yin, 2002b). For theory building research, single case is not adequate. Consequently, multiple case studies are suggested (Laws, 2006, Stake, 1995) because multiple case studies cover multidimensional facets of the subject, which helps to overcome such difficulties. However, the problem is to determine exactly how many cases are adequate to generalize the findings (Eisenhardt, 1989). Since the debate regarding the degree to which results can be used to generalize theory remains alive. Nevertheless, it depends on the quality of representativeness of cases (Eisenhardt, 1989). This, to some extent, depends on the quality of the representativeness of the cases due to their lack of generalizability. However, there are some potential weaknesses of theory building from cases, mostly because of the large amount of data; this may lead to the researcher being swamped thus being unable to distinguish the most significant variables from a particular case (Mintzberg, 1973). Nevertheless, case studies, like experiments, are generalizable to theoretical propositions. In this sense, the case study, like the experiment, does not represent a "sample," and the investigator's goal is to expand and generalize theories (analytical generalization) and not to enumerate frequencies (statistical generalization). In addition, the major solution to the generalization problem [for a multiple case study] may be that research findings generated by single case design need to be replicated and tested under a variety of conditions to allow generalization from one setting to another with a reasonable degree of confidence (Barlow, 1984, Marshall, 1995).

In summary, since this study aims to describe the current state of ERM development in re/insurance companies and to develop some general propositions concerning the ideal ERM design, it was decided to use the multiple Case Study approach with the intention that this will make the overall study more robust. However, the cases will be selected in such a manner that each case involves similar issues (that is why all cases are selected from the insurance industry) but have different business models (that is why the cases selected are in different stages in their development of ERM).

#### **7.4. Why Case Study fits with the interpretivist paradigm**

The interpretivist paradigm addresses concerns related to the changing and dynamic nature of ERM from a holistic perspective. The key objective of this research is to explore the initiative of ERM in the insurance industry from an interdisciplinary perspective. It is hoped to achieve this aim through analyzing the issues and concepts related to ERM established in the literature and the phenomena perceived in real insurance companies. It is necessary to explain the direct experiences of managers (equivalent to social actors) from the perspective of social relationships that constitute their experiences. Case study is an ideal methodology when a holistic, in-depth investigation is needed (Feagin, 1991). The case study process involves consolidation of collected empirical materials into an object of study (an individual insurer) that will reveal the properties involved in the social relationships that constitute the direct experiences of social actors (Eisenhardt, 1989, Yin, 2002a). Moreover, understanding the empirical properties of the social relationships consequently requires such a description, enabling us to establish the manner in which ERM has been concretely defined within the actual context of the experiences of the social actors (managers) and the meanings they assign directly to such experiences. Consequently, the case study approach appears to serve the purpose of the study.

#### **7.5. Why Case Study fits with the research questions**

Given the type of research questions posed earlier in this chapter, a scientific method for investigating these does not seem appropriate. (Green, 1975) suggests four basic steps of a scientific method of investigation (i.e.,

observing facts, forming tentative deductions from these facts (i.e., hypothesis) making predictions; and gathering new facts to test the predictions and verifying the extent of truth or falsehood of the initial deduction of hypothesis). The level of knowledge concerning how ERM operates in re/insurance companies is not sufficient to allow such a process. Rather, the study is more concerned with the conception building and leads itself more interpretative approach.

### **7.6. Strengths and weaknesses of the Case Study method**

The great strength of the case study method is that it allows researchers to concentrate on the specific instance or situation and to identify or attempt to identify the various interactive processes at work (Bell, 1993). However, case studies provide little basis for scientific generalisation (Yin, 2002a).

#### **7.6.1. Size of the Cases**

It is recommended that long interviews with about ten people can generate meaningful results (Creswell, 2003). Consequently, the study targets 10-15 in-depth structured interviews of interdisciplinary staff in each case, followed by closed question survey.

## **8. Data collection methods**

### **8.1. Survey (Interview and questionnaire)**

Surveys enable the researcher to obtain data about practices, situations or views at one point in time through interviews and questionnaire. They permit the researcher to study more variables at one time. Surveys can be done either by interview or by questionnaire (Miles, 1994). Interviews are regarded as one of the most important sources of Case Study data. Interviews may be open ended (asking respondents their opinion on events or facts), focused (respondent is interviewed for a short time and questions come from case study protocols) or structured (questions are pre-selected and remain within the context of the subject). In case of structured interviews, a formal questionnaire survey is necessary (Piore, 1979, Tellis, 1997b).

Both interview and questionnaire survey will be employed in the current study. The in-depth interviews will note the understanding of the respondents of each case study company. Since the disciplinary backgrounds of the respondents differs, it may be possible that the topics (or issues) covered by them will be inconsistent (for example, because of their disciplinary background one respondent may talk a lot on risk governance but not talk about economic capital at all). However, it is important for the study to take the views of all respondents on all topics (e.g., economic capital). To minimize the effect of inconsistency, a semi-structured questionnaire, addressing the points necessary for the discussion (getting the points in reviewing literature) will be supplied to all respondents prior to all interviews. Moreover, a structured questionnaire survey will be employed after completing all interviews and will be administered to all respondents who participated in the interview survey. The survey questionnaire will list the issues (relating to ERM) which were raised by various respondents and it will illicit their opinions in terms of "Yes" and "No" answers. The questionnaire survey will serve as a back-up document to the interview survey.

### **8.2. Observation**

Data can also be collected through observing people directly on site, both casually and formally. However, reliability is the key concern of this method where multiple observation techniques are employed (Denzin, 2000, Miles, 1994). In 'participant observation' the researcher actively participates in the events being studied. Considering the senior position of the respondents and taking the practical difficulties of gaining access (together with limitation of time in the companies) the observation method will not be employed in this study.

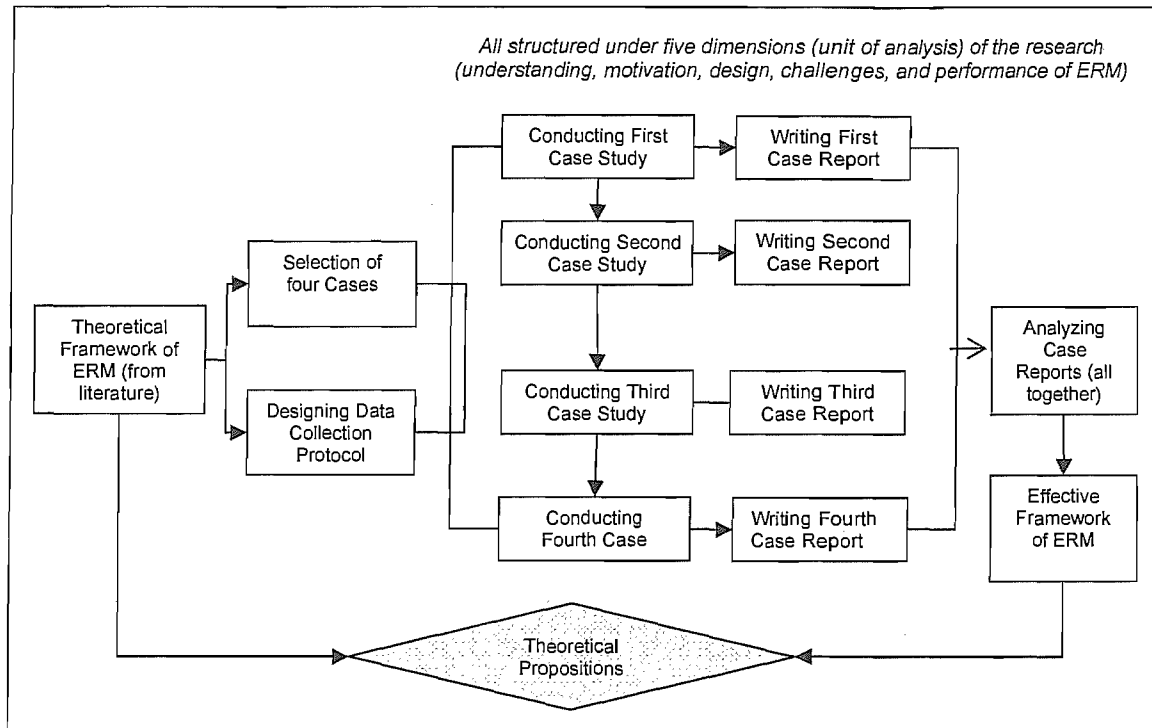
### **8.3. Documents and Archival Records**

Another key source of historical data is documents and archival records. They include study reports, annual reports presentation slides, and so on often available on the website of the case study companies (Silverman, 2001, Yin, 2002a). Historical documents and records (e.g., annual reports, internal and external presentations relevant to ERM) will be analyzed to support the interview responses.

## 9. Conclusion

Figure 23(3) draws together the conclusions of this chapter, through illustrating diagrammatically the key features of the discussion made above.

**Figure 23(3): Research Design**



It starts with the theoretical framework of ERM which is developed from the literature. Then four Cases were selected. Thereafter, data were collected from the cases and analyzed separately and four individual case reports were written. Afterwards they were analyzed holistically, which led an effective framework of ERM. Finally, theoretical propositions are made by comparing the “effective framework” with the “theoretical framework”.

In summary, since the assumptions of the study are that the reality is socially constructed and holistic and variables are complex, interwoven and difficult to measure, the thesis will seek context, interpretation, pluralism, and complexity in analyzing the data. Moreover, the study will describe and analyze the respondents' views and will end with propositions (hypothesis) to develop a substantive theory of ERM.

CHAPTER 4  
ANALYSIS OF RESULTS

Page 124-236

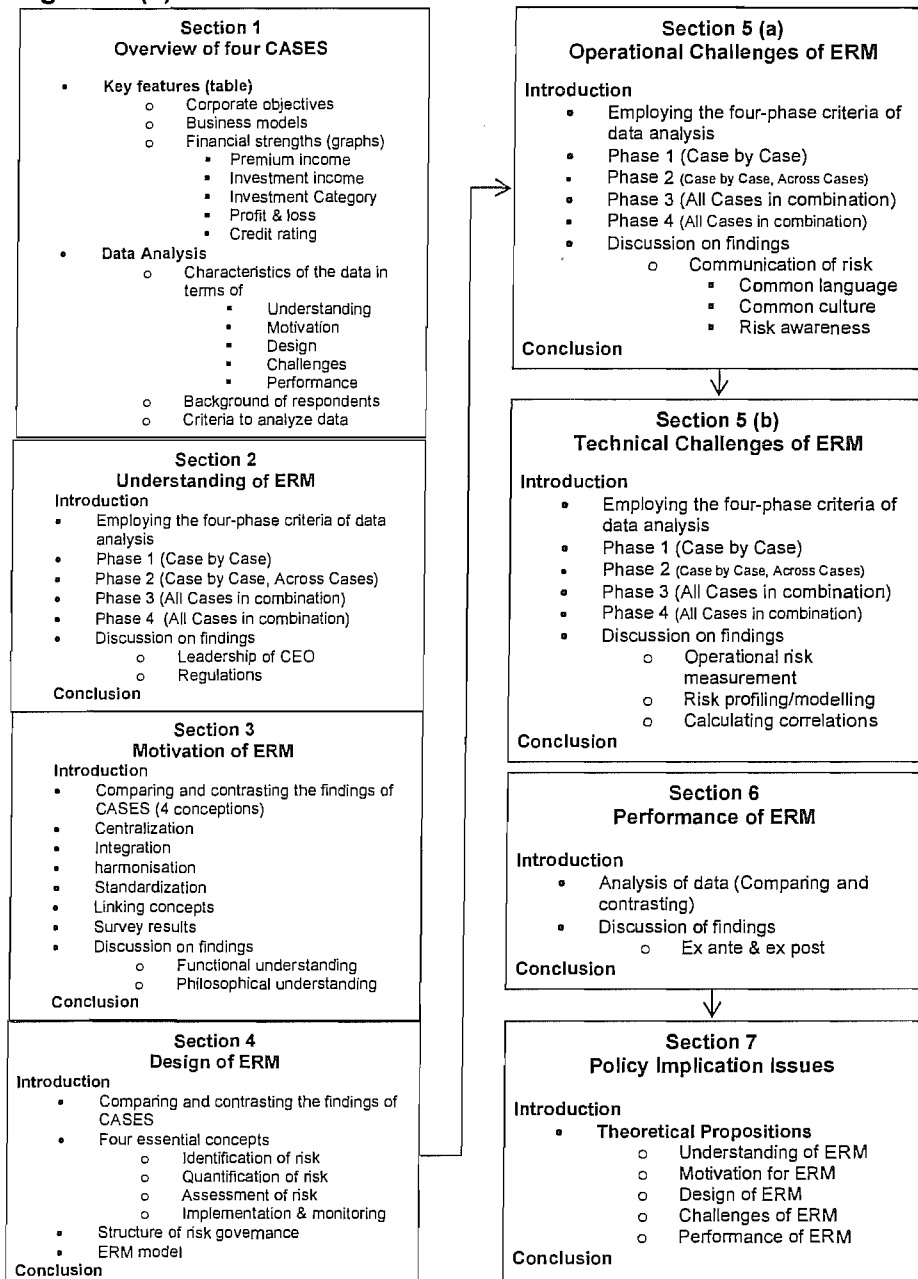
## CHAPTER 4

### ANALYSIS OF RESULTS

#### 1. Introduction

The chapter is divided into seven sections and each subsection explores a number of themes, as outlined in Figure 24(4).

Figure 24(4): Flowchart of the sections



Section 1 provides an overview of the four CASES included in the study. In exploring the key features of the CASES, their corporate strategies, business models, and some key financial indicators are discussed. The objective is to provide the reader with information concerning the similarities and differences between the CASES. Thereafter, the characteristics of the data, the background of the respondents, method of analyzing data (four-phase criteria) and the challenges associated with collecting the data are briefly discussed.

Section 2 analyzes the data collected to explore the understanding amongst staff across all CASES of the meaning of ERM in their organisation. It was found that ERM is understood either as an approach for managing risks holistically or as a process. Harmonisation, standardization, integration and centralization were found to be four key concepts associated with ERM.

A four phase criteria were employed to analyze data in Section 3 to find the motivation for developing ERM. The first phase involves an analysis of the data from the questionnaire and interview survey CASE by CASE. The second phase involves analysis CASE by CASE, and across CASES, using data from the interview survey alone. The third phase discusses the results of the questionnaire survey in terms of all CASES in combination. The fourth phase examines data from both the questionnaire and interview survey in combination across CASES.

The leadership of CRO was found the key amongst a list of driving forces of ERM across the CASES. Although, regulation was identified as one of the key motivation of ERM by the respondents, the analysis suggests that it shapes the design of ERM.

Section 4 explores the design of ERM used by the CASES as gained from the interview survey. Some key issues such as risk appetite and risk based capital, were found to be the key elements of the design of ERM.



Section 5A explores insights regarding operational challenges faced by the CASES in implementing ERM. Issues like risk communication, a common risk language, and risk culture were found the common challenges. Section 5B investigates the technical challenges in implementing ERM. Issues such as operational risk measurement, risk correlations and concentration were found the key technical challenges. The four phase criteria (as outlined above) were used to analyze the data in sections 5A and 5B.

Section 6 explores the means by which performance of ERM is measured in the CASES.

Section 7 identifies the key contributions of this study and draws out policy implications stemming from the general findings of the research. The discussion is also structured around the five dimensions of this study (i.e., understanding, motivation, design, challenges, and performance of ERM). It is important to mention here that the discussions and conclusions developed in this chapter, as well as in the CASE Reports in the APPENDIX are based on interviews and documents which are 1-2 years old as at the time of finalizing the thesis (June, 2006). In essence, the effort towards developing an effective ERM in the CASES has been gaining in sophisticating with incredible pace with respect to the global economic changes. Consequently, despite all efforts in making the findings/conclusions up-to-date, they may not reflect the current position of ERM in the CASES.

## SECTION 1

## INTRODUCTION OF FOUR CASES AND METHODOLOGY EMPLOYED TO ANALYZE DATA

This section provides brief descriptions of four CASES employed in this study. Moreover information about data including the methodology to be used to analyze data will be discussed.

## 2. An overview of the four CASES

Table 5(4) summarises key features of the four CASES (details are included in individual case reports in APPENDIX).

Table 5(4): Key features of 4 CASES

	CASE 1	CASE 2	CASE 3	CASE 4
<b>Key corporate objectives</b>	Operational improvement; growth and innovation; capital optimization; enhanced governance	Based on a disciplined approach to delivering quality earnings the corporate objectives are: sustainable performance with continued delivery of results according to targets, targeted profitable growth in ongoing businesses.	Improved financial discipline; strengthening balance sheet and reserves; focusing businesses more closely on delivering operational income.	Actively manage the cycle for profits; optimize organic and transactional growth; extend leadership in Asia; accelerate the balance sheet through risk securitisation.
<b>Business</b>	Retail (Life & Non-life)	Non-life	Insurance & Financial Services (Life & non-life)	Reinsurance (life & Non-life).
<b>Core expertise</b>				Risk assessment ad transfer
<b>Base</b>	Italy	United Kingdom	Switzerland	Switzerland
<b>Geographical Presence</b>	Europe (90%)	Europe, Scandinavia, USA	Europe, USA, Asia	Europe, USA, Asia, Africa
<b>ERM Department Established</b>	2005	2003 (Group Risk)	1997	1996 (first report on risk management released internally)
<b>Responsibility of Risk Management</b>	Corporate Finance Department	Finance Department	Group Risk Department	Group Risk & Knowledge Department
<b>Alternative term for ERM officially used</b>	Value Based Management	Group Risk Management	Corporate Risk Management	Integrated Corporate Risk Management
<b>Key focus of ERM</b>	Performance of local companies (mostly)	Performance of local entities (key geographical locations)	Performance of local entities (key geographical locations)	Performance of the Group as a whole

	CASE 1	CASE 2	CASE 3	CASE 4
<b>Regulators</b>	ISVAP available on <a href="http://www.isvap.it">www.isvap.it</a>	UK Financial Services Authority available on <a href="http://www.fsa.gov.uk">www.fsa.gov.uk</a>	FOPI available on <a href="http://www.bbv.admin.ch">www.bbv.admin.ch</a>	FOPI available on <a href="http://www.bbv.admin.ch">www.bbv.admin.ch</a> Comes under solvency regulations since January, 2006.
<b>Corporate Social Responsibility<sup>1</sup></b>	The first Group Sustainability Report was published on 2004.	Corporate responsibly performance is monitored externally through FTSE4Good Index Series,	One of the four core values of Corporate Philosophy. Shares qualify for various indices (DJ World and STOXX Sustainability, and FTSE4Good Global and Europe indices)	One of the four core values of Corporate Philosophy.

The following discussion explore the corporate objectives, business models and financial performance of the four CASES and these will be used to provide evidence to support arguments made in the following sections.

### 3. Corporate objectives

The corporate objectives of the four CASES are different. Whereas, CASE 1 focus more on operational issues (e.g., growth, innovation, capital optimization and governance), CASE 2 focuses on ethical issues (e.g., integrity, performance, and responsibility). CASE 3 has some similarity with CASE 1 (e.g., operational income) but it has specific financial goals (e.g., strengthening the balance sheet and reserves). However, CASE 4 is somewhat different from the others since it focuses on profit, growth, expansion, and accelerating the balance sheet through risk securitisation.

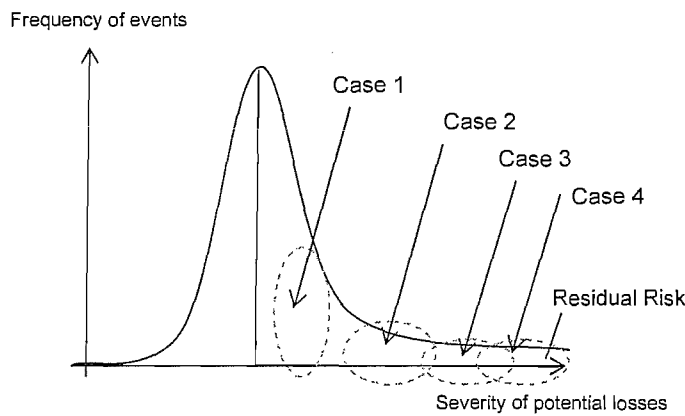
### 4. Business models

It is seen that the four CASES deal with different types of risk. Whereas CASE 1 (an Italian composite primary insurer) is a retail insurer concentrating mainly on business with low volatility (for example, personal and life products), CASE 4 (a reputable global reinsurer) deals with pick risks (highly volatile), which are reinsured by primary insurers. CASE 2 (a UK based primary insurer) mainly concentrates on non-life business and underwrites moderate risks across the globe. CASE 3 (a Swiss based composite primary insurer) deals with semi-extreme risks (in terms of size and frequency) and is also active in financial

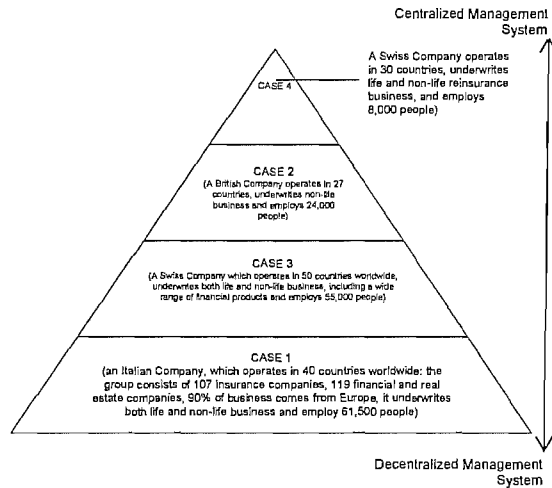
<sup>1</sup> Source: Sustainability Report of the CASES

products (such as bonds). Its reinsurance arm was spun off and now only underwrites primary business. This information clearly indicates that the four CASES have different risk profiles and different management philosophies as they operate under different regulatory regimes (even though they are increasingly coming under greater EU single market regulation).

**Figure 25(4): Comparison of nature of the risks of CASES**



**Figure 26(4): Comparison of business models of CASES**



In theory, reinsurers (e.g., CASE 4) play a vital role in loss mitigation either by monitoring or designing efficient dynamic contracts (e.g. experience rating) for ceding insurers (e.g., CASES 1, 2, 3) (Doherty, 2005, Plantin, 2006). Moreover, reinsurance strengthens the primary insurers capital-base (by

providing off-balance sheet capital), which in turn increases their earnings and reduce regulator costs (Adiel, 1996). Demand for reinsurance from CASE 1 is less than from CASE 2 and 3 because of its low exposure to long-tail business and lower leverage (Garven, 2003). It can be seen that the practice of ERM (although ERM is referred to by different names) amongst these CASES is likely to vary. In particular, the historical development of ERM in these four companies is quite different: CASE 4 has a long history in practicing ERM whereas ERM is fairly a new concept in CASE 1. For CASE 2, ERM evolved from the insurance and business continuity function, but in CASE 4, the concept of ERM has evolved from issues related with catastrophic risk management.

### 5. Business performance

The business performance of the CASES also differs. Figure 27(4) illustrates the profit and loss stream of the four CASES. This is important because the business performance appears to influence the nature of ERM practiced in the CASES.

**Figure 27(4): Comparison of the Profit & Loss stream of four CASES**

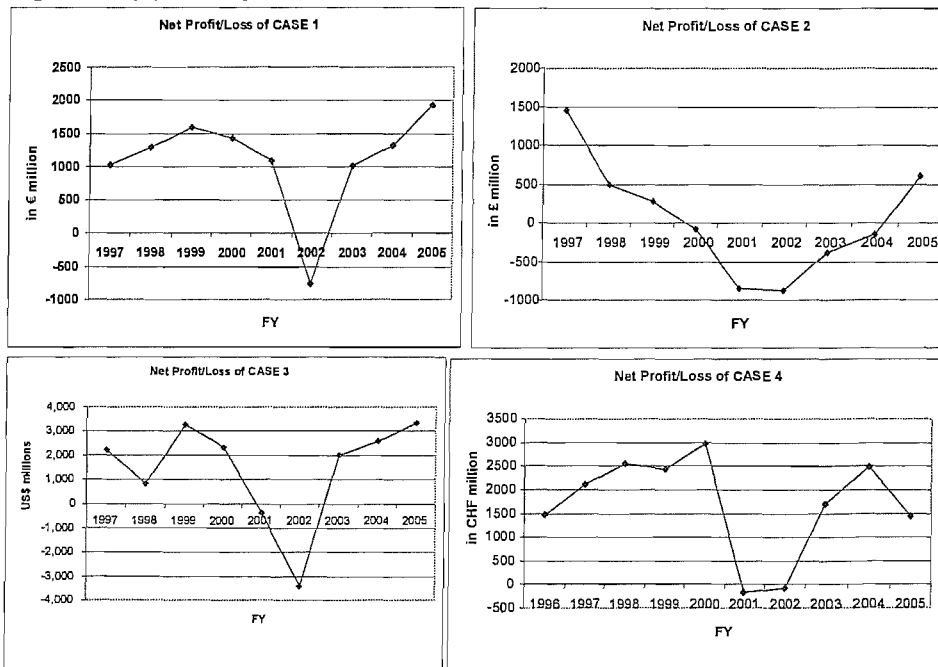


Figure 27(4) indicates that profit of CASES 1, 3 and 4 suffered during 2000-2002 mainly attributable to the adverse effects of the September 11<sup>th</sup> incident on the world economy. However, CASE 2 is an exception as it suffered a prolonged loss trend, but is now recovering slowly. Interestingly, the profit streams of CASE 4 show a downward trend in 2005, where the other CASES are showing increasing trends.

**Figure 28(4): Comparison of Premium Income of 4 CASES**

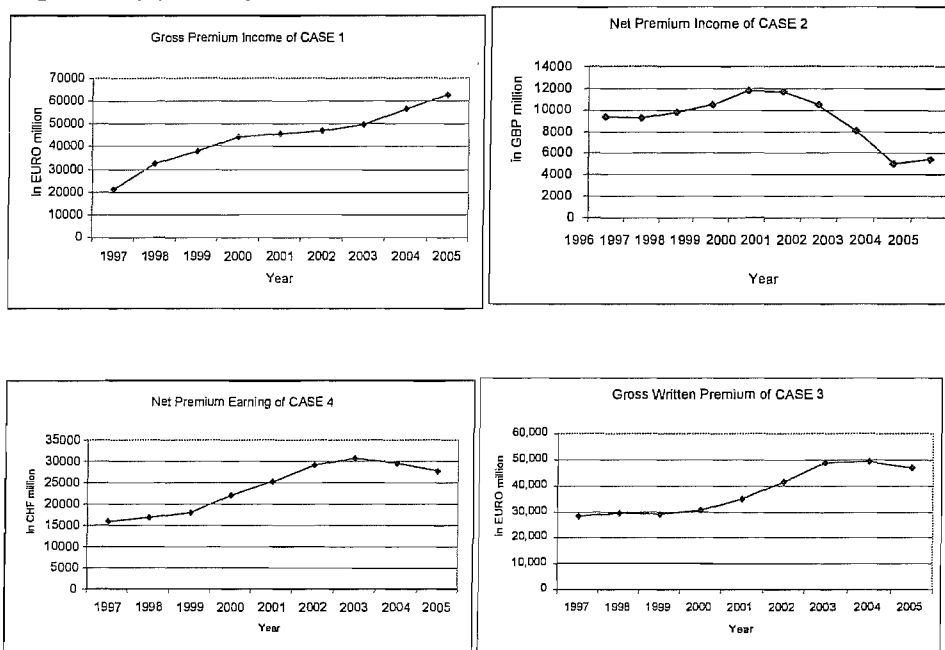


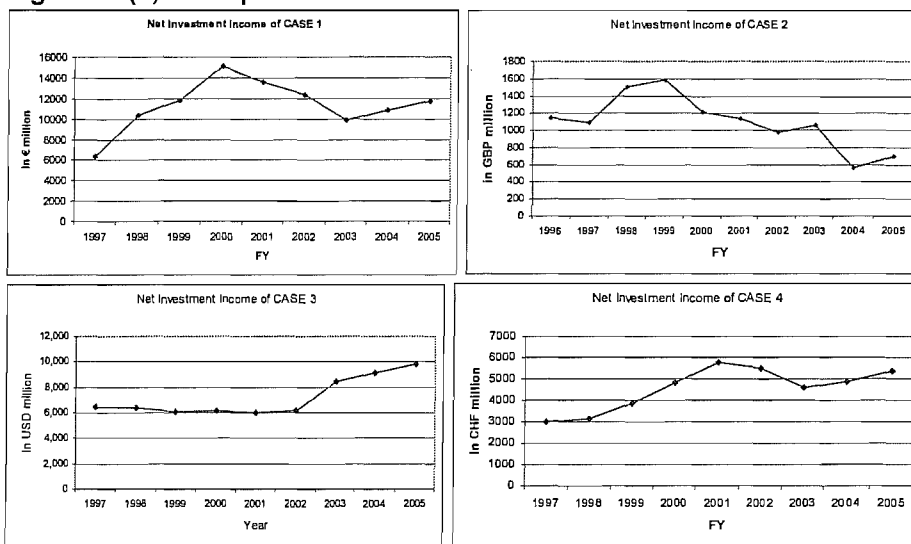
Figure 28(4) indicates that the premium income of CASES 2, 3, and 4 maintained an increasing trend from 1996 until 2002/3, but premium income has decreased since 2004. However, CASE 1 is an exception as its premium income has maintained continuous growth since 1997. This indicates that the underwriting cycle does not affect CASE 1 much, whereas the other three CASES (in particular CASES 3 and 4) are heavily exposed to the underwriting cycle.

In addition to premium income, investment returns were found to be an important indicator of the performance of ERM in insurance companies. This is because growth (which is regarded as one of the core objectives of ERM) is linked to income both in terms of premium and investment. Furthermore, it is

linked to the underwriting cycle (they are inversely linked). Figure 29(4) illustrates the investment income of the CASES.

It is seen in figure 29(4) investment returns for CASES 1, 3, and 4 increased from 2003 onwards but decreased sharply between 2003 and 2004 for CASE 2.

**Figure 29(4): Comparison of Investment income of 4 CASES**



Investment decisions are also clearly linked to risk management as the mix of debt and shares plays a central role in optimizing investment return. Figure 30(4) illustrates the investment mix of the four CASES and clearly indicates that CASE 2 and CASE 4 follow a similar investment policy. In recent years they both dramatically reduced their investment in equities while increasing the investment in bonds and other fixed income securities. The investment policy of CASE 1 remains relatively stable and this further reflects its retail type of business. CASE 3 is an exception, as it almost doubled its investment in equity in 2004 and maintained it in 2005. Consequently, its investment income increased sharply in 2004 and 2005 (see figure 29(4)).

Finally, achieving and maintaining a targeted rating of financial strength is one of the key objectives of ERM in most organisations and the following table illustrates the ratings that the CASES have obtained recently.

Figure 30(4): Comparison of category of investment of 4 CASES

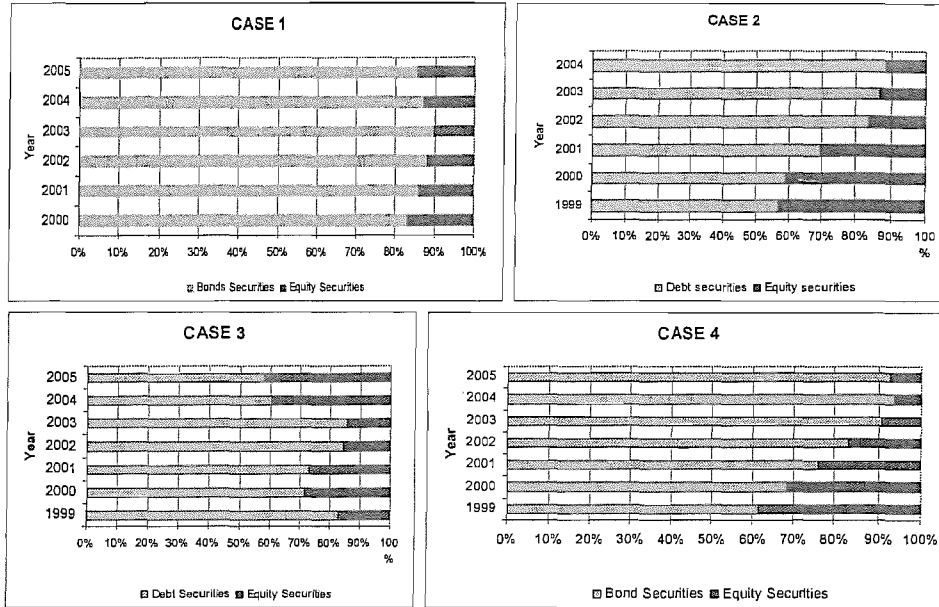


Table 6(4): Comparison of Insurance Financial Strength of the CASES

Organisations	Date of rating	Rating Agency			
		Standard & Poor's	Moody's	A. M. Best	Fitch
CASE 1	06 <sup>th</sup> March, 2006	AA Stable	Aa3 Negative	A+ Stable	AA Stable
CASE 2	Latest in 2006	A- Stable	Baa1 Positive	A- Stable	Not rated
CASE 3	14 <sup>th</sup> March, 2006	A+ Stable	A1 Stable	A Stable	A+ Stable
CASE 4	1 <sup>st</sup> March, 2006	AA Very strong	Aa2 Excellent	A+ Superior	Not rated

Source: Homepages of the CASES

It is evident from table 6(4) that only CASE 1 and CASE 4 maintain AA rating and this is not only in recognition of their financial strengths, but may also reflect the effective practice of ERM (which adds value to insurers (Ingram, 2005)).

## 6. Conclusion

This section gave a brief overview of the four CASES included in the study. Various topics (e.g., corporate strategy, business model, financial



performance, etc) have been included in the discussion. An interesting combination of risk characteristics (from retail to wholesale) across the CASES is seen in this overview. Selecting insurers with such a wide cross section of risk characteristics was considered necessary to enable the findings of the research to be generalized across the insurance industry.

## **7. Data quality and methodology employed for analysis**

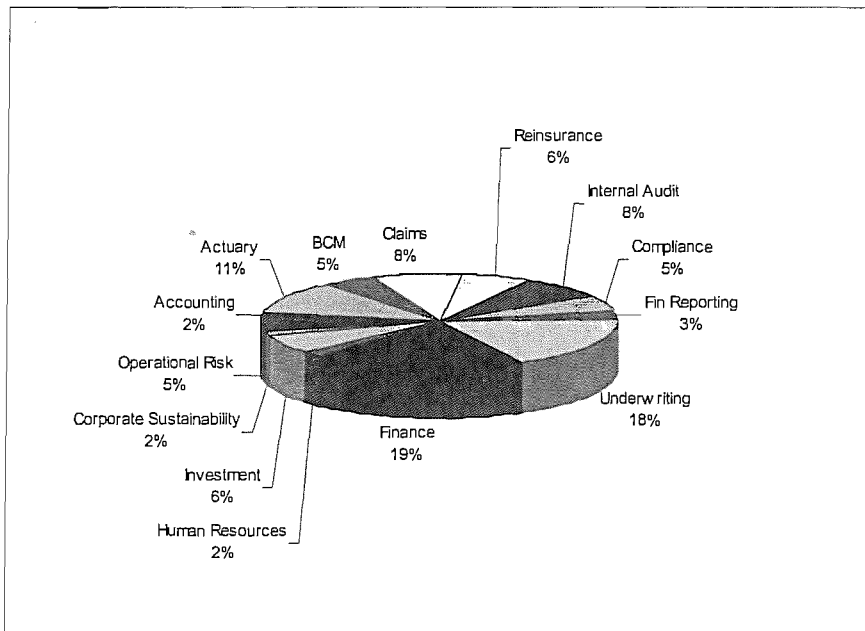
The following paragraphs explain the characteristics of the data and the criteria (methodology) developed to analyze the data.

### **7.1. Characteristics of the data**

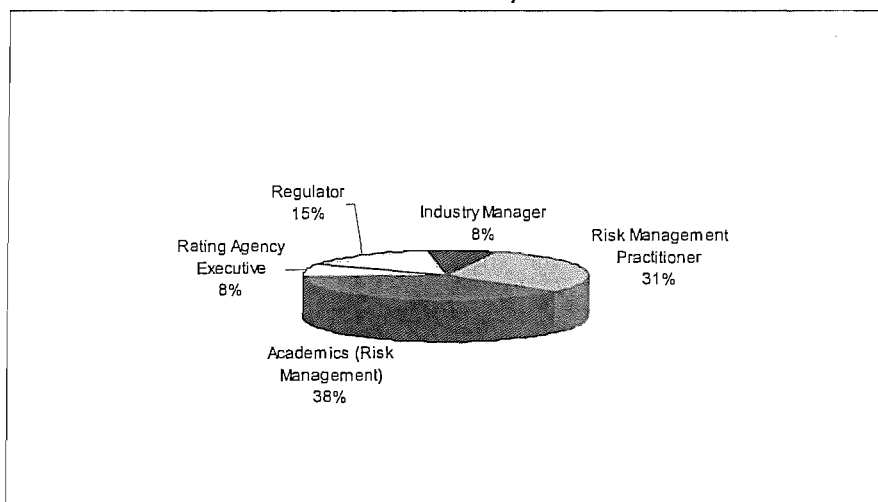
There are three sources of data used for the analysis. The first set of data was collected from the interview survey (mostly face to face interviews, although a few were conducted over the telephone) conducted with the CASE study companies. A total of 55 staff were interviewed between 28<sup>th</sup> May, 2003 and 21<sup>st</sup> December, 2005 covering all four CASES. The second set of data was collected from a semi-structured questionnaire survey (a copy of the questionnaire provided at the end of this chapter) conducted between May and July, 2005. The respondents of the questionnaire survey are the same staff who were interviewed in the CASES. However, most of the questionnaires for CASE 3 and 4 were completed by the researcher using his judgments after reading the respective interview transcripts. This approach was employed because of not sufficient responses to the questionnaire were received from respondents in CASES 3 and 4. Finally, a third set of data was collected from the industry observers (e.g., risk management academics, risk management practitioners working with various consulting firms, and officers working with prudential regulatory agencies). A total of thirteen industry observers were interviewed either face-to-face or over the telephone between 4<sup>th</sup> October, 2004 and 17<sup>th</sup> November, 2005. Figure 31(4) illustrates the profession of the respondents interviewed for the study. Another important source of data was the researcher's notes whilst attending various seminars and workshops, such as the ERM symposium of Causality Actuarial Society in the USA and AIRMIC conference in the UK (a partial list can be seen in table 16(6)) The views expressed by various speakers, including the researcher

himself, in these forums on the broader field of risk management, beyond disciplinary boundaries, facilitated the researcher to shape the study. In addition, attending the conferences gave the opportunity of networking with key risk professionals, which subsequently helped the researcher to secure interviews with the risk observers, as mentioned above.

**Figure 31(4): Comparison of Profession of the respondents**



**Figure 32(4): Comparison of professional background (industry observers)**



Most of the interview respondents of the CASES are located at the centre (head office), and a small number (around 15%) were located in branches in other countries. The finance profession was most heavily represented in the list of respondents (19%) followed by underwriters (18%) and actuaries (11%). Within the industry observers, 30% were academics working in various universities throughout Europe and USA and 31% were working with large risk management consultants at the senior level in the USA.

### **7.2. Challenges to collecting data**

There were many challenges that the researcher faced whilst collecting data. The following were the most demanding.

There was difficulty in gaining access to staff from a professional background, other than finance. It was also difficult to get access those who work at middle and lower levels of the organisation even from the same profession. Because access was permitted through senior staff (for all CASES) of the Risk Management and Finance departments, the contact person(s) was not sufficiently convinced that staff from other professions/department were in a position to give more information on the status of their ERM than that which could be provided by risk management staff. Although this difficulty was partially overcome by convincing the key contact person in terms of the research objective (which was interested to obtain the views of a multidisciplinary group of people), access to the middle and lower level staff remained limited (particularly in CASE 4). Interestingly, some middle and lower level staff of some CASES were reluctant to give interviews as they believed that they were not involved with ERM (on the grounds that ERM was a senior management job (particularly in CASE 2)). In all CASES the targeted staff were often too busy to give an appointment for interview at short notice. Consequently, the interviews were booked one to three months in advance and a semi structured questionnaire was sent around two weeks prior to the interview (a different set of questions was asked depending on the professional background of the interviewees). Most of the interviews were conducted on a one-to-one basis, other than one interview was conducted as a part of group discussion (CASE 2). A series of interviews were conducted

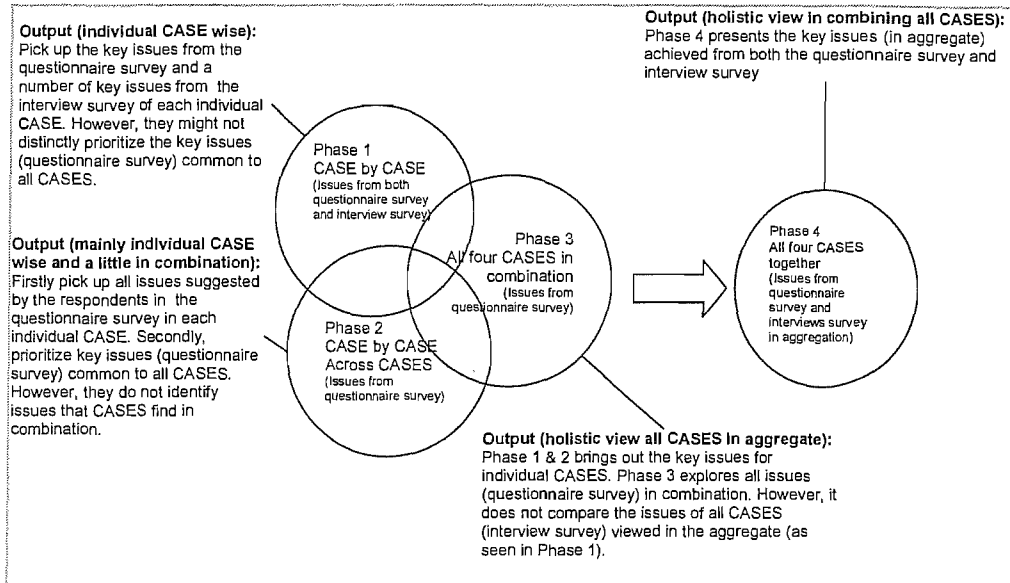
with CASE 1 staff in its head-quarters over two consecutive days. Only one pre-booked interview was cancelled (CASE 4) on the spot due to the sudden engagement of the potential interviewee for official duties and this interview could not be re-scheduled.

It was impossible for the researcher to maintain the order of the topics included the prior sent questionnaire during the interviews because respondents were often keen to express their views in an order they thought appropriate to them. Moreover, respondents were often tempted to stick in one or more points/issues which they found interesting, at which point the researcher attempted to re-direct their attention to a broader set of issues.

### **7.3. Method employed to analyze data (a four-phase criteria)**

Data is analyzed in respect of the five key dimensions of ERM identified in the research questions, namely, the staff's understanding of the nature of ERM, motivation for engaging in ERM, the design of ERM, the challenges faced in implementing ERM, and the measurement of performance of ERM. A five phase criterion was developed for analyzing the material collected from the CASES as seen in Figure 33(4).

Figure 33(4): A four phase criteria of analyzing data



As illustrated in figure 33(4), findings (obtained by questionnaire survey and interview survey) of each CASE are analyzed individually in Phase 1. Secondly, an analysis of the findings of the questionnaire survey across CASES is conducted in Phase 2. Thirdly, findings of the questionnaire survey are analyzed in combination with the literature in order to draw some general conclusions regarding ERM in the four CASE studies. Finally, a summary of the results for all CASES combined will be provided in Phase 4.

Analysis in the first two phases (CASE by CASE) gives a broad idea of the preferences for the factors associated with each CASE. However, it could not show the preference of each CASE for each of the factors. Consequently, to facilitate this analysis a table will be developed to illustrate the preference of the CASES on each individual factor.

The first two phases of analysis concentrate on the preferences of the CASES in isolation but cannot demonstrate the integrated (or combined) preferences of all CASES; which is the ultimate aim of the analysis. Consequently, a graph will be produced to illustrate the results obtained from the questionnaire survey across all CASES. Finally, the factors/issues obtained in phase 1 and

phase 2 from the questionnaire survey will be compared with those factors/issues obtained from the interview survey and they will be linked together in a discussion.

Data obtained from the interview survey were coded by NVivo, qualitative data analysis software.

The following sections of this chapter are arranged as follows:

Sections 2 to 6 will analyze the results from the four separate CASE Reports (as detailed in the APPENDIX). The findings of the four CASES are compared and contrasted in combination and key conclusions are drawn under the five dimensions of the research, namely, understanding, motivation, design, challenges, and performance of ERM. Section 5 is divided into two subsections: 5A and 5B. Subsection 5A analyzes the data for investigating operational challenges and subsection 5B analyzes the technical challenges in implementing ERM. The results will be used to develop the general findings of this study (in the form of several propositions) in the Section 7.

## SECTION 2

### UNDERSTANDING OF ERM

This section analyzes the data to conceptualize the understanding of ERM amongst staff in the CASES. The four phase criteria developed in Section 1 (see figure 33(4)) is not employed in this section because of insufficient data; rather material for the four CASES is compared and contrasted.

#### 1. Introduction

The relevant research question involves investigating the understanding of ERM<sup>2</sup> amongst staff. The objective is to see how staff from different professions/disciplines perceive ERM. The key concepts arising from the four CASE studies are compared and contrasted in the following section. This is followed by a discussion of how the key concepts across the CASES are connected. Finally, conclusions are drawn.

#### 2. Comparing and contrasting the findings of the CASES

The empirical study finds that CASE study organisations use the term ERM to mean a holistic approach to their risk management strategies and functions but they use different complimentary terms to describe the approach (see row 9 of table 5(4)). The study concludes that a problem in developing (or conceptualizing) of the ERM concept remains and staff use different terms and ideas to express the work they do in their risk management activities. This results in the requirement for different names to describe their holistic approach to risk management. Consequently, a senior staff member (for example, a global investment manager), who explores a holistic approach to his/her risk management functions may call it, for example, integrated risk management or enterprise-wide risk management. Similarly, another member of staff (for example, a global underwriter) following the same pattern in his/her domain of work or responsibility may also give the work a title such as Integrated Risk Management of ERM. The analysis suggests that although both persons (and similarly others) are conceptualizing their risk management

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<sup>2</sup> The study defines ERM in terms of corporate objectives (see section 2 of chapter 2)

as ERM, they are actually undertaking silo type risk management with a specific narrow focus (or one dimensional: e.g., finance perspective); even though these silo approaches may be linked across the organisation. The analysis further noted that the respondents often used four terms of concepts (for example, harmonisation, standardization, integration, centralization) interchangeably while conceptualizing ERM. The sources of these terms are clearly the interviews, where the respondents often found them indistinguishable. However, the analysis will show that these four concepts are distinct and close observation establishes that they are the core concepts in developing an understanding of ERM. The following paragraphs will explore the meaning of the concepts as seen in the perception of the respondents and to what extent these describe ERM is practiced in their organisation.

### **3. Exploring the meaning of centralization, integration, harmonization, and standardization**

The following paragraphs will explore their meaning as emerged from the interviews through analysis. A Table 7(4) is provided at the end to summarize the discussion.

#### **3.1. Centralization**

It is understood from the CASES that “centralization” is a process by which their activities, in particular, those regarding decision-making, become concentrated within the centre of the CASES. Whereas, “centralization” is viewed as the act of consolidating decision-making power under the central control in CASE 1, it is regarded as offering the flexibility to business groups in CASE 4. As seen in the CASES, centralization is used to institutionalize both mandate execution as well as functional integration within the organization. CASE 3 uses “centralization” as a means to achieve economies of scale and the widespread adoption of better and common business practices across its business units located at different geographical locations. According to the CASES, “centralization” takes a top-down view in designing and implementing ERM because they believe that the commitment of ERM must come from the top management. Respondent 1R10 states, “[using a



centralized approach] we have built up a common standard for introducing and maintaining communication within the company". The study concludes that a centralized process helps top-level staff to integrate and control the risk management functions of various parts (or silos) of their organizations.

### **3.2. Integration**

The analysis of CASES suggests that respondents perceive integration (or consolidation) as combining various parts of the organisation (silos) to form a whole (or large) picture. There are various uses of integration found in the CASES. For example, CASE 1 primarily uses "integration" to eliminate the duplication across various aspects and phases of its risk measurement and to share risk information. CASE 4 uses "integration" to establish a consolidated reporting framework at the top level of the organization in order to facilitate a holistic decision making process. It is found in CASE 3 that the departmental heads of investment risk, credit risk and business continuity management (who work under GRM) prepare consolidated (or integrated) reports on their respective issues and then report to the group CRO. The process of combining various elements of risk management, which at first seem to be incompatible or even conflicting are shown after analysis and re-synthesis (leading to reformulation of re-orientation), prove to be rather complementary. As found in the CASE studies, prior to integration it is important to proceed by two major stages (i.e., harmonization and standardization). The former helps to reduce the seemingly conflicting elements to their non-conflicting cores in a policy oriented fashion. However, the later combines these cores into a higher consistent frame in an action oriented manner. 3R11 states: "we always try to achieve integrated results because it [integration] is important for us to share our common purposes or objectives of risk management". Clearly, it is necessary to bring a common set of standards of risk management across the organization prior to integration. However, integration could take several forms, especially horizontal and vertical in terms of the ERM system.

### **3.3. Harmonization**

The study suggests that a narrow definition of harmonization relates to increased coordination and streamlining of the activities of different business

groups. As seen in the CASES, harmonization is based on three underlying ideas. First, the development of a common arrangement for planning, managing and delivering risk. Second, the gradual sophistication of procedures and specific requirements in order to reduce their burden on business units (reducing missions, reviews, reports etc.). Third, sharing of information in order to promote transparency and improve coordination. Ideally, harmonization increases comparability while avoiding total diversity in risk management issues across companies; as 2R7 states: “we [the top management] nevertheless like to see a simple but comprehensive view of risk”. The respondents indicated that the role of harmonization is to bring the diversified risk management issues into an identical form for easy control while allowing for the expertise and requirements of individual companies located in various geographical locations.

### **3.4. Standardization**

Similar to other three concepts, standardization is found to involve a process of documenting, reviewing, and approving unique names, definitions, characteristics, and representations of data elements according to established procedures and conventions. As an integral part of the ERM process, standardization emerged as a rescaling technique, useful for conveying information about the relative standing of any number of interests with respect to the whole distribution. In CASE 4, standardization brought global uniformity of various factors (i.e., risk identification, risk measurement across risk types, product types, business type) across business segments and at company level at various geographical locations. The objective of standardization in CASE 3 is to provide a common language. It is essential for all CASES to have a common terminology in the understanding of risk across disciplines. In essence, any structured scientific approach towards identifying, evaluating and managing risks requires standardization. The respondents' emphasise the point that only a common language could allow a comparison of scientific knowledge in their organisations. However, a common language can only be obtained through a meaningful dialogue (i.e., communication) among the

stakeholders in identifying, analyzing and quantifying risks in order to avoid surprises (3R14).

The following Table 7a(4) summarizes their distinctions clearly.

**Table 7(4): Distinctions: harmonisation, standardization, integration, centralization**

Terms	Uses	Approach	Implication	Objective
<b>Harmonisation</b>	Streamlining	Horizontal	Sharing of knowledge	Reducing burden of business units.
<b>Standardization</b>	Unification and common views	Horizontal	Facilitation of procedures	Bringing commonality (level playing field)
<b>Integration</b>	Consolidate	Horizontal & Vertical (to-down & bottom-up)	Co-ordination of actions	Better communication and decision making in agreement
<b>Centralization</b>	Control	Vertical (top-down)	Controlling the organisation	Instant decision making to meet urgent needs

#### 4. Linking the concepts

Although harmonization and standardization are similar concepts, analysis of the respondents' comments suggest they view them differently.

Harmonization allows choices between alternatives but standardization provides no flexibility. Effectively, harmonization offers a range of identical alternatives, out of which one or more can be adopted depending on the given circumstances. However, standardization does not offer such flexibility, but suggests a particular method or technique, which must be adopted. In addition, harmonization is based on existing concepts, which should be brought together in a way that makes comparison easier. It can be seen as a "bottom up approach" starting from an existing divergence and ending in a state of comparability. Standardization is a totally different concept and does not necessarily consider existing conventions and definitions. It focuses on a common standard, (i.e., generally accepted and followed system of nomenclature and can thus be interpreted as a "top-down" approach). Setting standards involves judgment as to the minimal position adequate to assure achievement of objectives (as with harmonization). However, standards are typically facilities which enable results to be compared at a higher degree compared to harmonized policies. Integration of competent policies and

processes, models, and data (either for management use, compliance and reporting) are not possible for global insurers like the CASE study companies without harmonizing and standardizing them. So, the research established that a sequence (i.e., harmonization, standardization, integration, and then centralization) is maintained when ERM is developed in practice (from an operational perspective).

**Table 8(4): Analyzing the understanding of ERM in CASES**

Concepts	CASE 1			CASE 2			CASE 3			CASE 4		
	Y	N	NA	Y	N	NA	Y	N	NA	Y	N	NA
Centralization	8	6	0	3	8	0	9	4	1	3	9	0
Integration	4	10	0	6	5	0	9	3	2	9	3	0
Harmonization	8	6	0	5	6	0	11	1	2	12	0	0
Standardization	9	5	0	6	5	0	9	3	2	10	0	2

Table 8(4) illustrates how the respondents in the CASE study companies view ERM<sup>3</sup>. It suggests that all respondents in CASE 4 and the majority of respondents in CASE 3 understand ERM as harmonization. However, in both these companies there appears to be a fairly consistent view that ERM involves all the concepts of centralization, consolidation, harmonization, and standardization. The staff of CASE 1 and CASE 2 portray inconsistent views concerning the nature of ERM. Those from CASE 2 largely argue that ERM does not essentially involve centralization and there are roughly equal numbers who believe that it does (or does not) include the concepts of standardization, integration and harmonization. The respondents from CASE 1 argue that ERM is all about integration of financial results. However, the majority of all four CASES believe that ERM involves some form of centralization, harmonization, and standardization. The staff of CASE 3 appear to see little difference between centralization, integration and standardization. The responses from the staff of CASE 4 appear consistent, but few of them associate ERM with the concept of centralization. There is still a significant majority in all four CASES who agreed that the concepts (centralization, harmonization, standardization and integration) are not adequately defined in their organizations.

<sup>3</sup> The purpose of this table is to show the choice (in terms of Y, (Yes), N (No) and no answer (Did not participate) of the key factors in understanding ERM across CASE study companies. The numbers represent the number of respondents of any particular CASE who answered yes/no/no response regarding their view of what factors were involved in ERM.

Figure 34(4): Understanding of ERM in 4 CASES

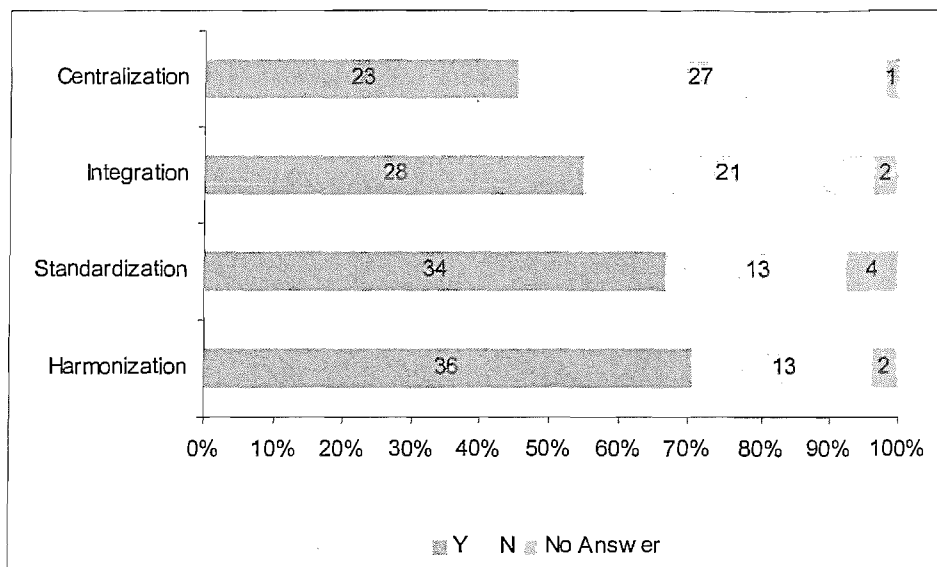


Figure 34(4)<sup>4</sup> suggests that the key concepts associated with ERM across the four CASES are in decreasing order of importance: harmonisation, standardization, integration and centralization. It further suggests that a unique understanding of ERM does not exist within the CASES, rather ERM is seen as a combination of the four factors and they often overlap. In fact, such a multidimensional concept permits creativity in designing an optimal system.

## 5. Discussion of the findings

The analysis finds that these four concepts play an important role in the conceptualization of ERM by managers and staff. Linking the knowledge developed from the above discussion with figure 7(2) it is clear that the operational level of ERM (as seen on the bottom of the triangle) involves these four concepts; they appear to operate simultaneously in a loop. Managers take decisions (that is; centralize), develop (or employ) an operating process (that is; harmonize and standardize), combine all outputs (integrate and centralize) and finally execute the decision. This implies that managers face both 'top down' and 'bottom up' decision-making in terms of implementing ERM.

The key point is the focus on, and most importantly the time horizon involved, in the execution of the four concepts. As the levels (see figure 7(2)) moves

<sup>4</sup> The numerical figures in the graph represent the number of respondents who viewed ERM as harmonization, standardization, integration and centralization within three choices: Y (Yes), N (No), No Answer (did not participate).

from bottom to top, the focus shifts from distinct to abstract (that is; from individual risk to enterprise<sup>5</sup> risk), and the time horizon shortens. Another important issue is that at the bottom of the organisation emphasis is more on execution, whereas at the top of the organisation the emphasis is on strategy formulation and decision making. In summary, it is now established that the conceptualization of ERM in the CASE study companies involves an understanding of all four concepts (harmonization, centralization, integration, and standardization), and the level of understanding differs in terms of how much weight is put each on each. The study also established that the weight placed on each of the concepts when implementing ERM, differs according to the levels shown in figure 7(2).

This understanding can also be extended easily to clarify whether ERM is a top-down or a bottom-up process. The study suggests that it differs where ERM is understood at different levels as seen in the figure of the management hierarchy (see figure 7(2). Conceptualizing ERM at the top of the triangle, it is clearly a top-down approach (and process), whereas, it is a bottom-up approach when viewed from the bottom of the triangle. But it is both bottom-up and top-down when the triangle is viewed from the outside (that is, as an enterprise or organization) taking views from the top, middle and bottom (from which an independent researcher views the organisation). As far as this study is concerned, this is a critical point to understand in conceptualizing ERM.

#### **4.1 Understanding ERM from the perspective of a management process (operational understanding)**

The understanding of ERM in terms of the above four factors is important when ERM is seen as a process (the operational perspective). The concept developed herein can be used to explore controversial issues like: whether ERM is a top-down or bottom-up process. As the CASE study suggests, ERM is perceived differently by staff according to their profession, their level in the management hierarchy, and the nature of their responsibilities. This finding can be linked to the concept of ERM developed from the literature (see figure 7(2)). The key point is how ERM is defined. Whatever way ERM is defined,

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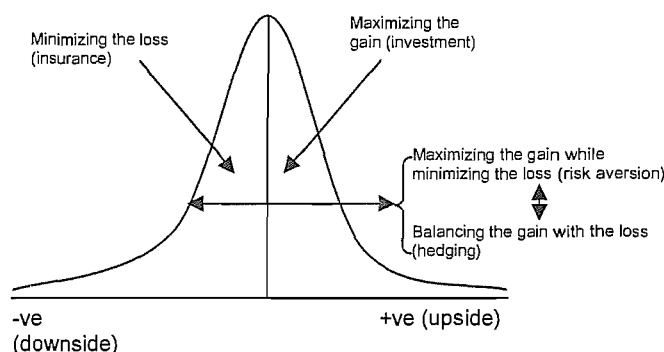
<sup>5</sup> This is one argument to clarify why the study consider the title 'enterprise' risk management.

the four factors play a central role in staff's perception of ERM. However, they are combined in different ratios to construct different meanings of ERM for different individuals or groups. One interesting point is that the combination is flexible (that is, it takes different forms in different situations), and this leads to a different conceptual understanding of ERM across disciplines and within disciplines. However, in general, staff of the CASE study companies do not perceive the concepts as distinct.

#### 4.2 Understanding ERM from the perspective of an holistic approach (philosophical understanding)

As the literature suggests, the objective of risk management is two fold. One objective is purely to minimize loss<sup>6</sup> (or remain at breakeven), and the other is to obtain gains (Dickinson, 1975). Insurance is a classic tool to implement the first objective; where the ultimate situation is 'no gain – no loss' and this is guaranteed (except in the case of insurers' default). However, the latter objective of risk management is complex, and three situations may arise. First, there may be the intention to obtain gain without protecting potential losses (for example investing on the stock market for a portfolio of shares). Second, the intention may be to obtain gain whilst protecting losses, such as derivative market hedging, which uses both investment and insurance mechanisms simultaneously. Thirdly, the intention may be to balance the gain with the loss in worst case scenario. They are illustrated in figure 35(4).

**Figure 35(4): Different perspectives in approaching ERM**



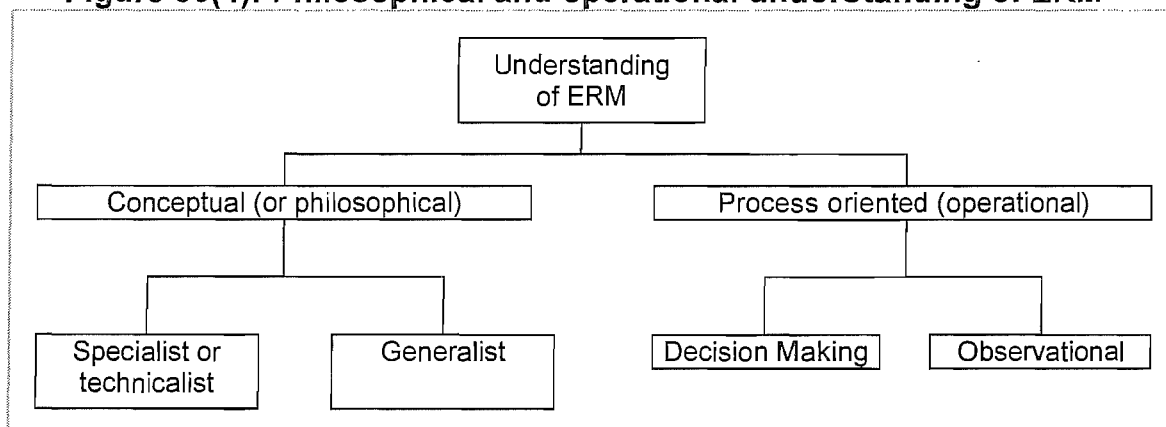
The key point in understanding ERM lies in which of the above three intentions are considered by a firm. From a classical point of view risk

<sup>6</sup> Minimizing the loss also provides opportunity based on the argument: why should an organization purchase insurance if there is no opportunity arising out of insuring (other than obligatory CASES such as government bindings or similar situations)? However, the opportunity in this case is 'indirect' similar to 'opportunity cost'.

management is about protecting the bottom-line issues, which is the final goal of risk management for insurance companies. The study suggests that the CASES do not strictly follow any of the three intentions indicated above but consider a combination of them in different ratios, depending upon their understanding. However, the percentage of each intention in any given situation is also flexible and differs with respect to circumstance, risk types, responsibilities, etc. Whatever the case, the objective of ERM appears to be to optimize the combination of these three intentions.

In summary, ERM is philosophically conceptualized in the CASES as a strategy (approach or concept) to align their businesses with the financial risk factors prevailing in their operating environment (both internal and external) in order to pursue their strategic objectives. Consequently, ERM may be described as a process. ERM also consists of a set of tools (that is; ALM/DFA, see section 4 of Chapter 2) to integrate market, credit, liquidity, and operational and business risks to achieve the organisations' [financial] objectives (Rosen, 2002). Figure 36(4) illustrates the above discussions.

**Figure 36(4): Philosophical and operational understanding of ERM**



In summary, the above discussions suggest differences between the philosophical and operational understanding of ERM as seen in the CASES. In brief, the difference is similar to a contrast between principle based and rule based understanding. However, one question still remains unanswered: why people do not generally recognize differences between the concepts (i.e., centralization, harmonization, standardization, and integration) when perceiving ERM. The argument in answering the question again goes to the



level of understanding in the management hierarchy. People responsible for technical functions (who can be both lower level or higher level) do not notice the difference because they apply the four concepts but they focus on a holistic result giving less concentration on individual concepts (in other words the conceptions gets more or less the same weight). However, people working at the top level (either generalist or specialists) also focus on a holistic perspective but they put different weights on each conception depending on the situation. Consequently, the understanding of ERM in terms of these four concepts varies depending on the individual's level (and position) in the management hierarchy.

## 6. Conclusion

Linking the four concepts (i.e., centralization, standardization, harmonization, and integration) with figure 7(2), it can be concluded that people face different realities at different levels and these influence them in the conceptualization of ERM. The difference is that at the macro (top) level the objective is more strategic, whereas it is more operational at the micro level (gradually top to bottom). However, the four concepts are still instrumental in implementing understanding at all levels. The research results suggest that ERM emerges in a different shape at different organisational levels (dominated by staff from different disciplines), but an interdisciplinary perspective is taken where the overall corporate objectives are designed and the performance is measured. So the key point is corporate objectives, where the business model, supported by market concentration and available resources, are the key issues. However, the corporate objectives are based on the type of risk the organization deals with and the business model it follows (see table 5(4)) to manage these risks. Consequently, it is not surprising at all to see an uneven view concerning perception of the meaning of ERM across the CASES in terms of approach although they have a similar understanding of ERM in terms of process.

Finally, as the combination of two approaches, ERM has emerged as a complex conception involving the totality of staff, rules, regulations, culture, processes, and mechanisms across the organisation. This is concerned with

how risks can be identified in advance, understood, analyzed and communicated, and how appropriate decisions are taken to minimize the extent of potential losses that might threaten the existence of the organisation, while providing incentives for prudent risk taking.

## SECTION 3

### MOTIVATION OF ERM

#### 1. Introduction

In line with the research question set to investigate the motivation of ERM, the section analyzes the data to answer two questions: (i) what are the key driving forces of ERM amongst the CASE study companies? and (ii) why are some driving forces seen in some CASES but not in others? In order to answer these questions, the data from the four CASES are compared and contrasted using sense making activities. References to financial data have been made in addition to the data obtained through interviews.

#### 2. Analysis of driving forces in the motivation for ERM in the CASES

The four phase criteria (see figure 33(4)) has been employed here to analyze the results. The phases are as follows. First, the findings (obtained by questionnaire survey and interview survey) will be analyzed individually (CASE by CASE). Second, the findings of the questionnaire survey will be analyzed across all CASES. Third, the findings of the questionnaire survey will be analyzed to explore all issues in combination. Finally, the results of both the questionnaire survey and the interviews across all four CASES will be used together to discuss the overall issues associated with motivation for developing ERM in the CASES.

##### 2.1. Phase 1: Analysis by individual CASES

Table 9(4) includes a summary of the results, which is explained in the following paragraphs.

**Table 9(4): Analysis of the motivation of ERM (Phase 1)**

<b>CASES</b>	<b>Top three driving forces of ERM ranked in the questionnaire survey</b>	<b>A range of key issues obtained from the interview survey</b>
<b>CASE 1</b>	<ul style="list-style-type: none"> <li>- Leadership of CEO &amp; CRO</li> <li>- Innovation</li> <li>- Volatile economic situation</li> </ul>	<ul style="list-style-type: none"> <li>- Leadership of CEO &amp; CRO</li> <li>- Volatile economic situation</li> <li>- Regulations (Solvency II &amp; Corporate Governance)</li> </ul>

<b>CASE 2</b>	<ul style="list-style-type: none"> <li>- Regulations</li> <li>- Changing risk landscape</li> <li>- Initiative of board of directors</li> </ul>	<ul style="list-style-type: none"> <li>- Leadership of CEO &amp; CRO</li> <li>- Volatile economic situation</li> <li>- Regulations (Solvency II &amp; Corporate Governance)</li> </ul>
<b>CASE 3</b>	<ul style="list-style-type: none"> <li>- Regulations (Solvency II &amp; Corporate Governance)</li> <li>- Leadership (CEO &amp; CRO)</li> <li>- Mergers &amp; Acquisitions</li> </ul>	<ul style="list-style-type: none"> <li>- Leadership of CEO &amp; CRO</li> <li>- Regulations (Solvency II &amp; Corporate Governance)</li> <li>- Innovation</li> <li>- Globalization</li> </ul>
<b>CASE 4</b>	<ul style="list-style-type: none"> <li>- Globalization</li> <li>- Changing risk landscape</li> <li>- Overcapitalization</li> </ul>	<ul style="list-style-type: none"> <li>- Market competition</li> <li>- Increasing rate of catastrophes</li> <li>- September 11 incident</li> <li>- Corporate disasters</li> <li>- Performance of equity market</li> </ul>

Table 9(4) suggests that the questionnaire survey of CASE 1 ranked the 'leadership of CEO and CRO'<sup>7</sup> as the most important motivators influencing a move towards adopting ERM. Innovation, a volatile economic situation and regulation (corporate governance and solvency II) came thereafter. However, the interview survey established that managements' thrust towards shareholder value creation (which was dominated by many factors, such as, market competition and volatility in the capital market (which in turn increases the demand of investors) was perceived as the most important driving force towards implementing ERM. The analysis indicates that the results of the two surveys are closely interrelated. This is because the move towards shareholder value creation motivated the CEO to take necessary measures to achieve the targeted value creation. In fact, the three year strategic plans (2002-05 and 2006-08) were recognized as the evidence of the leadership of the CEO.

The questionnaire survey of CASE 2 ranked regulations (solvency II and corporate governance) as the most important factors in motivating the company towards adopting ERM. Changing risk landscape, corporate governance, and initiative of the board of directors were also perceived as important. However, the interview survey established the leadership of CEO and CRO<sup>8</sup> as the top driving forces towards their motivation of ERM. The link between these two findings (regulations and the leadership of CEO) is clear in

<sup>7</sup> CASE 1 has no designated CRO, but according to interviewees it is understood that the Head of Capital Allocation acts as a CRO.

<sup>8</sup> In CASE 2, the CRO is designated as Group Risk Director

any UK insurer because of the dominating role played by the financial services authority (since insurance is a highly regulated business).

The questionnaire survey for CASE 3 ranked regulations (Solvency II and Corporate Governance) as the top driving force in their motivation towards ERM. Leadership of CEO and the CRO were also regarded as important. The interview survey established a range of factors (including leadership of CEO and CRO, regulations, innovation, and globalization) as key motivators of ERM.

The questionnaire survey of CASE 4 ranked globalization as the leading motivator of ERM. Other factors such as a changing risk landscape, overcapitalization, volatile economic environment, leadership of CEO and CRO, and growth of ART market were also cited as important. The interview survey established a range of forces such as market competition and an increasing rate of catastrophes, September 11 and the performance of the equity market as the key to their motivation towards ERM. Some factors such as ART market, catastrophes and corporate disasters are only mentioned in CASE 4 (compared to other CASES) and this probably arises because of the nature of the reinsurance business. Moreover, regulation was not seen as very important for CASE 4 either in the questionnaire or the interview survey because, as a reinsurer, CASE 4 was not obliged to comply with regulations<sup>9</sup>.

## **2.2. Phase 2: Cross analysis of questionnaire survey results of CASES**

The above analysis (CASE by CASE) provides an overview of the preferences of each CASE in terms of the driving forces of ERM. However, it could not show the preferences of each CASE in terms of the 17 probable driving forces which emerged from the interviews. Consequently, table 10(4)<sup>10</sup> was designed to illustrate the driving forces towards ERM as perceived by staff in the CASES, on the basis of the questionnaire survey.

<sup>9</sup> However, the situation has changed from January, 2006 (see row 11 of table 5(4))

<sup>10</sup> The purpose of the table is to arrange the driving forces in terms of preference (in descending order). The numbers as seen in each array represent the priority of driving forces of the CASES. While the vertical look gives the information about the priority of any driving force of any particular CASE, the horizontal look gives the priority of any particular driving force among all four CASES.

**Table 10(4): Analysis of the motivation of ERM (Phase 2)<sup>11</sup>**

Driving Forces	CASE 1	CASE 2	CASE 3	CASE 4
Changing Risk Landscape	3	1	7	1
Corporate Disasters	5	1	9	0
Corporate Governance	0	1	2	2
Divestment	10	3	10	0
Financial Shock	4	1	7	2
Globalization	10	3	7	1
Growth of ART Market	8	4	0	2
Inadequate Re(ecto)insurance Cover	7	2	7	2
initiative of Board of Directors	3	1	7	0
Innovation	2	2	7	0
Leadership of CEO	1	1	3	1
Leadership of CRO	2	1	5	1
Mergers & Acquisitions	3	3	4	2
Market Competition	10	2	8	2
Overcapitalization	10	4	7	1
Re(ecto)insurers Creditworthiness	6	1	8	2
September 11 Incident	6	3	8	2
Solvency II	3	1	1	1
Technology	10	1	9	0
Undercapitalization	10	2	6	2
Volatile Economic Situation	2	2	8	1

The numbers in the Table 10(4) represent the ranking of the driving forces towards ERM with each CASE study. This, for example, “leadership of CEO” is regarded as most important as in CASE 1, 2, and 4 third most important for CASE 3. Similarly, “Solvency II” was found to be a key issue in CASES 2, 3 and 4, and “changing risk landscape” was found to be the key driver of CASES 2 and 4. CASE 2 identified a number of factors such as “changing risk landscape”, “corporate disasters”, “corporate governance”, “financial shock”, “initiative of board of directors”, “leadership of CEO and CRO”, “reinsurers’ creditworthiness”, “solvency II” and “technology” as key to its motivation for ERM. Finally, CASE 4 also identified a range of factors including “changing risk landscape”, “globalization”, “leadership of CEO”, “overcapitalization”, Solvency II” and “volatile economic situation” as key motivators of its ERM. CASE 3 identified “Solvency II”, “Corporate Governance”, and “Leadership of CRO” as the first, second and third key factors affecting its motivation towards ERM.

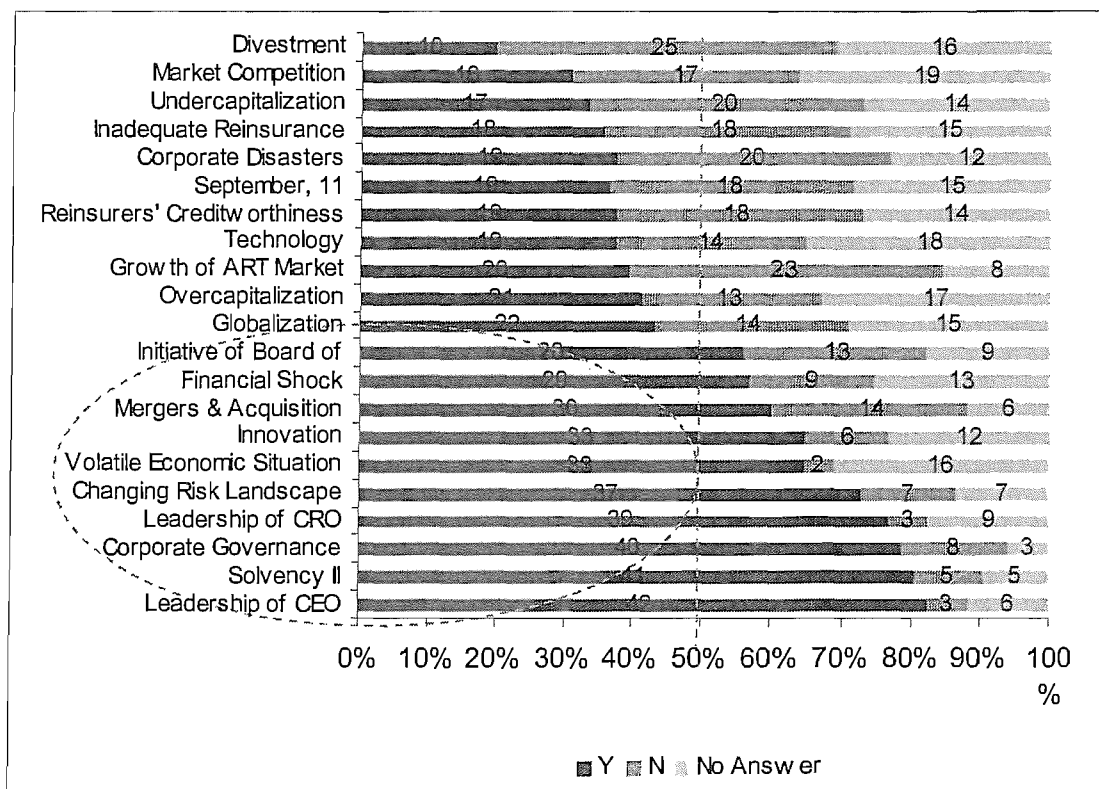
<sup>11</sup> The numbers (0, 1, 2 ...etc) as seen in Table 10(4) indicate the preferences of CASES in descending order obtained from the questionnaire survey. For example, 0 stands for ‘no preference’, 1 stands for ‘first preference’, 2 stands for ‘second preference’, etc.

Out of the four CASES the responses in CASES 2 and 4 were found to be the most consistent. Finally, the table clearly suggests that 'Leadership of CEO' and 'Solvency II' are the key dominating forces in the motivation towards ERM across all CASES.

### 2.3. Phase 3: Analysis of survey results of the CASES in combination

The first two phases of analysis concentrate on the preference of the CASES in isolation but could not demonstrate the integrated (or combined) preferences, which is the ultimate interest of the analysis. The following figure 37(4)<sup>12</sup> illustrates the results obtained from the questionnaire survey in combination (i.e., combining results of each case study under the various driving forces fro exploring ERM).

Figure 37(4): Driving forces of ERM for 4 CASES<sup>13</sup>



<sup>12</sup> The purpose of this graph is to show the choice of driving forces by the respondents in aggregate. The numbers represent the number of respondents on any particular driving force as classified in terms of Y (Yes), N (No) and No Answer (did not participate). The survey included 51 respondents altogether.

<sup>13</sup> The numerical figures in the graph represents the number of respondent who viewed the respective factors within three choices: Y (Yes), N (No), and No Answer (did not participate).

Figure 37(4) suggests that approximately 50% of the factors perceived as key driving forces by more than 50% of respondents. Moreover, 42 persons (82%) supported the leadership of CEO as being the key driving force (only 3 persons disagreed and 6 persons didn't answer the question). In the table 10(4), this has also been identified as the number one driving force for ERM in three individual CASES. Similarly, Solvency II, Corporate Governance, Leadership of CRO, and Changing Risk Landscape, are also rated as the leading motivating forces for developing ERM.

## 2.4. Phase 4: Analysis of all four CASES together

The following Table 11(4) summarises the results obtained in the three preceding phases of analysis.

**Table 11(4): Factors for motivation of ERM in CASES**

Phases	Aims	Results from questionnaire survey concerning the motivation to develop ERM	Results from interview survey concerning the motivation to develop ERM
<b>Phase 1</b>	To obtain a broad view concerning the preference of each CASE in terms of the driving forces of ERM	<ul style="list-style-type: none"> <li>- Leadership (CEO and CRO)</li> <li>- Innovation</li> <li>- Volatile economic situation</li> <li>- Regulations (Solvency II &amp; Corporate Governance)</li> <li>- Changing risk landscape</li> <li>- Initiative of board of directors</li> <li>- Mergers &amp; Acquisitions</li> <li>- Globalization</li> <li>- Changing risk landscape</li> <li>- Overcapitalization</li> </ul>	<ul style="list-style-type: none"> <li>- Leadership of CEO and CRO</li> <li>- Regulations (Solvency II &amp; Corporate Governance)</li> <li>- Innovation</li> <li>- Globalization</li> <li>- Market competition</li> <li>- Increasing rate of catastrophes</li> <li>- September 11 incident</li> <li>- Corporate disasters</li> </ul>
<b>Phase 2</b>	To identify the most common factors mentioned by staff of each CASE as key driving forces of ERM.	<ul style="list-style-type: none"> <li>- Leadership of CEO</li> <li>- Solvency II</li> </ul>	<ul style="list-style-type: none"> <li>- Performance of equity market</li> </ul>
<b>Phase 3</b>	To demonstrate the integrated (or combined) preferences of all CASES. This is the ultimate aim of the analysis.	<ul style="list-style-type: none"> <li>- Leadership of CEO</li> <li>- Regulations (Solvency II &amp; Corporate Governance)</li> </ul>	



### 3. Discussion

The above four phase analysis establishes leadership of the CEO and regulations (Solvency II and Corporate Governance) as the key driving forces of motivation towards ERM in the questionnaire survey. A further range of factors are established from the interview survey (see column 4 of table 11(4)), which influence the CASES towards developing ERM but the data does not permit them to be ranked in order. However, both the leadership of the CRO and regulations were again prominent features arising from the interviews. The ultimate objective of this discussion is to explore the final (phase 3) results obtained from the questionnaire survey with the results obtained from the interview survey to examine how are they linked. This is explored in the following paragraphs.

#### 3.1. Leadership of CEO is a key driving force of ERM

It is important to explore why leadership of the CEO is regarded as a key driver for developing ERM. However, the ideas of leadership vary depending on the level of management hierarchy (Avery, 2003). The analysis suggests that the CEO was influenced to encourage ERM by a number of factors as discussed below.

It is seen that the markets of the four CASE study organizations are global and insurance and capital regulations are becoming more global. Moreover, rating agencies (who eventually fill up the gaps between the regulators and insurance companies<sup>14</sup>), take a global view, looking at the consolidated balance sheets of global insurance companies, in particular their capital strengths. In addition, a major factor influencing the CEOs was the fact that shareholders were unhappy with the massive reduction in the value of companies shares between 2000 to 2003, when most shareholders in the insurance sector lost a substantial percentage of their investments (see figure 37A(4)) and they held management accountable.

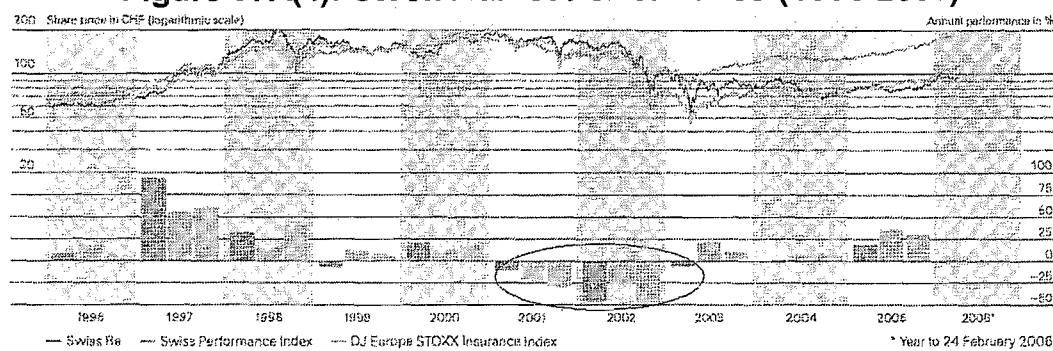
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<sup>14</sup> As the credit rating companies provide financial strengths (credit rating) of insurers through analytical methods. The ratings support the policyholders and shareholders in choosing the appropriate re/insurers to re/insure their risks.

This ultimately influenced the board of directors of all CASES to change their CEOs between 2001 and 2003 as seen in Figure 38(4). Moreover, the study revealed that all newly appointed CEOs were insurance professionals except in CASE 3, where the CEO came from an accounting background<sup>15</sup>.

Although the findings (phase 3) do not recognize the leadership of CRO categorically, it is relevant nonetheless, (as seen in other two phases) and the role of CRO is important in this discussion. CASE 4 appointed a CRO for the first time in 1998. He is considered to be the first CRO in the European Insurance Industry and he has an insurance related background. However,

**Figure 37A(4): Stock Market Performance (1996-2005)**



Swiss Re Annual Report 2004

his successor, who was appointed in the beginning of 2005, has an actuarial background. CASE 3 appointed their first CRO in 2002, and s/he had an actuarial background. However, his successor, who was appointed at the beginning of 2006, comes from a finance background. CASE 2 appointed its first Group Risk Director (equivalent to CRO) in 2002 (prior to that s/he was Group Director for Underwriting and Claims) and his successor, who was appointed in early 2005, holds a finance background. Finally, CASE 1 established an ERM division in 2005 within the focus of the Corporate Finance department for the first time, but did not create the specific position of CRO.

It is important to see that in all four CASE study companies three CROs hold a finance qualification and one holds an actuarial qualification at the present time. However, previously, of three CASE study companies which had CROs,

<sup>15</sup> The point about the professional background of CEOs is grounded on the belief that the profession of any individual influences the quality of leadership.

two came from an insurance background and one from an actuarial background. The conclusion is that the new CROs are tending to come from a finance background, thus indicating the ERM is becoming a more finance related issue. However, ERM was originally dominated by CROs with an insurance background.

The analysis suggests that there are motivations that influence the leaders (CEO, CRO and Board of Directors) to think about ERM. They included the profit stream, the economic environment, regulations, the changing the nature of risks and others. However, they are all interrelated and difficult to prioritize but they definitely have a combined effect that influences the leaders to implement an aggressive business drive to manage their risks holistically. Figure 38(4) illustrates the changing pattern of CEOs in line with the profit stream of the four CASE studies.

**Figure 38(4): The changing pattern of CEOs in the loss/profit cycle of CASES**

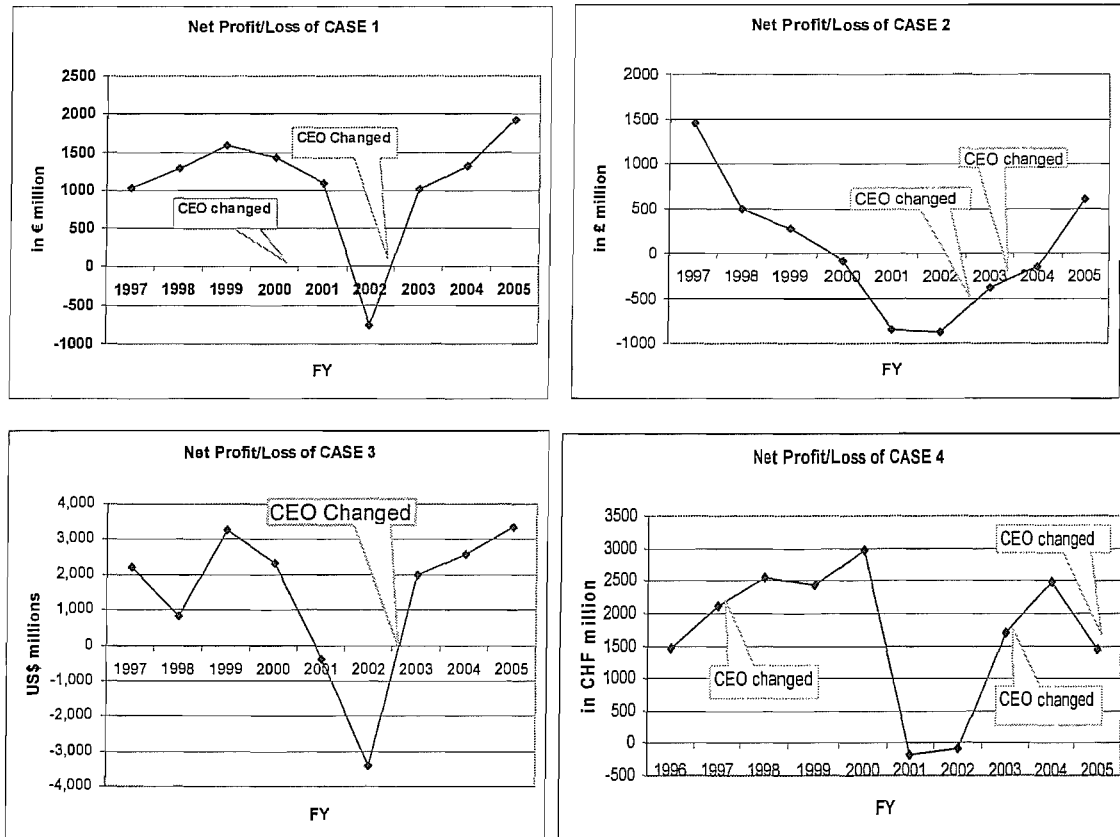


Figure 38(4) illustrates that the rate of changing CEOs is less in CASE 3 (only once) compared to other CASES. Moreover, all CEOs were replaced from

inside in CASE 1 and 4 but the other two CASES replaced CEOs from external sources. CASE 2's profit stream appears less strong than the other 3 CASES. The conventional norm is that "poorly performing companies are more likely to replace CEOs with outside, rather than inside, successors" (Dalton, 1985). Figure 38(4) suggests that replacement of CEOs do not maintain any pattern across CASES (in terms of profit and loss results). However, background of CEOs influences the design of ERM. Consequently, the central concept that the analysis suggests is that ERM seems to originate with the leadership of CEOs.

All these factors have led to the global insurance companies becoming aware of the dynamic global marketplace in which they operate. This has ultimately influenced the management of those companies to provide sufficient capital to buffer the implications of the actions of the all interested parties as explained above. These global insurance companies have realized that if they do not have an aggregate consolidated view of their businesses they can not take meaningful and effective decisions, which enable them to exist in such a dynamic market place.

### **3.2. Regulation is a key driving force in the motivation of ERM**

In addition to leadership, regulation was also found to be one of the key driving forces of ERM in the CASES (with the growing concern of failure in leadership, in particular, ethical terms). Clearly, the new regime of risk-based regulation forces CASES to accelerate and reshape their decentralized risk management systems in a more holistic framework. 3R12 states, "[as an insurance company] we comply with many new regulations and given their nature and requirements we have to adopt/reshape ERM". Interestingly, there is a voice which often comes from the top management level suggesting that the argument should go ahead of the regulatory curve. This means that in some CASES (e.g., CASE 3 and 4), regulation may guide but does not drive the ERM system. For example, CASE 4 was found to be most strong in the practice of ERM, although it did not come under regulation (the solvency regulations came into effective for reinsurers from 2006). In summary,

although regulation can be seen as a key driving force for some CASES in developing ERM but for others regulation simply provides guidance.

#### **4. Conclusion**

The section analyzes the motivation of ERM in the CASES. The leadership of CEO and CRO were found to be the key motivation towards ERM within CASES. However, such leadership was not an isolated issue but essentially driven by many economic and political factors (e.g., a volatile economic situation in the marketplace, competition, globalization). All these sub factors effectively influence the CEOs (and the top management) to add more value in the firm in order to remain solvent and beat the competition. However, regulation was also found to be a motivating factor of ERM within some of the CASES. However, regulations guide organisations to shape their ERM in a market consistent manner.

## SECTION 4

### DESIGN OF ERM

#### 1. Introduction

In line with the research question set to investigate the design of ERM, the objective of this section is to analyze data to answer the question: (i) what are the key elements of the design of ERM in insurance companies and how are their elements linked? The objective is achieved through analyzing the findings of the CASE reports (attached in the APPENDIX). Four management steps (e.g., identification, quantification, assessment, and implementation) emerged from the analysis as key components of the design of ERM systems in insurance companies. Finally a conceptual model of ERM is developed, selecting elements from the practice of the CASES, and its limitations are discussed.

The four phase criteria developed in Section 1 (see figure 33(4)) is not employed in this section because of insufficient data; rather material for the four CASES is compared and contrasted.

#### 2. Four essential concepts

The ERM designs, as seen in the four CASES have four common components: identification, analysis, assessment and implementation of ERM. The first component involves an identification of the risks faced by the organization. This is not identification simply for the purposes of compliance (which is simply a catalogue of risks) but identification of risks which need to be handled strategically versus those which require an operational approach<sup>16</sup>. The second common component of ERM involves analysis and quantification of the risks. So the first component defines the risks; the second component enables a risk distribution to be determined. The third component of ERM involves assessing what can be done about the risk that is now understood. The key managerial question here is “how much chance (opportunity) should an organization assume in a certain level of loss?

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<sup>16</sup> Virtually, the identification process always ends up with remaining risks (the risk always left hidden because of the lack of ignorance)

Companies may want to take more risks in one place or move risks around, and then see how this impacts on capital requirements. The initial analysis assesses the capacity (or ability) of the organization in terms of available resources. This gives the organization an understanding of its capability, which then helps it decide where it wants to be. It is then necessary to map the way from where the organization is to where it wants to be. And, finally, the fourth common component is the actual implementation and ongoing execution of the ERM process. So ERM, in all the case study organizations, in a very broad sense, involves these four components although each case undertakes different specific activities under each of these components. In these four key steps (see figure 12(2)), organizational structure (where the key focus is to control risks arising in the process of executing decisions) plays an important role. The following paragraph discusses its various aspects as seen in the CASES.

### **3. The structure of risk governance among four CASES**

All four CASES are found to conform to a three line organisational structure (see figure 20(2)). The structure distinguishes risk observing as an independent functions from risk taking and management functions. The first line of defence takes, owns and manages risks in accordance with the set guidelines (Group Risk Policy). Although the group CEO holds the overall responsibility for the management of risks faced by the group, as the owner of risk, the primary responsibility of managing risks goes to individual business units (or local units). The second line of defence (constituting a part of central office) is often led by the CRO, who acts as risk observer and facilitator, and who is primarily responsible for providing technical (and logistic) support to the first line of defence. The second line of defence does not incur any management responsibility, and is thus not directly liable for mismanagement of risks. The third line of defence often led by a group internal auditor (who directly reports to the board) provides independent assurance on the effectiveness of risk management (carried out by the first line of defence) and efficiency of technical support (offered by the second line of defence). Since both the second and the third lines of defence do not hold any risk

management responsibility (they perform an advisory function), their functions sometimes coincide. Operational risk management often generates conflict. However, it is clear from the CASES that the area of operational risk that these two lines of defence (more distinctly the chief risk officer and the group internal auditor) are totally different and their objectives are also different. In fact, the group internal auditors look at operational risk around the area of non-compliance of Group Risk Policy (for example) because their job is to provide assurance of proper execution. It is not their responsibility to provide solutions for operational error. They go through the predetermined guidelines (group risk management policy). However, the CRO is keen to develop tools and techniques to manage operational risks and monitor the efficiency of the tools and provide alternative solutions, where necessary. This job is more technical and innovative.

The model (see figure 39(4)), which all four CASES call their ERM model is in fact an internal risk model, which is used to estimate economic capital for three purposes: meeting the requirements of regulations to remain technically solvent (e.g., Solvency II) (see figure 15(2)), satisfying the requirements of rating agencies to achieve (or maintain) the expected financial strength rating (see table 6(4)), and finally for its internal use in financial planning.

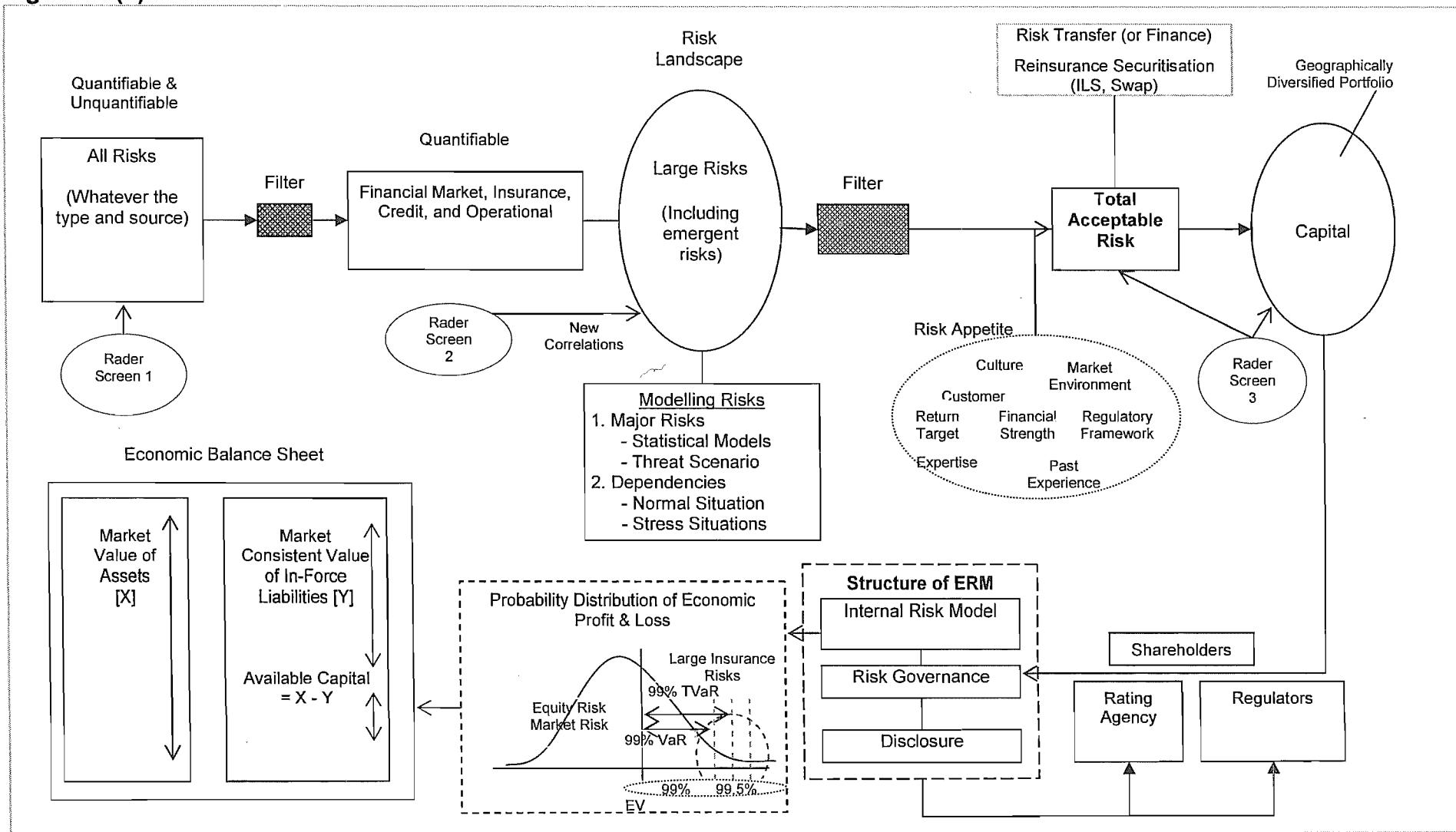
#### **4. Description of the model**

The theoretical framework of ERM drawn from the literature, suggests that ERM should consider all risks. Figure 39(4) illustrates a conceptual framework of such an internal [risk-capital] model. However, case study companies practically filter these 'all risks' using an imaginary *Radar Screen 1* and capture only numerically quantifiable risks in terms of a predetermined probability of failure over a certain period of time. However, even all quantifiable risks are not considered for the purpose of ERM; rather a chunk of large risks including emergent risks (which are best described as the unknown of known risks) are there considered for the next stage of ERM. Another *Radar Screen 2* continuously operates with the portfolio of quantifiable risks to calculate their potential frequency and severity using



various statistical techniques. However, the volatility and dependency among them always remain the key concerns. The following stage uses

Figure 39(4): ERM Model



another filter to calculate total acceptable risks, which are essentially linked to the risk appetite of the firm. In fact, the risk appetite is a complex issue as it includes many qualitative factors like organisational culture, customers' preference, market environment etc. They are very specific to the firm and difficult to quantify. The Cases exhibit inconsistent risk preferences. Various techniques, including both the capital market and money market are used to transfer and finance the total acceptable risk. A variable amount of capital is then deployed to finance these total acceptable risks. These actions illustrate that the cases deal with risks by first calculating and then choosing from the available and alternative risk-return combinations (March, 1987). A third *Radar Screen 3* comes into operation at this stage to observe the changes in the total acceptable risks and this information is then deployed to adjust the amount of capital. This is commonly known as economic capital (Belmont, 2004, Richard Barfield, 2002).

Modelling of this economic capital is then linked to the first pillar of the structure of ERM. The first pillar deals with the internal risk model. It includes calculation of economic capital in terms of totally acceptable risks. The second pillar includes the internal control, in terms of corporate governance issues, as a process of risk reduction. The third pillar deals with the transparency of disclosure to stakeholders; in particular, regulators, rating agencies, and shareholders. The dynamic relationship between total acceptable risk and the economic capital results in an economic balance sheet, which demonstrates economic profit or loss. The economic profit (the profit attributable to shareholders, less a notional charge for the equity invested in the business) provides a common approach for assessing the creation of shareholder value across the Group. The focus on economic profit allows the Group to compare the returns being made on capital employed in each business unit (Smith, 2003). This hypothetical balance sheet provides updated information to the stakeholders about the strength of the organisation both in financial and operational terms.

All the above descriptions suggest that the CASES are using the ERM model for calculating the economic capital under certain assumptions rather than

managing risks utilizing their resources and knowledge. The model introduces some filters (switch-gates) built on strict parameters, thus obstructing the natural flow of knowledge within the organisation. Therefore, the focus is clearly more towards the opportunities (winning more than losing) rather than protecting the organisation from physical danger. The model encourages the organisation to take more risk without justifying their consequences, other than in terms of the financial implications. It is unclear if the model is designed to protect the survival or promote the growth of the organisation concerned. The outcome is essentially the economic capital, typically defined as sufficient surplus capital that will cover potential losses at a given risk percentile (e.g., 99% or 99.5% tail), depending on the companies risk tolerances level.

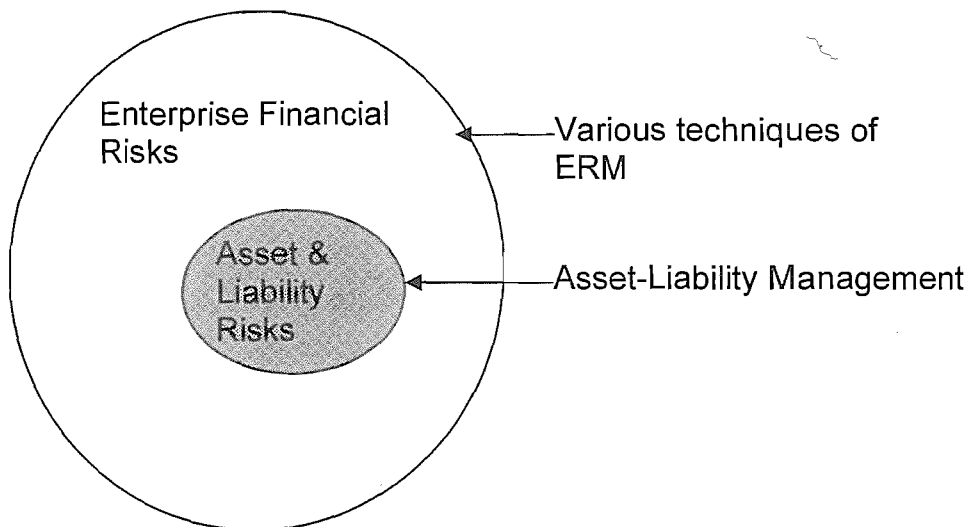
#### **4.1. Limitations of ERM Model**

Models can never represent the entire reality as they are built on many assumptions. The study identifies several weaknesses of the so called ERM models employed by the CASES. Firstly, they ignore unquantifiable risks because of the lack of expertise in dealing with these risks. Even within the range of quantifiable risks, the model finally includes only the large risks. Secondly, the evaluation of risk appetite presents a major concern because it excludes all subjective issues (e.g., culture, customer attitude, trust, and limitation of expertise). In calculating the total acceptable risks (risk tolerance level). Thirdly, the interest of a major group of stakeholders (i.e., managers and staff) is not considered; for example, incentive schemes are not provided for prudent risk taking. Finally, much emphasis is given to the internal risk-capital model rather than the risk governance framework and disclosure policy, including the establishment of an integrated model of these three factors. Moreover, the models do not provide sufficient scope to incorporate cultural values in designing risk management policies and procedures. Consequently, the models employed by no means fit with the theoretical frameworks of ERM suggested in the literature.

From a finance perspective asset-liability management (ALM), which is the core insurance activity, is found to be a sub-product under the ERM umbrella. Literature suggests that actuaries developed a formal ALM method in the

1950s for assessing and managing interest risks (see Chapter 2: section 4). This method, known as immunization, has become the foundation of several risk management techniques in the fields of life insurance, pensions, banking and derivatives (IO7). In financial sense the difference between the ALM and ERM approaches is that ALM manages assets to fund liabilities and ERM calculates capital (which includes assets) to fund risk exposures and risk opportunities. However, a similar philosophy and procedure is adopted for these two approaches; since, as the CASE studies suggest, the origin of ERM is ALM (where risk and capital are two interlinked concepts (see figure 3(2) for different types of asset-liability risks). This is illustrated in figure 40(4).

**Figure 40(4): Role of ALM in ERM**



In practice the study finds that in ERM in the insurance industry, is a sophisticated version of Asset-Liability Management. However, the problem with the traditional view (forecasting the future on the basis of past results) is that uncertainty in an ever-changing real world of issues is attached to *all* aspects of the business. Consequently, the attempt of business managers to project future expectations by looking at the past results and then extrapolating predictions from them about the future with various adjustments proves insufficient. Instead, the future economic approaches in terms of discounted cash flow (DCF) techniques and shareholder value analysis have gained popularity. In addition, some recent corporate scandals such as Enron, WorldCom and Andersen brought Corporate Governance into the picture

because of the attempt of senior management to maintain the expected improvements in the growth of value through manipulation of financial data and perceived facts (Lewis, 2002).

Whereas capital is treated as a resource available to finance its corporate activities, risks represent the exposure that impairs a firm's ability to achieve its corporate objectives. However, the CASE study companies use cash flow testing (CFT) for life businesses, which is an expanded version of ALM to cover a wider set of risks (such as risks arising from options and guarantees embedded in both products and assets). For non-life businesses, where the frequency and severity of events are important, CASE study companies employ dynamic financial analysis (DFA) to manage the portfolio of risks and calculate the amount of capital required to fund them using the principles of ALM and CFT.

The basis of the design of ERM as seen in the four CASES, is not how to best manage the risks but rather how best to manage operations. It is clear that a lot of elements of ERM already exist in the CASE study companies but the challenge is how to put them together. In the design phase, the CASE study companies are trying to develop some kind of organizing principle around which they are able to better connect these ideas. They find it necessary because they believe that by connecting and strengthening them, they can gain more insights into their business dynamics from multiple perspectives. The concern is mostly about connecting the existing knowledge, which remains scattered throughout the organization. Consequently, compliance and corporate governance are predominantly a dominating issue in the design phase of ERM. The view to explore from the CASE studies is that new rules and responsibilities have been imposed on senior management and board of directors by the regulators. These have resulted in higher costs and resource constraints. Consequently, many of the respondents questioned whether these new regulations are really cost effective (IO7). The effective design of ERM brings two separate operations together (risk management and capital management) to establish dynamic relationships between risk and capital. Since it is difficult to articulate the risk and capital relationship in a

straightforward manner, the relationship is developed by referring to an intermediate measure called economic capital; this is the amount of capital needed for an insurer to remain solvent with a low probability of default. In this sense, economic capital is considered as the true measure of the weight of insurers' risks. Consequently, this enables insurers to begin to develop an artificial economic balance sheet for capital allocation and financial decision making purposes in a dynamic environment.

## **5. The origin of the design of ERM**

In discussions with some respondents and by analyzing the information as seen in the annual reports of respective CASES the researcher gained the impression that the design of ERM as a holistic issue developed from some already existing processes or practices utilized by the CASES. For example, a similar process is used for ERM in CASE 1 as that used to measure the integrated performance of business units (or lines) and allocate capital. Similarly, in CASE 2 the holistic process used for business continuity management (and to some extent the underwriting and claims management) is adopted for ERM. Risk engineering is a well established topic in CASE 3, where it provides enterprise-wide risk management services to its clients. It utilizes its knowledge and experience gathered from this function in designing its ERM system. Being a reinsurer, catastrophe risk management is the core function of CASE 4, where it uses sophisticated risk measurement, modelling and management techniques. Its expertise in this area has been substantially utilized in developing its ERM system. In summary, this discussion establishes the fact that the design of ERM is not a totally new concept for the CASES, rather the elements (or parts) of the ERM are borrowed from many of their existing functions.

## **6. Conclusion**

From the analysis and discussion, it can be concluded that the design of ERM as seen in the CASES is not complete. It is basically a model to calculate the economic capital of the organisation, although different CASES remain at different stages of the design process. However, it is seen that all CASES tend to follow the similar pattern because they face similar phenomena both in

market and regularity constraints. Interestingly, the study finds that all CASES, except CASE 4 took advisory support from an external consultant to develop their ERM. This suggests that only CASE 4 has sufficient internal knowledge which is long established to develop and practice ERM. However, there is a hope that the model used in practice will further develop, in particular, with respect to the issues of risk identification and risk appetite in parallel with the development of regulators' and rating agencies' enhanced requirements.



## SECTION 5A

### OPERATIONAL CHALLENGES TO IMPLEMENTING ERM

#### 1. Introduction

In line with the research question set to examine the operational challenges of ERM this section analyzes the data to answer two questions: (i) what the key operational challenges to implementing ERM? and (ii) How are they interrelated? Analysis is carried out on the findings of CASES obtained through questionnaire survey and interview surveys to identifying a range of issues which challenge the implementation of ERM; but communication of risk was found to be the key challenge.

The four phase criterion (see Figure 33(4)) has been employed here to analyze the results. The phases are as follows. First, the findings (obtained by questionnaire survey and interview survey) will be analyzed individually (CASE by CASE). Second, the findings of the questionnaire survey will be analyzed across all CASES. Third, the findings of the questionnaire survey will be analyzed to explore all issues in combination. Finally, the results of both the questionnaire survey and the interviews across all four CASES will be used together to discuss the overall issues associated with the operational challenges in implementing ERM in the CASES.

#### 2. Summary of the findings of CASES

The results obtained from the CASE studies are summarized in table 12(4).

**Table 12(4): Operational challenges of ERM (Phase 1)**

	<b>Top three operational challenges to ERM implementation as ranked by the questionnaire survey</b>	<b>A range of key operational challenges to ERM implementation identified by interview survey</b>
<b>CASE 1</b>	-Risk communication -Risk awareness -Risk classification	-Risk communication -Risk awareness -Risk culture -Developing a common risk language
<b>CASE 2</b>	-Data accuracy, adequacy & consistency -Risk communication -Appropriate risk analysis techniques	-Data accuracy, adequacy & consistency -Risk communication

		-Risk awareness -Risk culture -Developing a common risk language
<b>CASE 3</b>	-Risk communication -Risk culture -Developing a common risk language	-Risk communication -Risk culture -Risk perception
<b>CASE 4</b>	-Risk communication -Risk controlling -Inconsistent data	-Risk ownership

## 2.1. Phase 1: Analysis by individual CASES

### CASE 1

The questionnaire survey of CASE 1 ranked 'risk communication across discipline' as top of the list of operational challenges associated with implementing ERM. Risk awareness, risk classification, risk controlling, and linking risk management with the corporate strategy were also found to be important. The interview survey also identifies finds risk communication and risk awareness to be the key challenges associated with ERM implementation, but in addition identifies challenges in developing a risk culture and developing a common risk language as important barriers.

### CASE 2

The questionnaire survey of CASE 2 ranked 'data accuracy, adequacy, and consistency' as top of the list of operational challenges in implementing ERM. Risk communication across the management hierarchy, appropriate risk analysis techniques, and linking risk with the corporate strategy were also seen key challenges. The interview survey does not identify data and risk communication as key challenges, rather points to risk awareness, risk culture and developing a common risk language as the key difficulties faced when implementing ERM.

### CASE 3

The questionnaire survey of CASE 3 ranked 'risk communication' and 'risk culture' as top of the list of operational challenges in implementing ERM. Moreover, a common risk language, data accuracy, and risk awareness were also seen as important factors. Risk communication and risk culture were also identified in the interview survey as the key operational challenges but risk perception was also seen as being important.

## CASE 4

The questionnaire survey of CASE 4 ranked 'risk communication' as top of the list of operational challenges in implementing ERM with risk controlling, inconsistent data and risk awareness also being ranked highly. Interestingly, the interview survey did not find any of them as the key challenges of ERM but, rather, identified other issues as important, including determining risk ownership.

### 2.2. Phase 2: Cross analysis of questionnaire survey results of CASES

Although the above analysis (CASE by CASE) gives a broad idea concerning the operational challenges of ERM for each CASE, it does not show the ranking of each of 19 potentially challenging issues associated with implementing ERM. Consequently, table<sup>17</sup> 13(4) was designed to illustrate the preference of CASES for each of the potential operational challenges.

**Table 13(4): Comparison of operational challenges among 4 CASES**

	Operational Challenges	CASE 1	CASE 2	CASE 3	CASE 4
1	Appropriate risk analysis techniques	6	2	6	1
2	Data accuracy	5	1	2	2
3	Data adequacy	7	1	5	3
4	Data consistency	5	1	7	3
5	Data storing	7	4	10	3
6	Determining risk ownership	5	4	5	4
7	Lack of transparency: in the requirements of Group Internal Auditor	6	6	6	5
8	Lack of transparency: in the requirements of Group Risk Management	8	7	6	5
9	Linking risks with corporate strategy	4	1	5	5
10	Risk awareness at the lower level	9	2	4	5
11	Risk awareness at the mid-level employees	2	2	3	6
12	Risk awareness at the top-level (strategic)	4	4	8	6
13	Risk classification	3	4	3	7
14	Risk Communication across discipline	1	6	1	7
15	Risk communication: a common risk culture	5	2	1	8
16	Risk communication: a common risk language	4	3	1	9
17	Risk communication: a consistent regulatory framework	5	3	8	9
18	Risk communication: hierarchical difference	5	7	9	3
19	Risk controlling	3	3	5	3

<sup>17</sup>The purpose of the table is to arrange the challenging issues in terms of preference (in descending order). For example, respondents in CASE 1 ranked risk communication across discipline as the most challenging issue facing ERM implementation. The numbers as seen in each array represent the priority of challenging issues of the CASES. While the vertical look gives information about the priority of any challenging issue of any particular CASE, the horizontal look provides information about the priority of any particular challenging issue among all four CASES.

There is little consistency in the issues found to be key operational challenges by the four CASE study companies. However, the main similarities were data accuracy, adequacy, and consistency. These were found as key operational challenges for CASES 2 and 4. In addition, risk communication across disciplines was found to be a key challenge for CASES 1 and 3.

Individual companies ranked different features of ERM as the main operational challenges. For example, risk communication, in the absence of a common risk culture and a common risk language were found to be the key challenges for CASE 3. Accuracy, adequacy, and consistency of data including linking risk with corporate strategy were found to be the key challenges for CASE 2. For CASE 1, communication of risk across different disciplines, risk awareness of middle-level employees, and taking risks in a controlled manner were found to be the three key challenges. Finally, appropriate risk analysis techniques, accuracy, adequacy and consistency of data including determining risk owners and lack of transparency in the requirement of group internal audit were found to be key challenges in CASE 4.

As noted earlier in section 1, no CASE exhibits much consistency in ranking the driving forces of ERM. The analysis identified two reasons for such inconsistencies. One is in the level of uneven understanding concerning the nature of ERM and the other is the design of ERM. These were explored in section 1 and section 3 of this chapter, respectively. However, they are not isolated issues but closely linked together. As section 1 reports an uneven understanding of the concept of ERM amongst staff in the CASES, the operational challenges are limited by the level of understanding. Since, the level of understanding is reflected in the design of ERM; some CASES (for example, CASE 1) do not exploring the full spectrum of ERM, which the advocated by this study. However, using self defined criteria<sup>18</sup>, appropriate risk analysis techniques, data accuracy, risk communication across disciplines,

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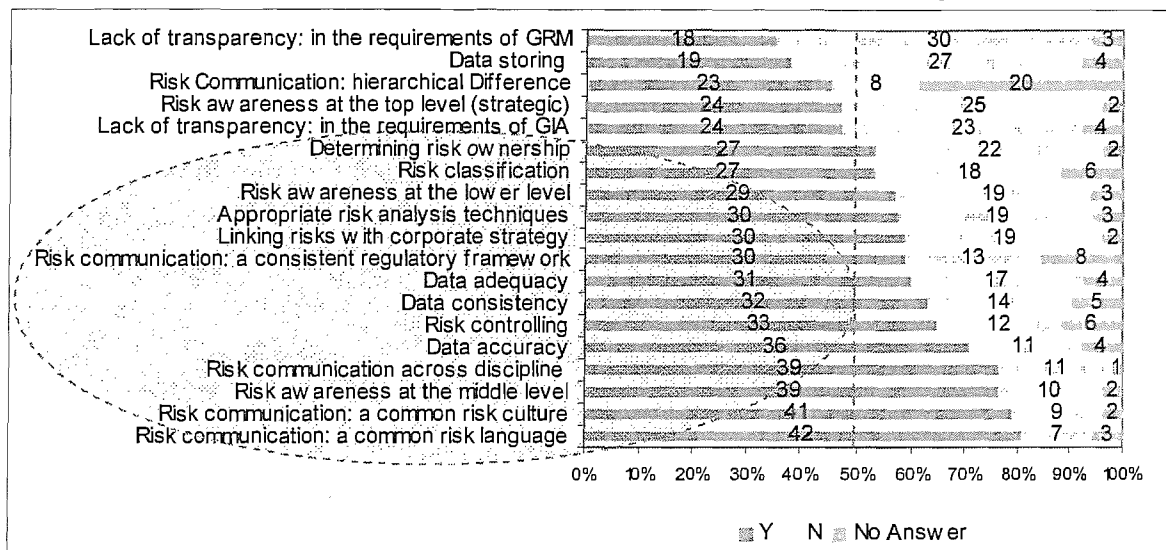
<sup>18</sup> Since no challenge was ranked as number 1 by at least three CASES, challenging issue as ranked as number 1 by two CASES and ranked 1 by one CASE and at least ranked 2 by another case were considered as key challenges.

and establishing a common risk culture were found the key challenges of ERM in this phase of the analysis.

### 2.3. Phase 3: Analysis of survey results of CASES in combination

The first two phases of analysis concentrate on the challenges of ERM of the CASES in isolation but could not demonstrate the challenges an integrated (or combined) manner, which is the ultimate interest of the analysis. The following figure<sup>19</sup> 41(4) illustrates the results obtained from the questionnaire survey in combination across the CASES.

Figure 41(4): Operational challenges in implementing ERM



It is important to see that a broad range of operational challenges is mentioned by over 50% of the respondents. However, all the factors noted in the above table come from the data, thus proving the robustness of the findings through cross checking. In the graph, 42 people identified developing a common risk language in communication issues as the key operational challenge whereas seven persons disagreed and three persons did not answer. This is followed in popularity amongst respondents by a common culture and risk awareness at the middle and risk communication across disciplines.

<sup>19</sup> The purpose of this graph is to show the operational challenging issues in implementing ERM as viewed by the respondents in aggregate. The numbers represent the number of respondents on any particular challenging issue as classified in terms of Y (Yes), N (No) and No Answer (did not answer). The survey included 52 respondents altogether.

## 2.4. Phase 4: Analysis of all four CASES together

Table 14(4) summarises the results obtained in the three phases of analysis.

**Table 14(4): Summary of three phase analysis for the operational challenges of ERM in CASES**

Phases	Purpose of the phases	Preference of all CASES from the questionnaire survey concerning key operational challenges to implementing ERM	Preference of all CASES from the interview survey concerning the key operational challenges to implementing ERM
<b>Phase 1</b>	To obtain a rough idea about the key operational challenges faced in implementing ERM for each CASE	<ul style="list-style-type: none"> <li>-Data accuracy, adequacy and consistency</li> <li>-Risk communication</li> <li>-Appropriate risk analysis techniques</li> <li>-Risk communication</li> <li>-Risk culture</li> <li>-Developing a common risk language</li> </ul>	<ul style="list-style-type: none"> <li>-Risk communication</li> <li>-Risk awareness</li> <li>-Developing a common risk language</li> <li>-Data accuracy, adequacy &amp; consistency</li> <li>-Establishing a common risk culture</li> <li>-Risk perception</li> <li>-Risk ownership</li> </ul>
<b>Phase 2</b>	To note the most common preference of each CASE on each of 17 challenges.	<ul style="list-style-type: none"> <li>- Appropriate risk analysis techniques</li> <li>- Data accuracy</li> <li>- Risk communication across discipline</li> <li>- Establishing a common risk culture</li> </ul>	
<b>Phase 3</b>	To demonstrate the integrated (or combined) preferences of all CASES. This is the ultimate interest of the analysis.	<ul style="list-style-type: none"> <li>-Common risk language</li> <li>-Common risk management culture</li> <li>-Risk awareness</li> <li>-Risk communication</li> </ul>	

While phase 1 gives the results from individual CASES, phase 2 and phase 3 give the aggregated data from all CASES. Consequently, issues identified in phases 2 and phase 3 (i.e., appropriate risk analysis techniques, data accuracy, risk communication, risk awareness, a common risk language, and a common risk culture) are now explored in terms of the issues which arose from the interview survey. In fact, the set of challenging issues drawn from the questionnaire survey closely matches those issues noted from the interview survey.

## 3. Discussion

The objective of the discussion is to answer why the issues of data accuracy, risk communication, risk awareness, a common risk language, and a common risk culture as derived from the above process are perceived as the key

challenges facing the CASES in implementing ERM. The discussion establishes that communication is the overriding operational challenge of ERM. As all the issues are closely linked, they will be discussed in combination. Whereas risk awareness is a potential barrier to effective communication of risk, a common language of risk facilitates communication. Inconsistency in the data set was found a key problem in CASE 2 for pricing insurance risks, and storing and communicating data in a consistent manner was found an important issue. While economic capital provides a common language of risk across the quantitatively oriented community in CASE 1, it is not so well understood by most of the respondents in CASE 1, thus hindering effective communication. While expressing risks numerically provides a common language throughout the organization (Mengle, 2003) for quantitative analysis, putting numbers on operational risk is difficult. Since people understand and judge risks in terms of locally defined values and concerns, communication is a problem. Moreover, because of the lack of communication and awareness, people focus on their own risk (which remains under their individual domain) thus providing inadequate knowledge of risk sharing between members of the organisation. Consequently, the enterprise risk remains hidden, and ultimately becomes large, complex and costly over time (Shiller, 2003). As a result, risk communication, culture, and awareness of risk need to align within a common language, which is often attempted by the organizations through developing a unique and consistent group risk policy. Specialization hides the bigger picture. All of these points suggest that growing bigger is the greatest difficulty in managing a company, particularly for the top management is to handle for overview of the company. For smooth running, organizations need a balanced team (or a balanced portfolio), which is difficult to build. It is important to the organization to ensure that people can understand each others' problems.

The fundamental point of this discussion is that people live with an all-pervasive awareness of risk (Smith, 2006) in which, according to (Beck, 1994): " ....the future looks less like the past than ever before and has in some ways become very threatening ....the notion of 'risk' is central to modern culture today ....In most aspects of our lives, individual and collective,

we have regularly to construct potential futures ...” Consequently, to handle this increasingly perceived risk which affects the whole organisation, it requires that people across the organisation share a common risk language in the exercise of their daily functions.

#### **4. Conclusion**

Based on the analysis of the data and discussions thereafter it can be concluded that communication of risk appears to be the key challenge facing the CASES in implementing ERM. This may be due to the limitations of their design of ERM (as seen in the previous section) because issues which must be addressed in an ERM program were not adequately captured by their modes. Moreover, there is a gulf between the designer and user of the model in terms of the disciplinary perspective, which in effect triggers the communication problem. This emphasises the fact that prior to implementing the model, a common understanding of all associated factors/elements (in particular the meaning of terminologies) is essential. All these arguments suggest the need for a cultural change within organisations in conceptualizing ERM as an interdisciplinary subject.



## SECTION 5B

### TECHNICAL CHALLENGES IN IMPLEMENTING ERM

#### 1. Introduction

In line with the research question set to note the technical challenges of ERM the section analyzes the data to answer two questions: (i) what are the key technical challenges of ERM? and (ii) how are they interrelated? Analysis is based on the findings from the CASES obtained through the questionnaire and interview surveys. A range of technical challenges to implementing ERM were identified, but operational risk measurement was found to be the key challenge.

The four phase criteria (see figure 33(4)) has been employed here to analyze the results. The phases are as follows. First, the findings (obtained by questionnaire survey and interview survey) will be analyzed individually (CASE by CASE). Second, the findings of the questionnaire survey will be analyzed across all CASES. Third, the findings of the questionnaire survey will be analyzed to explore all issues in combination. Finally, the results of both the questionnaire survey and the interviews across all four CASES will be used together to discuss the overall issues associated with the technical challenges in implementing ERM in the CASES

#### 2. Summary of the findings of CASES

The results obtained from the CASE studies are summarized in Table 15(4).

**Figure 15(4): Key technical challenges in implementing ERM**

CASES	Top three technical challenges to implementing ERM as identified in the questionnaire survey	The range of key technical challenges to ERM implementation as observed in the interview survey
CASE 1	-Operational risk measurement -Risk modelling -Risk profiling	-Risk measurement -Risk modelling
CASE 2	-Allocation of capital -Calculating economic capital -Calculating correlations (among business lines and risk classes)	-Risk modelling -Calculating correlations

<b>CASE 3</b>	-Operational risk measurement -Risk modelling -Risk profiling	-Calculating risk correlations -Risk measurement -Risk modelling -Risk identification -Calculation of diversification benefit, -Risk integration -Determining risk tolerance -Calculating economic capital
<b>CASE 4</b>	-Operational risk measurement -Calculating correlation among risk types -Risk integration	-Risk measurement -Risk securitization -Calculating economic capital

## 2.1. Phase 1: Analysis by individual CASES

### CASE 1

The questionnaire survey of CASE 1 ranked 'operational risk measurement' as top of the list of operational challenges to implementing ERM. Risk modelling, risk profiling, allocation of capital, and calculating correlations among business lines were also regarded as important technical challenges. The interview survey identified risk measurement and risk modelling as key technical challenges, but none of the other factors identified in the questionnaire survey were mentioned as technical challenges to implementing ERM in the interviews.

### CASE 2

The questionnaire survey of CASE 2 ranked 'allocation of capital' as the most important technical challenges to implementing ERM. Calculating economic capital, and correlations among business lines and risk classes, risk modelling and determining offsetting benefits were also regarded as key challenges. The interview survey identified find risk modelling and calculating correlations as key technical challenges but no other challenges were discussed by respondents.

### CASE 3

The questionnaire survey of CASE 3 ranked 'operational risk measurement' as top of the list of technical challenges to implementing ERM. Risk modelling, risk profiling, allocation of capital, and calculating correlations were also regarded as key issues. In the interviews, calculating risk correlations, risk measurement and risk modelling were identified as the technical challenges.

In addition, lesser technical challenges, such as risk identification, calculation of diversification benefits, risk integration, risk modelling, determining risk tolerance, and calculating economic capital were also mentioned.

## CASE 4

The questionnaire survey of CASE 4 ranked 'measurement of operational risk' as top of the list of technical challenges to implementing ERM. Calculating correlation among risk types, risk integration, risk modelling, and risk identification were also ranked as key challenges. The interview survey did not identify risk measurement as a key technical challenge. However, the interview survey did identify risk securitisation and calculating economic capital as key technical challenges in implementing ERM. Table 16(4) lists the key technical challenges identified in the questionnaire and interview survey conducted in each CASE as discussed.

### 2.2. Phase 2: Cross analysis of questionnaire survey results of CASES

Although the above analysis (CASE by CASE) gives a rough idea about the technical challenges of ERM for each CASE, does not show the preference of each CASE on each of the 22 technical challenges which may hinder ERM implementation. Consequently, Table<sup>20</sup> 16(4) designed to illustrate the ranking of the technical challenges (as observed from the questionnaire survey) in each of the CASES.

**Table 16(4): Technical challenges in 4 CASES (Phase 2)**

Challenging Factors	CASE 1	CASE 2	CASE 3	CASE 4
Allocation of capital across business lines	3	1	4	11
Allocation of capital across business units	5	1	6	7
Calculating risk based capital	4	1	5	10
Determining correlations among business lines	4	1	4	3
Determining correlations among risk classes	5	1	5	2
Determining offsetting benefit among business lines	5	1	8	8
Determining offsetting benefit among risk classes	7	1	5	9
Determining risk appetite	6	3	7	10
Profiling Risk (a risk database)	3	1	3	8
Risk identification	4	3	4	3

<sup>20</sup>5 The purpose of the table is to arrange the technical challenges in terms of preference (in descending order). The numbers as seen in each array represent the priority of technical challenges of the CASES. While the vertical look gives the information about the priority of any technical challenge for any particular CASE, the horizontal look gives the priority of any particular challenge among all four CASES.

Risk integration	5	3	5	3
Risk measurement: Insurance (financial)	4	4	5	6
Risk Measurement: Insurance (operational)	1	2	1	4
Risk Measurement: Non-Insurance (financial)	6	3	6	4
Risk Measurement: Non-Insurance (operational)	2	2	2	1
Risk Measurement: Strategic	2	1	2	5
Risk Modelling	2	1	2	5

Measurement of operational risks in the insurance functions is regarded as the key technical challenge for both CASES 1 and 3. In addition, measurement of operational risk in the non-insurance functions (which includes financial and treasury functions) has been identified as the second most important key challenge for CASE 1, 2 and 3. There is close agreement among respondents in CASE 1, and 3 concerning the key challenges they face in implementing ERM; namely measurement of operational risks both in insurance functions and non-insurance functions, measurement of strategic risks and modelling risks. A more diverse range of factors (such as allocation of capital across business lines and units, calculating risk based capital, determining correlations business lines and units, determining offsetting benefits among business lines and units and measurement of strategic risks and modelling risks) are all regarded as key technical challenges in implementing ERM for CASE 2. However, in CASE 4, respondents suggest that the measurement of operational risks in non-insurance functions and determining correlations among risk classes are the key challenges.

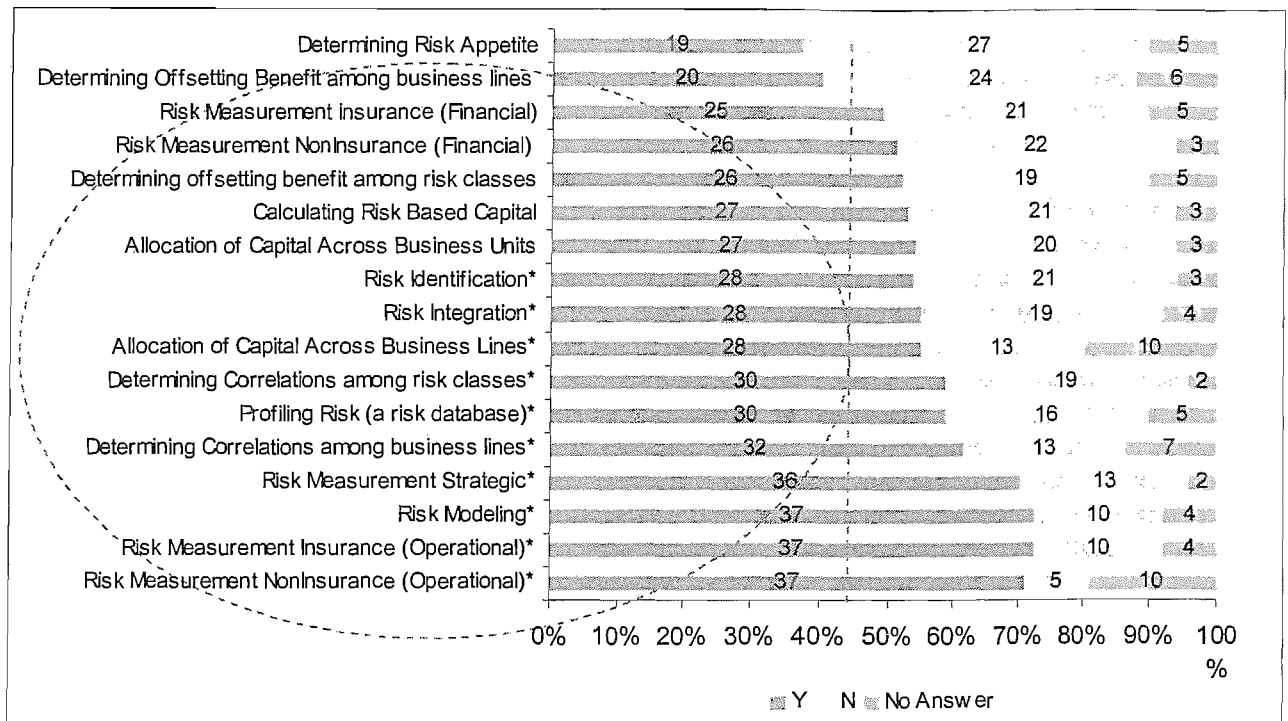
In summary, operational risk measurement, risk modelling, and calculating correlations among different risk classes and risk profiling were found to be key technical challenges across the CASES.

### **2.3. Phase 3: Analysis of survey results of CASES in combination**

The first two phases of analysis concentrated on the challenges of ERM for the CASES in isolation but could not demonstrate the challenges in an integrated or combined manner, which is the ultimate interest of the analysis.

Figure 42(4)<sup>21</sup> illustrates the results obtained from the four questionnaire surveys combined.

**Table 42(4): Technical Challenges of ERM in 4 CASES**



A wide range of challenges are mentioned at least 50% of respondents (as indicated by an asterisk in table 42(4)). This indicates that the CASES struggle significantly with technical challenges in implementing ERM. It illustrates that 37 respondents (71%) ranked operational risk measurement as the top technical challenge. Calculating correlation among business lines and risk profiling were ranked as key challenges by 62% and 58% respectively.

## 2.4. Phase 4: All four CASES together

Table 17(4) summarises the results obtained in the three phases of analysis associated with identifying the technical challenges to successful ERM implementation.

<sup>21</sup> The purpose of this graph is to show the technical challenging issues in implementing ERM as viewed by the respondents in aggregate. The numbers represent the number of respondents on any particular challenging issue as classified in terms of Y (Yes), N (No) and No Answer (Did not participate). The survey included 52 respondents altogether.

**Table 17(4): Summary of three phase analysis for the technical challenges of ERM in CASES**

Phase	Purpose of the phases	Key technical challenges of implementing ERM as identified by the questionnaire survey	Key technical challenges of implementing ERM as identified by the interview survey
Phase 1	To obtain an overview of the key technical challenges to implementing ERM faced by the CASE	<ul style="list-style-type: none"> <li>-Operational risk measurement</li> <li>-Risk modelling</li> <li>-Risk profiling</li> <li>-Allocation of capital</li> <li>-Calculating economic capital</li> <li>-Calculating correlations (among business lines and risk classes)</li> <li>-Operational risk measurement</li> <li>-Risk integration</li> </ul>	<ul style="list-style-type: none"> <li>-Risk modelling</li> <li>-Calculating correlations (business and risk types)</li> <li>-Risk measurement</li> <li>-Risk modelling</li> <li>-Risk identification</li> <li>-Calculation of diversification benefit,</li> <li>-Risk integration</li> <li>-Determining risk tolerance</li> <li>-Calculating economic capital</li> <li>-Risk securitisation</li> </ul>
Phase 2	To identify the most common technical challenges identified by the respondents in each CASE.	<ul style="list-style-type: none"> <li>-Operational Risk measurement</li> <li>-Calculating correlations (among risk classes)</li> <li>-Risk profiling</li> <li>-Risk modelling</li> </ul>	
Phase 3	To demonstrate the integrated (or combined) preferences of all CASES. This is the ultimate interest of the analysis.	<ul style="list-style-type: none"> <li>-Operational risk measurement</li> <li>-Risk modelling</li> <li>-Strategic risk measurement</li> <li>-Calculating correlations</li> <li>-Risk profiling</li> </ul>	

While phase 1 gives the results of each individual CASE, phase 2 and phase 3 give aggregated data for all CASES. Consequently, issues identified in phases 2 and 3 as key issues across the CASES (operational risk measurement, calculating correlations among risk classes, risk profiling, risk modelling, strategic risk measurement) are now explored in terms of the issues that arose in the interview survey. The list of key technical challenges as obtained from the questionnaire survey is a subset of the list of issues obtained from the interview survey.

### 3. Discussion

The objective of the discussion is to explore why the issues (operational risk measurement, calculating correlations among risk classes, risk profiling, risk

modelling, and strategic risk measurement) as highlighted by the above process as the key technical challenges to successful implementation of ERM in the CASES.

### **3.1. Operational risk measurement**

Operational risk management under group risk does not focus on minimizing the effect of operational risk. Rather it aims to calculate the capital necessary to hold to cover operational risk. Thus it focuses on measurement and modelling of operation risk, and is clearly driven by regulation (solvency). However, the minimization of operational risk, which is a part of the risk governance agenda (Turnbull, Sarbanes Oxley Act) and which comes under corporate governance guidelines (see section 5 of Chapter 2) is a different issue. This may not come under the current approach adopted towards ERM, but this varies from one CASE to another. For example, for CASES 1 and 2, operational risk is an issue totally isolated from enterprise risk, but for CASE 3 (in particular) ERM and operational risk are closely linked. As established earlier (section 3 of this chapter), ERM has two dimensions: organizational and technical and they are complimentary – one can not operate in the absence of the other. Operational risk arises from both dimensions but they are different in character. However, operational risk is not new in the insurance industry; but the measurement of operational risk in numerical terms is new. Therefore, conceptualizing and defining operational risk, and identifying a complete list of risk indicators (which may include purchasing inadequate reinsurance, wrong data, and losing reputation) is problematic (Tripp, 2004). Consequently, measurement of operational risk is a major technical challenge. However, the recent regulatory constraints for measuring operational risk have given initial momentum to the insurers' ERM initiatives.

### **3.2. Calculating correlations among risk types**

The issue regarding correlation (or dependency) comes with the complexity of quantifying total risks of insurers. In order to combine the different parts of the business it is important to consider correlations between risks (across types and business lines). This arises because the capital charges for risks may not be accurate (often it is higher) if the proper correlations are not considered.

This is also important for diversification. In addition to the appropriate model, the key challenge to calculating correlations is accurate and adequate data. As 3R14 argues: "it is critical to evaluate this sensitivity because the correlations are largely judgment based, since little empirical data is available". Respondents from CASE 1 and 3 particularly find it difficult to estimate the correlations between risks.

### **3.3. Risk profiling**

In order to increase the visibility of risk, risk profiling is a challenging issue in most of the CASES. Risk profile, which in effect is a database of an organizations' risk exposure is the key to the accuracy of all risk management functions and strategic decisions in all four CASES. In CASE 3, risk profile is considered a primary support tool for its ERM system, including risk identification and managing risk tolerance. It is seen that the profiling of risk in terms of frequency and severity is efficiently done by some CASES (e.g., CASE 4) using stochastic simulation techniques for quantifiable risks but the key challenge arises in respect of operational risk, for which there is no reliable data.

### **3.4. Risk modelling**

Risk modelling is regarded as a core of function of ERM in the CASES. However, is closely related to other issues (e.g., risk quantification, risk correlations, and risk profiling) as identified earlier. The model of financial risk is well developed in all CASES, but risk modelling for operational risk is a new area. However, an enormous growth in modelling operational risk is currently taking place in some CASES (e.g., CASE 2) mainly because of the regulatory constraints. However, adequacy and accuracy of data are key concerns of all CASES.

## **4. Conclusion**

The section presents a long list of challenges to successfully implementing ERM and key among these appear to be risk measurement and risk modelling. However, these two challenges are not isolated issues; rather, all other issues (e.g., correlations, identification, and calculation of risk based capital and so on) are closely interrelated. Although the challenges are



somewhat manageable for financial risks, because of adequate data, they are problematic for operational risks, where using expert judgments are used to provide a solution. However, respondents from the CASES hope that this situation is changing rapidly.

## SECTION 6

### PERFORMANCE OF ERM

#### 1. Introduction

In line with the research question set to explore how CASES measure the performance of their ERM this section analyzes the data to answer two questions: (i) how is the performance of ERM measured? and (ii) what are the key challenges faced by the organisations in measuring the performance of ERM? Analysis was conducted through comparing and contrasting the information obtained from the interview survey. No questionnaire survey was conducted on this issue due to the lack of information available to develop a questionnaire for this topic<sup>22</sup>.

The four phase criteria developed in Section 1 (see figure 33(4)) is not employed in this section because of insufficient data; rather material for the four CASES is compared and contrasted.

#### 2. Analysis of data

The analysis finds that no criterion has been developed to evaluate the performance of ERM in the CASES for the specific use of management and internal decision making purposes. However, the evaluation of companies' performance by key stakeholders' (credit rating agencies, financial analysts, and regulators) are generally considered as crude benchmarking criteria. The analysis of interviews finds that the execution of ERM is complex, time-consuming and costly. This is because ERM depends on the company's specific business model (retail or wholesale), its culture, the depth of knowledge of its staff in handling risks and also the size of the organisation (see Figure 25(4) and 26(4) and Table 5(4)). Organisations having less (or more) volatile profit streams have less (or more) structured ERM systems in place (see Figure 27(4)). This is because the driving forces of ERM are different from one CASE to another<sup>23</sup> (see table 10(4)). In addition, the effort of

<sup>22</sup> A reminder for the readers is that the questionnaire for the motivation of ERM, and key challenges (operational and technical) were developed from the information obtained through interview survey.

<sup>23</sup> The two key driving forces of ERM for CASES as the survey results suggest are for CASE 1 (leadership, innovation), Case 2 (regulation and changing landscape), Case 3 (regulation and leadership), Case 4 (globalization and changing risk landscape). For details see the report of respective CASE studies in APPENDIX.

reinsurers towards developing ERM is seen to be greater than that of primary insurers because of the distinctness of their risk profile and business model. In theory, poorly performing firms may seek risky investments (Bowman, 1982). However, the performance of the CASES supports this view for some CASES but not others. For example, the investment decisions, loss and profit streams of CASE 3 support this view but this is not for the CASE 2 (see Figures 27(4) and 30(4))

### **3. Discussion**

The analysis of interviews suggests that the benefits that managers find while practicing ERM are general in nature. They include improved risk assessment in terms of understanding, identifying and prioritizing risks. Through risk mapping, management have a better knowledge of the critical risks and their potential impact on the company. It is argued that the organisation through ERM will be better prepared to manage its risks and maximize its opportunities within the acquisition, product, and funding programmes. In addition, the practice of ERM could provide a common language for describing risks and its potential effects, which could improve general communication. Better knowledge of risk, in particular, the emergent risks, could enable management to handle them more efficiently and effectively in terms of quantification and modelling; which may help the efficient pricing of risk. The development of risk awareness could mitigate the level of risk, thus requiring less capital, which would ultimately reduce the cost of capital. Above all, the practice of ERM may enable insurers to maintain competitive advantage.

In addition, the research finds that industry managers apparently do not see any disadvantages arising from ERM. However, the centralization (as opposed to harmonisation) of risk and capital management issues in the framework of ERM could cause a systemic failure in the future (Bate, 2006). However, risk management shows its effectiveness best when things are at their worst. When markets are less volatile and there are no surprises, it is more difficult to evaluate how effective an institution's risk management

policies are. Unfortunately, it is often only when unpleasant surprises arise that the effectiveness of risk management policies becomes apparent.

Creation of shareholder value has been found to be the ultimate measure of the success of ERM. The question is how ERM can be proved to be a value adding function. The CASE study companies talked much about the potential benefits of ERM and there is little doubt among the respondents that these benefits exist. They see a business opportunity in ERM in the face of imminent danger. However, they find it difficult to demonstrate the value since the benefits may not be immediately available<sup>24</sup>.

CASE 4 was identified as an aligned organization (Kaplan, 2004) because its employees were found risk aware, which in turn linked to the achievement of its corporate objectives through individual risk management actions. Furthermore, the risk taking and innovative actions of individuals are incentivized by the management.

At the current state of development of ERM, the study concludes that the measurement of the performance of ERM in simple terms is not possible. The general belief is that, in addition to protecting assets (both tangible and intangible), ERM provide opportunities for strategic decision making in many areas of business (e.g., performance evaluation, capital allocation, etc).

### **3.1. Demonstrating the value of ERM**

The analysis suggests that the demonstration of value is a fundamental problem for ERM. It is easy to demonstrate that an organization complied with regulations to the certain standards. However, the objective for ERM is to create value for the firm. Identifying the growth drivers of and protecting them is the simplest way of creating value, while continuing operations, even in a challenging market (IO7). Three major value drivers of insurance business are: production, investment, and reinsurance (Calandro, 2002). However, it is

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<sup>24</sup> Shareholder value is not really related very often to the issue of financial risks. Moreover, shareholder value is not just dependent on risk management but depends on many other factors, including the general climate, rumours, politics, and psychology (Renn, 2003).

difficult to identify a metric from a risk management perspective. A classic example is of somebody who looks back after five years of buying insurance and who has continuously paid insurance premiums but has never made a claim; the classical finance erroneous view would suggest it was a waste of money because the organization paid all these premiums, yet did not make a single claim. Theoretically, the premium represents an option to raise capital (so that option has value) but the price of this option, which is in effect the annual premium, is marked against the value to the firm, which should be measured in terms of the opportunity cost of the risk. The performance of ERM needs to be demonstrated in such a context.

Moreover, a part of the value of managing risks is that it opens up further opportunities. For example, a part of the corporate risk management literature suggests that the failure of risk management abruptly curtails the budget for R&D in some firms (Hambrick, 1983, Wiseman, 1996). The argument is based on the premise that if risk is not managed and something happens, which causes firm to pay compensation to customers who are injured, or to rebuild buildings or property that have been destroyed etc, and this will create a financial drain on the organization. The resources to cover these losses often adjusted from the R&D budget. So in this sense, risk management creates the opportunities to undertake R&D, and R&D develops new products, new prices or new ideas, which are very difficult to cost or value. Consequently, effective risk management gives the option of introducing further innovation in the organization and this is difficult to value. In addition, many of the benefits of risk management are difficult to value directly in monetary terms.

### **3.2. Ex-ante and ex-post**

Ultimately, the truth is that risk management shows its effectiveness best when things are at their worst. When markets are less volatile and there are no surprises, it is more difficult to evaluate how well an institution's risk management policies are operating. Unfortunately, it is often only when unpleasant surprises arise that the effectiveness of risk management policy becomes most apparent.

Consequently, the issue becomes whether to value the performance of ERM ex-ante or ex-post (that is; before or after the loss) (Bromiley, 1991). For instance the benefits of corporate risk management could be measured in reduced tax payments. In other words, in advance of knowing what may actually happen in the world. Measuring its benefits ex-post it is rather like saying: "Should I decide whether I should have bought the insurance after I discover whether I incur a loss or not?". So if there is no loss, the insurance is identified as a waste of money, but if there is a loss, the insurance is regarded as having incredible value. However, as insurance has to be purchased in advance and as the vast majority of risk management decisions have to be made in advance of knowing what will happen in the world, mistakes can occur. In addition, it is quite difficult to model risk management decisions against different risk scenarios. One argument says that risk management reduces financial distress or bankruptcy costs. The modellers should be able to get a handle on that too, because they ought to know roughly what might happen to, for example, the credit rating of a company if it suffers certain losses or disruptions. Consequently, they should be able to build the extra cost of debt into the risk scenario. This way of managing risk reduces the need to incur the extra debt cost. These issues could be modelled, but there are some other benefits to risk management that are almost impossible to quantify. For example, as explained earlier, risk management allows firms to continue to invest in R&D and investment, but it is difficult to know what the benefits of R&D and investment are going to be.

#### **4. Conclusion**

In conclusion it can be said that although ERM certainly provides benefits to the organisation, the measurement of its performance (e.g., through adding shareholder value) is difficult. Value creation for ERM is not being demonstrated naturally in a straight forward manner and demonstration this value is a slow process. Instead, meeting the regulatory constraints as a result of the practice of ERM or paying taxes clearly are value added functions.

The study indicates that currently organisations have not identified any financial measures that are adequate to measure the performance of ERM. More importantly, timing needs to be considered when measuring the performance of ERM. Consequently, the ex-ante and ex-post aspect of losses is important, which makes a huge difference in calculating the benefits of ERM. Nevertheless, the ERM system involves the interests of stakeholders and it is necessary to develop new tools, which can measure of the confidence of stakeholders, resulting from the application of ERM, in a holistic manner.

## SECTION 7

### OVERALL DISCUSSION AND POLICY IMPLICATION ISSUES

#### 1. Introduction

The analysis of the data as obtained from four CASE reports (seen in Appendix) does not provide a fully consistent picture of ERM in terms of the five dimensions of the research (e.g., understanding, motivation, design, challenges and performance of ERM) but there are some common elements across the CASES and the following sections will elaborate on these.

The section is arranged as follows: . Firstly, a general discussion of the findings of the analysis is conducted. Secondly, a number of propositions are developed in an attempt to establish theory from the findings. They will be arranged under the five dimensions of the research. In addition, the propositions may be utilized to explore policy implication purposes.

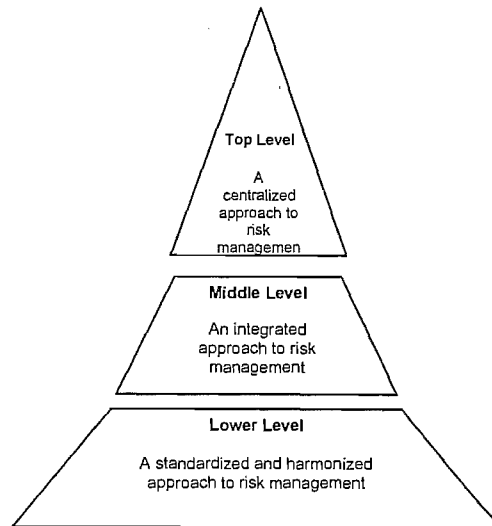
#### 2. Overall discussion

##### 2.1. Understanding of ERM

The study finds an uneven understanding of ERM across the CASES. The understanding does not only differ among the staff of any CASE but it also differs across the broader stakeholders communities (i.e., organizations, shareholders, regulators, rating agencies, and customer/social groups). Moreover, the understanding of ERM differs within the management hierarchy (both in terms of conceptualization and implementation). Perception of ERM at the top level is often that it represents a centralized approach, focusing on broader issues (e.g., reputation, social recognition, sustainability, etc.: issues which usually come under the corporate governance agenda; in addition to profit maximization and growth).



**Figure 43(4): Understanding of ERM in various management levels**



In the middle level of organisations, ERM is mainly understood as ‘integration’ in consolidating different silos in terms of types of risk (e.g., financial: market, credit, liquidity; insurance, operational, and many others), in terms of business lines (e.g., life, non-life, financial services including their sub-categories) and in terms of business units/entities located at different geographical locations. In the lower (purely functional) levels of organizations, ERM is perceived as harmonization and standardization.

However, one can argue that at the top level ERM can be viewed as a combination of centralization, integration, standardization and harmonization. Interestingly, the same is true for other two levels. This argument is valid from the perspective of “self similar” which abstractly means that a part of the big picture should look the same as the whole picture. That is why exploring the understanding of ERM at the three different levels is important in order to perceive the whole picture from different angles. The key conclusion is that the schema within the four dimensional approach of ERM (i.e., centralization, integration, standardization, and harmonization) is important in order to aid conceptualization of ERM. This arises because the context and purpose at each level is different and the four dimensions vary in terms of degrees to which they take a holistic view. Moreover, the view of conceptualizing ERM is closely related with the view of ERM as a four-stage management tool (i.e.,

risk identifying and planning, organizing, implementing, and monitoring), where it fits as an integral part of each stage. Finally, the understanding of ERM is very much context driven, emphasizing the situation and problems associated with the issues in place with the organisation waiting to be addressed.

In summary, the study suggests that ERM does not emerge in organisations in a consistent pattern. For example, while one case started with ERM based on centralization, another started with ERM based on integration. It also appears that ERM is a multi-layered process, and the understanding of what it represents differs at different levels of management. For example, when ERM is regarded as centralization, each manager is seen as responsible for the risks s/he takes (i.e., risk owner) with senior management overseeing the process (Dickinson, 2001). To achieve this objective, part of the ERM process involves developing a vocabulary (a common language) so that people across the organisation can understand risk in the same way across different disciplines (Verbrugge, 2003). This introduces the need for standardization. However, senior management has a coordinating role in bringing together a harmonized or aligned framework, offsetting the duplication of risk management policies and arrangements through modifications and alterations. Integration involves consolidating all three layers (centralisation, harmonisation and standardisation). While harmonization and standardization operate horizontally across a layer of the organisation, in terms of organisational policies and resources, centralization operates vertically to control the entire ERM process. From this perspective, ERM can be defined as a four-layered process in terms of harmonisation, standardisation and integration and centralisation.

## **2.2. Motivation of ERM**

It is clear from the analysis that the drive towards ERM gained momentum from the relentless and accelerated growth of regulation (in terms of solvency and corporate governance) since the mid 1990s. Regulations, have directed the growth of ERM in two key dimensions: one in the area of internal control

(a purely qualitative focus) and the other in financial risk management (a purely quantitative focus). It is found in the CASES that the practice of risk management is not new and, in fact, insurance companies have a long history of managing their risks prior to advent of risk based regulations. It is evident that CASES 2 and 4 had a long tradition of managing their insurance risks from a holistic perspective and this is also true for CASES 1 and 3 in terms of financial risks. Moreover, all the CASES used sophisticated modelling and capital calculation techniques and methodologies in managing their core risks. However, prior to risk-based regulations no initiative was really taken to integrate the silos (which existed as a holistic focus of risk types). Even after the recent growth of regulations (solvency and corporate governance) the silo approach was still allowed. However, the recent generation of regulations (from the mid 1990s and onwards) has really pushed insurers to integrate these holistic silos. In addition, insurers were motivated to do this as they found it advantageous either because it produced competitive advantage or it was seen as a value adding function for the entire organization. One important contribution of the recent generation of regulations (in particular, the corporate governance regime) is that it has forced the concept of ERM to the board room. This is the vital role which regulation has played in promoting ERM in the insurance industry.

Despite the evidence suggesting a positive role of regulation in promoting ERM, the analysis also identifies some disagreement with the view in the CASES. In particular, CASES 3 and 4 believe that they are ahead of the regulatory curve (i.e., their risk management initiatives are more advanced than the current regulatory regime) and the cost and complexity to deal with the recent risk-based regulations is massive in terms of the risk management system already in place. However, the views of CASES 1 and 2 are different since they believe that their risk management system is consistent with the regulatory initiatives. The concerns of CASES 3 and 4 is that the current regulatory initiative has left them facing a great uncertainty in managing their risks. In essence, these insurers believe that regulation is a burden as it does not help them to manage their risks in the way they want to. Consequently, they argue that they must maintain two lines of ERM approaches: one for their

actual business purposes and another for only compliance with regulations for statutory purposes. The argument they pursue is that the customer base they serve is more sophisticated than the regulators and their customers are much aware of the changes in the marketplace and the dynamic nature of risk.

Another concern in CASES 3 and 4 is the conflicting requests and overlapping demands imposed by regulations. Since CASES 2, 3, and 4 (also for CASE 1 to some extent) operate globally, they face such overlapping requests for information from a number of regulators (e.g., FSA of UK and EU; Solvency II and IFRS), which burdens their risk management initiatives. They believe that the time, cost and effort they invest to meet the overlapping requests/demand of regulators (in terms of separate data collecting/storing/analyzing/reporting processes) could be better utilized in the managing their businesses.

In principle, it is not the objective of regulation to drive the business of the organization. However, the ultimate objective of regulations in general is to maintain market consistency and integrity as a whole while focusing on the entire market. Indeed, the objective is not to focus on all aspects of an organisation's arrangements for risk management. Of course, an organisation's failure to remain technically solvent is a different issue, where regulators do need to intervene. This is always a contradictory point and often misunderstood. The key concern of regulators is the failure of organizations due to hidden risk (whether intentional or unintentional as Enron/Equitable Life) that could be controlled if risks are detected earlier.

Another important point that has emerged from the analysis is the growing size of organizations (mainly through mergers and acquisitions) which invariably needs more control. The analysis of the CASES revealed that they have all undergone strategic shifts and these have provided further momentum for ERM. For example, CASE 1 has grown in size (the CEO regards it as a 'super tanker'). CASE 2 has withdrawn from life business, CASE 3 has withdrawn fully from reinsurance and from financial services to some extent, and CASE 4 has focused only on insurance business. These changes in strategic development have involved or motivated a holistic

treatment of all risks, independent of regulation. Consequently, innovation is also seen as an important force for ERM in the insurance company.

In summary, it is difficult to identify any single factor as the origin of ERM. In essence, there are several factors that motivated the CASES to develop their ERM systems. Importantly, the factors identified in the analysis are closely interrelated. Moreover, there is a timing issue that needs to be considered when thinking about the motivations. In addition, motivation differs across organisations depending on their business strategy, market, and size, and the expertise they have to handle risk management issues in an proactive manner.

### **2.3. Design of ERM**

The following discussion concentrates on two issues: the role of specialist and generalists in the structure of ERM and how does the CRO fits into the design.

The interview survey in the CASES discovered the distinction between the specialist and the generalist as a key issue in promoting ERM. The key criticism is that specialists (e.g., actuaries, financial managers, etc) are often blinded by the perceived wisdom of their discipline and fail to realize the benefits of a broader perspective. Moreover, specialists tend to be overconfident and rigid in their views even when dealing with conflicting opinions from specialists in other disciplines (Otway, 1992). Consequently, one of the many demerits of such a one sighted view is that it may not consider subjective risks if it focuses on objective risk. Traditionally, financial specialists and actuaries tend to solve problems based on their professional background, principles, and training. However, specialists placed in the position of CRO are compelled to see the broader picture of risk which is often beyond their professional boundaries (Dickinson, 2001, Dickinson, 2005, Liebenberg, 2003). For instance, actuaries who are expert in working with historical data are often unaware of the principles of other subjects such as organisational behaviour. However, ERM should integrate financial risks with operational and strategic risks. Fortunately, there is evidence that individual

professions are beginning to realize their limitations (James, 1968, Wang, 2004). The study identifies that effective communication across disciplines is the core requirement to dealing with a wider community of stakeholders when implementing ERM (Nielson, 2005). All these arguments suggest the need for a person, or a group of people, who can see the holistic picture of risk within and outside of the organisation. Unfortunately, often only one person has such an opportunity and that is the CEO; this is why the CEO is the ultimate CRO. Consequently, the CRO in effect represents CEO within the management hierarchy to look after risk and its holistic management. Such responsibilities establish the ideal CRO as a strategist having knowledge of all risks, irrespective of source and type (Hood, 1996, Power, 2005b).

Essentially, the educational system in universities and professional institutes is built on silos like finance, actuarial science, organisational behaviour etc. and there is little scope to produce such a multidimensional person with interdisciplinary knowledge. Essentially, the CRO (either a person or a unit) must deal with a body of interdisciplinary knowledge. Practically, many of the problems face by the CRO are not technical, but procedural, involving communications, coordination and control (Aabo, 2005, Denenberg, 1966, Lee, 2005, Power, 2005b, Stahel, 2005). Therefore the role of a CRO is closely related to each layer of ERM (i.e., harmonization, standardization, integration, and centralization) as discussed earlier. However, the current practice in the CASES does not support this approach. Rather, the CASES appear to employ a silo type risk management and try to practice ERM within the broader scope of a specific disciplinary silo. In summary, risk management academics have ignored the literature of management, but the literature of management has ignored risk management (Denenberg, 1966). In fact, the various disciplines, while contributing on ERM, bring their own silo-type histories and believe themselves to be the most important perspective. Consequently, they each attempt to take control (Kloman, 1992). As a result, communication between the generalist and specialists does not enable them to connect effectively with, or to alter, each others opinions (Skipper, 2005). However, the study suggests that CROs should have an interdisciplinary background and they should reflect a broad body of knowledge (Ward, 2001).

This requires the active support of a group of interdisciplinary staff. To achieve this objective, there is a growing argument among the respondents of the survey to merge the role of the CRO with the Group Risk Committee, on which is represented key staff from different departments (and, hopefully, disciplines) of the organisation.

## **2.4. Challenges of ERM**

From the technical perspective, risk measurement is the key challenge for ERM because risks by nature are often dynamic. Consequently, a unique measurement system, although a prerequisite, is difficult to achieve. In addition, some risks (e.g., reputation, strategic, etc.) are not measurable by traditional statistical techniques. However, measurement of risk is important because it allows insurers to make better decisions about the future with greater potential for favourable results and reduce potential for the unfavourable.

From the operational perspective, the key challenge is communication, which takes many forms. Communication of risk messages to different disciplinary groups of people within and outside the organisation leads to the integration of different silos of ERM in practice such as internal risk model and risk governance and also brings transparency throughout the ERM systems.

## **3. Propositions and policy implication issues**

As the final output of this research a number of propositions have been suggested. They, in combination, constitute a set of substantive theories concerning ERM, which may be utilized to establish policy implications in the practice of ERM by insurers. The propositions are arranged under five dimensions (unit of analysis) of the research. The description and explanation of the propositions maintained the linkage between the literature and CASES. In addition, the views of industry observers are also often quoted.

### **3.1. Understanding of ERM**

In order to generalize the findings of the study from the understanding of ERM observed in the CASES two propositions are developed and they are

discussed in the light of existing literature, the CASE reports and the views of the various industry observers.

## Proposition 1

***Enterprise Risk Management should be understood as an approach at the top level of an organization and as a process at lower levels in order to aid operationalization. The perception of ERM amongst staff, moving from the bottom to the top organizational levels, follows the sequence of harmonization, standardization, integration and centralization. Consequently, the staff at the top of the organization hold an abstract definition of ERM, which embraces all these concepts and this not always understood at the lower levels in functional terms.***

The study reveals a huge diversity among staff in conceptualizing ERM across the insurance industry (in particular CASE 2). However, two key elements of understanding are prominent. The first understanding conceptualizes ERM as a philosophical approach for managing the organisation as a whole, irrespective of risk type and sources; here the focus is the organisation itself. The second is a functional approach, which operationalizes the philosophical approach using a four step process containing harmonization, standardization, centralization, and integration. This is to some extent related to the four risk management tasks of identification, measurement, control, and monitoring (see Section 2 of Chapter 2). In essence, the terms 'approach' and 'process' bear different meanings. The former (i.e., approach) focuses on the organisation itself but the later (i.e., process) focuses in the risk and its categories (see Figure 7(2) for clarification)

Conceptualizing ERM as an approach for managing risk holistically is currently heavily dominated by a financial perspective from the domains of economics and finance, where the ultimate objective is to maximize shareholder value. This is in line with Reppaport (1997), who suggests: "the



ultimate test of corporate strategy, the only reliable measure, is whether it creates economic value for shareholders". However, in reality, as the study suggests, many of the inputs of ERM require the support of stakeholders. Interestingly, the assumptions underlying the 'financial approach' to ERM are based on the rational economic behaviour of the firm and assumptions that market is efficient (see Section 2.2.4.1 of Chapter 2). In reality, firms must address a complex combination of various stakeholders' interests (as suggested by agency theory and incentive-signalling theory (Barton, 1987)<sup>25</sup>. Questions of balancing interests of stakeholders as an agenda come under the emerging field of corporate social responsibility and yet this area is not addressed at all by the financial approach to ERM (see Section 2.2.4.2 of Chapter 2).

Irrespective of its focus, ERM is clearly gaining momentum and there is an increasing understanding in organisations of taking positive risks for value creation, while avoiding negative risks. Also insurers' are associated with a comprehensive list of risk categories (e.g., market risk, credit risk, credit risk, liquidity risk, operational risk, insurance risk etc. and, ideally, all these need to be managed within their ERM system. Within this understanding of ERM, insurers set out management rules and guidelines (e.g., identification, measurement, control, monitoring etc). In essence, the ERM system of insurers should include any risk that may have a material affect on their financial health, in the sense of affecting their ability to deliver the promise they have made to their stakeholders. However, risks are sometimes not fully understood and/or measured; in particular, the indirect (consequential and contingent) losses. The understanding of ERM remains incomplete because risks are frequently not added in determining the total cost of capital (see Section 1.3 of Chapter 2). The broader objective of ERM is maximizing the benefits and minimizing the downsides thus making a risk-reward balance.

In summary, two key points drive the understanding of ERM within insurance companies: whether ERM is perceived as (i) a defensive mechanism to help

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<sup>25</sup> In fact, there are two established hypothesis, which suggests why risk should be managed. One is the shareholder value maximization and the other is managerial risk aversion (Fatemi, 2002)

the organisation to remain in the business (survival strategy – ad hoc), which is seen in CASE 2 or (ii) a management culture to acquire new businesses and capture opportunities wherever they arise as the business progresses (i.e., competitive advantage – continuous) (Sayan, 2003), which is the focus of ERM of CASE 1 and 3. However, a comprehensive understanding of ERM requires both these perspectives as seen in CASE 4.

## Proposition 2

***ERM should be a mix of both top-down and bottom-up processes.***

The argument for perceiving ERM in terms of harmonization, standardization, centralization and integration can be extended to explore whether ERM is a top-down or bottom-up process (see section 2 of Chapter 4). The view, as contained in the literature, suggests ERM is a top-down approach (Dickinson, 2001). However, the empirical study suggests that the “top down”/“bottom up” debate somewhat mis-specifies how risk management occurs within an organization. As seen in the CASES, top-down and bottom-up approaches are interrelated and dependent each other. Indeed, ERM is an organic concept meaning that it is fundamental to and interlinked with all aspects of an organization’s functioning and management. Certainly, such an organic process has both implicit (survival) and explicit (achieving specific goals) purposes, and this suggests that specifying an organizational purpose is central to ERM. This requires top management (top down) involvement. However, organic ERM seeks to embed risk management thinking and practice into all aspects of the organization. Thus, the effort must be pervasive (meaning, somewhat, bottom up). However, this could be thought of more as a cultural phenomenon, which means that cultural values arise from both visions and missions and also from the belief systems within the organization. It is found that ERM seems top-down where the focus is on the organisation but it is bottom-up when the focus is on risk categories. Consequently, top-down and bottom-up approaches to ERM are better seen as integrated parts of a whole rather than as competing approach (IO6).

### 3.2. Motivation of ERM

In order to generalize the findings of the study in terms of the motivation for engaging in ERM, following propositions are developed and these are discussed in the light of the existing literature, the CASE reports and the views of industry respondents.

#### Proposition 3

***Whilst the motivation for developing ERM in the CASES was derived from multiple sources, they can be classified into two categories: (i) leadership of the CEO (in adding shareholder value) and (ii) compliance with regulations. It is suggested that the development of ERM is best served if the drive towards ERM stems from the CEO.***

The analysis of the CASE study data suggests that a lot of factors have motivated insurers to engage in ERM including regulatory pressure; particularly corporate governance and solvency (see the CASE reports in Appendix). Regulators are particularly keen that organizations adopt an ERM approach but there appears to be no standard regulatory definition of ERM. The study finds that there could be two categories of insurance organisation based on their paradigm of ERM development: (i) within regulations or (ii) beyond regulations. Whilst the ERM efforts of the former remains within the scope of regulations, the initiatives of the latter goes beyond regulations in order to meet market demand and their own specific needs. The following paragraphs describe these two categories of insurance organisation.

#### ***Within regulations***

Insurers for whom ERM is a logical approach to address new regulatory requirements engage with ERM as a reaction to regulatory pressure (for example, CASE 2). In such organizations, ERM is a strategic initiative which provides distinctive benefits (such as shareholder value) over and above simple regulatory compliance. For those firms ERM is not a defensive undertaking but an offensive strategy (for example, CASE 4). It offers them potential competitive advantage through an integrated enterprise-wide

perspective on their risk profile, containing operational risk, liquidity risk, credit risk, market risk and strategic risks. CASES 1, 2, and 3 fall into this category but they remain at different levels. In fact, ERM does not interest the regulators. IO13 states: “we do not define ERM; we do not use it as a concept in our regulatory issues”. In fact, regulators use the ideas of system control and the idea of operational risk management as concept but essentially from the regulatory point of view. Regulators are not interested in an organization’s risk management initiative either from a silo or holistic, perspective, which concentrates on shareholder value. However, regulators are interested in risk management from the point of view of securing their regulatory objectives (e.g., protecting consumers, maintaining confidence in the financial system as a whole and reducing financial crime) in proportionate cost-benefit terms (Verduzco, 2006, Dingfu, 2006). These are not necessarily the aims of the companies. However, companies may have similar aims for quite legitimate reasons but in some respects the risk management aims of the organizations are significantly different from the regulatory aims. Of course, insurance companies should concentrate on the risks that are important. However, they vary from one company to another; but clearly they need to know enough about risk; to know how important they are, so that they can focus on the most important risks. It is viewed by the respondents that regulators provide guidance to insurers on these risk prioritizing issues. For example, regulators talk about risks which are typically important for insurance companies (i.e., for a life insurance company it is the market risk which includes interest rate risk, operational risk (to some extent) and various aspects of insurance technical risks (e.g., longevity risk)). In their supervising role, regulators always emphasis the ability of senior management to identify material risks rather than risk types (see Section 5 of Chapter 2) through principles-based approach (Schiro, 2006).

### ***Beyond regulations***

The second set of companies has motivations which go beyond regulations. These companies admit that any effective ERM program should enable a business to meet its challenges and obligations on a number of fronts, including the strengthening of risk governance, wider risk control and

awareness amongst employees and managers of significant financial and non-financial risks and their uncontrolled status and improved capital management. Here leadership of the CEO plays an important role. CASE 4 clearly falls under this second category. Here the key motivation for ERM is not the regulations but a fundamental imperative to gain an understanding of the core business principles, which is promoted under the leadership of the CEO (Power, 2004, Schiro, 2005). These insurers and, in particular, reinsurers see ERM as a way to enable them to survive (Muller, 1999). This argument suggests that progressive insurers go ahead of regulation (as the case in CASE in 3 and 4). In the earlier stages, regulation was the overwhelming motivation. Now regulations, whilst still probably the main motivation for ERM amongst most insurers, is relatively less important as a motivator than it was before. There is now a clear understanding, at least in respect of risk management techniques (in particular those coming under Pillar II of Solvency II) that they are relevant to shareholder value. IO13 states: "I believe that they (the risk management techniques) motivated insurers to develop ERM in addition to responding to regulators". In particular, some of the regulatory approaches to operational risk management are potentially useful for insurers themselves, not just as a response to the regulators.

Although regulations help to shape the organizational initiatives of ERM, it is interesting to see that the initiative of insurers' ERM helps regulators per se to supervise insurers while achieving their regulatory objectives. IO13 (who works for a regulator) states: "the initiatives of insurers towards ERM help us to reduce the risks in fulfilling our statutory objectives such as consumer protection, maintaining market confidence, financial crime".

Indeed, there were risk specialists in the insurance industry even before the latest reforms. These individuals understand their business have been implicitly managing risk for a quite sometime (see figure 11(2)). Within the implicit (or traditional) way of managing risks, the key objective and messages were un-stated and not well communicated. Consequently, the risk appetite of the organization was often determined in an uncoordinated manner where

one risk could be managed well and another risk might remain unmanaged – representing an unbalanced situation (not a cost effective way of controlling risk). Moreover, risks in the past have often been looked at in a segmented fashion, so that the correlations (and cause and affect relationships) between risks were not as well understood as they should have been (see Section 2 of Chapter 2). In addition, some types of risk were handled using out-dated techniques. For example, time risk or time value of an option was being looked at using a pre-Black-Scholes approach (see section 2.2.4.1 of Chapter 2). As a part of the modernization process, regulations transform and accelerate such implicit management of risk to an explicit dimension.

In summary, the study finds two key motivations of ERM. One is the initiative of insurers in adding more shareholder value (which comes from the leadership of the CEO) and the other is the compliance with regulatory constraints (both in terms of solvency and corporate governance) (see Section 4 of Chapter 2). Interestingly, they are closely interrelated issues, because the collapse of investors' confidence brings tighter regulation and as the chief risk owner of the organization the ultimate responsibility for failure (for whatever the reason) rests with the CEO. Nevertheless, regulation helps to shape the initiatives of insurers in adopting ERM.

## Proposition 4

***The practice ERM should bring transparency to the pricing of insurance risks and the more the robust the insurers' ERM system, the lower the price they can charge to clients for their products.***

One of the key objectives of risk management is to minimize the cost of risk so that an insurer can underwrite more and more businesses within its limitations. Alternatively, the pricing of insurance risk is in the core of insurers' risk management functions. Moreover, pricing is related to the underwriting cycle, which in turn is related to the capital market (see figure 8(2)). Evidence from the CASES suggests that (see figure 30(4)), because of the volatility in the capital market, CASES 1, 2, & 4 look for safer, rather than, higher returns,

as they invest more than 80% of their capital in bonds and fixed income securities. Consequently, they show a decreasing trend in investment income (see figure 29(4)) and in order to meet the targeted overall return there is a pressure on them to increase price of insurance. However, increasing the price of insurance affects the underwriting of quality business as some insureds may look for alternative markets (either using captive insurance or the capital market) as seen in the case of British Petroleum and United Grain Growers (Doherty, 1993, Harrington, 2003, Harrington, 2002, Shimpi, 2002). However, in a competitive market a large increase in the price for products is unrealistic. This leaves the reduction of costs of all other operational activities as the ultimate option (rather than increasing the insurance) and insurers try to minimize costs through risk management. The people interviewed did not indicate these issues as an important motivation for ERM. This may be because senior management generally come from a finance background and ERM is dominated by the financial market solutions (IO6). Consequently, they identified various issues like regulation, leadership, etc. as key motivations for ERM. However, the literature suggests that these issues should not be regarded as key driving forces of ERM. Although “volatile economic situation” was categorized as one of the key driving forces by the respondents, factors like “growth of ART market”, “market competition’ etc. were not considered important.

In summary, the role of ERM in reducing the price of products is currently implicit because finance-based managers rather than insurance experts are the key individuals involved in developing ERM. However, reducing the price of insurance through effective ERM remains an important means of competitive advantage for insurers and this represents an important driver for the adoption of ERM.

## **Proposition 5**

***To design an effective ERM system requires the complementary application of both qualitative and quantitative approaches. However,***

***the qualitative approach remains largely unrecognized in the current practice of ERM in the insurance companies.***

The current approach to ERM as practiced in the CASES puts to one side everything which is not measurable quantitatively (e.g., corporate social responsibility, reputation, etc). These are treated secondary aspects. If everything is fine and falls under the assumptions on which the quantitative methodology is based then the approach works. However, the main concern of these organisations is flexibility, and if something goes wrong it costs a lot (IO4) (for example, Enron). The study concludes that ERM as practiced in the CASES is purely a quantitative function. The qualitative issues, in particular, human factors are seen as 'necessary but not sufficient' meaning the human factors<sup>26</sup> are not regarded as the key contributors to success (Hillson, 2005).

The case studies suggest that insurers' ERM models treat risk as primarily a technical phenomenon (it is almost the case for CASES 1, 2 and 3). There is a bias towards mathematical calculation and measurement. However, as found in the CASES, the nature of risk (in particular emergent risk) is subjective, requiring knowledge of alternative values and beliefs. The most conventional methods of risk analysis and management are based primarily on using the past as a basis for the future (Shah, 2003). The study suggests that this problem becomes especially acute when there are fundamental changes in the types of risks, in particular, for catastrophe risks. As such, not only do past approaches fail, but they can also create a misleading sense of comfort and security. Although risks are real and worthy of scientific study, in practice it is very difficult to study the science of risk. The very nature of risk is diverse and subjective. The quantitative approaches to managing risks, as practised by the CASE study Companies, are unable to explore the various dimensions of risk while analyzing them because these approaches get trapped in their own language and methods (which are based on certain assumptions).

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<sup>26</sup> Hillson (2005) suggested a list of human factors viz. shared understanding, agreed definitions (common language), efficient risk processing framework, skilled and capable human resources, clear objectives, risk-aware culture, etc.



Such a biased, quantitative approach tries to avoid subjectivity primarily because of the increasing separation between the applied sciences and social sciences (see Section 1 of Chapter 2). The study finds that very little effective dialogue takes place between individuals in CASES with essentially quantitative and qualitative outlooks. Moreover, qualitative research into the risk management of financial firms is limited and is not well integrated with quantitative research (Ruefli, 1999). However, those with a quantitative and qualitative background in the organisations need to be directly connected to one another if the objectives of ERM are to be achieved (Shah, 2003). The convergence of the quantitative and qualitative approaches is indeed a critically important issue in developing an effective understanding of ERM.

The quantitative approach currently provides a dominating role and reflects the science (objectivity) of ERM. It concentrates more on accuracy and reliability rather than the validity. However, effective ERM has emerged as an art in this study rather than a science; an art which needs to embrace uncertainty in subjective terms. Briefly, the development of ERM needs both a quantitative and qualitative element. However, a strong and robust qualitative understanding is essential for setting an effective quantitative of system for ERM.

## Proposition 6

***ERM should be regarded as an interdisciplinary<sup>27</sup> concept. A robust ERM can only be designed through an interdisciplinary initiative and participation across the organization.***

The literature suggests that from a business perspective ERM should be designed to monitor and manage risks from whatever source and whatever impact; it is therefore involved in all aspects of business activity (see Section 2 of Chapter 2). The argument is that since risk affects business in a holistic way, risk management needs to respond in a similar fashion (IO12). The

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<sup>27</sup> The terms 'interdisciplinary' and 'multidisciplinary' have been used interchangeably throughout the study.

discussions and explanations for this proposition are deliberately long because it provides a core contribution of this study.

In practice, as evidence from the CASES suggests, ERM is mostly concerned with finance. This is not different to the academic world, where risk management is driven from within disciplinary silos. In addition, the research expertise is concentrated in disciplinary silos and academic journals generally operate within silos. Consequently, academics approach risk management from a particular academic silo and it is difficult for those who approach the issues from an interdisciplinary perspective to get published in good journals (IO12). This suggests that the academic treatment of risk management for the financial sector is dominated by the finance profession. Since those people who write about risk management are dominated by finance and accounting profession. Consequently, those people who write about risk management from a non-financial perspective are criticized by finance profession as they believe that risk management in the financial sector can be best served by taking it from a finance perspective. Other aspects of risk management (e.g., the organizational behaviour approach), have not been widely published. Moreover, the work conducted by actuaries on ERM (CAS, 2003) has not really interfaced with organizational issues. Consequently, no real theoretical foundation of ERM exists from an interdisciplinary perspective. However, the CASE study evidence suggests that the result of viewing ERM from any unique discipline results in an incomplete system (see Section 1).

The study establishes risk profiling as one of the key challenges of ERM for the CASES and the central challenge of insurers' approach towards ERM (as seen in the CASES) is measuring the value of their risk profile rather than its appropriateness.

The study suggests that the quantitative approach towards ERM should be criticized because the parameters and assumptions which it uses in the face of reality are inappropriate (see Section 1 of Chapter 2). Babble (2005) states: "Real markets are far from financial economic perfection". However, the question remains: why is risk management in insurance companies is

dominated by finance? This can be answered from the structural foundation of these organisations. Like other financial firms, insurance companies are a collection of contracts (both financial and non-financial). An insurer binds itself [willingly] by contracts with policyholders (customers), shareholders, debt-holders (banks), employees, and other concerned parties. In addition, it comes under statutory contracts with regulators and supervisors, who look after the interests of consumers and are responsible for ensuring a level playing field in the market. There are many reasons that can cause an insurer to fail in meeting its contractual obligations. Consequently, contracts are a key source of risks (IO6). To maintain such contracts, organizations set up specific corporate objectives and accordingly develop corporate strategies. Since strategies of financial firms are directly or indirectly linked to finance, the failure of any objective has financial implications. The study predicts that this places finance at the top of the risk management agenda of insurance companies.

Moreover, the study presents an interesting picture where various traditions are moving towards ERM but they are all using their own history and their own perspectives to shape what they mean by of ERM. Two disciplinary focuses of ERM have been noted from the CASES: (i) a compliance focus, and (ii) the shareholder value creation focus. The compliance focus is practiced by internal auditors using a qualitative approach, whereas a value creation focus is practiced by actuaries and those with a finance background using a quantitative approach. The actuarial perspective begins with a bottom-up evaluation of each individual risk and then aggregates that information into an overall assessment of the portfolio of risks (as seen in CASES 3 and 4). The analysis of the portfolio of risks leads to a determination of the amount of capital needed to support those risks. However, the corporate finance perspective focuses on the firm's capital structure (as seen in CASE 1). Its purpose is to increase shareholder value by delivering the optimal balance sheet composed of equity and debt that minimizes the cost of capital, not just in absolute terms but relative to the price of the risk it bears.

Risk management to those with a finance background is regarded as relatively easy because in its basic conception it works around the mean of the distribution. Consequently, it is not problematic even if the actual distribution is wrong, provided the behaviour around the mean is reasonably good (Dickinson, 1975, Dickinson, 1997). In contrast, effective risk management mostly concentrates within tail of the distributions (as in CASE 3 and 4; also see figure 25(4)) and getting the distribution wrong means getting the tail wrong (IO7). This may lead to major problems because their focus and concerns are totally different and one does not complement another. Consequently, this is one of the key challenges in the finance approach towards the effective implementation of ERM. It demonstrates the fact that the problem for insurance companies is much tougher when risk management approached from a financial perspective.

All of the above arguments suggest that the design of ERM requires a combination of both analytical skill and, importantly, business knowledge in order to bring risk and capital into a coherent framework. This can be done through blending the insights of financial economics with the tools of management science (IO9), where the former is much better suited for explaining economy-level phenomena and the latter explains firm level behaviour (Barton, 1987). Consequently, it requires a holistic ERM model, which is free from the influence of any one particular discipline. However, this is difficult because there is not a natural group of advocates for this particular new view of ERM within the insurance industry. All the alternative views have organized advocates: including the accounting, finance, actuarial, and management professions. However, as seen in the CASES there is no powerful advocacy group for introducing a more holistic and non-disciplinary based view of ERM. It is evident from the CASES that every group comes up with good ideas (from their partial perspective) but none of them see the big (whole) picture. Viewed from the data obtained from the CASES, the study suggests it is a very unusual moment in the development of risk management as a discipline ((IO6).

The above discussions have clearly established that ERM is an interdisciplinary subject. The case study analysis concludes that an interdisciplinary knowledge, which is necessary for designing and implementing effective ERM is absent in the insurance industry. These conclusions question whether ERM in insurance companies is a function of general management, strategic management or technical management. It clearly emerged from the CASES that all employees, whether having operational or decision making functions, must be kept informed about all significant risks, which are relevant to their scope and responsibilities. This is important for to enable them to take decisions both in terms of day-to-day and strategic activities. From a general management perspective, managers should understand the fundamental principles of risk from an economic, financial and cultural perspective. So the general view, which emerges from the discussions, is that somebody, who might be a general manager, primarily needs to understand and appreciate risk management as it affects their job; in particular. They need to understand risk - the theories and applications of risk principles (Crockford, 1976). Secondly they need to have a general understanding of risk management structure and strategy, but only to the extent that it is relevant to their job. So knowledge of risk, theory of risk, and principles of risk and to a lesser extent the principles of risk management structure and strategy are central to the development of ERM. This argument suggests that there is a body of knowledge that both the strategist and the technician must have; but the technician must then add a higher level of technical proficiency in the management of risk. So beyond the structure and principles of risk management they may need to be insurance experts, financial risk management experts, engineering or environmental risk experts, legal risk experts etc. depending upon their speciality. A general risk manager needs to understand concepts and principles related to risk management but all they really need to know about the technical aspects of risk management is how to ask the right questions and where to go to get the answer (4R4). In other words, all they need to know is what they don't know and how to get answers. So there is a common body of knowledge which everyone must but know but it is the technical specialisation that represents the distinguishing difference.

There exists a very unclear understanding of two key concepts in most organisations: risk measurement and risk management (Cumming, 2001). Risk measurement is an element of the whole risk management process (see figure 12(2)) and risk measurement is dominated by the quantitative discipline (e.g., actuaries), whereas risk management, which is a topic for strategists, involves a broader understanding of risk across the whole organisation. However, the study finds that risk measurement and risk management are not always isolated. At certain levels in the management hierarchy (see figure 7(2)), in particular, at the lower levels risk measurement and risk management takes place simultaneously.

This is where ERM holds harmonisation, centralization, integration, and standardization (see Section 2 of Chapter 4). Indeed, there also remain different level of perfections of risk measurement (as seen in figure 13(2)), which puts risk management from qualitative and quantitative perspective (objective versus subjective).

This further extends to the debate of ERM as a subject of specialists and generalists.

In summary, the above discussion suggests that the scientific disciplines take a one dimensional view of risk and thus a one dimensional view of risk management. The same can be said for the professionals having backgrounds in corporate finance, accounting and internal auditing and management science as their core expertise. Each of them has their own philosophy in conceptualizing risks and thus uses different tools and techniques to help manage them. Unfortunately, none of them see the whole picture of risk – involves have multiple facets. Moreover, corporations themselves operate in a complex business environment where peoples from various disciplines must work together to achieve corporate objectives. ERM is supposed to manage all major risks of the organization and, consequently, a multidimensional treatment of risk is necessary to achieve this effectively. The traditional, one dimensional approach is not sufficient to capture the true

essence of ERM even though much effort is devoted to quantifying risks. Large insurers (e.g., CASE 4) have realized that at the end of the day most of the risks are about people. In order to cope with this reality they must evaluate what theory does work and what does not work. Consequently, it is necessary to combine a “pragmatic” approach with a hard “scientific” approach. However, organizations also need the “scientific” approach because they require some tangible numbers to support their business decisions. The problem is that many professionals do not understand risk dynamics and consequently, use whatever data is available and try to overcome its limitations via some sophisticated modelling. However, a sophisticated effective ERM model needs expertise from both applied science and social science perspectives (IO9).

These discussions can be extended to argue that the CRO requires a body of interdisciplinary knowledge. Often in practice, however, the background of the CROs is one dimensional and this can affect their approach to ERM. For example, a CRO having an actuarial background may over emphasise the modelling (i.e., quantitative) approach to ERM. However, a CRO, who has a non-actuarial background (e.g., underwriting) may tend to focus more on the qualitative side. However, it is clear that from the above discussion that an effective ERM system requires both approaches.

### **3.3. Design of ERM**

The findings from the analysis of the CASES together with the views of industry observers and material published in the literature suggests the following propositions in relation to the design of ERM and they are now discussed in turn.

#### **Proposition 7**

***An effective ERM system needs to be designed to encourage participation of individuals from a range of disciplinary backgrounds. However, the design of ERM in insurance companies is currently dominated by core principles developed by those with a finance***

***background and as a result there is an inconsistent understanding of ERM within CASES and across the insurance industry as whole.***

This proposition is an extension of Proposition 6 but it focuses much on what was observed in the CASES taking inputs from the literature.

Critics of the financial approach to risk management suggest that the financial literature of risk management plunges straight into the measurement and management of risk, as if the concept of risk itself was unproblematic. The fundamental assumption in the financial risk management literature is that the decision makers of a corporation are only interested in the level of final wealth, without engaging in debates surrounding the uncertainties themselves (Gollier, 1995). For example, a view of loss of reputation which is based solely in terms of the standing of the business with investors is clearly insufficient. The non-financial (i.e., those from a psychological and sociological background) approach perceives risk itself as problematic. They attempt to explore and define various elements of uncertainties (see figure 4(2)). Although, their explorations open many areas of debate regarding uncertainties, they rarely provide solutions.

The study finds that the majority of CASES are traditionally familiar with known enterprise risks and they see no need, or are unwilling, to redefine it. Consequently, they go ahead measuring and modelling risks. However, CASE 4 (which is established as a progressive reinsurance company) realized the potential destructive effect of emergent risks, which, consequently, require exploration. This exploration revealed neither the financial or non-financial perspectives could provide complete solutions to managing risks – a joint effort is essential. However, what constitutes a suitable combination to optimize the risk management objectives is clearly a matter of debate; and this was seen to be an emerging issue in the CASES, under the topic of operational risk management.



Another key problem involves defining the boundary of risk categories or types (see figure 9(2)). Although, a clear conception exists among CASES about financial risk, but there is no clear understanding about other categories of risks (in particular, operational and strategic risks). For example, CASE 1 finds no difference between how operational and strategic risks are managed, but CASE 4 holds a different view. Nevertheless, there exists no clear boundary between these illusionary risk classes, which then, necessarily, broadens the concept of risk to uncertainty (see figure 4(2)). The reason for such an inconsistent understanding across CASES occurs because of the business model, market concentration and nature of risk an insurer is exposed to varies between the companies: for example, CASE 1 is a retail insurer and CASE 4 is a wholesaler (see figures 25(4) and 26(4)). Consequently, CASE 1 is less exposed to operational risk (because its business is more uniform and business management involves quantity or volume) but is more exposed to strategic risk. However, CASE 4 is more exposed to operational risk (because its business is less standardized: it is a question of quality). Indeed, there is also a question of time-horizon attached to implementation to strategy: For CASE 1 a longer time horizon exists but for CASE 4 it is shorter. Whereas, in CASE 1, there is less scope of innovation but for CASE 4, the scope of innovation is much higher.

In summary, an effective ERM system requires participation of individuals from a range of disciplinary backgrounds, but the appropriate mix depends upon the circumstances of the organisation. However, in practice, the mix can be derived by the professional background of CEO and CRO who direct the understanding of ERM across the organisation.

## Proposition 8

***Operational Risk Management is a core function of insurance companies. Whether ERM should be approached from the general management perspective from a specialist perspective is a matter of debate.***

Operational risk has increasingly become an important issue associated with insurers' risk management initiatives within their agenda of strategic risk (see Section 3 of Chapter 2). Insurers have tried to broaden the horizon of ERM because they realized that they face a lot of non-financial risks. The Barings Bank disaster and the failure of Equitable Life provide simple examples of this, where the company employed a range of sophisticated financial instruments without adequate control of operational risks. As a result, the literature suggests that advocates of financial risk management began broadening their horizons and moving closer to a holistic view. However, this view was not fully supported by this study.

It is evident that operational risk management has always received significant attention in CASE 2 (as their ERM begins with the holistic management of operational risk), but it is new to CASES 3 and 4 (as they have only extended ERM to operational risk recently). Interestingly, operational risk has not yet received any adequate consideration in CASE 1. The reason can be explained by the business model of CASE 1. It is found that CASE 1 concentrates in retail businesses and nearly 90% of its business remains within Europe. However, other CASES have diversified their business across various geographical locations of the globe. This establishes a link between diversification and operational risk. In fact, operational risk increases with the increase in diversification.

The survey of the CASES confirms that operational risk (e.g., human error, fraud, systems failure, etc.) is a major risk to insurers' operations (Dickinson, 2001). The study discovers two important aspects of operational risk (i.e., bad luck and bad housekeeping) and the focus of the management of the operational risk in the CASES is to establish sound housekeeping. Operational risks are found to be context driven and embedded in management culture (O'Hara, 2006), organisational structure, and the desires of those who manage risk. It is felt that the management of operational risks does not explicitly drive value of the organisation. However, it obviously provides competitive advantage. The study reveals that providing incentives

to individual employees (or business units/departments) in reporting operational risks is an important aspect of developing a database and also for its effective management (Besley, 2005). However, the key challenge is managers' intentional avoidance of responsibility through delegating this to others. The success of operational risk management depends on the reporting arrangements in place and the capability of the organisation in building and maintaining "trust" of all employees within the organisation. The study of the CASES identifies that the consequences of large operational risk can be devastating (e.g. loss of reputation) and this often remains hidden because of the lack of effective communication (Argent, 2005b, Drzik, 2005b, Gray, 2005, Power, 2005a, Schwamm, 2005a).

In summary, the view the study concludes that ERM should not be a separate function of insurers' business processes but rather it should be an integral part of managing business both in terms of its day-to-day and strategic functions.

## **Proposition 9**

***The effective design of ERM requires a good appreciation and application of knowledge management.***

Knowledge management is strongly related to complexity and good knowledge management should take account of new developments in knowledge (see section 6 of Chapter 2). For example, the unknown threats from emergent risks such as those posed by nanotechnology, electromagnetic field and human epidemic can represent big liability issues. For the insurance industry, knowledge management is now thought to be problem and IO5 argues "good knowledge can help you to accept various risks and to make use of the best available knowledge at the time". 1R13 argues "despite the segmental barriers on national lines such as language, tax rules, etc. there are important synergies that can be delivered by a European Group, particularly in the area of capital, risk, asset and knowledge management".

Analysis of the CASES indicates at least two approaches to ERM. One is the 'measurement driven approach' and other is the 'process driven approach'. Although, they are important, further analysis of the CASES suggests another important factor, which is a 'knowledge driven approach'. The study finds that a key concern of the 'measurement driven approach' is the innovation of various techniques for risk modelling and risk measurement methodologies. The 'process (governance) driven approach' is more concerned with the effectiveness of such techniques including their proper use and control. However, the analysis of CASES reveals that the real issue for effective ERM is neither of these. Rather, it involves means for extrapolating imputed data (i.e., knowledge) in the system of risk management, the efficient use of data (knowledge) and the quality of the output (result). This argument can be established on the ground that insurance companies are built on risk (where risk management is their core function) but this is simply a subset of uncertainty (see section 1 of Chapter 2). However, transforming uncertainty into risk is an issue involving broadening knowledge in the universe of the unknown. Indeed, intellectual capital is a key success factor for the organizations (Kunzler, 2004). As knowledge based organisation, CASE 4 provides an important lesson for the study in developing and implementing ERM. Their knowledge, as a central economic resource, and its systemic application, create value for the business (Drucker, 1974) through innovation (Ullberg, 2002). ERM is essentially a subject of Knowledge Management surrounding the uncertainty<sup>28</sup> attached with emerging risks, which is currently a big issue for global insurers.

Another argument for knowledge management stems from the need to integrate silos. ERM brings a common corporate philosophy in underwriting, investment, marketing, etc. so that people understand more or less the same fundamentals in the same way. This can be achieved through a strong knowledge management network. Consequently, a robust and coordinated practice of knowledge helps to promote ERM within the organization.

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<sup>28</sup> The concept of uncertainty has been explored in Section 1 of Chapter 2.

However, the CASES, in particular CASE 3, respond to the issue through a network which they term as 'risk leadership team' (see report of CASE 3 in APPENDIX).

In summary, an efficient way of managing knowledge within the organisation is important. In fact, the key to effective ERM is in the ability of the organization to mobilize the knowledge and expertise of its employees so that organizational leaders can ensure that they get accurate and timely information about both risks and opportunities arising from any potential event (Neef, 2005). In this sense risk management and knowledge management are complimentary. Therefore it is proposed that an organization can not manage its risk effectively without managing its knowledge

## **Proposition 10**

***The role of trust in ERM is an important issue but needs further exploration.***

The greatest asset an insurance company possesses is its reputation and the maintenance of the trust of its stakeholders (employees, shareholders, regulators, business partners, customers, the environment and community). Losing the trust of shareholders and customers put all the efforts of the organization at risk.

The relationship between risk and trust is an established concept. However, risk management research concerning trust has mainly been limited to risk management aspects of food and health as social phenomena. Risk and risk management are products of human actions and the consequence of human decisions and one of the barriers to interdisciplinary communication of risks is the lack of the willingness to trust the judgment of others in the absence of personal knowledge (i.e., a common language). Trust is essential in the insurance business and is fully relevant to risk management (see subsection 7.4 of Section 3 in Chapter 4). The role of human factors (i.e., skills, expertise, environment and culture) are the imputes to and consequences of risk. This is an established concept but the role of trust has been less clearly defined. In

relation to ERM it is necessary to examine key questions like “Does trust among staff from different disciplines (in terms of communicating risk information) make up for a lack of knowledge?” Is trust driving the perception of risk amongst stakeholders? Is trust itself a risk? Can a trustworthy corporate environment promote risk awareness of managers? Does the lack of trust influence the management of operational risks? Can a trustworthy workforce increase the performance of ERM? How can trust be defined and managed? Is its role limited to improving confidence and co-operation? How are confidence and co-operation linked together? How is trust built and destroyed in crisis situations? How does trust affect the design of ERM? Does the introduction of ERM build trust in the organization, thus facilitating the flow (or communication) of risk information? Does the over-communication of risk messages pose a potential threat?

All of the issues raised above are highly contextual and clear-cut answers are not always possible. One simple answer is that fragmented risk management keeps the parties isolated but ERM brings them closer (which should improve trust). However, how close should they be is a question. Will not such contact create conflicts of interest among employees? Will such conflict destroy trust and ultimately destroy the objective of ERM?

The objective of enhancing risk disclosure to external parties (whether it is regulators or shareholders or rating agencies) has the aim of building trust on and achieving sustainable value creation. However, a key question here is “Do the stakeholders trust the statements or the performance?” If the performance of ERM is hard to demonstrate then how do organizations (or managers) build and maintain trust of stakeholders. Above all organizations initiatives of building long term reputation through providing sustainable value are targeted to build and maintain the trust of shareholders and their confidence. The organizations, as the owners of the knowledge, see regulators as decision enablers but not decision makers (Wilkinson, 2003). Moreover, the organizations intend to see the regulators as a promoter of their risk management decision making process and practice but the regulators wish the reverse. Consequently, there always remains a lack of trust between

these parties, which triggers regulatory arbitrage, and ultimately increases the cost of complying with regulations (Schiro, 2006).

## Proposition 11

***A universally agreed theory of ERM is unrealistic. Instead, a set of competing theories picking elements from different disciplines will form a provisional theory.***

It is revealed from the CASES that in order to establish it as a unique academic subject, there clearly needs to be a theory of ERM. However, seeing the mode of application of ERM in the CASES and then linking this with the literature, it can be said that developing a universally agreed theory of ERM (such as portfolio theory in finance) is an unrealistic concept. Instead, there are a variety of different theories which might apply depending on different academic disciplines from which it is viewed. This is because risk, as a subject, was originally studied from a variety of different academic background, which essentially contributed different theories (IO12). Since, the academic world is driven by disciplinary silos; the research is conducted in disciplinary silos. Moreover, there exists an imbalance in the risk management research conducted in different disciplines. For example, the financial perspective of risk management has received more attention than the other perspectives (e.g., organizational behaviour, crisis/contingency/operational management). The study demonstrates that ERM involves many disciplines but the academic world is compartmentalized and very few people get excited about interdisciplinary work. In addition, a lot of research on risk management and insurance has been conducted by the quantitative community (e.g., actuaries) but this does not really interface with core aspects of organizational issues. Consequently, an unbalanced situation exists in terms of the academic view on risk management. This suggests that it will be extremely difficult, and certainly at the present time, impossible to drive a universally accepted ERM theory.

This argument suggests that it is still open to question whether ERM is actually something which can be effectively studied by academics. If ERM remains limited to the practitioner community then ERM does not need any theory at all. The practitioners essentially need frameworks (or model) which enables them to have a coherent view of their business to get timely and precise solutions, which will become more sophisticated over time, depending on market developments. This is because the practitioner who goes to work with an academic text often runs into many practical difficulties (Bannister, 1999). Rather than academics, consultants can promote ERM frameworks efficiently (i.e., bridging the gap between theory and practice) because they are in a better position to deal practically with real problems (the recent work of the consultant community can be seen in Section 2 of Chapter 2). Their objective is to develop best practice across an organization (or industry). However, it is important for the practitioner (even if dominated by one discipline) to gain awareness of the specialization of other fields (or disciplines). Nevertheless, the shape of the theory of ERM is fundamentally different from a grand (complete) theory but rather involves a universal model of thinking about how an organisation comes to encounter risk and what they do about it (IO6). This could be thought as a form of substantive theory (a set of competing theories) which involves breaking down the organisation and thinking about how risks enter the organisation and how risk behaves in the organisational process. In summary, the unified theory of ERM should synthesize the principles from a range of academic disciplines.

### **3.4. Challenges of ERM**

Following analysis of the CASES, the academic literature and industry observers' comments the following propositions are developed in relation to the challenges which insurers face in the effective implementation of ERM. These are discussed below.



## Proposition 12

***The challenges faced in implementing ERM differ depending upon the size, business model, and markets of the insurers; in general the larger the organization, the more it needs a decentralized ERM system.***

The analysis of the CASES suggests that insurers are quite good at managing their core insurance risks, for which they are directly remunerated. The difficulty really comes in managing the other (ancillary) risks and also managing the correlation between different risks (including core risks). The insurance industry is still in the very early stages in terms of managing risks using a holistic framework and the practice is still evolving. The different hierarchical levels of staff within the CASES face different challenges in adopting and implementing ERM. Whilst risk measurement and aggregation are key technical challenges, bringing a balance between the different risk management functions within the organisation is a key operational challenge. An ERM system includes methodology, parameters, tools and processes (Filipovic, 2005), and most importantly the behavioural aspects (e.g., risk attitude, culture, value, and communication specific to the organization). Consequently, the internal risk model, as described above, is merely a part of the entire ERM system (see Figure 39(4)). The key obstacles in designing and implementing the internal model and creating flexibility in terms of determining the minimum/adequate level of capital commensurate with the CASES specific risk appetite, lie in the organizational variables (e.g. people and processes, including sufficiently reliable data). Indeed, these difficulties are close to the broader and interdisciplinary perspective of managing risk knowledge across the CASES. All these arguments suggest that the size, business model, market and management culture are important for the design of ERM. For a larger organization, these issues are difficult to manage in a centralized framework thus requiring a decentralized but controlled ERM system (e.g., capturing diversification benefits in calculating capital (Bergera, 1995, Drzik, 2005a)).

### 3.5. Performance of ERM

Analysis of the CASES together with the views of industry observers and analysis of the literature suggests the following propositions in terms of the measurement of the performance of ERM. These are discussed below.

#### Proposition 13

***ERM should protect the reputation of the insurer.***

Clearly ERM provides a systemic view of the business rather than of the functions and it aligns business functions and decisions closely to the economy. In addition, ERM should be designed to respond quickly and effectively to the evolving business and market conditions (O'Donnell, 2005). Nevertheless, the key worry of any system is risk concentration (or systemic risk), which can cause total failure in the worst case (e.g., natural catastrophe events). In other words, the systemic approach of ERM as seen in the CASES means that the whole organisation is increasingly seen as a unique company (a brand). Having such a one dimensional view, the CASES are interested to highlight the group's financial performance but not other elements, such as reputation. This itself puts the risk to reputation at top of the senior managers' agenda (Argent, 2005a, Gray, 1998 ). Consequently, the biggest threat of a well established insurance company is nothing but maintaining its reputation (Schwamm, 2005b), in a holistic manner. Indeed, reputation is affected by many factors and the building and maintaining of reputation might well be viewed as a measure of performance of ERM (Pressman, 2006).

#### Proposition 14

***The CRO should possess a body of interdisciplinary knowledge***

The study suggests that the CRO should perform the role of facilitator (or coordinator) of risk taking and risk managing issues across the organisation. In essence, the CRO neither takes risk nor own risk. His/her job is to identify

and assess risks, monitor their correlations and find the diversification opportunities within a holistic framework (beyond disciplinary/departmental silos) and provide inputs/advice in developing tools and techniques to different department/managers to manage their risks efficiently, taking account of the interests of the organisation as a whole. In performing this complex function, the CRO should work with almost all departments of the organisation (see Figure 19(2)). This is truly an interdisciplinary job and in performing a range of activities the CRO has to act both as generalist and specialist within the capacity of the risk advisory function. In this sense, the CRO should represent a body of interdisciplinary knowledge leading a team of cross disciplinary staff.

The rise in the awareness of operational risk concentrates the attention of stakeholder community at a large. In fact, its growth in recent years is much faster than the sophistication of quantification techniques. As a result the ratio of quantified risks and unquantified risks in the insurers risk portfolio are becoming closer and closer. Moreover, the characteristics and size of the unquantified risks (in terms of frequency and severity) often remain undiscovered and thus present a key concern to senior management. Therefore, there is a greater need for prudent managerial judgement to deal with unquantifiable risk. In fact, the case study respondents suggested that risk management does not always need risk measurement (neither accurate risk measurement is always possible). Consequently, the CRO must not be capable of dealing with both quantifiable and unquantifiable risks.

The above findings relating to the interdisciplinary role required of the CRO suggest that such a person who possesses suitable interdisciplinary knowledge may never be found. This is the reason why CASE 1 did not appoint any CRO. Instead, a Group Risk Committee, with members drawn from a range of disciplinary backgrounds (often the departmental heads) could be an alternative (perhaps appropriate) solution. As Meredith Belbin observes – “Nobody is perfect, but a team can be” – and this could be argued to be the case in terms of co-ordinating and managing ERM. However, there needs to be somebody to organize the Group Risk Committee to

communicate and to take necessary initiatives to implement its decisions. This is most obviously a role of CRO (as seen in CASES 2, 3 and 4).

#### **4. Conclusion**

This section generalizes the findings of the research and presents the policy implementation issues in terms of propositions categorized under the five dimensions of the research. It is clear that if ERM remains limited within any specific discipline then it will not achieve its broader goals. Consequently, it is suggested that it is an interdisciplinary subject and hence the theory of ERM is likely to be a set of competing theories built on the principles of different disciplines (see figure 44(6)). Moreover, the CRO was found to be a body of interdisciplinary knowledge. Since such multifaceted knowledge is difficult for an individual to acquire, it is suggested that the co-ordination of ERM should be controlled by a Group Risk Committee. Finally, it was found that that risk to reputation will derive the performance of ERM over time, at least for large global insurance firms.

### Sample Questions (designed for structured questionnaire survey)

Please write your discipline in the BOX below  
 (all information you supplied will remain confidential)

(for example: Credit/Investment Risk Management/Underwriting/Claims/Reinsurance/Finance/Investment/Business Continuity/Internal Audit/ etc)

.....

#### MOTIVATION OF ENTERPRISE RISK MANAGEMENT

	Corporate Governance	Regulations	
	Solvency (Capital Adequacy)		
	Board of Directors	Leadership	
	Chief Executive Officer		
	Chief Risk Officer (or similar designation)		
	Innovation (to meet business needs)		
	Technology (sophisticated statistical techniques)		
	Globalization		
	Mergers & Acquisitions		
	Divestments		
	Financial Shock ((from Capital Market))		
	Corporate Disaster (Fraud & Mismanagement)		
	September 11 Incident		
	Over Capitalization	Capital	
	Undercapitalization		
	Volatile Economic Environment		
	Changing Risk Landscape (emergent risk)		
	Competition (in global insurance market)		
	Development of non-traditional (ART) Insurance Market		
	Shortage of Adequate Cover	Reinsurance	
	Creditworthiness		

Write Y (for YES) and N (for NO) in the row below for the issues applicable for your organisation in your belief

## Operational Challenges for the implementation of ERM

<b>Write Y (for YES) and N (for NO) in the row below for the issues applicable for your organisation in your belief</b>	Risk Awareness	Top Level (Strategic)	
		Middle Level	
		Lower Level (purely operational)	
		Risk Perception across discipline (insurance, finance, actuarial, auditing, risk engineers etc.)	
	Risk Communication	A Common Risk Language (understanding)	
		A Common Risk Culture	
		Disciplinary Difference	
		Hierarchical Difference	
		Consistence regulatory Requirements	
	Data	Adequacy	
		Consistency	
		Accuracy	
		Storing	
		Appropriate Analysis Techniques	
		Risk Controlling	
		Risk Classification (financial, insurance, operational, strategic)	
	Understanding the objective of ERM	Centralization	
		standardization	
		Harmonization	
		Consolidation (or Integration)	
	Linking Risk with Corporate Strategy		
	Determining Risk Ownership		
Lack of transparency	In the requirements of Group Risk Management		
	In the requirements of Group Internal Audit		



CHAPTER 5  
CONCLUSION

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## CHAPTER 5

### CONCLUSION

#### 1. Introduction

The chapter aims to draw conclusions from the study. Firstly, conclusions will be drawn from the empirical research by selecting key findings from the CASES. These conclusions will be organized under the five dimensions of the research (e.g., understanding, motivation, design, challenges, and performance). Secondly, the conclusions will be linked to the theoretical issues explored in the literature.

#### 2. Conclusions of the empirical research

It is observed that the CASES still manage risks in a silo fashion and their challenge in terms of developing an ERM perspective is to break down these silos. This will enable them to be able to think about aggregating risks across the organisation in a way that provides different insights, rather than focussing in one view developed from within a silo. It was clear from the empirical evidence that the CASES were not yet achieving this goal. For example, CASE 1 develops a holistic view of financial risks and CASE 2 focuses on insurance risks from a holistic perspective in their ERM approach. The study found a lack of understanding amongst senior managers within these CASES about the role of risk management and this appeared to arise because they are not sufficiently aware about the benefits of ERM.

The following sections intend to draw the conclusions of the study. They will also attempt to interrelate the five dimensions of this research (understanding, motivation, design, challenges, and performance of ERM).

## 2.1 Understanding the nature of ERM within the CASES

The study finds an uneven understanding of the nature of ERM across the CASES. This appears to arise from the following two understandings: firstly, ERM is an approach (philosophical view) and secondly ERM is a management tool (functional view). As an approach ERM is conceptualized as the management of all significant risks, whatever their source. As a management tool the understanding concerns means of putting ERM into action. Moreover, within this action oriented understanding ERM is perceived as a four-stage functional process (i.e., identifying and planning, assessing and organizing, implementing and monitoring). However, in a holistic perspective ERM is perceived as a logical approach for addressing new regulatory requirements. In addition, ERM is a strategic initiative (offensive to attain competitive advantage) that provides distinct benefits beyond regulatory compliance. In this understanding, market, credit, liquidity, and operational risk types were found to be focused on the ERM programmes of CASE study companies.

The analysis finds that the above two understandings (philosophical and functional) of ERM (which are held by employees depending in their discipline and position on the management hierarchy) are not fully isolated but they bear at least three common themes, as follows: (i) a standard risk management process across the organization, (ii) an integrated view of all significant risk that the organization faces, and (iii) linking risk to corporate objectives.

The study concludes that in whatever way ERM is understood (or conceptualized), a robust ERM system should enable the insurers to overcome the challenges they face (IO11) in many areas of their business. Some of the advantages of an effective ERM system which were identified in the study appear to be: (i) a well structured risk governance system in line with the organisation's business model and culture, (ii) risk and control awareness amongst staff at all levels (suggesting that everybody is responsible for managing risk), (iii) communication of risk knowledge consistently and effectively across the organization, and (iv) an efficient risk

and capital measurement and management framework (i.e., an internal risk model). The understanding constitutes an ERM framework as discussed below.

### **2.1.1. ERM Framework**

As seen in the CASES, the functional perspective of ERM is institutionalized by a framework, comprising major management actions (i.e., identifying and planning, assessing and organizing, implementing and monitoring). An appropriate organisational structure, where risk management is aligned with the business strategies and a framework of setting organisational goals from a business perspective was found to be essential to developing such as institutionalized framework. Moreover, appropriate types of risk measurement techniques for capturing the different types of risk and techniques of determining risk appetite and setting some boundaries around the risks that insurers are willing to take are important features of an effective ERM framework. The limit essentially represents how much capital the firm is willing to loose. This in turn sets the stage for the whole capital allocation process (where organisations think about how they allocate capital at different levels of risk and how returns are generated in relation to the capital). A system and infrastructure for reporting is also essential for an effective ERM framework. All these things help to develop a comprehensive and effective ERM system.

### **3. Motivation of ERM**

The study discovers the leadership of CEO is the key motivation for developing ERM. However, the study finds that the motivation of CEO is influenced by different realities the most important of these are the pressure from investors for more and sustainable returns, the expectation of policyholders asking for more security for their potential claims, and most importantly a constant monitoring by regulators who impose tough regulations both in terms of solvency and corporate governance issues. The important role of the CEO is motivating the organization towards ERM is echoed in the arguments of IO11: "there needs to be visible and active advocacy of the importance of risk management by senior management. It is essential that you have the buy-in of the CEO and the Board of Directors. The culture shift

which is required will not occur unless the CEO is a champion of risk management". Regulation was not found to be the key motivation towards ERM (Power, 2004) in any CASE (although it is often strongly believed to be by most of the respondents). However, regulation often helped reshape the ERM initiative of some CASES (i.e., CASES 1 and 2).

#### **4. Design of ERM**

As noted earlier, there appear to be two isolated approaches in designing the ERM for the CASES. One is a purely compliance based approach (qualitative: corporate governance issues), and the other is based on Quantitative Risk Management (Solvency and Capital Management issues). However, the study finds that one approach can unite these isolated approaches; and the best example, that the study discovered is one based on operational risk (which contains both financial and non-financial elements), where people are regarded as the cornerstone of all systems and processes of the organization. As stated earlier, the loss of reputation is the key concern (IO11) of the CASES, which has developed from the belief that "people [staff] have the potential to enhance or destroy the reputation of the organization". This is in line with the statement of Sir Howard Davis<sup>1</sup>: "no amount of capital is sufficient to protect the firm from the hand of inefficient [dishonest] management". It is suggested that the advancement of operational risk management will tie these two isolated approaches (compliance & quantitative risk management) of ERM into a common framework. Moreover, transparency in particular, risk reporting is another important issue in both approaches.

##### **4.1. Strengths and Weaknesses of the ERM design**

It is clear from the CASES that the idea of risk and capital management (which depends heavily on risk measurement and modelling) provides only a partial view of ERM. It is found that many risks (emergent risks) are unquantifiable (at least based on the current sophistication of measurement techniques). Prudent insurers can not leave them untouched since they require management. This is not yet regarded as a key issue in CASES 1 and

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<sup>1</sup> Former chairman of Financial Services Authority in the United Kingdom

3 but gradually becoming a key concern of CASE 4. It has emerged as an important issue since the risk-capital approach towards ERM is only successful when risk is measurable as accurately as possible. Nevertheless, all CASES realize that their design of ERM must be linked to their organization's risk philosophy, corporate objectives and strategies, capital structure and the expectation of influential stakeholders in a transparent way (in particular, that it is understandable to all member of staff within the organization). In other words, the design of ERM must be placed at the centre of organisations corporate decision making process.

#### **4.2. Role of Group Risk Management (GRM) and CRO**

Within the design of ERM, the role of GRM was found to be limited to one of establishing risk policy and risk processes for the Group, and to provide consultative support to the business units, where day-to-day management of risk originally takes place. In addition, GRM is also responsible for collecting, aggregating risk data and reporting to the board in respect of risk (IO11). The objective is to have adopted a centralized approach to ERM whilst allowing considerable flexibility to parts of the business in adapting ERM to suit their own businesses. However, the degree of freedom given to the businesses and the level of expertise they have vary considerably from one CASE to another. Within an effective ERM design, it was found that the CRO requires good interdisciplinary skills and that s/he should have a good understanding of the business, strong communication skills, be numerate and a good negotiator in bridging the gaps between departmental silos.

The study discovers that the design of ERM requires a model which includes elements associated with three parties: risk owners, risk takers, and risk observers. The ERM system should be used to assign roles and responsibilities for the staff in these roles. This is in line with the risk governance structure as seen in the CASES. From an ERM perspective, everybody in the company could be seen as a risk owner (and at the same time a risk taker, risk observer) at the micro level. However, at the macro level, the CEO is the chief risk owner and others (e.g., underwriting, investment, treasury, etc) are risk takers (and to a lesser extent, risk owners).

However, the CRO and chief internal auditor are risk observers, although the later is available to provide assurance to the board of directors in an independent role from the management. In the facilitation and co-ordination role, the chief risk officer needs to act as both generalist and specialist. In the function of generalist, communication with staff from a range of disciplines (e.g., chief finance officer, chief actuary, chief underwriting officer, chief investment officer, chief operating officer and so on) is the key job of the CRO. In the function of specialist, a key task of the CRO is to provide inputs for technical issues (e.g., identification, quantification and modelling of risks) from the perspective of entire Group. However, these two roles of CRO are not always distinct and most often they are required simultaneously. This happens, for example, when the CRO looks at the various fragmented risk management functions from a holistic perspective. This simultaneous role involves harmonization, standardization, centralization, and integration. This is regarded as an important finding of the research in understanding the conceptualization of ERM within the CASES as seen earlier. However, in practice, the CRO in most CASES are simply assigned the technical task with the objective of calculating the "economic capital". The one exception is CASE 4 where the role of the CRO is to some extent is regarded not only from a specialist but also a generalist perspective.

In summary, the role of the CRO involves both substantive (technical) and procedural (Denenberg, 1966) elements. The professional background and training of the CROs (as seen in the CASES) often leads them to concentrate more on the substantive side of ERM, but less (often eliminates) on the procedural ingredient (i.e., managerial consideration) of the analysis. The analysis of the CASES discovered that "communication" was the key challenge to successful implementation of ERM. Denenberg (1966) rightly argues, "the risk manager is aware that many of his [her] most difficult problems are often not substantive, but procedural, involving such matters as communications or control or organisation or direction, or some other managerial concept". This suggests that the communication is the key challenge to effective ERM (and for CROs) because the concerns of the current approach of ERM as seen in most CASES (which is often

quantitative/financial) are almost entirely substantive (technical), largely neglecting the procedural (managerial) aspects.

## **5. Challenges of ERM**

The following sections explore, first the operational challenges and then the technical challenges which are faced when implementing ERM in insurance companies.

### **5.1. Operational challenges**

On the operational side, a range of closely related issues (e.g., communication, indistinct ownership of risk within the organizational structure, political issues (e.g., blaming, integrity, responsiveness etc.) and, most importantly, the inherited culture (due to the silo mentality towards risk management)) were found to be the key challenges to implementing ERM. It was seen that all CASES are devoting considerable energy to overcoming these challenges and the CEOs and CROs are playing key roles.

Inadequate and inconsistent data provide a further operational challenge to ERM implementation. All CASES are seen to be more confident in their ability to manage financial risks (such as credit, market, liquidity) and insurance risks, where more data is available. However, they are seen comparatively vulnerable to operational risk and strategic risk (e.g., loss of reputation/social reorganization, etc.). This is mainly because of the lack of available data and due to their lack of understanding of the nature of their risks and their propensity to damage the organisation. Interestingly, CASE 1 was found to be still concentrating on assessing financial risks to a further degree of accuracy whilst having less concern for operational risk. However, CASE 4 concluded that financial risks are not the main threat on their business; instead long-tail risks (e.g., underwriting cycle, natural catastrophes, etc) and emergent risks (e.g., global pandemics, nanotechnology, electro magnetic fields, etc) are their key concern.

In summery, operational challenges concentrates on the lack of communication: getting staff to agree on definitions and risk categories, getting staff to really understand the common themes and risk categories

across different areas of business, and getting staff to customize risk measures in a way they makes them comparable. This finding has echoed the view of (Chaffee, 1985) who suggests: “the more science breaks into sub-groups, and the less communication is possible among the disciplines, however, the greater chance there is that the total growth of knowledge is being slowed down by the loss of relevant communication”.

## **5.2. Technical challenges**

On the technical side, which receives the full attention of the quantitative disciplines, risk measurement and estimating correlation among risks (among similar types of risk located at various geographical locations) provide key challenges. In addition, profiling of risk (i.e., risk landscape) and determining organizations' risk appetite (which is currently undifferentiated from risk tolerance level) is not clearly and widely understood.

### **5.2.1. Asset-liability management as an ERM tool**

As seen in the CASES, the challenges of ERM are mainly bounded within the concept of economic capital, which involves the measurement of identified risks and allocating the appropriate amount of capital for these risks. In simple terms the CASES define economic capital as the amount of capital adequate to protect the organization from unexpected losses (IO11). The CASES use Asset-Liability Management as the key tool to manage risks (IO7, IO9, IO1). They spread the risks across both the assets and liabilities of the balance sheet (4R4, 1R15) (also see Figure 16(2)). In this technique, they attribute capital (X) on the asset side to offset the risk of a change in their investments, while they set capital (Y) aside on the liability side to cover any change (such as claims and bad debts). The combination of both the amounts (X + Y) represents their risk-based capital (equivalent to economic capital) that they assume to attribute among the businesses. CASES were seen to conduct stress tests and scenario tests on each side of the balance sheet to determine the amount of capital through stochastic or dynamic financial analysis (Monte Carlo Simulation) (see figure 18(2)). Using ALM techniques the CASES estimate the ongoing capital attribution required for these risks both at the Business Unit/Group level and the business line level. This technique assures



the CASES about the optimal attribution of capital to their businesses commensurate to the risks they assume. This balanced position (asset-liability matching) provides a stable foundation, which facilitates the CASES in taking future financial decisions/planning (e.g., reattributing capital more efficiently throughout the business/making up any capital shortfall/utilizing excess capital) in terms of their organization specific risk appetite (IO11, IO7, IO2) (more information about ALM technique is available on CASE Report 4 in APPENDIX).

The key challenge is to match assets with liabilities because calculating the market value of assets is easy but calculating a market consistent value of liabilities is difficult because there is no trading market for liabilities. The possible solution to separate insurance risk from financial risk through a replicating cash-flow technique (as used by CASE: please see the CASE Report). Another problem is to relate ALM with Strategic Risk Management as ALM does not cover risks beyond the A-L risks, whereas strategic risks are important element in organisation's risk landscape.

### **5.3. Strengths and Weaknesses of the ERM system**

In addition to its various strengths, the study finds some dangers in the current approach of ERM practiced by the CASES. First, the current approach of ERM is very much concentric (i.e., relying on the brain power of one person/department – which is obviously the Group Risk Management in the CASES). It is important to have enough people making the collective assessment of risk, thus spreading the control mechanism across more than one person or department. Consequently, the idea of building a risk awareness team, a risk management culture and a common risk language under the broader field of knowledge management is gradually taking a more prominent role in the ERM plasticized by the CASES. Second, the big insurance companies (and to some extent for the whole insurance industry) are going towards the same modelling processes and the same risk assessment bases. This may give rise to the systemic risk because everyone is doing the same thing at the same time. This could be very

dangerous because they may all become exposed to the same risks (Bate, 2006). Consequently, such a common practice will amplify concern within the marketplace unless the solvency regulations build in features to overcome these potential dangers.

The study clearly shows that the calculated risk differs (underestimates) from the risk actually perceived by managers. In this sense the actual amount of risk is not captured in the ERM framework used by the CASES. The study identifies the weakest area of the current ERM initiative is its conceptualization (both in holistic and unique sense) and this triggers all other issues. Consequently, risk communication is a problem because the people understand and judge risks (in particular for subjective risks) in terms of locally defined values and concerns. In addition, because of the lack of communication and awareness, people focus on their own risk, which remains under their individual domain, thus providing inadequate knowledge [risk] sharing. Consequently, the enterprise risk remains hidden, and ultimately becomes large, complex and costly (Shiller, 2003).

From an operational perspective, the specific objectives of risk management include: (i) providing assurance in the face of uncertainty (pre loss situation); (ii) survival (post loss situation), (iii) supporting efficiency and growth (where profitability is the immediate measure of achievement), and (iv) social responsibility. Staff from the CASES in their interviews focused the discussions on pre loss aspects (ex-ante) with an emphasis on opportunities (IO12). However, few talked about the situation when loss actually happens (i.e., the post loss strategy<sup>2</sup>). Therefore, it appears that the performance of ERM in the CASES is influenced by a one sided arguments. Consequently, the current practice of ERM in the CASES does not provide any survival strategy. The study suggests that a holistic approach (e.g., business continuity management), which is not limited to the physical damage (as opposed to the financial damage) but also looks at the ex-post losses, also needs to be brought into the scope of ERM (3R6). Clearly, the design of ERM

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<sup>2</sup> The most important post loss objective in most organization is survival (Mehr, 1974)

is complex because it intends to bring commonality to risk management practices across the organization where a great extent of diversity traditionally exists. Consequently, the big challenge for the CRO is “communication” as seen previously. In addition, inadequacy and inconsistency of data provide another challenge.

The practice of ERM as seen in the CASES is clearly fragmented. The governance issues and financial risk management issues are dealt with separately. In addition, the behavioural issues, which are regarded as influential element of the entire ERM system receive no attention. Consequently, the measurement of performance is intended to address the issues regarding economic responsibility (i.e., maximization of shareholder value) and public responsibilities (i.e., the statutory obligations) of the corporate objectives. In effect, the other elements (e.g., social responsibility) often remain unnoticed. However, failure to maintain this vital element could become the root cause of loss of reputation (or image) where the stakeholder community is concerned. Importantly, all three elements of the corporate strategy are closely interlinked and failure in any one badly harms the others. Because insurance companies (being financial firms) are built on contracts and risks (both upside and downside) are integral to all contracts, the study suggests that ERM should be aligned with managing the enterprise in a general sense. However, the model suggested here is a long way ahead of practice, as observed in the four CASES.

The final conclusion concerning the design of ERM is that the concept of ERM as seen in the literature is that of managing all risks whatever their nature and source. However, this is not a true reflection of the way insurance organizations run or things happen practically. In this sense, either concept (theoretical or practical) of ERM needs major modification.

## **6. Performance of ERM**

The staff of the CASES believe that if they could conduct ERM correctly then it could add a lot of value to the business. However, value creation is not

being demonstrated naturally in a straight forward manner and it is a slow process. Despite many advantages, implementation of an ERM project can be costly (as it involves cost of regulatory compliance) and might create confusion in the organization because of the lack of participation on the part of a wide range of managers.

Calculation of the costs and benefits is the key to measuring the performance of any project/activity. Unfortunately, the study finds no consistent understanding of ERM across the CASES. Whilst there was no uniform agreement about the benefits of ERM (mostly tangible) those that did emerge from the CASES include:

- a better corporate governance structure,
- a better regulatory and rating agency treatment,
- a better risk management culture
- a better knowledge regarding the uncertainty around the business
- an expectation of more shareholder value

From a functional perspective staff in the CASES believe that ERM provides transparency in managing risk on a day-to-day basis. Moreover, ERM allows them to aggregate the information of significant risks across the firm and provides a holistic view of the firm's risk profile and its changing status in a proactive sense (identifying and predicting a likely range of events and formulating effective responses to those events). In addition, ERM helps them to think proactively in identifying and managing risks. From a strategic perspective the staff in the CASES believe that establishing a common understanding and culture in identifying and managing risk could enable them to overcome various complex issues which face in their operations (e.g., multiphase and multidimensional regulatory requirements across the globe) by providing a common (or simultaneous) solution which meets their business needs (e.g., risk based capital: regulatory capital, rating agency capital, and economic capital). An efficient capital allocation methodology under the

framework of ERM enables the CASES to measure the risk-adjusted performance of the business lines/units.

The study suggests that tracking and quantifying the costs for the intangible benefits of ERM is challenging (IO11) for the CASES. However, CASE 1 (who focuses mainly on a niche market) traditionally maintained a simplified and centralized management structure. Consequently, its ERM system is also based on a centralized framework (as it is the case for CASE 4). In contrast, CASE 1, which mostly focuses on retail business) maintains a much more decentralized management structure. Its ERM system is narrowly focused on corporate financial issues (the conceptual understanding of ERM in CASE 1 is, therefore, different from the other Cases). The centralized ERM model appears to involve fewer constraints compared to the decentralized ERM model. Consequently, it is easier to report the performance of ERM for insurers who pays a centralized focus provided the ERM is designed from an interdisciplinary perspective. Trying to the performance of ERM to compensation and reward, some CASES (e.g., CASES 3 and 4) introduced capital incentives for good risk management and reporting.

In summary, ERM, from the strategic poring of point of view, is conceptualized as the management of the risk that the outcomes of the corporate strategy differs from the corporate objective (Dickinson, 2001). However, it is suggested that the corporate strategy has more than the economic goals (e.g., profit/wealth maximization) and should incorporate multifaceted social and behavioural goals (Andrews, 1994). In essence, organisations, in a broader sense, are committed to three specific responsibilities: economic, public, and social (Wartick, 1985), which a complete ERM system should address.

Finally, one conclusion to emerge from the study is that the measurement of the performance of an ERM system remains a difficult task (3R4). In fact, no financial measures alone are sufficient. Since ERM is holistic and involves the stakeholder communities, confidence of stakeholders' is likely to reflect the performance of ERM in terms of a Corporate Social Responsibility index

(e.g., Dow Jones Sustainability Index<sup>3</sup>, FTSE4Good Index<sup>4</sup>) (see Figure 7(2)) in addition to the financial indicators (e.g., economic capital), including financial strength ratings.

## 7. Linking empirical findings with theory

The ERM movement in the insurance industry only just maturing. As such there is neither a standard ERM process nor a standard method of implementing ERM. Perhaps this is a good thing as it permits creativity in designing an optimal system. Clearly, there appears no standard for ERM because progressive insurers (e.g. the studied CASES) feel that a standard may inhibit creativity and may not be applicable for the diverse needs of business managers. It is not clear that how this issue will develop. Finance staff have their own spin on risk management; it is naturally driven by derivative products. Non-finance staff (e.g., operational managers) are looking at a broader interpretation in terms of strategic issues and marketing issues. The following paragraphs explore some points in the attempt to link empirical findings with theoretical issues.

### 7.1. Shareholder Value versus Stakeholders' Interest

The study revealed that maximization of shareholder value (in line with enterprise value: the discounted value of net cash flow) coupled with maintaining liquidity and solvency is the primary goal of ERM in the CASES. If the ERM model is built on the framework of corporate risk management which suggests that shareholders (in their capacity as owners) are only providers of capital, this should ensure that the maximum sustainable return is the primary function of ERM. From a corporate finance perspective, risk management is central to creating shareholder value. This is because risk information, based on economic capital, is a required input for accurate capital budgeting, capital structuring, capital allocation, and risk adjusted performance calculations (Belmont, 2004). Within this perception, the satisfaction of policyholders' is maintained simply in terms of the fulfilment of contractual obligations. Further,

<sup>3</sup> Available on [www.sustainability-indexes.com](http://www.sustainability-indexes.com)

<sup>4</sup> Available on [www.ftse.com/Indices/FTSE4Good\\_Index\\_Series](http://www.ftse.com/Indices/FTSE4Good_Index_Series)

it involves ensuring a certain minimal level of cash flow to preserve the targeted credit rating. However, such a narrow focus on shareholder value under ERM is questionable when the objective is to serve a broader group of stakeholders.

The current economic situation has led to shareholders' faith on organizations has progressively weakened by corporate crises and scandals and it is now generally agreed that the generation of economic value is a necessary, but not a sole element for running a business (Marsiglia, 2005). In addition it is observed that although the risk management efforts of the CASES are based on the Modern Finance Theory they principally oppose the Modigliani and Miller irrelevance propositions, which assume that a company's initiative in risk management is not a value adding function from the perspective of shareholders (Verbrugge, 2003). This tension is given some relief from the finance literature, since it indicates that increasing shareholder value does not conflict with the long term interest of other stakeholders (Copeland, 2000). However, a further area of conflict arises from corporate finance: namely, one concept focuses on the capital market (through financial economists' theories) based on efficient market assumptions (Prahalad, 1994), which entails full attention to shareholders. Whereas another focuses on corporate social responsibility through stakeholder theory based on culture and ethics (Drew, 2006, Gamble, 2001, Omran, 2002, Smith, 2003) which draws attention to stakeholders' interest. Moreover, shareholders loose interest on the organisation while insolvency occurs but the interest of other stakeholders (e.g., policyholders) still remains.

All the above arguments suggest a conflicting outlook amongst staff from various disciplines concerning the objectives of ERM, in particular, shareholder value and stakeholder interest. An embracing objective to overcome these conflicts is necessary and this points to the "interest of stakeholders" as the ultimate objective for ERM.

## **7.2. Portfolio Theory versus ERM**

To insurance industry staff enterprise risk means a portfolio of financial risks. This study proved that such view of Enterprise Risk is not complete. However, the study found that enterprise risk should cover risks both at the aggregated level and at the business unit level. Modern portfolio theory only talks about one perspective, which is total aggregated risks and it ignores the local risks (IO9). However, a robust ERM system as proposed in this study should offer more balanced view – providing for the coexistence of a portfolio view (at the corporate level) and the local view of the business units level (IO9). However, the problem is that the insurance business, unlike the stock and bond markets, are divided into different sector (e.g., life, non-life) and each sector is further divided into different sub-sectors (e.g., personal line, commercial line). Moreover, each line has different kinds of products and risk attached to them and these are sometimes fundamentally different. Consequently, the application of modern portfolio theory in ERM depends on the specific situation; although there may be a clear understanding of the underlying correlation structure for some risks (e.g., catastrophes) the correlation structure can often be complex (e.g., operational risk) (IO7). However, the balance between them can only be achieved if there do exists a coherent risk measurement technique.

## **7.3. Asset Liability Management versus ERM**

From the perspective of the principle of funding liabilities with assets, ALM is believed to be the foundation of insurers' ERM. In essence, ERM is based on the philosophy of funding insurers' total risk exposure by both assets and capital. This indicates the broadening of the traditional financial approach of risk management into the area of corporate finance, which talks more about capital structure and capital allocation. Clearly, there exist both communication difficulties and cultural problems in relating these two separate disciplines in a quantitative sense. Since ERM aims to manage all major risks of the organization, irrespective of types and sources, the communication and cultural problems further broaden into areas of social science beyond finance.



The initiative of financial (or corporate) risk management needs to be incorporated into the strategic risk management approach (Bettis, 1983, Dickinson, 1997) and vice versa. Financial risk managers should work closely with strategists to share their experience and techniques in managing the risk that an organisation faces as a whole in the turbulent market environment. Such joint work could overcome the challenges of ERM which have as emerged in this empirical study.

Consequently, the asset-liability management approach can be considered as a part of ERM and even then there exists complications in valuing liabilities in a market consistent basis as no trading market exists for insurance liabilities, unlike assets.

#### **7.4. Operational Risk versus ERM**

Following the banking definition, operational risk in insurance is defined as “the risk of loss resulting from inadequate or failed internal process, people and systems or from external events”. Although it includes legal risk (the loss resulting from failure to comply with laws, standards, and contractual obligations) strategic risk and reputational risk are intentionally excluded because they are too complex to be modelled when charging risk capital (Basel, 2001).

Since ERM takes an integrated view of all risks irrespective of sources and nature (although a mechanism is essential to differentiate company-specific significant risk and insignificant risk in the face of all risks) operational risk is a subset of enterprise risks. However, operational risks are often inseparable from other types of risk (e.g., financial risks). It is learnt that the most common sources of operational risks are business transactions, either at the functional or strategic level. However, there are pure operational risks (e.g., setting and operating an IT infrastructure, recruiting and managing human resources, etc).

From the discussion it is also clear that operational risk is also an element of strategic risk because the formulation and execution of strategies are exposed

to operational error. The study concludes that operational risk is an inherent element of all other categories of risk of insurance companies. In addition, there are pure operational risks. Most importantly, all operational risk have financial consequences. Since, it is difficult to separate operational risk from other categories of risks (when they exists jointly) the capital charged only for operational risk may suggest misleading results. Therefore, it is important to explore and understand a large spectrum of operational risks rather than quantifying them beforehand. This is because the ultimate objective of the quantification of risk is their management in order to end up with sustainable profit. Finally, the question of whether operational risk comes under strategic risk (which is defined as the risk of adopting and adapting corporate strategies), and vice versa, is irrelevant because operational risk is an inherent element of all other risks in addition to being a significant risk itself.

#### **8. Validity, reliability and generalizability of the study**

The concern of interpretivist research in terms of validity, reliability and generalizability are as follows (Easterby-Smith, 2002, Miles, 1994, Yin, 2002).

Validity – the study should clearly gain access to the experiences of those in the research settings.

Reliability – there should be sufficient transparency in making sense from the raw data.

Generalizability – the concepts and constructs derived from the study must have relevance to other settings.

The study clearly satisfies all three criteria and they are discussed below.

Concerning the question of validity: the study includes the views of industry managers (see figure 31(4)) both in the form of an interview survey and a questionnaire survey. In addition, archival records (e.g., annual reports, presentation slides, etc) were also used to clarify the views of the survey respondents. In fact, the study goes further and adds the views of a set of

industry observers (see figure 32(4)); and there provided valuable information for shaping the propositions of the study (see section 7 of Chapter 4).

Concerning the question of reliability: all the interviews were transcribed, and codified using NVivo qualitative software). The conclusions were drawn by comparing and contrasting the views of respondents, both within each single CASE and across CASES (see Chapter 4). In addition, the views from the literature were referred to where necessary. Moreover, a four-phase criteria was developed (see figure 33(4)), which establishes transparency in the analysis of the data obtained.

The concepts and constructs, which have been developed as the result of the study (in particular, a number of propositions under five dimensions of the research (see Section 7 of Chapter 4)) generalize the key issues concerning ERM. In addition, the CASES were selected taking account of a range of different considerations (e.g., business profiles: see figure 25(4), 26(4); an interdisciplinary group of staff: see figure 31(4), etc.). In addition, the CASES originated in different European countries and this brings diversity among the selection of CASES, thus providing more confidence for generalizing the findings. Moreover, the views of industry observers (see figure 32(4)) add a further degree of assurance in this respect. Finally, the CASES are in different stages of their development of ERM, which enables different aspects of ERM evolution to be explored.

## **9. Conclusion**

In summary, in the face of different views towards and techniques of, ERM, as described by different professions (e.g. finance, actuaries, auditors, etc) (see figure 31(4)), this study attempted to compare their views (both theoretically and practically). Combining the various perspectives it was seen that things outside (what people call the big picture) was intended to answer some basic questions like what is happening, why is it happening, how is it happening (their relations) and what are the key issues (challenges). Finally, the study attempted to analyze the findings in order to draw out some emerging issues

(i.e., propositions). What the study failed to do was to effectively evaluate of the means used to measure performance and what are the alternative (and cost effective) ways of doing this? This will be the next focus in carrying forward this research (as explored in Chapter 6).

Finally, the study revealed that until around 1970 risk management remained a broad subject (as encapsulated in the title 'business risk management'). However, with the advent of ERM, insurers have begun to focus more narrowly on subset of risk (mostly financial). The analysis conducted here suggests that such a narrow treatment of risk by no means reflects the problems faced by the insurers. Consequently, the current practice of ERM needs to broaden, to incorporate with other branches of risk management, in order to achieve a more generic (or holistic) shape. Such a generic shape is also important given the different style of ERM related initiatives adopted by various external parties. In particular, regulators and rating agencies may influence the insurers to operate in a world of several standards.

## CHAPTER 6

# CONTRIBUTION AND RECOMMENDATION OF FURTHER RESEARCH

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## CHAPTER 6

### CONTRIBUTION AND RECOMMENDATION OF FURTHER RESEARCH

#### 1. Introduction

Mankind has always lived with risk but the traditional view of risk was that of a threat. However, the modern definition of risk embraces the concept of opportunity in the face of uncertainty; risk management is a discipline for dealing with uncertainty. Insurance and they have learnt how to cope with risk. Nevertheless, intelligent risk-taking is at the root of insurers' prosperity (Kloman, 2005). Transferring uncertainties into risk (see the discussion differentiating risk from uncertainty in Section 1 of Chapter 2) allows insurers to make better decisions about the future, with a greater potential for favourable results and a reduced potential for unfavourable results.

This chapter intends to summarize the contributions of this research and is structured as follows:

Firstly, it describes the theoretical contributions of the study made in terms of the literature review. Various issues have been identified such as the debate concerning whether ERM is a technique or a process, whether ERM is reshaping classical finance theory or whether the focus of ERM is the organisation rather than risk types. Most importantly, in this section ERM is identified as an interdisciplinary subject.

It secondly describes the methodological contribution where it shows the development of a four phase data analysis methodology. This is essential for the research on any emerging topic like ERM.

Thereafter the practical contributions of the study are described. Here it is argued that a CRO should represent a body of interdisciplinary knowledge, and should clearly understand the difference between risk appetite and risk tolerance. This section identifies regulation as a systemic risk.

In assessing the researcher's personal contribution, the researcher's presentations in different insurance and risk management conferences are explored. In addition, the successes of a paper stemming from this research in an international competition and the guarantee of publication of the research in a reputable journal are pointed out.

Finally, the researcher's self criticism of the study and further research directions are identified. Various issues including the resolution of conflict between organisations and regulatory agencies, development of the theory of ERM, exploring ERM under the broader field of knowledge management and measuring the performance of ERM in the broader area of corporate social responsibility were discussed.

## **2. Contributions of the research**

The following paragraphs aim to summarize the contributions of this research and to explore directions for further research in light of the study findings.

One of the key difficulties at the start of the research was how to put boundaries around the topic to be investigated. There was no recognized or suggested methodology for this type of research. In other words there were no guidelines. In fact, the method or guideline employed arose over time as the research progressed. This approach was in line with the comment of IO4: "reality is the best source of suggestions for getting forward". Moreover, whenever the research established guidelines or made some progress then another problem arose of when to stop. This arose because there was an ample flow of information (often inconsistent) to develop new directions, new ideas and new conceptions for future research.

Before being able to draw general conclusions, it is important to outline some of the obstacles identified in the research process. One of these was that whilst studying the financial aspects of risk management, the researcher began to believe that the key to understanding risk management was

knowledge of financial issues. However, reading the more qualitative literature (e.g., work of social scientists, psychologists, etc.) covering risk management, the weaknesses of a financial perspective become apparent; and the contribution of a social perspective of risk management became clear. While exploring the topic of risk management from both perspectives, it became clear that there were gaps between these two perspectives. In particular, it was found that although the qualitative perspective recognizes the contribution of the quantitative (finance) perspective (with methodological criticisms), the quantitative (finance) perspective generally fails to recognize the qualitative perspective. The best example is 'operational risk', where the quantitative community is struggling to measure without understanding its meaning and characters. This is regarded as a key concern for the development of ERM since the study finds that insurance companies appear to be developing their ERM systems from a finance perspective. There is therefore a clear danger that key aspects of risk management will be neglected as a result because it is necessary to bring a balance of all risk management efforts within the organisation under the umbrella of ERM. As 4R5 states: "the only alternative to risk management is crisis management".

In addition to this broad conclusion, the contributions of this research study are now discussed under four headings: theoretical, methodological, practical and personal contribution.

## **2.1. Theoretical contributions**

### **2.1.1. ERM: a technique or a concept**

One of the key initial challenges in the research was to define ERM as a set of management techniques or a concept. Famous authors (e.g., (Bernstein, 1999) describe risk management as a set of techniques. They are probably right in a sense when the focus is on individual risk types or disciplines. However, the study identifies that ERM brings a change in the style of managing organisations. In this sense ERM is not restricted to the traditional thinking of risk management focusing narrowly on downside risk. ERM is much more focused on the knowledge of the organisation: how does knowledge develop, spread, transform and communicate across the



organisation. In this sense ERM is about a cultural change, about a change in perception/thinking and how things are done in an organisation. ERM touches the thinking of an organisation's staff, its management style, and organisational structure, not only in terms of risk related issues but also in terms of day to day management issues. The study finds that ERM is more about cultural issues and how staff think; and within a broad ERM framework, risk and knowledge are found to be closely interrelated issues (Macgill, 2005).

In summary, ERM is formed as a concept. However, it is important to have a set of techniques to implement the concept in practice.

### **2.1.2. ERM is reshaping the assumptions of classical finance theory**

Generally speaking, the shareholders, as (Bernstein, 1999) suggests, ".....have no control over the management of the companies in which they invest. They have some kind of legal control, but, as a practical matter and in most instances, minority investors have little influence over management discussion and strategies." Perhaps, with this in mind, finance theory suggests that risk management can remain an internal issue with minimal information concerning its functioning being given to shareholders. However, if risk management remains as an internal issue of an organization and is designed and controlled by management then shareholders may not have sufficient faith in their organization's risk management activities. However, the recent endeavours of leading enterprises to disclose their risk management policies and actions (through statutory reports and presentations to, for example, investors and analysts) will change the situation. Also there appears a growing consensus (interest) amongst regulators and rating agencies (FSA, 2003, Ingram, 2006a, Mohrenweiser, 2006) for a need of information regarding an organisation's risk management practices. This is likely to be given added impetus by the disclosure regulations appearing in Pillar III of Solvency II (SwissRe, 2006). Consequently, it is expected that in future the shareholders will put a large value on the risk management initiatives of

organizations, thus reshaping the traditional conclusions of classic finance theory indicated above.

### **2.1.3. Focus of ERM: organisation or risk type**

ERM should focus on the enterprise itself rather than an individual risk types. To this end, ERM is not a science, rather it is an art, because it can not be used as a method of acquiring complete knowledge, because of limitations of its methodical approach (Giarini, 1999). Seeing managers' concerns about a more uncertain future for their enterprises (despite technological advancement/sophistication), it is clear that the focus of ERM should and will move towards dealing with uncertainty rather than risk. (Chapman, 2003, Ward, 2003). Enterprises can never dispense with uncertainty, but their growing ability to translate some uncertainty into risk, measurable at least to some degree, enables them to take on more risk more intelligently (Kloman, 2005). The research studied that in insurance companies there was no unified understanding if what ERM involves and different staff at different levels and in different disciplines regard it as a process of harmonisation, standardization, centralization and integration to different degrees (see figure 7(2) in Chapter 2) .

### **2.1.4. ERM is an interdisciplinary subject**

ERM is an interdisciplinary subject combining strategic management, risk management and financial management (Dickinson, 1997) although most researches on risk management and insurance in past were dominated by economics and finance (Brown, 2003). As Miller (1992) argues "researchers need to incorporate risk as an outcome variable in studying a broad range of corporate strategies". Clearly, the findings and arguments of this study suggest the requirement for a fundamental revision of a number of risk management paradigms (or fundamental beliefs) of related disciplines.

ERM should emerge within the practice of insurers' general management despite many technical requirements. ERM should not be limited within the scope of technical management of different risk types in a holistic or

combined framework. Indeed, ERM fits into the general management framework, which includes various steps of management as a disciplinary subject, e.g., identification, measurement, action, and monitoring (Ward, 2003) of all risks irrespective of nature and sources. This is because risk remains in the centre of all insurers' activities; thus risk management is a key function. Consequently, ERM should be viewed as an interdisciplinary subject.

## **2.2. Methodological contributions**

### **2.2.1. ERM should be studied from an interdisciplinary perspective**

In selecting the interview respondents the main focus was achieving a good mix of professional (disciplinary) backgrounds. Since the respondents had various disciplinary backgrounds, their perceptions of risk management were different and it was important to note their distinct views on any unique topic. Consequently, by achieving this disciplinary diversity it was felt that the respondents would provide a cross sectional view. In essence, the objective was to interview at least two members of each profession (one at the top and other at the middle/lower level). However, some respondents were interviewed more than once depending on the interest of the subject topic. The significance difference in views across disciplines and at different levels of the Case Study Companies fully supported the decision to interview a diverse set of respondents. In fact, the diversity of views encountered provided a far more complete picture of the nature of ERM and the complex myriad of perspectives on ERM held by staff throughout insurance companies that would have been obtained had the study simply explored the views of a few key staff. In summary, a cross disciplinary view is essential to progress research on ERM.

### **2.2.2. ERM should be studied from the perspective of theory and practice**

Methodologically this work is different from other works conducted by, in particular, consultants and practitioners. These differences are described in terms of the figure 44(6).

Figure 44(6): A view of ERM research (theory and practice)

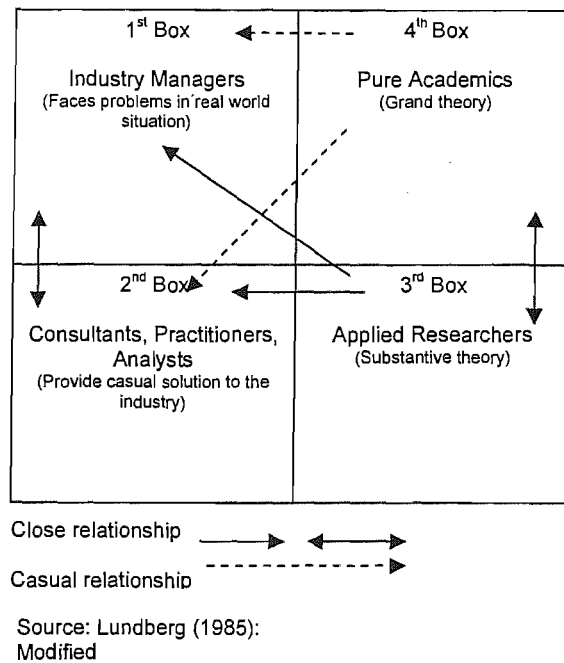


Figure 44(6) identifies the different roles performed by industry managers, consultants, academics and researchers who work with the industry (e.g., the current study) in the development of ERM as a unique subject. This also provides an indication as to how the research in ERM should be carried forward. The key source on ERM research is the work conducted by industry managers (as seen in 1<sup>st</sup> box), who are in touch with the economy, which allows them to remain aware of the latest changes which they intend to adapt to in their everyday business practices. Another group of stakeholders (e.g., consultants, practitioners, analysts, etc.), who co-operate with industry managers on various innovative ideas and tools, provide casual solutions to adopt the changes or to seek competitive advantage. As the work moves forward to the researchers involved with the industry, ERM gradually takes more theoretical shape, where the researcher maintains in contact with the practitioner community (both industry managers and consultants) and in touch with the economy. This enables them to combine theory and practice of ERM. Finally, the output moves to pure academics to give a theoretical shape to ERM. One key distinction between the researchers (boxes 3 and 4) and practitioners (boxes 1 and 2) are that researchers intend to see ERM as a

concept (focusing on the organisation) and practitioners view ERM as a process (focusing on risk and its categories).

The current stage of the development of ERM is heavily influenced by the practitioner community (as seen in 1<sup>st</sup> and 2<sup>nd</sup> Box in Figure 44(6)). This study on ERM best fits into the 3<sup>rd</sup> box where it suggests a set of competent theories (see the propositions in Chapter 6) taking insights from both the practitioner and academic community. However, the academic community operates within disciplinary solos. This does not enable them to develop an effective grand theory of ERM. Consequently, the conclusion to emerge regarding the methodological issues is that researches on ERM should remain in the 3<sup>rd</sup> box, which embraces many standards (both regulatory and industry level) and theories covering a range of disciplines.

### **2.3. Practical contributions**

The study provides practical insights about the challenges of ERM that a typical insurer face (e.g., risk awareness, risk culture). In particular, the key practical contributions include the need for the CRO to possess a multidisciplinary body of knowledge, the factors influencing risk appetite and the identification of regulation as a systemic risk. These are now discussed in turn.

#### **2.3.1. The CRO should possess a body of interdisciplinary knowledge.**

The study identifies different organisational variables (e.g., managers' perceptions of risk, the culture of the organisation in dealing with risks, and the barriers in communicating risks throughout the organisation) as the key challenges of implementing ERM. The study further identifies the CRO as the key observer and communicator of risk messages across the organisation, including the overall assessment of the effectiveness of ERM. In addition, it was found that the professionals (who represent the business units/departments) within the organisation have different perceptions of risk because of their different disciplinary backgrounds and there need to be recognized, weighted and integrated. Group Risk Management (which is

usually led by the CRO in the CASES) should be aware of such diversity of perception and attitude to risk. The policy makers (in particular the CEO and the Board of Directors) also need to be aware of this issue and nominate the right person as the CRO, who is able to align the interdisciplinary views of the professions and link it within the overall framework of ERM. Moreover, the Group Risk Management department needs to be constructed with a mix of interdisciplinary people to take their thinking outside the disciplinary soils.

Clearly, from the foregoing discussion, CROs can no longer be technical experts alone. They must increasingly be strong leaders and general managers as well. The risk management function must develop the capacity to attract and retain large numbers of staff from a wide range of backgrounds” (Drzik, 2005). Schiro (2005) suggests that a big question to solve is how much a CRO should play a role of generalist (with integrity and sound judgement) and how much that of a specialist (i.e., high level of technical competence). In essence, CROs have multiphase responsibilities. S/he are responsible for identifying opportunities in the face of uncertainties, to drive the change and are also responsible for managing crises in alarming situations, where necessary. Consequently, the research conducted here suggests a clear need for a more generalist role for a CRO.

In addition, it is worth considering that human beings have a limited capacity for information storage and processing (Miller, 1956). Given that a CRO must possess a body of interdisciplinary knowledge. Such limited cognitive capacity suggests an important role for the Group Risk Committee, which is represented by a multidisciplinary group of departmental heads, could serve this purpose (this is essentially the approach adopted by CASE 1)

### **2.3.2. Regulation as a systemic risk**

The insurance industry, as it receives premium upfront based on future promises (Castris, 2005), is subject to extensive regulation and supervision. Regulation cannot eliminate all risk. All actions would have to be based on the principle of ethical behaviour. But the study concludes that ethical behaviour

cannot be imposed through regulation and there often exists mistrust between the insurers and regulators which must be handled individually with extensive and meaningful dialogues (Rossum, 2005, Kielholz, 2005). Despite the benefits of regulations, the growing convergence of regulatory initiatives (Schante, 2005) (in particular, solvency regulations) increases systemic risks (Nabel, 2004, Kupieca, 2005).

#### 2.4. Personal contribution

During the currency of the study, the up-to-date findings and results were presented at a number of conferences. A list of these is attached below in figure 16(6). In addition, the study has been awarded the prestigious 2006 SHIN Research Excellence Award for insurance scholarship (Prize Money US\$ 10,000), which was presented by the Geneva Association (Switzerland) and International Insurance Society (USA) in Chicago. Moreover, summarizing the study (authored with Professor Johnnie Johnson) has been published in the Geneva Papers of Risk and Insurance: Issues and Practice (special issue) in 2006. One of the anonymous judges commented “very interesting paper which brings the topic in a detailed, but more practical and operational way, which might be of relevance for the industry”.

**Table 18(6): Personal contribution in to the ERM literature**

Year	Organizers	Paper/Presentation title	Remarks
2003	European Institute for advanced studied in Management, Brussels	Enterprise Risk Management: the role of Scenario Thinking.	Presented the paper
2003	Society of Risk Analysis, USA	Scenario Thinking: a common language of risk in enterprise risk management	Proposal accepted Won Travel Scholarship (\$750).
2004	Western Risk and Insurance Association, USA	Implementing Enterprise Risk Management in the Property and Causality Insurance Industry	Proposal accepted
2004	Asia Pacific Risk and Insurance Association, Singapore	Searching theories for Enterprise Risk Management in the non-life insurance industry	Proposal accepted
2004	American Risk and Insurance Association, USA	The rationale behind Enterprise Risk Management in the non-life insurance industry	Proposal accepted
2005	Society of Risk Analysis, Europe	Enterprise Risk Management in the insurance industry: exploring the gap between theory and practice	Paper presented

2005	Western Risk and Insurance Association, USA	Enterprise Risk Management in the insurance industry: analyzing the complexities between theory and practice	Proposal accepted
2005	Society of Actuaries, USA	Enterprise Risk Management in the insurance industry: exploring the international and cultural issues	Paper presented
2006	American Risk and Insurance Association, USA	Enterprise Risk Management in Insurance Industry: an empirical study	Proposal accepted
2006	Asia Pacific Risk and Insurance Association, Singapore	Exploring the management of operational risk in insurance organisations: insights from an empirical study on Enterprise Risk Management	Proposal accepted
2006	Geneva Association and International Insurance Institute	Investing the understanding, motivation, design, challenges and performance of Enterprise Risk Management in the insurance industry: findings from an empirical study	The paper was selected as best research on 'integrated risk management in insurance industry. Prize money: US\$ 10,000

### 2.5. Self criticism of the study

The key criticism of the study is that it will be difficult for the examiner, readers and analysts to fit this work within the scope of any traditionally recognized discipline. The work deliberately embraced this difficult interdisciplinary area knowing that, although it has existed for sometime all risk management issues remain under the big cap of a 'business' discipline. However, there are few little environments in organisations or academic departments for holistic thinking. The academic departments now work in silos with very distinct ethics and principles. Moreover, most of academic journals on the subject of risk and risk management take very strict disciplinary view (with very few exceptions). However, in this research 'risk management' has emerged as an independent academic subject above disciplinary silos. It is really a multidisciplinary subject which involves elements of organizational behaviour, strategic management, and decision economics, etc.

### 3. Future research directions

Risk management is now established as a discipline for dealing with uncertainty. It is never possible for organizations to dispense with uncertainty. However, as the findings suggest, the ability to translate some uncertainty into risk will grow and enable it to become measurable (at least to some



degree), enabling the organizations to take on more risk more intelligently (Kloman, 2003). Consequently, risk management will be to convert “unknown” risks to “known” risks over the next decade by developing new measurement and management techniques that are suitable and effective for the new challenges (Drzik, 2005) .

This research deliberately explored the complexities associated with ERM more from a strategic perspective. However, application needs simplification in the face of complexities; and such as approach may be carried forward by future research initiatives. The results of this study suggest several conclusions and avenues for future research, which can be undertaken both on organizational level and at a broader socioeconomic level (Kleindorfer, 2004). Some of these are discussed below:

### **3.1. Bringing consistency in risk based capital calculation**

Conflict between regulators and enterprises in calculating risk-based capital is a key issue. The study found that the internal risk model of insurance companies (which is similar to that used by Banks) calculates three types of risk-based capital (e.g., regulatory capital, rating agency capital, and economic capital (see Figure 15(2)). They use economic capital as a true measure of risk (it involves establishing a basis for both the amount of available capital and the amount of regulatory risk-based capital required) and this directs their financial planning. The respondents suggested that the other two types of capital are simply used for external purposes and may not contribute to the running of their business. The respondents argued that the external capital measures (regulatory and rating agency) do not adequately capture the diversification benefits which they (the organizations) believe are important to consider. The key issue here is to ensure the consistency in the calculation of the two types of capital (i.e., regulatory capital and economic capital). The respondents believe that calculating these two types of capital actually doubles the workload and yet adds nothing to the effective management of risk. One respondent argues, “the outcome will be a ‘solvency mis-match’ similar in principle to the ‘accounting mis-match’ which IFRS

(International Standard Reporting Standard) is on the way to eliminating". It is also found that all the conflict between the organizations and regulatory agencies in terms of calculating risk-based capital is mainly a matter of mistrust in authority and expertise (Hutter, 2001, Power, 2004, Taylor-Gooby, 2006). The consumer and the market are the ultimate losers of this conflict because they will pay the price in the end. The key objective of this suggested future research should be to explore the issues associated with how trust affects such conflicts. Otherwise, insurers will face multiple regulatory requirements on the same issue and it would be difficult for them to fit the requirements in their ERM model (this would impose more regulatory cost). To achieve this objective it is firstly important to see how trust is built within the enterprise. One way of achieving this is to investigate how risk knowledge (at the individual and disciplinary level: typically risk owners, risk takers, risk observers) is communicated within the ERM system of an organization (Power, 2005). However, the systemic effect of the convergence of regulations also needs to be considered.

The result of this research can contribute to the risk and regulation literature by producing at least two papers on the following areas:

- What causes conflict between the enterprises and regulators in calculating risk-based capital in a consistent manner (the core theme of the research)?
- How agents (interdisciplinary managers within the enterprise) perceive regulatory constraints in communicating risk knowledge within an ERM system?
- The findings can be extended to understand the nature and propensity of operational risk (Power, 2005), the allocation of risk ownership, and the measurement of the performance of ERM.

It is hoped that this work will lead to a number of conceptual papers. Moreover, the results can contribute to the effort of regulators in developing guidelines and policies for controlling and managing the market; in particular, from failures due to operational risks (FSA, 2005).

### **3.2. Theory of ERM**

The study finds that the search for a theory (or may be a set of competing theories) about ERM is a very promising area. In addition, a better understanding of risk management in the board room linking the relationship between risk governance, quantitative risk management and corporate social responsibility is also an area to be researched. Research on this topic will open the door on a number of different avenues such as strategy and policy and corporate social responsibility, business ethics, as well as risk management.

In order to have a better understanding of the pattern of implementation the result of this research may be compared to the manner in which pattern of implementation in banks have implemented practical risk measures. This may serve two purposes. One is to strengthen the current initiative of the insurance industry as noted in this study. Moreover, the result can be utilized into the initiative of bancassurance, which is considered to be an important emerging topic.

### **3.3. Exploring ERM on Prospect Theory**

Despite the fact that ERM encourages sustainable risk taking, the study, finds that three of the cases (CASES 1, 2, and 3) focus their efforts on avoiding large losses. In addition, it is clear in three Cases that attitude to risk varies with the experience of top managers and the organisation's specific risk appetite as well as the intervention of regulators/supervisors in the way they [organisations] manage risks. In this respect, more research need to be carried out on the relationship between performance of ERM and the risk taking and risk avoiding behaviour of individuals within the organisation (March, 1987, Sitkin, 1992).

### **3.4. ERM in the concept of Portfolio Theory**

The risk model of the CASES follows the principle of diversification as established in the portfolio theory of finance; which stipulates that uncorrelated risks can balance out each other and thereby limit the overall risk of the portfolio (Darlapa, 2006). Insurance companies maintain a strong portfolio of Group investment of assets comprising stocks, bonds, cash and real estate. If enterprise risk includes only these types of financial risks then the portfolio approach is fine for ERM. In this sense, enterprise risk means a portfolio of risks to many people. However, this view of Enterprise Risk is not complete. Enterprise risk should cover risks both at the aggregated level and at the business unit level. Modern Portfolio Theory only talks about one perspective, which is the total aggregated risks and it ignores the local risks. ERM should offer a more balanced view – combining the portfolio view and the local view of the business units. The application of modern portfolio theory in ERM depends on the specific situation. For some risks there is a clear understanding of the underlying correlation structure (for instance, when the underlying driver is very much catastrophe in nature, like earthquake or hurricane etc). Consequently, an issue for further research is how the portfolio approach can be more appropriately applied to ERM (also see Section 7.2 of Chapter 5).

### **3.5. ERM in system theory and knowledge management**

This study identified ERM as a system of managing all risks of an organization. The complexities associated with understanding, designing, implementing and evaluating the performance of ERM are presented. They represent an interdisciplinary involvement of humans with various parts of the ERM system, which includes subjective issues e.g., their emotions, trust, relationships, etc. These sociological factors invariably affect the efficiency and effectiveness of the ERM system, in particular, identifying the gaps between the theoretical knowledge of ERM. In essence, risk management is an attitude of mind (Knox, 2006). Consequently, the research can be carried forward to explore the challenges from the perspective of system theory (Boulding, 1956) under the broader field of knowledge management.

### **3.6. Communicating risk knowledge across the organization**

The study identifies three groups of people within the risk functions across the organizations: risk owners, risk takers, and risk observers. It was seen that risk observers lead ERM (as a remote function across the organization) and their role often not communicated properly to other groups of staff. However, questions still remain of whether risk owners and risk takers necessarily need to know the ethics of ERM. If so: to what extent. How will this help the organization to achieve its objectives? The potential (and probably the clear) answer should be "yes" because if their mindset has not evolved they will not understand what the risk observers want. They do not have to understand the details, but they should know how much they contribute to group wide risk in each risk class, and accordingly will be charged with the corresponding capital costs. However, in practice, the observer is considered to be theorist, with the attitude of a policeman, rather than a facilitator. Further research is necessary to explore the difficulties in such risk communication issues across the organization taking their mutual trust relationship into account.

### **3.7. Risk appetite**

The study discovers a complex range of views across Case Study respondents regarding their ability to differentiate risk appetite from risk tolerance. However, it was concluded that risk tolerance (a measure of risk that an insurer can take or is willing to take) may be different from the concept of risk appetite. In essence, risk appetite is a subjective issue and is constituted by a range of organisational and economic variables (e.g., culture, business model, market). Further research is needed to explore the elements of risk appetite and how it changes with the change of organisational variables. The result will provide input to the in design of an effective ERM framework.

### **3.8. ERM versus IFRS**

The study finds that ERM is not necessarily to set equal to IFRS. ERM is the process of establishing a risk management organization, and is not linked to

the type of valuation (4R4). Moreover, these concepts clearly have different objectives (i.e., ERM is about strategic decision making and IFRS is about financial reporting). Most of the companies explored in the study use EVM (Economic Value Management) as a basis for measuring the economic performance of its business and IFRS is doing so in phase II (but this is unlikely to happen before 2008 or even later). Given the current context, some regulators may be faster than other IFRS promoters; however, the transition from phase I to Phase II in valuing assets marked to market, and valuing liabilities by the traditional old way (i.e., discounting) is not found suitable in the insurance industry. There are some other issues related to accounting, which are contrary to achieving an economic view, like hedge accounting<sup>1</sup>. But there is still hope that this may change. The future research in this aspect is two fold: (i) how to bring consistency in calculating the values and assets and liabilities in the approaches of finance (for ERM purpose) and accounting (for IFRS purpose), and (ii) how do the results feed into the asset-liability management functions (4R4). However, this is still an open agenda and this has got concentration of various research organisations e.g., the Geneva Association (Dickinson, 2003) and International Association of Insurance Supervisors (available on [www.iaisweb.org](http://www.iaisweb.org)).

### **3.9. Knowledge management**

The study finds that ERM is in its early stage of development in the insurance industry but is gradually maturing in knowledge. Clearly, there exist a lot of uncertainties remains around ERM and the study identifies some of them. The same can be observed in the evolution of physics, operations research, economics, financial management and a number of other fields (Pender, 2001). All the factors as identified by the study as challenges of ERM generally arise because of limited flow of knowledge. The study argues that ERM as a discipline closely fits within the scope of general management rather than technical management. Further research is needed to explore how social knowledge within the scope of general management interacts (or conflicts) with the scientific knowledge and how this might benefit ERM

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<sup>1</sup> Hedge accounting involves designated hedge instruments (e.g., derivatives) to offset changes in the fair value or cash flows of hedge items (e.g., assets, liabilities)

(Macgill, 2004). Indeed, research in the Case Study Companies suggests that technical expertise is more developed currently in ERM than general expertise. Furthermore, research is needed to identify the optimal degree to which these two approaches needed to be combined to optimize the performance of ERM (see also subsection 2.3.1 of Chapter 6).

### **3.10. Measuring the performance of ERM in the broader agenda of Corporate Social Responsibility**

The study demonstrates that it is difficult to measure the performance of ERM, and then may suggest the needs for an alternative measure. The performance of firms can be linked to the corporate social responsibility (Aupperle, 1985, Cochran, 1984, Gruning, 1979, McGuire, 1988) in the convergence with financial performance and strategic performance (Chakravarthy, 1986), where regulations play a key role. This is because the objective of ERM is “sustainability (sustainability value creation)”. The key concern is the separation of business from ethics (or society). The key question to answer is: what is the business for? The link between social (or ethical) performance (responsibilities) and financial (or economic) performance (responsibilities) is poor (Carroll, 1979) but will grow through the agenda of corporate social responsibility. It is seen in the CASES that the relation between social responsibility and profit maximization (and reputation) is not observable in good time but their relation is prominent during the loss of reputation. The key criticism of the Shareholder Value Model of ERM is that value (not necessarily sustainable value) of the firm is reflected simply because of its ‘tunnel view’ approach. In essence, the calculation of sustainable value could be possible from a stakeholder perspective where corporate social responsibility is an important issue.

### **3.11. Identification of strategic risk**

The key function of insurance companies is to finance risks that their clients transfer to them. However, the current evidence suggests that the role of insurers in financial risks will gradually become limited because of the sophistication of risk management techniques and methodology. Moreover,

some large client companies from different sectors are also developing ERM system in their organisations. The study did not find any indication in the insurance industry (at least in the primary insurers) that they even thought of this potential risk; at least within the perspective of their ERM initiatives. However, the reinsurance industry is somewhat more advanced, as they are looking proactively at their emerging risk agenda (although it is currently limited within the exposure level). This is a huge [strategic] risk for the insurance industry as risk financing is the key to the insurance business. The role of insurance should not be limited to financing risks that the clients voluntarily transfer to them. However, ERM related research of the [primary] insurers should not focus only on the risk they face but should essentially focus on the risk that their clients face and in addition to offer convergence of the downside and upside part of the risk. Most of the CASES studied in this research have a risk engineering department to deal with this concept but liaison between at least three departments (such as Group Risk Management, Risk Engineering, and Marketing and Product Development) is required. As noted in CASE 4 (which it is believed originated ERM in Europe) the CRO (the first CRO in the insurance sector) came from risk engineering background.

#### **4. Concluding remarks**

The thesis set out to answer the following five questions.

- What is the understanding of the nature of ERM within the insurance industry?
- What motivates insurance companies to develop ERM?
- How do they structure ERM?
- What challenges do they face in implementing ERM?
- How do they measure the performance of ERM?

Following in-depth analysis of the empirical data and comparing and contrasting it with the literature, the study identifies the following key findings:



- An inconsistent understanding of the nature of ERM exists within the management hierarchy of insurance companies and also there is an inconsistent understanding between companies.
- The organisations' inconsistent understanding of ERM is reflected in different ERM design, but regulation (as an external force) is helping to create a more common basis for ERM design.
- Motivation for developing ERM systems differs depending upon the circumstances of the insurance companies and their business models, market and management skill in identifying significant risks and employing tools/solutions.
- Similar challenges to successful implementation are found in fall all insurance companies who adopt ERM. However, because levels of understanding differ between insurance companies, some are unaware of the potential challenges they face (e.g., risk communication).
- Currently, there appears to be little progress toward measuring the performance of ERM systems within insurance companies.

It is clear from the research that the development of ERM systems is seen as vital for the continued success of insurance organisations but considerable work still needs to be done in developing an interdisciplinary approach to risk management, which ERM demands.

# BIBLIOGRAPHY

## Bibliography

- AABO, T., FRASER, J. R. S., & SIMKINS, B. J. (2005) 'The Rise and Evolution of the Chief Risk Officer: Enterprise Risk Management at Hydro One'. *Journal of Applied Corporate Finance*, **17**(3): 62-75.
- ACUTIS, C. (2001) *Strategic Issues in Insurance: Essays in Honour of Orio Giarini*, Blackwell Publishers.
- ADIEL, R. (1996) 'Reinsurance and the Management of Regulatory Ratios and Taxes in the Property-Casualty Insurance Industry'. *Journal of Accounting and Economics*, **22**(1): 207-204.
- AHN, H. (2001) 'Applying the Balanced Scorecard Concept: An Experience Report'. *Long Range Planning*, **34**(4): 441-461.
- AIRMIC (1999) *Integrated Risk Management* London: Integrated Risk Management Special Interest Group, AIRMIC.
- ALINK, S., LÖWE, M., & WÜTHRICH, M. V. (2004) 'Diversification of aggregate dependent risks'. *Insurance: Mathematics and Economics*, **35**(1): 77-95.
- ALLWOOD, D. (2003) 'Capital Management in an insurance company', in FAURE, J. (Eds) *Capital Allocation: A necessity for the insurance industry*, Group Strategy & Development Department, pp. 44-55
- ANDERSEN, A. (1995) *Managing Business Risks: An Integrated Approach*, The Economist Intelligence Unit.
- ANDERSEN, T. J. (2005) 'A Strategic Risk Management Framework for Multinational Enterprise'. *SMG Working Paper 3*.
- ANDRÉASON, T., JOHANSSON, F., & PALMGREN, B. (2000) 'Measuring and Modelling Technical Risks in Non-Life Insurance'. *Scandinavian Actuarial Journal*, **2**(1): 80-88.
- ANDREWS, K. R. (1994) *The concepts of corporate strategy*, Irwin: McGraw-Hill.
- ARGENT, P. A. (2005) 'The challenge of protecting reputation', *Mastering Risk*, *Financial Times* London, 30 September, pp. 2-3.
- ARROW, K. J. (1991) 'Insurance, Risk, and Resource Allocation', in DIONNE, G., ARRINGTON, S. E. (Eds) *Foundations of Insurance Economics*, London: Kluwer Academic Publishers, pp. 220-229
- AUFRAGNE, N. (2002) 'Reinsurance as a tool to increase statutory capital', *SCOR technical newsletters. Life*, **4**, pp. 1-4.
- AUPPERLE, K. E., CARROLL, A. B., AND HATFIELD, J. D. (1985) 'An Empirical Examination for the relationship between Corporate Social Responsibility and Profitability'. *The Academy of Management Journal*, **28**(2): 446-463.
- AVEN, T. (2004) 'On How to Approach Risk and Uncertainty to Support Decision-making'. *Risk Management: An International Journal*, **6**(4): 27-39.
- VERY, G. C. (2003) *Understanding Leadership: Paradigms and Cases*, London: Sage Publications Ltd.
- BABEL, D. F. (2001) 'Asset/Liability Management for Insurers in the New Era: Focus on Value'. *The Journal of Risk Finance*, **3**(1): 9-17.
- BABEL, D. F., & MERRILL, C. (2005) 'Real and Illusory Value Creation by Insurance Companies'. *The Journal of Risk and Insurance*, **27**(1): 1-22.

- BALLOU, B., & HEITGER, D. (2005) 'A Building-Block Approach for Implementing COSO's Enterprise Risk Management Integrated Framework'. *Management Accounting Quarterly*, 6(2): 1-10.
- BANKS, E. (2004) *Alternative Risk Transfer: Integrated Risk Management through Insurance, Reinsurance, and the Capital Markets*, John Wiley & Sons Limited.
- BANKS, E. (2005) *Catastrophic Risk: analysis and management*, Chichester: John Wiley & Sons, Ltd.
- BANKS, E., & DUNN, R. (2003) *Practical Risk Management*, John Wiley & Sons Ltd.
- BANNISTER, J. (1999) 'The Ubiquitous Role of Risk Management in the Modern Economy'. *The Geneva Papers on Risk and Insurance: Issues and Practice*, 24(3): 376-382.
- BARBERIS, N., HUANG, M., & SANTOS, T. (2001) 'Prospect Theory and Asset Prices'. *The Quarterly Journal of Economics*, 116(1): 1-53
- BARLOW, D. H., & HERSEN, M (1984) *Single case experimental designs: Strategies for studying behaviour change* New York: Pergamon Press.
- BARTON, S. L., & GORDON, P. J. (1987) 'Corporate Strategy: Useful Perspective for the Study of Capital Structure?' *Academy of Management Review*, 12(1): 67-75.
- BARTRAM, S. M. (2000) 'Corporate Risk Management as a Lever for Shareholder Value Creation'. *Financial Markets, Institutions and Instruments*, 9(5): 279-324.
- BASEL (2001) Operational Risk: Proposal for a New Basel Capital Accord, Basel, *Basel Committee on Banking Supervision*, January. Accessed on [www.bis.org/publ](http://www.bis.org/publ)
- BASEL (2005) International Convergence of Capital Measurement and Capital Standards: A Revised Framework, Basel, Bank of International Settlement, November.
- BATE, O., PLATO, P., & THALLINGER, G. (2006) 'Stochastic Modelling - Boon or Bane for Insurance Industry Capital Regulation?' *Geneva Paper on Risk and Insurance: Issues & Practice*, 31(1): 52-82.
- BAUMAN, Z. (1991) *Modernity and Ambivalence*, Oxford: Cornell University Press.
- BEASLEY, M. S., CLUNEB, R., & HERMANSON, D. R. (2005) 'Enterprise risk management: An empirical analysis of factors associated with the extent of implementation '. *Journal of Accounting and Public Policy*, 24(6): 521-531
- BEAVE, W., KETTLER, P., & SCHOLE, M. (1970) 'The Association between Market Determined and Accounting Determined Risk Measures '. *The Accounting Review*, 45(4): 654-682
- BECK, M. (2004) 'Obstacles to the evolution of risk management as a discipline: some tentative thoughts '. *Risk Management: an international journal*, 6(3): 13-21.
- BECK, U. (1992) *Risk Society: Towards a New Modernity* London: SAGE Publications.

- BECK, U. (1994) 'Preface', in BECK, U., GIDDENS, A., & LASH, S. (Eds) *Reflexive modernization: politics, tradition and aesthetics in the modern social order*, Cambridge: Polity: pp. vi-vii
- BECK, U. (1998) 'The Politics of Risk Society', in FRANKLIN, J. (Eds) *The Politics of Risk Society*, London: Polity Press.
- BECK, U. (1999) *World Risk Society*, Oxford: Polity Press.
- BEDER, T. S. (1995) 'VAR: Seductive but Dangerous'. *Financial Analysts Journal*, **51**(5): 12-24.
- BEDFORD, T., & COOKE, R. (2001) *Probabilistic Risk Analysis*, Cambridge: Cambridge University Press.
- BELMONT, D. P. (2004) *Value Added Risk Management in Financial Institutions*, Singapore: John Wiley & Sons (Asia) Pte Ltd.
- BENTON, B. (2001) 'Step-by-Step Enterprise Risk Management', *Risk Management Magazine*, 9, September, pp. 43.
- BERGER, L. A. (1988) 'A Model of the Underwriting Cycle in the Property and Casualty Insurance Industry'. *Journal of Risk and Insurance*, Issue **55**: 298-306.
- BERGERA, A. N., HERRINGB, R. J., & SZEGÖ, G. P. (1995) 'The role of capital in financial institutions'. *Journal of Banking & Finance*, **19**(3): 393-430.
- BERNSTEIN, P. L. (1998) *Against the Gods: The Remarkable Story of Risk* John Wiley & Sons, Inc.
- BERNSTEIN, P. L. (1999) 'Risk, Time, and Reversibility'. *The Geneva Papers on Risk and Insurance: Issues and Practice*, **24**(2): 131-139.
- BERNSTEIN, P. L. (2000) 'Risk Management, Financial Markets and Insurance: The Hidden Linkages'. *The Geneva Papers on Risk and Insurance: Issues & Practice*, **25**(4): 629-636.
- BESLEY, T., & GHATAK, M. (2005) 'Incentives, risk and accountability in organizations', in HUTTER, B., & POWER, M. (Eds) *Organizational Encounters with Risk*, Cambridge: Cambridge University Press, pp. 149-166
- BETTIS, R. A. (1983) 'Modern Financial Theory, Corporate Strategy and Public Policy: Three Conundrums'. *The Academy of Management Review*, **8**(3): 406-415.
- BICKMAN, L., & ROG, D. J. (Ed.) (1997) *Handbook of Applied Social Research Methods*, Sage Publications.
- BLACK, F., JENSEN, M.C., & SCHOLES, M. (1972) 'The Capital Asset Pricing Model: Some Empirical Tests', in JENSEN, M. C. (Eds) *Theory of Capital Markets*, New York: Praeger Publishers.
- BLACK, T. R. (1999) *Doing Quantitative Research in the Social Sciences: An Integrated Approach to Research Design, Measurement and Statistics*, Sage Publications Ltd.
- BLAZENCO, G. (1986) 'The Economics of Reinsurance'. *The Journal of Risk and Insurance*, Issue **53**: 258-277.
- BLOOM, T. S. (1987) 'Cycles and Solutions'. *Best's Review: Property/Casualty Edition*, **86**(6).

- BLOOMER, J. (2005) 'Developments in International Financial Reporting Standards and Other Financial Reporting Issues'. *The Geneva Papers on Risk and Insurance: Issues & Practice*, **30**(1): 101-107.
- BLUM, P., & DACOROGNA, M. M. (2003) *Dynamic Financial Analysis: Understanding risk and value creation in insurance* (An In-depth publication), Zurich, Convergium, March.
- BLUME, M. E. (1971) 'On the assessment of risk'. *The Journal of Finance*, **XXVI** (1): 1-10.
- BOHOLM, A. (1998) 'Comparative studies of risk perception: a review of twenty years of research'. *Journal of Risk Research*, **1**(2): 135-163.
- BOMHARD, N., & FREY, C. (2006) 'Future Financial Frameworks - Essentials for Risk-Based Capital Management'. *Geneva Paper on Risk and Insurance: Issues & Practice*, **31**(1): 46-56.
- BONDUELLE, Y., & OGIER, T. (2000) 'Risk, real options, and the valuation of e-business', in ALEXANDER, C. (Eds) *Visions of Risk*, London: Pearson Education Limited, pp. 52-59
- BOULDING, K. E. (1956) 'General System Theory - The Skeleton of Science'. *Management Science*, **2**(3): 197-208.
- BOWMAN, E. H. (1980) 'A risk/return paradox for strategic management'. *Sloan Management Review*, **21**(3): 17-31.
- BOWMAN, E. H. (1982) 'Risk seeking by troubled firms'. *Sloan Management Review*, **23**(4): 33-42.
- BRAUNDER, C. (1998) *Preparedness: basics of business continuity management*, Zurich, Swiss Re,
- BRINK, G. J. (2001) *Operational Risk: the new challenge for banks*, Palgrave Macmillan.
- BRIYS, E., & VARENNE, F. (2001) *Insurance: from underwriting to derivatives*, John Wiley & Sons.
- BROMILEY, P. (1991) 'Testing a Casual Model of Corporate Risk Taking and Performance'. *The Academy of Management Journal*, **34**(1): 37-59.
- BROWN, B. (2004) 'Implementing and Managing Risk across the Enterprise: A Practical Guide to ERM', *Jan/Feb, GARP Risk Review*, **16**, pp. 20-24.
- BROWN, K. J. (2003) 'Risk Management and Insurance Research: 1980-2002'. *Risk Management & Insurance Review*, **6**(1): 1-6.
- BRYMAN, A. (1988) *Quantity and Quality in Social Research*, London: Routledge.
- BRYMAN, A. (2004) *Social Research Methods*, Oxford University Press.
- BRYMAN, A., BELL, E. (2003) *Business Research Methods*, Oxford University Press.
- BULTER, A., LETZA, S. R., & NEALE, B. (1997) 'Linking the Balanced Scorecard to Strategy'. *Long Range Planning*, **30**(2): 242-253.
- BUTSIC, R. P. (1989) 'The Underwriting Cycle: A Necessary Evil?' *The Actuarial Digest*, **8**(2).
- BUTTERWORTH, M. (2001) 'The emerging role of the risk manager', in PICKFORD, J. (Ed) *Mastering Risk: Concepts*, London: Pearson Education Limited, pp. 21-25

- CALANDRO, J., & LANE, S. (2002) 'The insurance performance measure: bringing value to the insurance industry'. *Journal of Applied Corporate Finance*, **14**(4): 94-99.
- CAMPBELL, S. (2006) 'Risk and the Subjectivity of Preference'. *Journal of Risk Research*, **9**(3): 225-242.
- CANDEL, F. M. (2006) 'New Markets - New Regulation'. *Geneva Paper on Risk and Insurance: Issues & Practice*, **31**(1): 11-16.
- CARPENTER, T. D., FENNEMA, M. G., FRETWELL, P. Z., & HILLISON, W. (2004) 'A Changing Corporate Culture: How Companies Are Adjusting to Sarbanes-Oxley'. *Journal of Accountancy*, Vol. **197**, P. 57.
- CARROLL, A. B. (1979) 'A Three-Dimensional Conceptual Model of Corporate Performance'. *The Academy of Management Review*, **4**(4): 497-505.
- CARTER, R., LUCAS, L., & RALPH, N. (2000a) *Reinsurance*, Reactions Publishing Group.
- CARTER, R. L., & DOHERTY, N. A. (Ed.) (2000b) *A review of alternative reporting lines for the risk manager*, London: Kluwer Publishing.
- CAS [Casualty Actuarial Society] (1999) *Overview of Dynamic Financial Analysis*, New York.
- CAS [CASUALTY ACTUARIAL SOCIETY] (2000a) *Dynamic Financial Analysis: performance and risk measures, using model results*, New York
- CAS [CASUALTY ACTUARIAL SOCIETY] (2000b) *Dynamic Financial Analysis: strategies*, New York, June.
- CAS [CASUALTY ACTUARIAL SOCIETY] (2001) *Survey on Enterprise Risk Management*, New York, July.
- CAS [CASUALTY ACTUARIAL SOCIETY] (2004) 'Fair Value of P&C Liabilities: Practical Implications'. New York
- CAS [CASUALTY ACTUARIAL SOCIETY] (2003) 'Overview of Enterprise Risk Management', in *The Casualty Actuarial Society Forum*, pp. 99-164
- CASSELL, C., & SYMON, G. (1994) *Qualitative Methods in Organizational Research: A Practical Guide*, Sage Publications.
- CASTRIES, H. (2005) 'Capital Adequacy and Risk Management in Insurance'. *The Geneva Papers on Risk and Insurance: Issues and Practice*, **30**(2): 47-51.
- CEA [COMITE EUROPEEN DES ASSURANCES] (2005) *Solvency II: building blocks for the Solvency II project*, May. Accessed on [www.cea.assur.org/](http://www.cea.assur.org/)
- CEA & CROF [COMITE EUROPEEN DES ASSURANCES AND CHIEF RISK OFFICER FORUM] (2006) *Solution to major issues for Solvency II*, February. Accessed on [www.cea.assur.org/](http://www.cea.assur.org/)
- CHAFFEE, E. E. (1985) 'Three Models of Strategy'. *Academy of Management Review*, **10**(1): 89-98.
- CHAKRAVARTHY, B. S. (1986) 'Measuring Strategic Performance'. *Strategic Management Journal*, **7**(5): 437-458.
- CHAPMAN, C., & WARD, S. (2003) *Project Risk Management: Processes, Techniques and Insights*, Chichester: John Wiley & Sons, Ltd.
- CHATTERJEE, S., WISEMAN, R. M., FIEGENBAUM, A., & DEVERS, C. E. (2003) *Integrating Behavioural and Economic Concepts of Risk into*

- Strategic Management: the Twain Shall Meet. *Long Range Planning*, **36**(1): 61-79.
- CHECKLAND, P. (1981) *System thinking, system practice*, Chichester: Wiley.
- CHICKEN, J. C., & POSNER, T. (1998) *The Philosophy of Risk*, London: Thomas Telford Publishing.
- CHORAFAS, D. N. (2004) 'Operational Risk Control Business Opportunity and Challenges for the Insurance Industry'. *The Geneva Papers on Risk and Insurance Issues & Practice*, **29**(1): 87-101.
- CLARKE, C., & VARMA, S. (1999) 'Strategic risk management: the new competitive edge'. *Long Range Planning*, **32**(4): 414-424.
- CLEMONS, E. K. (1995) 'Using Scenario Analysis to Manage the Strategic Risks of Reengineering'. *Sloan Management Review*, **36**(4): 61-71.
- CLOSE, D. B. (1974) 'An Organization Behaviour Approach to Risk Management'. *The Journal of Risk and Insurance*, **41**(3): 435-450.
- COCHRAN, P. L., & WOOD, R. A. (1984) 'Corporate Social Responsibility and Financial Performance'. *The Academy of Management Journal*, **27**(1): 42-56.
- CONNOR, R. A. (1996) 'More than risk reduction: The investment appeal of insurance'. *Journal of Economic Psychology* **17**(1): 39-54.
- COOK, T. D., & REICHARDT, C. T. (1979) *Qualitative and Quantitative Methods in Evaluation Research*, Sage Publications.
- COOL, T. (2000) 'Proper definitions for uncertainty and risk', in *Definition & Reality in the General Theory of Political Economy*, Gophser Publishers, pp. 300
- COOL, T. (2001) 'Proper definitions for risk and uncertainty'. Unpublished article. Accessed on [www.dataweb.nl/cool/Risk/ProperRisk.pdf](http://www.dataweb.nl/cool/Risk/ProperRisk.pdf)
- COOMBER, J. R. (2006) 'Natural and Large Catastrophes - Changing Risk Characteristics and Challenges for the Insurance Industry'. *The Geneva Papers on Risk and Insurance: Issues & Practice*, **31**(1): 88-95.
- COPELAND, T., KOLLER, T., & MURRIN, J. (2000a) 'Valuing Insurance Companies'. *Balance Sheet*, **8**(6): 36-46.
- COPELAND, T., WILEY, J., KOLLER, T., & MURRIN, J. (2000b) *Valuation: Measuring and Managing the Value of Companies*, McKinsey & Company, Inc.
- COPEMAN, S. (2003) The challenging role of the risk manager, Strategic Risk Roundtable Proceeding.
- CORBIN, J. M., & STRAUSS, A. (1990) 'Grounded theory research: Procedures, canons, and evaluative criteria'. *Qualitative Sociology*, **13**(1): 3-21.
- CORPORATE EXECUTIVE BOARD (2002) 'The New Basel Capital Accord', Financial Services Industry Council, April. Accessed on [www.financialservicesindustryCouncil.com](http://www.financialservicesindustryCouncil.com)
- COVELLO, V. T., WINTERFELDT, D., & SOLVIC, P., (1986) 'Risk Communication: a review of the literature'. *Risk Abstracts*, **3**(4): 173.
- COWLEY, A., & CUMMINS, J. D. (2005) 'Securitization of life insurance assets and liabilities'. *The Journal of Risk and Insurance*, **72**(2): 193-226.



- CRESWELL, J. W. (2003) *Research design: qualitative, quantitative, and mixed methods*, Sage Publication.
- CROCKFORD, G. N. (1976) 'The Changing face of Risk Management'. *The Geneva Papers on Risk and Insurance: Issues and Practice*, 1(2): 10-15.
- CULP, C. L. (2001) *The Risk Management Process: business strategy and tactics*, New York: John Wiley & Sons, Inc.
- CULP, C. L. (2002) 'The Revolution in Corporate Risk Management: A Decade in Innovations in Process and Products'. *Journal of Applied Corporate Finance*, 14(4): 8-26.
- CULP, C. L. (2003) 'The Modigliani-Miller Propositions', in FIELD, P. (Eds) *Modern Risk Management*, London: Risk Books, pp. 93-105
- CULP, C. L. (2005) 'Alternative Risk Transfer', in FRENKEL, M., HOMMEL, U., & RUDOLF, M. (Eds) *Risk Management: challenges and opportunities*, Berlin: Springer, pp. 369-389
- CULP, C. L., MILLER, M. H., & NEVES, A. M. P. (1998) 'Value at Risk: Uses and Abuses'. *Journal of Applied Corporate Finance*, 10(4): 26-38
- CUMMING, C. M., & HIRTLE, B. J. (2001) 'The Challenges of Risk Management in Diversified Financial Companies', *FRBNY Economic Policy Review*, 1, March, pp. 1-17.
- CUMMINS, D. J. & OUTREVILLE, J. F. (1987) 'An International Analysis of Underwriting Cycles in Property-Liability Insurance'. *Journal of Risk and Insurance*, 54(2): 246-252.
- CUMMINS, J. D. (1976) 'Risk Management and the Theory of the Firm'. *The Journal of Risk and Insurance*, 43(4): 587-609
- CUMMINS, J. D. (2000) 'Allocation of Capital in the Insurance Industry'. *Risk Management and Insurance Review*, Issue 3, pp 7-28.
- CUMMINS, J. D. (2003) Organizational structure and efficiency, Paper presented in the 30<sup>th</sup> Seminar of European Group and Insurance Economist, Geneva.
- CUMMINS, J. D., & LAMM-TENNANT, J. (1994) 'Capital Structure and the Cost of Capital in the Property-Casualty Insurance Industry'. *Insurance: Mathematics and Economics*, 15(2-3): 187-201.
- CUMMINS, J. D., & PHILLIPS, R. D. (2005) 'Estimating the cost of equity capital for property-liability insurers'. *Journal of Risk & Insurance*, 72(3): 359-520.
- CUMMINS, J. D., & SOMMER, D. W. (1996) 'Capital and risk in property-liability insurance markets'. *Journal of Banking & Finance*, 20(6): 1069-1092.
- CUMMINS, J. D., HARRINGTON, S. E. & KLEIN, R. W. (1991) 'Cycles and Crises in Property-Casualty Insurance: Causes and Implications for Public Policy'. *Journal of Insurance Regulation*, 10(Fall): 50-93.
- CUMMINS, J. D., HARRINGTON, S. E., & KLEIN, R. (1995) 'Insolvency experience, risk-based capital, and prompt corrective action in property-liability insurance'. *Journal of Banking & Finance*, 19(3-4): 511-527.
- CUMMINS, J. D., PHILLIPS, R. D., & SMITH, S. D. (Ed.) (1999) *Financial Risk Management in the Insurance Industry*, Boston, Kluwer Academic Publishers.

- CUMMINS, J. D., PHILLIPS, R. D., & SMITH, S. D. (2001) 'Derivatives and Corporate Risk Management: Participation and Volume Decisions in the Insurance Industry'. *The Journal of Risk and Insurance*, **68**(1): 51-91
- CUMMINS, J. D., and WEISS, M. A. (2000) The Global Market for Reinsurance: Consolidation, Capacity, and Efficiency. IN LITAN, R. E., and SANTOMERO, A. M. (Ed.) *Brookings - Wharton papers on Financial Services*.
- D'ARCY, S. D. (2001) 'Enterprise Risk Management'. *Journal of Risk Management of Korea*, **12**(1): 207-228.
- D'ARCY, S. P., & GORVETT, R. W. (2004) 'The use of Dynamic Financial Analysis to determine whether an optimal growth rates exists for a property-liability insurer'. *The Journal of Risk and Insurance*, **71**(4): 583-615.
- D'ARCY, S. P., & Garven, J. R. (1990) 'Property-Liability Insurance Pricing Models: An Empirical Evaluation'. *Journal of Risk and Insurance*, **57**(3): 391-419.
- DALTON, D. R., & KESNER, I. F. (1985) 'Organizational performance as an antecedent of inside/outside chief executive succession: an empirical assessment'. *Academy of Management Journal*, **28**(4): 749-762.
- DAMARY, R. (1976) 'A Survey of the Practice of Risk Management in West Europe Companies'. *The Geneva Papers on Risk and Insurance: Issues and Practice*, **1**(2): 27-42.
- DANIELSSON, J. (2002) 'The emperor has no cloths: Limits to risk modelling'. *Journal of Banking & Finance*, **26**(7):1273-1296.
- DANIELSSON, J., & VRIES, C. G. (2000) 'Value-at-Risk and Extreme Results', in EMBRECHTS, P. (Eds) *Extremes and Integrated Risk Management*, Risk Books.
- DARLAP, P., & MAYR, B. (2006) 'Group Aspects of Regulatory Reform in the Insurance Sector'. *Geneva Paper on Risk and Insurance: Issues & Practice*, **31**(1): 96-123.
- DARLAP, P., & MAYRA, B. (2006) 'Group Aspects of Regulatory Reform in the Insurance Sector'. *Geneva Paper on Risk and Insurance: Issues & Practice*, **31**(1): 96-123.
- DAVENPORT, E., & BRADLEY, M. (2000) *Enterprise Risk Management: a consultative perspective*. Casualty Actuarial Society, Discussion Paper Program on Insurance in the Next Century.
- DAVIES, D. (2002) 'Risk Management -Protecting Reputation', *Computer Law & Security Report*, **6**, pp. 414-420.
- DAVIS, G. (2002) Scenarios and Enterprise Risk Management, New York, Speech in the The Conference Board, October.
- DAVIS, R. C. (1958) 'A Philosophy of Management'. *The Journal of Insurance* **25**(3): 1-7.
- DEARLOVE, D. (2003) Rising Power of the Chief Risk Officer, The Times, 30 April.
- DELOACH, J. W. (2000) *Enterprise-wide Risk Management*, London: Arthur Andersen.

- DEMAULT, M. (2001) 'Coherent Allocation of Risk Capital'. *The Journal of Risk*, 4(1). Accessed on [www.thejournalofrisk.com](http://www.thejournalofrisk.com)
- DENENBERG, H. S., & FERRARI, J. R. (1966) 'New Perspectives on Risk Management: The Search for Principles'. *The Journal of Risk and Insurance*, 33(4): 647-661.
- DENZIN, N. K., & LINCOLN, Y. S. (2000) *The Handbook of Qualitative Research*, Sage Publications.
- DESISTA, A. (2001) 'Comments on Stephen Ross's Paper on "Financial Regulation for the New Millennium'. *The Geneva Papers on Risk and Insurance*, 26(1): 17-18.
- DEWING, I. P., & RUSSELL, P. O. (2006) 'Corporate Governance – Regulation and Reform: the actuarial governance of UK life insurers'. *Corporate Governance: An International Review*, 14(3): 172-180.
- DIACON, S., O'BRIEN, C. & BLAKE, A. (2005) *The Economic Value of General Insurance*. Association of British Insurers, Accessed on [www.abi.org.uk/generalinsurance](http://www.abi.org.uk/generalinsurance),
- DICKINSON, G. (1975) 'Concepts of probability and risk', in CARTER, R. L., & DOHERTY, N. A. (Eds) *Handbook of Risk Management* London: Kluwer Publishing, pp. 2.4-7 (01-24)
- DICKINSON, G. (1997a) 'Integrating Insurance and Hedging Decisions into the Overall Risk Management of the Firm'. *Singapore International Insurance and Actuarial Journal*, 1 (inaugural issue): 161-173.
- DICKINSON, G. (2001a) 'Comments on Stephen Ross's Paper on "Financial Regulation for the New Millennium". *The Geneva Papers on Risk and Insurance*, 26(1): 19-22.
- DICKINSON, G. (2001b) 'Enterprise Risk Management: Its Origins and Conceptual Foundation'. *Geneva Papers on Risk and Insurance: Issues and Practice*, 26(3): 360-366.
- Dickinson, G. (2001c) 'Insurance finds a blend of innovation and tradition', In Pickford, J. (Ed), *Mastering Risk: Concepts*, London: Pearson Education Limited, pp. 195-201
- DICKINSON, G. (2003) 'The Search for an International Accounting Standard for Insurance: Report to the Accountancy Task Force of the Geneva Association'. *The Geneva Papers on Risk and Insurance*, 28(2): 151-175.
- DICKINSON, G. (2005a) 'The evolution of enterprise risk management', in TAPLIN, R. (Eds) *Risk Management and Innovation in Japan, Britain and the USA*, Routledge, pp. 150-161
- DICKINSON, G. (2005b) Solvency II: Challenging issues for the insurance industry, Conference Presentation. Milan, ANIA, Macros Risk Management and the Geneva Association
- DICKINSON, G., DINENIS, E., & SIOKIS, V. (2001c) 'Rethinking the Solvency Margin System in Europe'. *Journal of Insurance Research and Practice*, 16(1): 34-46.
- DICKINSON, G. M. (1997c) 'Some Issues in Risk-Based Capital'. *The Geneva Papers on Risk and Insurance*, 22(82): 76-85.

- DICKSON, G. (1982) 'A Comparison of Attitudes Towards Risks Among Business Managers'. *The Geneva Papers on Risk and Insurance: Issues & Practice*, Issue No. 23
- DINGFU, W. (2006) 'New Market, New Regulation and New Prospect - The Chinese Perspective'. *Geneva Paper on Risk and Insurance: Issues & Practice*, **31**(1): 17-24.
- DOBSON, P. J. (1999) 'Approaches to Theory Use in Interpretive Case Studies - a Critical Realist Perspective'. Unpublished article. Accessed on [www.vuw.ac.nz/acis99/Papers/PaperDobson-075.pdf](http://www.vuw.ac.nz/acis99/Papers/PaperDobson-075.pdf)
- DOHERTY, N. A. (1985) *Corporate Risk Management* New York: McGraw Hill.
- DOHERTY, N. A. (2000) *Integrated Risk Management: techniques and strategies for reducing risk*, New York: The McGraw-Hill Companies.
- DOHERTY, N. A., & SMITH JR., C. W. (1993) 'Corporate Insurance Strategy: The Case of British Petroleum'. *Journal of Applied Corporate Finance*, **6**(3): 4-15.
- DOHERTY, N. A., AND SMETTERS, K. (2005) 'Moral Hazard in Reinsurance Markets'. *Journal of Risk and Insurance*, **72**(3): 375-391.
- DOHERTY, N. A., & Graven, J. R. (1992) 'Insurance Cycles: Interest Rates and the Capacity Constraint Model'. *Journal of Business*, **68**: 383-404.
- DOUGLAS, M. (Ed.) (1986) *Risk Acceptability According to the Social Sciences*, Russell Sage Foundation.
- DOUGLAS, M. (1992) *Risk and Blame; Essays in Cultural Theory* Routledge Publisher.
- DOUGLAS, M., & WILDAVSKY, A. (1982) *Risk and Culture: An Essay on the Selection of Technical and Environmental Dangers*, Berkeley: University of California Press.
- DRENNAN, L. T., & BECK, M. (2001) 'Corporate Governance: a mandate for risk management?' *Risk Management Reports*.
- DREW, S. A., KELLEY, P. C., & KENDRICK, T. (2006) 'CLASS: Five elements of corporate governance to manage strategic risk'. *Business Horizons*, **49**(2): 127-138.
- DRUCKER, P. F. (1974) *Management: Tasks, Responsibilities, Practices*, London: William Heinemann Ltd.
- DRZIK, J. (2005a) 'At the crossroad of change Risk and Capital Management in the Insurance Industry'. *The Geneva Papers on Risk and Insurance: Issues and Practice*, **30**(2): 72-87
- DRZIK, J. (2005b) 'New Directions in Risk Management'. *Journal of Financial Econometrics*, **3**(1): 26-36.
- DUFFY, M. E. (1987) 'Methodological triangulation: a vehicle for merging quantitative and qualitative methods'. *Image*, **19**(3): 130-133.
- EASTERBY-SMITH, M., & THORPE, R. (2002) *Management Research: An Introduction*, Sage Publications Ltd.
- Economic Business Risk (2005) Taking Risk on Board: How global business leaders' view risk. Accessed on [www.lloyds.com/NR](http://www.lloyds.com/NR)
- EISENHARDT, K. M. (1989) 'Building Theories from Case Study Research'. *The Academy of Management Review*, **14**(4): 532-550.

- ELSTER, J. (1998) 'Emotions and Economic Theory'. *Journal of Economic Literature*, **36**(1): 47-74.
- MULVEY, J. M., & ERKAN, H. G. (2003) 'Risk Management of a P/C Insurance Company Scenario Generation, Simulation and Optimization', In CHICK, S., SANCHEZ, P. J., FERRIN, D., & MORRICE, D. J. (Eds). *Proceedings of the Conference Presentation*, 1: 364-371. Accessed on [www.ieeexplore.ieee.org](http://www.ieeexplore.ieee.org)
- ERNST&YOUNG (2004) *A Brave New World: Risk Measurement and Capital Management in the Insurance Industry*, Ernst & Young,
- ESSERT, H. (2002) 'Risk and Enterprise Value'. *Geneva Papers on Risk and Insurance: Issues & Practice*, **27**(3): 435-443.
- ESTRELLA, A. (2000) 'Regulatory Capital and the Supervision of Financial Institutions: Some Basic Distinctions and Policy Choices', in ANTHONY SANTOMERO, S., VIOTTI, S., & VREDIN, A. (Eds) *Challenges for Modern Central Banking*, Boston: Kluwer Academic Publishers, pp.
- EU SOLVENCY SUBCOMMITTEE (2001) *Banking rules: relevance for the insurance sector?* Brussels, EU Insurance Solvency Subcommittee, June. Accessed on [www.ec.europa.eu/Internal\\_Market/insurance](http://www.ec.europa.eu/Internal_Market/insurance)
- EUROPEAN COMMISSION DG INTERNAL MARKET (2002) *Risk Models for Insurance Companies or Groups*. European Commission, MARKT/C2/OFD(2002),
- FATEMI, A., & LUFT, C. (2002) 'Corporate risk management Costs and benefits'. *Global Finance Journal*, **13**(1): 29-38.
- FAYOL, H. (1916) *General and Industrial Administration*, Sir I. Pitman & Sons, Ltd, p. 84
- FEAGIN, J., ORUM, A., & SJOBERG, G. (Ed.) (1991) *A case for case study*, Chapel Hill, NC, University of North Carolina Press.
- FELDBLUM, S. (1989) 'Asset Liability Matching for Property/Casualty Insurers'. *Casualty Actuarial Society Discussion Paper Program*, Valuation Issues: 117-154.
- FIEGENBAUM, A., & THOMAS, H. (1988) 'Attitudes toward Risk and the Risk-Return Paradox: Prospect Theory Explanations'. *The Academy of Management Journal*, **13**(1): 85-106.
- FIELD, P. (Ed.) (2003) *Modern Risk Management: A History*, London, Risk Books.
- FILIPOVIC, D., ROST, D. (2005) *Benchmarking Study of Internal Models*, Munich, CRO Forum of Geneva Association, April. Accessed on [www.math.lmu.de/](http://www.math.lmu.de/)
- FISHBURN, P. C. (1984) 'Foundation of Risk Measurement. Risk as a probable loss'. *Management Science*, **30**(4): 396-406.
- FOCARELLI, D., & SAVINO, C. (2006) 'The impact of New Regulations: an ANIA Survey', *PROGRES Newsletter of Geneva Association*, Issue No. 43, June, pp. 4-11.
- FOOT, M. (2002) 'Operational risk management for financial institutions'. *Journal of Financial Regulation and Compliance*, **10**(4): 313-316.

- FORBES, S. W. (1987) 'Life Insurance Financial Management Issues'. *The Journal of Risk and Insurance*, **54**(3): 603-613.
- FRAME, J. D. (2003) *Managing risk in organizations: a guide for managers*, San Francisco: Jossey-Bass.
- FRC [FINANCIAL REPORTING COUNCIL] (2005) Internal Control: Revised Guidance for Directors on the Combined Code, October. Accessed on [www.frc.org.uk/corporate](http://www.frc.org.uk/corporate)
- FREEMAN, A. (2000) 'The future of risk - insurance and capital markets converge', in ALEXANDER, P. C. (Eds) *Visions of Risk*, London: Persons Education Limited, pp. 30-42
- FRIEDMAN, M., & SAVAGE, L. J. (1948) 'The Utility Analysis of Choices Involving Risk'. *The Journal of Political Economy*, **56**(4): 279-304.
- FROOT, K. A., & STEIN, J. C. (1998) 'Risk management, capital budgeting, and capital structure policy for financial institutions: an integrated approach'. *Journal of Financial Economics*, **47**(1): 55-82.
- FROOT, K. A., SCHARFSTEIN, D. S., & STEIN, J. C. (1993) 'Risk Management: Coordinating Corporate Investment and Financing Policies'. *The Journal of Finance*, **48**(5): 1629-1658.
- FSA [FINANCIAL SERVICES AUTHORITY] (2003) Review of UK insurers' risk management practices, London,
- FSA [FINANCIAL SERVICES AUTHORITY] (2005) Operational risk management Practices: feedback from a thematic review, London, February.
- FUNG, H. G., LAI, G. C., PATTERSON, G. C. & WITT, R. C. (1998) 'Underwriting Cycles in Property and Liability Insurance: An Empirical Analysis of Industry and By-Line Data'. *The Journal of Risk and Insurance*, **65**(4): 539-562.
- GALLOWAY, D., & FUNSTON, R. (2000) 'The Challenges of Enterprise Risk Management'. *Balance Sheet*, **8**(6): 22-25.
- GAMBLE, A., & KELLY, G. (2001) 'Shareholder Value and the Stakeholder Debate in the UK'. *Corporate Governance: An International Review*, **9**(2): 110-117.
- GAMBLE, D. (2002) 'The role of the corporate risk manager is changing ', in SHIMELL, P. (Eds) *The universe of risk: how top business leaders control risk and achieve success*, Essex: Pearson Education Limited, pp. 77-83
- GART, A., NYE, D. J., HARRISON, C. M., GIBBONS, R. J., & SCOLES, K. N. (1994) *Insurance Company Finance and Investment*, Pennsylvania: Insurance Institute of America.
- GARVEN, J. R. (1987) 'On the Application of Finance Theory to the Insurance Firm'. *Journal of Financial Services Research*, **1**(1): 57-76.
- GARVEN, J. R., AND LAMM-TENNANT, J. (2003) 'The Demand for Reinsurance: Theory and Empirical Tests'. *Insurance and Risk Management* **7**(3): 217-238.
- GEORGE, A. L., & BENNETT, A. (2005) *Case Studies and Theory Development in the Social Sciences*, The MIT Press.

- GIARINI, O. (1999) 'A Comment on Peter Bernstein's "Against the Gods: The Remarkable Story of Risk"'. *The Geneva Papers on Risk and Insurance*, 24(2): 140-144.
- GILL, J., & JOHNSON, P. (2002) *Research Methods for Managers* Sage Publications Ltd.
- GLASER, B., & STRAUSS, A. (1967) *Discovery of Grounded Theory: The Strategies for Qualitative Research*, New York: Aldine de Gruyter.
- GLASER, B. G. (1994) *Basics of Grounded Theory analysis: Emergence versus forcing*, Mill Valley: CA: Sociology Press.
- GOULDING, C. (1998) 'Grounded theory: the mission methodology on the interpretivist agenda'. *Qualitative Market Research: An International Journal*, 1(1): 50-57.
- GRACE, M. F., & HOTCHKISS, J. L. (1995) 'External Impacts on Property-Liability Insurance Cycle'. *Journal of Risk and Insurance*, Issue No. 62, pp. 738-754.
- GRAY, E. R., & BALMER, J. M. T. (1998) 'Managing Corporate Image and Corporate Reputation'. *Long Range Planning* 31(5): 695-702.
- GRAY, J. H., & DENSTEN, I. L. (2005) 'Towards an Integrative Model of Organizational Culture and Knowledge Management'. *International Journal of Organizational Behaviour*, 9(2): 594-603.
- GREEN, B., & HOWCROFT, J. B. (Ed.) (2000) *Risk Behaviour and Risk Management in Business Life*, Dordrecht, Boston, London, Kluwer Academic Publishers.
- GREEN, M. R. (1975) 'The scientific method in decision making', in CARTER, R. L., & DOHERTY, N. A. (Eds) *Handbook of Risk Management*, London: Kluwer Publishing, pp. 2.1.1 (01-03)
- GROENEWALD, T. (2004) 'A Phenomenological Research Design Illustrated'. *International Journal of Qualitative Methods*, 3(1). Accessed on [www.ualberta.ca](http://www.ualberta.ca)
- GRON, A. (1994) 'Capacity Constraints and Cycles in Property-Casualty Insurance Markets'. *Rand Journal of Economics*, 25(1): 110-127.
- GROSE, V. L. (1987) *Managing Risk: Systematic Loss Prevention for Executives*, Prentice Hall
- GRUNDL, H., & SCHMEISER, H. (2002) 'Risk Adjusted Performance Measurement and Capital Allocation in Insurance Firms'. Unpublished article. Accessed on [www.huebnergeneva.org/documents](http://www.huebnergeneva.org/documents)
- GRUNING, J. E. (1979) 'A New Measure of Public Opinions on Corporate Social Responsibility'. *The Academy of Management Journal*, 22(4): 738-764.
- GUBA, E. G. (1990) *The Paradigm Dialogue*, Sage Publications.
- HAIMES, Y. Y. (2006) On the Definition of Vulnerabilities in Measuring Risks to Infrastructures. *Risk Analysis*, 26, 293-296.
- HALLER, M. (1978) 'New Dimensions of Risk: Consequences for Management'. *The Geneva Papers on Risk and Insurance: Issues & Practice*, Issue 7: 3-15.

- HAMBRICK, D. C., & SCHECTER, S. M. (1983) 'Turnaround Strategies for Mature Industrial-product Business Units'. *Academy of Management Journal*, **26**(2): 231-248.
- HANCOCK, J., HUBER, P., & KOCH, P. (2001) 'Value Creating in the Insurance Industry'. *Risk Management & Insurance Review*, **4**(2): 1-9.
- HARDY, C. (1924) *Readings in Risk and Risk Bearing*, Chicago: University of Chicago Press.
- HARRINGTON, S., & NIEHAUS, G. (2003) 'United Grain Growers: Enterprise Risk Management and Weather Risk'. *Risk Management and Insurance Review*, **6**(2): 193-217.
- HARRINGTON, S. G., NIEHAUS, G., & RISKO, K. (2002) 'Enterprise Risk Management: the case of United Grain Gowers'. *Journal of Applied Corporate Finance*, **14**(4): 71-81.
- HAUSLER, G. (2005) 'Risk Transfer and the Insurance Industry'. *The Geneva Papers on Risk and Insurance: Issues & Practice*, **30**(1): 121-127.
- HAYNES, J. (1895) 'Risk as an Economic Factor'. *The Quarterly Journal of Economics*, **IX**(4): 409-449.
- HEDRICK, T. E., BICKMAN, L., & ROG, D. J. (1993) *Applied Research Design: A practical guide*, Sage Publications Ltd.
- HELE, J., & BROEKHOVEN, H. (2006) Chief Risk Officer Forum Principles for Regulatory Admissibility of Internal Models, March.
- HELLIAR, C., LONIE, A., POWER, D., SINCLAIR, D. (2001) *Attitudes of UK Managers to Risk and Uncertainty*, Institute of Chartered Accountants of Scotland.
- HENDERSON, H. (1978) 'Risk, Uncertainty and Economic Futures'. *The Geneva Papers on Risk and Insurance: Issues & Practice*, Issue 9: 3-17.
- HERR, K., & ANDERSON, G. L. (2005) *The Action Research Dissertation: A Guide for Students and Faculty*, Sage Publications Ltd.
- HERSHEY, J. C., & SCHOEMAKER, P.L J. H. (1980) 'Risk Taking and Problem Context in the Domain of Losses: An Expected Utility Analysis'. *Journal of Risk and Insurance*, **47**(1): 111-132.
- HILB, M. (2005) 'New corporate governance: from good guidelines to great practice'. *Corporate Governance: An International Review*, **13**(5): 596-581.
- HILLSON, D., & MURRAY, R. (2005) *Understanding and Managing Risk Attitude*, Cornwall Gower Publishing Limited.
- HOFFMAN, D. G. (2002) *Managing Operational Risk: 20 firm wide best practice strategies*, New York: John Wiley & Sons, Inc.
- HOLTON, G. A. (2004a) 'Defining Risk'. *Financial Analysis Journal*, **60**(6): 19-25.
- HOLTON, G. A. (2004b) 'A new position on risk'. *Contingency Analysis*, 1-3.
- HOMMEL, U. (2005) 'Value-based motives for corporate risk management', in FRENKEL, M., HOMMEL, U., & RUDOLF, M. (Eds) *Risk Management: challenges and opportunities*, Berlin: Springer, pp. 455-478
- HONOUR, D. (2004) 'Business continuity on a limited budget'. *Continuity Central: the journal of the Business Continuity Institute*, **10**(1): 12.
- HOOD, C. (1996) 'Control Over Bureaucracy: Cultural Theory and Institutional Variety'. *Journal of Public Policy*, **15**(3): 207-230.



- HOPKIN, P. (2002) *Holistic Risk Management in Practice*, London: Witherby & Co. Ltd.
- HORLICK-JONES, T., & ROSENHEAD, J. (2002) 'Investigating Risk, Organizations and Decision Support through Action Research'. *Risk Management: An International Journal*, Issue 4:45-63.
- HORLICK-JONES, T., ROSENHEAD, J., GEORGIU, I., RAVETZD, J., & LÖFSTEDTE, R. (2001) 'Decision support for organizational risk management by problem structuring'. *Health, Risk & Society*, 3(2): 141-165.
- HUOVINEN, T. (1999) *Strategic Risk Management*, London: Risk and Insurance Research Group,
- HUSSEY, J., & HUSSEY, R. (1996) *Business Research: A Practical Guide for Undergraduate and Postgraduate Students*, Palgrave Macmillan.
- HUTTER, B., & POWER, M. (2001) 'Risk Management and Business Regulation', in PICKFORD, J. (Eds) *Mastering Risk: Concepts*, London: Financial Times Prentice Hall, pp. 165-168
- IAIS [INTERNATIONAL ASSOCIATION OF INSURANCE SUPERVISORS] (2003) Insurance Core Principle and Methodology, October. Accessed on [www.iaisweb.org](http://www.iaisweb.org)
- IAIS [INTERNATIONAL ASSOCIATION OF INSURANCE SUPERVISORS] (2005) Towards a common structure and common standards for the assessment of insurer solvency: cornerstones for the formulation of regulatory financial requirements, October. Accessed on [www.iaisweb.org](http://www.iaisweb.org)
- INGRAM, D., SANTORI, L., & PUCCIA, M. (Analysts) (2005) *Insurance Criteria: Evaluating The Enterprise Risk Management Practices of Insurance Companies*, Standards & Poors.
- INGRAM, D., SANTORI, L., PUCCIA, M., & JONES, R. (Analysts) (2006a) 'Insurance Criteria: Refining the focus of insurers Enterprise Risk Management Criteria', Standard & Poors, June. Accessed on [www.standardpoors.com](http://www.standardpoors.com)
- INGRAM, D., SANTORI, L., PUCCIA, M., & JONES, R. (Analysts) (2006b) 'Six months after rollout, Enterprise Risk Management of 78 major insurers evaluated', Standard & Poors, May. Accessed on [www.standardpoors.com](http://www.standardpoors.com)
- INGRAM, D. N. (2006) Standard & Poor's Enterprise Risk Management Evaluation of Insurers Schaumburg, March.
- IQBAL, M. (2005) 'Effective Decision Making in a life Company'. *British Actuarial Journal*, 11(1): 133-166.
- ITTNER, C. D., LARCKER, D. F., & RANDALL, T. (2003) 'Performance implications of strategic performance measurement in financial services firms'. *Accounting, Organizations and Society*, 28(7-8): 715-741.
- JAMES, H. (1968) 'New Perspectives on Risk Management: Comments'. *The Journal of Risk and Insurance*, 35(4): 607-610.
- JICK, T. D. (1979) 'Mixing Qualitative and Quantitative Methods: Triangulation in Action'. *Administrative Science Quarterly*, 24(4): 602-611.
- JOBSON, J. D., & KORKIE, B. (1982) 'Potential performance and tests of portfolio efficiency'. *Journal of Financial Economics*, 10(4): 433-466

- JOHNSON, J. E. V. (1975a) 'Perception, heuristics, biases: their effect on risk management', in CARTER, R. L., & DOHERTY, N. A. (Eds) *Handbook of risk management*, London: Kluwer Publishing, pp. 5.9 (01-28)
- JOHNSON, J. E. V. (1975b) 'The application of utility analysis to risk management', in CARTER, R. L., & DOHERTY, N. A. (Eds) *Handbook of risk management*, London: Kluwer Publishing, pp. 5.10 (01-19)
- JOHNSON, J. E. V. (1975c) 'Subjective judgments in risk measurement', in CARTER, R. L., & DOHERTY, N. A. (Eds) *Handbook of Risk Management* London: Kluwer Publishing, pp. 5.6 (01-25)
- JORION, P. (2000) *Value at Risk: the new benchmark for managing financial risk*, McGraw Hill.
- KAEN, F. R. (2005) 'Risk Management, Corporate Governance, and the Public Corporation', in FRENKEL, M., HOMMEL, U., & RUDOLF, M. (Eds) *Risk Management: challenges and opportunities*, Berlin: Springer, pp. 423-436
- KAHNEMAN, D., & TVERSKY, A. (1979) 'Prospect Theory: An Analysis of Decision under Risk'. *Econometrica*, **47**(2): 263-292.
- KAHNEMAN, D., & TVERSKY, A. (1992) 'Advances in Prospect Theory: Cumulative Representation of Uncertainty'. *Journal of Risk and Uncertainty*, **5**(4): 297-323.
- KALECKI, M. (1937) 'The Principle of Increasing Risk'. *Economica*, **4**(16): 440-447.
- KAPLAN, R., & NORTON, D. P. (2004a) *Strategy Maps: Converting Intangible Assets into Tangible Outcomes*, Harvard Business School Press.
- KAPLAN, R. S., & NAGEL, M. E. (2004b) 'Improving Corporate Governance with the Balanced Scorecard'. *Harvard Business School Working Papers*, No. 04-044. Accessed on [www.hbs.edu/research/facpubs/workingpapers](http://www.hbs.edu/research/facpubs/workingpapers)
- KAPLAN, R. S., NORTON, D. P., & LOWES, A. (1996) *Balanced Scorecard: Translating Strategy into Action*, Harvard Business School Press.
- KAPLANSKI, G., & KROLL, Y. (2002) 'VAR risk measures vs. traditional risk measures: an analysis and survey'. *Journal of Risk*, **4**(2): 1-25.
- KAUFMANN, R., GADMER, A., & KLETT, R. (2001) 'Introduction of Dynamic Financial Analysis'. Unpublished Work, April, Accessed on [www.ifor.math.ethz.ch/publications](http://www.ifor.math.ethz.ch/publications)
- KAYE, P. (2005) A guide to risk measurement, capital allocation and related decision support issues, Benfield ReMetrics, May.
- KIELHOLZ, W. (2000) 'The Cost of Capital for Insurance Companies'. *The Geneva Papers on Risk and Insurance*, **25**(1): 4-24.
- KIELHOLZ, W. B., & NEBEL, R. (2005) 'Improving Regulatory Governance'. *The Geneva Papers on Risk and Insurance: Issues & Practice*, **30**(1): 34-42.
- KLEFFNER, A. E., LEE, R. B., & MCGANNON, B. (2003) 'The Effect of Corporate Governance on the Use of Enterprise Risk Management: Evidence From Canada'. *Risk Management & Insurance Review*, **6**(1): 53-73.
- KLEINDORFER, P. R. (2004) Perspectives on Enterprise Risk Management, Workshop presentation in the National Research Council of the National Academics, Washington.

- KLOMAN, F. (2003a) 'Using scenarios'. *Risk Management Reports*, **30**(4), April
- KLOMAN, F. (2003b) 'Enterprise Risk Management: Past, present and future', *Risk Management Reports*, **30**(5), May.
- KLOMAN, H. F. (1992) 'Rethinking Risk Management'. *The Geneva Papers on Risk and Insurance: Issues and Practice*, Issue No. 64, pp. 3-15.
- KLOMAN, H. F. (2005) *Mumpsimus Revisited: Essays on Risk Management*, Seawrack Press, Inc.
- KNIGHT, F. H. (1921) *Risk, Uncertainty, and Profit*, Boston: Houghton Mifflin Company.
- KNOBLOCH, A. P. (2005) 'Value at Risk: regulatory and other applications, methods, and criticism', in FRENKEL, M., HOMMEL, U., & RUDOLF, M. (Eds) *Risk management: challenges and opportunity*, Berlin: Springer, pp. 99-124
- KNOX, J. (2006) 'The first CRO assembly - Creating Risk Culture', *Risk Management Newsletter of Geneva Association*, Issue No. 39, May, pp. 18-21
- KORN FERRY INTERNATIONAL & OLIVER WYMAN AND COMPANY (2002) 'The Evolving Roles of the Chief Financial Officer and the Chief Risk Officer', Survey, November.
- KORSVOLD, A. (2000) 'Capital Management and the Cost of Capital for the Insurance Industry'. *The Geneva Papers on Risk and Insurance: Issues and Practice*, **25**(1): 34-37
- KPMG (2001) Understanding Enterprise Risk Management: An Emerging Model for Building Shareholder Value, *KPMG LLP*. Accessed on [www.kpmg.com.au/aci/docs](http://www.kpmg.com.au/aci/docs)
- KPMG (2002) Study into the methodologies to assess the overall financial position of an insurance undertaking from the perspective of prudential supervision, European Commission, May. Accessed on <http://intranet.icea.es/Documentos>
- KPMG (2004) Risk and Capital Management for Insurers, November.
- KRVAVYCH, Y., & SHERRIS, M. (2006) 'Enhancing insurer value through reinsurance optimization'. *Insurance: Mathematics and Economics*, **38**(3): 495-517.
- KUHN, T. S. (1970) *The Structures of Scientific Revolutions*, Chicago: The University of Chicago Press.
- KULIK, J. (2003) 'Capital application applications in the insurance industry', in FAURE, J. (Eds) *Capital Allocation: A necessity for the insurance industry*, Group Strategy & Development Department, SCOR, pp. 34-41
- KUNREUTHER, H. C., SANDERSON, W., & VETSCHERA, R. (1985) 'A behavioral model of the adoption of protective activities'. *Journal of Economic Behavior and Organization*, **6**(1): 1-15.
- KUNZLER, S., & PAYNE, A. (2004) 'The New Face of Enterprise Risk', *Risk Management Magazine*, June.
- KUPIECA, P., & NICKERSON, D. (2005) 'Insurers are not Banks: Assessing Liquidity, Efficiency and Solvency Risk Under Alternative Approaches to

- Capital Adequacy'. *Geneva Paper on Risk and Insurance: Issues & Practice*, **30**(3): 498-521.
- LAKER, J. F. (2005) Operational Risk Management: A Prudential Perspective, Sydney, Australian Prudential Regulation Authority. Accessed on [www.apra.gov.au](http://www.apra.gov.au)
- LAM, J. (2000) 'Enterprise-wide risk management and the role of the chief risk officer'. *Erisk Magazine*, Accessed on [www.erisk.com](http://www.erisk.com)
- LAM, J. (2001) 'CRO: Here to Stay', *Risk Management Magazine*, April.
- LAM, J. (2002) 'The use of economic capital in ERM and Risk Transfer', *8, Risk Management*, August.
- LAM, J. (2003) *Enterprise Risk Management: from Incentives to Controls*, John Wiley & Sons Inc.
- LAMM-TENNANT, J., & WEISS, M. A. (1997) 'International Insurance Cycles: Rational Expectations/Institutional Intervention'. *The Journal of Risk and Insurance*, **64**(3): 415-439.
- LAMM-TENNANT, J. (1999) 'Enterprise Risk and Capital Management', *SOA Reinsurance Section News*, 45, March, pp. 1,5-12.
- LAMSER, I., HELLAND, E. (2000) 'How the chief risk officer is taking centre stage'. *Balance Sheet*, **8**(6): 26-28.
- LANGE, P. E., FLETEN, S-E., & GAIVORONSKI, A. A. (2004) 'Modeling financial reinsurance in the casualty insurance business via stochastic programming'. *Journal of Economic Dynamics and Control*, **28**(5): 991-1012.
- LAUX, C. (2005) 'Integrating corporate risk management', in FRENKEL, M., HOMMEL, U., & RUDOLF, M. (Eds) *Risk Management: challenges and opportunities*, Berlin: Springer, pp. 335-453
- LAWS, K., & MCLEOD, R. (2006) 'Case Study and Grounded Theory: Sharing some alternative qualitative research methodologies with systems professionals'. *Unpublished Work*, Accessed on [www.systemdynamics.org](http://www.systemdynamics.org)
- LEE, C. R., & SHIMPI, P. (2005) 'The Chief Risk Officer: What Does It look Like and How Do You Get There?' *Risk Management Magazine*, **52**(9), September. Accessed on [www.rmmag.com](http://www.rmmag.com)
- LEWIS, M., FROST, A., TAYLOR, N. (2002) Topics in Actuarial and Corporate Governance The Staple Inn Actuarial Society, November, Accessed on [www.sias.org.uk/data/papers/Governance](http://www.sias.org.uk/data/papers/Governance)
- LEWIS, R. E. (1998) 'Capital from an Insurance Company Perspective'. *FRBNY Economic Policy Review*, **4**(33): 183-185.
- LIEBENBERG, A., & HOYT, R. (2003) 'The Determinants of Enterprise Risk Management: Evidence From the Appointment of Chief Risk Officers'. *Risk Management & Insurance Review*, **6**(1): 37-52.
- LIEBWEIN, P. (2005) Risk and Capital. Some thoughts on risk modelling in insurance companies, Swiss Re Technical Publishing. Accessed on [www.swissre.com](http://www.swissre.com)
- LIN, A. C. (1998) 'Bridging Positivist and Interpretivist Approaches to Qualitative Methods'. *Policy Studies Journal*, **26**(1): 162-180.
- LINCOLN, Y. S., & GUBA, E. G. (1985) *Naturalistic Inquiry*, Sage Publications.

- LINDGREN, M., & BANDHOLD, H. (2003) *Scenario Planning: the link between future and strategy*, London: Palgrave Macmillan.
- LINSMEIER, T. J., & PEARSON, N. D. (2000) 'Value at Risk'. *Financial Analysts Journal* **56**(2): 47-67.
- LINTNER, J. (1965a) 'The Valuation of Risk Assets and the Selection of Risky Investments in Stock Portfolios and Capital Budgets'. *The Review of Economics and Statistics*, **47**(1): 13-37.
- LINTNER, J. (1965b) 'Security prices, risk, and maximal gain from diversification'. *The Journal of Finance*, **20**(4): 587-625.
- LISA, M. (2002) 'The Promise and Challenge of Integrated Risk Management'. *Risk Management & Insurance Review*, **5**(1): 55-66.
- LITTLER, K., AISTHORPE, P., HUDSON, R., & KEASEY, K. (2000) 'A new approach to linking strategy formulation and strategy implementation: an example from the UK banking sector'. *International Journal of Information Management* **20**(6): 411-428.
- LLEWELLYN, D. (1999) The Economic Rationale for Financial Regulation. *FSA Occasional Papers in Financial Regulation*, Series 1, April. Accessed on [www.fsa.gov.uk/pubs/occpapers](http://www.fsa.gov.uk/pubs/occpapers)
- LLOYD-JONES, G. (2003) 'Design and Control Issues in Qualitative Case Study Research'. *International Journal of Qualitative Methods*, **2**(2), June. Accessed on [www.ualberta.ca](http://www.ualberta.ca)
- LOCKE, K. D. (2001) *Grounded theory in Management Research*, Sage Publications Ltd.
- LOEWENSTEIN, G. F., WEBER, E. U., HSEE, C. K., & WELCH, N. (2001) 'Risk as feelings'. *Psychological Bulletin*, **127**(2): 267-286.
- LOHMANN, C., FORTUIN, L., & WOUTERS, M. (2004) 'Designing a performance measurement system: A case study'. *European Journal of Operational Research* **156**(2): 267-286.
- LONG, J. D. (1956) 'What Is Life Insurance?' **23**(1): 27-33.
- LOUISOT, J. P. (2003) 'What Makes an Effective Risk Manager?' *Risk Management Magazine*, **50**(6), June. Accessed on [www.rmmag.com](http://www.rmmag.com)
- MACGILL, S. M., & SIU, Y. L. (2005) 'A new paradigm for risk analysis'. *Futures*, **37**(10): 1105-1131
- MACGILL, S. M., & SIU, Y. L. (2004) 'The Nature of Risk'. *Journal of Risk Research*, **7**(3): 315-352.
- MACKAY, I., & SWEETING, R. (2000) 'Perspectives on Integrated Business Risk Management (BRM) and the Implications for Corporate Governance'. *Corporate Governance: An International Review*, **8**(4): 367-374.
- MACKENZIE, D. (2005) 'Mathematizing risks: models, arbitrage and crises', in HUTTER, B., & POWER, M. (Eds) *Organizational Encounters with Risk*, Cambridge: Cambridge University Press, pp. 167-189
- MACMINN, R. D. (1987) 'Insurance and corporate risk management'. *The Journal of Risk and Insurance*, **54**(4): 658-677
- MAHONEY, D. L., & PUNTER, A. (1999) 'Meeting the Challenges of the Changing Landscape of Risk: Implications for Insurance. In BRITTON, N. R. (Ed.), *The Changing Risk Landscape: Implications for Insurance Risk*

*Management*. Aon Group Australia. Sydney. Southwood Press. pp. 195-217

- MALTZ, A. C., SHENHAR, A. J., & REILLY, R. R. (2003) 'Beyond the Balanced Scorecard: Refining the Search for Organizational Success Measures'. *Long Range Planning*, **36**(2): 187-204.
- MARCH, J. G., SHAPIRA, Z. (1987) 'Managerial Perspectives on Risk and Risk Taking'. *Management Science*, **33**(11): 1404-1418.
- BEASLEY, M. S., CLUNEB, R., & HERMANSONB, D. R. (2005) 'Enterprise risk management: An empirical analysis of factors associated with the extent of implementation '. *Journal of Accounting and Public Policy*, **24**(6): 521-531
- MARKOWITZ, H. (1952) 'Portfolio Selection'. *The Journal of Finance*, **7**(1): 77-91
- MARSHALL, C., & ROSSMAN, G. B. (1995) *Designing Qualitative Research*, Thousand Oaks, CA: Sage Publications.
- MARSIGLIA, E., & FALAUTANO, I. (2005) 'Corporate Social Responsibility and Sustainability Challenges for a Bancassurance Company'. *The Geneva Papers on Risk and Insurance: Issues and Practice*, **30**(3): 485-497.
- MARTINIERE, G. D. L. (2003) 'The Complexity of Managing a Global Company: Regional exposure vs. global exposure'. *The Geneva Papers on Risk and Insurance: Issues & Practice*, **28**(1): 87-93.
- MARTINIERE, G. L. (2005) 'New International Accounting Standards and Insurance'. *The Geneva Papers on Risk and Insurance: Issues & Practice*, **30**(1): 108-113.
- MASUDA, J. R., & GARVIN, T. (2006) 'Place, Culture, and the Social Amplification of Risk '. *Risk Analysis*, **26**(2): 437-454.
- MAYER, L. (2005) 'Insurance and International Financial Reporting Standard'. *The Geneva Papers on Risk and Insurance: Issues and Practice*, **30**(1): 114-120.
- MAYERS, D., & SMITH, C. W. (1982) 'On the Corporate Demand for Insurance'. *Journal of Business*, **55**(2): 281-296.
- MAYERS, D., & SMITH, C. W. (2000) 'Organizational Forms Within the Insurance Industry: Theory and Evidence', in DIONNE, G. (Eds) *Handbook of Insurance*, Kluwer Academic Publishers: Boston MA, pp. 689-707
- MCCARTHY, C. (2006) Risk Based Regulation: The FSA's Experience, Financial Services Authority, 13 February.
- MCGOUN, E. G. (1995) 'The history of risk measurement'. *Critical Perspective on Accounting*, **6**(6): 511-532.
- MCGUIRE, J. B., SUNDGREN, A., & SCHNEEWEIS, T. (1988) 'Corporate Social Responsibility and Firm Financial Performance'. *The Academy of Management Journal*, **31**(4): 854-872.
- MEDINA, P. K., KRIETER, F., SCHRECKENBERG, S. (2003) 'Trends in Capital Adequacy'. *Risk*. Accessed on [www.swissre.com/INTERNET/pwswpspr.nsf/](http://www.swissre.com/INTERNET/pwswpspr.nsf/)

- MEER, R. V. D., SMINK, M. (1999) Discounted Downside Risk: The Time Dimension of Asset-Liability Management. *The Geneva Papers on Risk and Insurance*, 24, 182-188.
- MEHR, R. I., & HEDGES, B. A. (1958) 'New Perspectives on Risk Management: Further Comment'. *The Journal of Risk and Insurance*, 35(4): 615-623
- MEHR, R. I., & FORBES, S. W. (1973) 'The Risk Management Decision in the Total Business Setting'. *The Journal of Risk and Insurance*, 40(3): 389-401.
- MEHR, R. I., & HEDGES, B. A. (1963) *Risk Management in the Business Enterprise*, Homewood: IL: Richard D. Irwin, Inc.
- MEHR, R. I., & HEDGES, B. A. (1974) *Risk Management: Concepts and Applications*, McGraw-Hill Education.
- MELVILLE, R. (2003) 'The Contribution Internal Auditors Make to Strategic Management'. *International Journal of Auditing*, 7(3): 209-222.
- MENGLE, D. (2003) 'Risk management as a process', in FIELD, P. (Ed) *Modern Risk Management* London: Risk Books, pp. 3-10
- MERRIAM, S. B. (1997) *Qualitative Research and Case Study applications in education*, Jossey Bass Wiley.
- MERTON, R. C. (1973) 'An Intertemporal Capital Asset Pricing Model'. *Econometrica*, 41(5): 867-887
- MEULBROEK, L. K. (2002a) 'Integrated risk management for the firm: a senior manager's guide'. *Harvard Business School Working Papers No. 02-046*. Accessed on [www.hbs.edu/research/facpubs/workingpapers](http://www.hbs.edu/research/facpubs/workingpapers)
- MEULBROEK, L. K. (2002b) 'The Promise and Challenge of Integrated Risk Management'. *Risk Management & Insurance Review*, 5(1): 55-66.
- MEY, J. D. (2000) 'Comments on the Cost of Capital'. *The Geneva Papers on Risk and Insurance*, 25(1): 25-33
- MICCOLIS, J. (2002a) 'The Language of Enterprise Risk Management: A Practical Glossary and Discussion of Relevant Terms, Concepts, Models, and Measures', *Expert Commentary: International Risk Management Institute*, May, pp. 10.
- MICCOLIS, J. (2002b) 'Practical ERM Applications: Assessing Capital Adequacy'. *Expert Commentary*. Accessed on [www.irmi.com](http://www.irmi.com)
- MICCOLIS, J. (2003a) 'The Alchemy of Enterprise Risk Management: Examples from the Investment World', *IRMI*, December.
- MICCOLIS, J. (2003b) 'Implementing Enterprise Risk Management: Getting the Fundamentals Right', *International Risk Management Institute*, June, pp.
- MICCOLIS, J., & SHAH, S. (2001a) 'Modeling the Reality of Risk: The Cornerstone of Enterprise Risk Management'. *Expert Commentary*. Accessed on [www.irmi.com](http://www.irmi.com)
- MICCOLIS, J., & SHAH, S. (2001b) *Creating value through Enterprise Risk Management - A practical approach for the insurance industry*, Tillinghast-Towers Perrin.
- MICCOLIS, J., MUELLER, H., & GRUHL, R. (2000) *Enterprise Risk Management in the Insurance Industry: 2000 benchmarking survey report*, Tillinghast-Towers Perrin.

- MICCOLIS, J. A., HIVELY, K., & MERKLEY, B. W. (2001c) *Enterprise Risk Management: Trends and Emerging Practices*, The Institute of Internal Auditors Research Foundation.
- MICHAEL, M. S., MICHAEL, H., MATTHEW, C., & DOUG, F. (2002) *Embedded Value and Enterprise Risk Modelling*, Ernst & Young for American Council of Life Insurers, August.
- MICHAEL R. WILLIAMS, D. T. R. (2001) 'Enterprise Risk Management: Why Isn't It Catching On?', Illinois, Illinois State University.
- MICHAUD, R. O. (1989) 'The Markowitz Optimization Enigma: Is 'Optimized' Optimal?' *Financial Analysts Journal*, **45**(1): 31-42.
- MIKES, A. (2005) 'Enterprise Risk Management in action'. *Discussion Paper of ESRC Centre for Analysis of Risk and Regulation at the London School of Economics and Political Science*, No. 35. Accessed on [www.lse.ac.uk/collections/CARR/documents/discussionPapers.htm](http://www.lse.ac.uk/collections/CARR/documents/discussionPapers.htm)
- MILES, M. B., & HUBERMAN, A. M. (1994) *Qualitative Data Analysis: an Expanded Sourcebook*, Sage Publications.
- MILLER, D. C., & SALKIND, N. J. (2002) *Handbook of Research Design and Social Measurement*, Sage Publications Ltd.
- MILLER, G. A. (1956) 'The Magical Number Seven, Plus or Minus Two: Some Limits on Our Capacity for Processing Information'. *The Psychological Review*, **63**(2): 81-97.
- MILLER, K. D. (1992) 'A Framework for Integrated Risk Management in International Business'. *Journal of International Business Studies*, **3**(2): 311-331.
- MILLER, K. D. (1998a) 'Economic exposure and integrated risk management'. *Strategic management Journal*, **19**(5): 497-514.
- MILLER, K. D. (1998b) 'Economic exposure and integrated risk management'. *Strategic Management Journal*, **19**(5): 497-514.
- MILLER, K. D., AND WALLER, H. G. (2003) 'Scenarios, Real Options and Integrated Risk Management'. *Long Range Planning*, **36**(3): 93-107.
- MILLER, K. D. B., P. (1990) 'Strategic Risk and Corporate Performance: An Analysis of Alternative Risk Measures'. *The Academy of Management Journal*, **33**(4): 756-779.
- MINTZBERG, H. (1973) *The nature of managerial work*, New York: Harper and Row.
- MINTZBERG, H. (1979) 'An Emerging Strategy of "Direct" Research'. *Administrative Science Quarterly*, **24**(4): 582-589.
- MODIGLIANI, F. M., M. H. (1958) 'The Cost of Capital, Corporation Finance and the Theory of Investment'. *The American Economic Review*, **48**(3): 261-297.
- MOHRENWEISER, J., MURRY, A., & PATRINO, P. (Analysts) (2006a) 'Exposure Draft: Assessment of Insurers' In-House Economic Capital Models', Fitch Ratings, June. Accessed on [www.fitchratings.com/prism](http://www.fitchratings.com/prism)
- MOHRENWEISER, J., MURRY, A., & PATRINO, P. (Analysts) (2006b) 'Exposure Draft: Capital Assessment Methodology and Model', Fitch Ratings, June. Accessed on [www.fitchratings.com/prism](http://www.fitchratings.com/prism)



- Morgan Stanley Roundtable on Enterprise Risk Management and Corporate Strategy (2005), *Journal of Applied Corporate Finance*, Vol. 17, No. 3, pp. 32-61.
- MOSH, M. C. (2006) 'A. M. Best Comments on Enterprise Risk Management and Capital Models'. *A. M. Best Co. Special Report*, pp. 1-3.
- MOSSIN, J. (1966) 'Equilibrium in a Capital Asset Market'. *Econometrica* **34**(4): 768-783
- MUELLER, H., & SIBERON, J. (2004) 'Economic Capital in the limelight'. *Journal of Financial Regulation and Compliance*, **12**(4): 351-358.
- MULLER, A. (1999) Integrated Risk Management: a holistic risk management approach for the insurance industry, Munich,
- MYERS, S. C., & READ, J. A. (2001) 'Capital Allocation for Insurance Companies'. *The Journal of Risk and Insurance*, **68**(4): 545-580.
- NEBEL, R. (2004) 'Regulations as a Source of Systemic Risk: The Need for Economic Impact Analysis'. *The Geneva Papers on Risk and Insurance: Issues & Practice*, **29**(2): 273-283.
- NEEF, D. (2005) 'Managing corporate risk through better knowledge management'. *The Learning Organization*, **2**(2): 112-124.
- NEIL, M. F., N., & TAILOR, M. (2005) 'Using Bayesian Networks to Model Expected and Unexpected Operational Losses'. *Risk Analysis*, **25**(4): 963-972.
- NEUMANN, J. V., & MORGENSTERN, O. (1994) *Theory of Game and Economic Behaviour*, Princeton, Princeton University Press
- NIELSON, N. L., KLEFFNER, A. E., & LEE, R. B. (2005) 'The Evolution of the Role of Risk Communication in Effective Risk Management'. *Risk Management & Insurance Review*, **8**(2): 279-289.
- O'DONNELL, E. (2005) 'Enterprise risk management: A systems-thinking framework for the event identification phase'. *International Journal of Accounting Information Systems*, **6**(3): 177-195
- OECD (2003) *Assessing the Solvency of Insurance Companies*, Organization for economic cooperation and development OECD.
- O'HARA, B. M. (2006) 'Risk and Value: Changing Perceptions and Cultural Challenges for the Property and Casualty Industry'. *Geneva Paper on Risk and Insurance: Issues & Practice*, **31**(1): 83-87.
- OLSON, D. G., SIMKISS, J. A. (1982) 'An Overview of Risk Management'. *The Geneva Papers on Risk and Insurance: Issues & Practice*, No. 23, April
- OMRAN, M., ATRILL, P., & POINTON, J. (2002) 'Shareholders versus stakeholders: corporate mission statements and investor returns'. *Business Ethics: A European Review*, **11**(4): 318-326.
- ORTON, J. D. (1998) 'From inductive to interactive grounded theory: Zipping the gap between process theory and process data'. *Scandinavia Journal of Management* **13**(4): 419-438.
- OTLEY, D. (1999) 'Performance Management: a framework for management control systems research'. *Management Accounting Research* **10**(4): 363-382.

- OTWAY, H. (1992) 'Public, Wisdom, Expert Fallibility: Toward a Contextual Theory of Risk', in KRIMSKY, S., & GOLDING, D. (Eds) *Social Theories of Risk*, Westport: CT: Praeger Publishers, pp. 215-228
- PABLO, K., JOHN, H., & PAUL, H. (2001) *The Economics of Insurance: How insurers create value for shareholders*, Zurich, Swiss Re Technical Publishing Series,
- PANDIT, N. R. (1996) 'The creation of theory: a recent application of the grounded theory method'. *The Qualitative Report* 2(4), December. Accessed on [www.nova.edu/ssss/QR/QR2-4/pandit.html](http://www.nova.edu/ssss/QR/QR2-4/pandit.html)
- PARTY, S. W. (2002) Report on solvency working party: prepared for IAA insurance regulation committee, International Actuarial Association, February.
- PÁSTOR, L. (2000) 'Portfolio Selection and Asset Pricing Models'. *The Journal of Finance*, 55(1): 179-223.
- PATTON, M. Q. (2002) *Research & Evaluation Methods*, Sage Publications Ltd.
- PAUL-CHOWDHURY, S. (2001) 'Fitting Scenarios to Statistics'. *ERisk*.
- PEAKIN, S., GOHIL, H., & MURRAY, A. (2005) Solvency II – What is Happening?, Fitch Ratings. Europe Special Report, 5 April.
- PEARSON, N. D. (2003) 'Markowitz Mean-Variance Portfolio Theory', in FIELD, P. (Eds) *Modern Risk Management*, Navarra: Risks Books, pp. 45-55
- PEIRCE, F. M. (1961) 'The responsibility of the insurance industry'. *The Journal of Insurance*, 28(1): 45-51.
- PENDER, S. (2001) 'Managing incomplete knowledge: Why risk management is not sufficient'. *International Journal of Project Management*, 19(2): 79-87.
- PERRIN, T.-T. (2000) *Enterprise Risk Management: An Analytical Approach*,
- PETRONI, A. (2000) 'The organization of risk management at FIAT'. *Technology, Law and Insurance*, 5(3-4): 193-198.
- PFEFFER, I. (1956) *Insurance and Economic Theory*, Illinois: Richard D. Irwin, Inc.
- PHILLIPS, E., & PUGH, D. S. (2005) *How to Get a PhD: A Handbook for Students and Their Supervisors*, Open University Press.
- PIORE, M. J. (1979) 'Qualitative Research Techniques in Economics'. *Administrative Science Quarterly*, 24(4): 560-569.
- PIXLEY, J. (2002) 'Emotions and Economics', in BARBALET, J. (Eds) *Emotions and Sociology*, Oxford: Blackwell Publishing/The Sociological Review, pp. 69-89
- PLANTIN, G. (2006) 'Does Reinsurance Need Reinsurers?' *The Journal of Risk and Insurance*, 73(1): 153-168.
- POUNTNEY, B., & CROCKFORD, G. N. (Ed.) (2000) *Handbook of risk management* London, Kluwer Publishing.
- POWER, M. (2004a) 'Enterprise Risk Management and the organization of uncertainty in financial institutions', in CETINA-KNORR, K., & PREDA, A. (Eds) *The Sociology of Financial Markets*, Oxford: Oxford University Press, pp. 250-268
- POWER, M. (2004b) *Risk Management for Everything: Rethinking the politics of uncertainty*, London: Demos.

- POWER, M. (2005a) 'The invention of operational risk'. *Review of International Political Economy*, **12**(4): 577-599.
- POWER, M. (2005b) 'Organizational responses to risk: the rise of the chief risk officer', in HUTTER, B., & POWER, M. (Eds) *Organizational Encounters with Risk*, Cambridge: Cambridge University Press, pp. 132-148.
- PRESSMAN, R. (2006) 'Our World'. *The Geneva Papers on Risk and Insurance: Issues and Practice*, **31**(1): 38-45.
- PUNTER, A. (2000) 'The Changing Economics of Non-Life Insurance: New Solutions for the Financing of Risk', *White Paper*, AON Group Limited, March,
- PUNTER, A. (2002) 'Reinventing Re/Insurance for the Twenty-First Century'. *The Geneva Papers on Risk and Insurance: Issues & Practice*, **27**(1): 102-112.
- PRAHALAD, C. K. (1994) 'Corporate Governance or Corporate Value Added?: Rethinking the Primacy of Shareholder Value'. *Journal of Applied Corporate Finance*, **6**(4): 40-50.
- PRESSMAN, R. (2006) 'Our World'. *The Geneva Papers on Risk and Insurance: Issues and Practice*, **31**(1): 38-45.
- PWC [Price Waterhouse Coopers] (2003) 'IFRS and Solvency II Perfect marriage or double Whammy'.
- RABIN, M. (1998) 'Psychology and Economics'. *Journal of Economic Literature*, **36**(1): 11-46.
- RANDALL, D., & ERTEL, C. (2005) 'Moving Beyond the Official Future', *Mastering Risk: Financial Times*
- RAPPAPORT, A. (1997) *Creating Shareholder Value: A Guide for Managers and Investors*, New York: The Free Press.
- RAULY, D. D. D. (2000) *Extremes and Integrated Risk Management*, UBS Warburg.
- RAWLS, S. W., & SMITHSON, C. W. (1990) 'Strategic Risk Management'. *Journal of Applied Corporate Finance*, **2**(4): 6-18.
- RAYNER, J. (Ed.) (2003) *Business Risk Management*, London, GEE Publishing Ltd.
- REAVIS, M. W. (1969) 'The Corporate Risk Manager's Contribution to Profit'. *The Journal of Risk and Insurance*, **34**(4): 473-479.
- RECH, J. E., & YAN, R. (1999) *Scenario issues for dynamic financial analysis*, New York, Casualty Actuarial Society.
- RENN, O. (1992) 'Concepts of Risk: A Classification', in KRIMSKY, S., & GOLDING, D. (Eds) *Social Theories of Risk*, Westport: CT: Praeger Publishers, pp. 53-79
- RENN, O. (1998) 'The role of risk perception for risk management'. *Reliability Engineering & System Safety*, **59**(1): 49-62.
- RENN, O. (2003) 'Acrylamide: Lessons for Risk Management and Communication'. *Journal of Health Communication*, **8**(5): 435-441.
- RENN, O. (2004) 'Perception of Risks'. *The Geneva Papers on Risk and Insurance Issues & Practice*, **29**(1): 102-114.
- RENNIE, R. A. (1961) 'The Measurement of Risk'. *The Journal of Insurance* **28**(1): 83-91

- REPPAPORT, A. (1997) *Creating Shareholder Value : A Guide for Managers and Investors*, New York: The Free Press.
- RICH, V. (2002) 'Risk Managers Tap the Reinsurance Market', *Risk Management*, March
- RICHARD BARFIELD, A. P. (2002) Economic Capital: at the heart of managing risk and value, New York, PriceWaterHouseCoopers & EIU, Jan-Feb.
- RIPPL, S. (2002) 'Cultural theory and risk perception: a proposal for a better measurement'. *Journal of Risk Research*, **5**(2): 147–165.
- ROSEN, D., & ZENIOS, S. A. (2002) 'Enterprise-wide Asset and Liability Management: Issues, Institutions, and Models', Working Paper No. 01-18. HERMES Centre on Computational Finance & Economics, University of Cyprus. Accessed on [www.hermes.ucy.ac.cy/publications](http://www.hermes.ucy.ac.cy/publications)
- ROSS, S. A. (2001) 'Financial Regulation in the New Millennium'. *The Geneva Papers on Risk and Insurance*, **26**(1): 8-16.
- ROSSUM, A. (2005) 'Regulation and Insurance Economics' *The Geneva Papers on Risk and Insurance Issues & Practice*, **30**(1): 43-46.
- ROTH, W. D., & MEHTS, J. D. (2002) 'The Rashomon Effect: Combining Positivist and Interpretivist Approaches in the Analysis of Contested Events'. *Sociological Methods & Research*, **31**(2): 131-173.
- ROTTMAN, D. L. (1971) 'Corporate Risk Manager's Contribution to Profit: Comment'. *The Journal of Risk and Insurance*, **38**(2): 299-302.
- RUEFLI, T. W., COLLINS, J. M., & LACUGNA, J. R. (1999) 'Risk measures in strategic management research: Auld Lang Syne?' *Strategic Management Journal*, **20**(2): 167 - 194.
- RYAN, A. (1970) *The Philosophy of the Social Sciences*, The Macmillan Press Ltd.
- SAIDENBERG, M., SCHUERMANN, T. (2003) 'The New Basel Capital Accord and Questions for Research'. Discussion Paper No. 03-14. *Wharton Financial Institutions Centre*. Accessed on <http://fic.wharton.upenn.edu/fic/papers>
- SAMANTA, P. (2005) 'The Rationale For Assessing Risk Based On An Enterprise Risk Management Framework', *RatingsDirect (Standard & Poors)*
- SANTOMERO, A. M., & BABEL, D. F. (1997) 'Financial Risk Management by Insurers: An Analysis of the Process'. *The Journal of Risk and Insurance*, **64**(2): 231-270.
- SARENS, G., BEELDE, I. D. (2006) 'Internal auditors' perception about their role in risk management: A comparison between US and Belgian companies'. *Managerial Auditing Journal*, **21**(1): 63-80.
- SAUNDERS, M. N. K., LEWIS, P., & THORNHILL, A. (2002) *Research Methods for Business Students*, FT Prentice Hall.
- SAYAN, C., WISEMAN, R. M., FIEGENBAUM, A., & DEVERS, C. E. (2003) 'Integrating Behavioral and Economic Concepts of Risk into Strategic Management: the Twain Shall Meet'. *Long Range Planning*, **36**(1): 61-79.
- SCANDIZZO, S. (2005) 'Risk Mapping and Key Risk Indicators in Operational Risk Management'. *Economic Notes*, **34**(2): 231-256.

- SCHANTE, D., & CAUDET, L. (2005) 'Insurers and their multidisciplinary regulatory landscape', *The Geneva Papers on Risk and Insurance: Issues & Practice*, **30**(2): 19-28.
- SCHANZ, K.-U. (2004) 'Issue Management in (Re)insurance: An Emerging Strategic Challenge'. *The Geneva Papers on Risk and Insurance: Issues & Practice*, **29**(2): 334-341.
- SCHIRO, J. J. (2005) 'Successful Risk & Capital Management'. *The Geneva Papers on Risk and Insurance: Issues & Practice*, **30**(1): 60-64.
- SCHIRO, J. J. (2006) 'External Forces Impacting the Insurance Industry: Threats from Regulation'. *Geneva Paper on Risk and Insurance: Issues & Practice*, **31**(1): 25-30.
- SCHMEISER, H. (2004) 'New Risk-Based Capital Standards in the European Union: A Proposal Based on Empirical Data'. *Risk Management and Insurance Review*, **7**(1): 1-91.
- SCHOEMAKER, P. J. H. (1995) 'Scenario Planning: A Tool for Strategic Thinking'. *Sloan Management Review*, **36**(2): 25-40.
- SCHOEMAKER, P. J. H., & KUNREUTHER H.C. (1979) 'An experimental study of insurance decisions. *Journal of Risk and Insurance*'. *Journal of Risk and Insurance*, **46**(4): 603-618.
- SCHWAMM, H. (2005) 'Reputation Risk: The biggest risk banks and insurance companies face today', *The Geneva Association Risk Management Newsletter*, 38, November, pp. 5-7.
- SCOR (2003) 'Capital Allocation: A Necessity for the Insurance Industry', *Focus*, July, pp. 68.
- SEARBY, S. (2003) 'Dynamic Financial Analysis and Rating Agency Models: Room for Both', *RatingsDirect*,
- SELIM, G., & MCNAMEE, D. (1999a) 'Risk Management and Internal Auditing: What are the Essential Building Blocks for a Successful Paradigm Change?' *International Journal of Auditing*, **3**(2): 147-155.
- SELIM, G., & MCNAMEE, D. (1999b) 'The Risk Management and Internal Auditing Relationship: Developing and Validating a Model'. *International Journal of Auditing*, **3**(3): 159-174.
- SERIO, G. V. (2006) 'External Forces Shaping the Future of the Insurance Industry'. *Geneva Paper on Risk and Insurance: Issues & Practice*, **31**(1): 31-37.
- SHAH, S. (2003) 'Measuring Operational Risk using Fuzzy Logic modelling', *IRMI Expert Commentary*, 72, September.
- SHAPIRO, A. C., AND TITMAN, S. (1986) 'An Integrated approach to corporate risk management', in STERN, J. M., & Chew, D. H. (Eds) *The revolution in corporate finance*, Oxford: Blackwell, pp. 215-229
- SHARPE, W. F. (1964) 'Capital Asset Prices: A Theory of Market Equilibrium under Conditions of Risk'. *Journal of Finance*, **19**(3): 425-442
- SHARPE, W. F. (1965) 'Risk-Aversion in the Stock Market: Some Empirical Evidence'. *The Journal of Finance*, **20**(3): 416-422.
- SHAW, M. E. (2002) *ERM and Operational Risks*, New York, Society of Actuaries,

- SHERRIS, M. (2004) 'Solvency, capital allocation and fair rate of return in insurance'. *Working Paper, University of New South Wales*. Accessed on [www.actuary.unsw.edu.au](http://www.actuary.unsw.edu.au)
- SHILLER, R. J. (2003) *The new financial order: risk in the 21st century*, New York: Princeton University Press.
- SHIMPI, P. (2002) 'Integrating Risk Management and Capital Management'. *Journal of Applied Corporate Finance*, **14**(4): 27-40.
- SHIMPI, P. A. (2001) *Integrating Corporate Risk Management*, TEXERE, New York
- SHIMPI, P. A. (2005) 'From compliance to value', *Financial Executive*, Towers Perrin, July/August.
- SHIMPI, P. A. (2006) 'Katrina: a lesson in risk management ', *Emphasis: A Tillinghast Tower publication*
- SILVERMAN, D. (2001) *Interpreting Qualitative Data: Methods for Analyzing Talk, Text and Interaction*, Sage Publications Ltd.
- SIMON, A., SHARMA, P., & WILLIAM, M. (2003) *Lessons about Risk: Analyzing the Casual Chain of Insurance Company Failure*, London: Financial Services Authority.
- SITKIN, S. B., PABLO, A. L. (1992) 'Reconceptualizing the Determinants of Risk Behavior'. *The Academy of Management Review*, **17**(1): 9-38.
- SKIPPER, H. D. (2005) 'Why Do They Dislike Us?' *The Geneva Association Newsletter – Insurance Economics*, **52**, pp. 1-3.
- SLOVIC, P., FINUCANE, M., PETERS, E., & MACGREGOR, D. G. (2004) 'Risk as Analysis and Risk as Feelings: Some Thoughts about Affect, Reason, Risk, and Rationality'. *Risk Analysis*, **24**(2): 311-322.
- SLOVIC, P. (1972) 'Psychological Study of Human Judgment: Implications for Investment Decision Making'. *The Journal of Finance*, **27**(4): 779-799.
- SMITH, C. W. (1993) 'Corporate Risk Management and the Insurance Industry', in CUMMINS, D. (Eds) *Life Insurance Company Financial Management*, Kluwer Academic Publishers, pp. 125-149
- SMITH, C. W., & STULZ, R. M. (1985) 'The Determinants of Firms' Hedging Policies '. *The Journal of Financial and Quantitative Analysis* **20**(4): 391-405
- SMITH, A., & EXLEY, J. (2003a) The cost of capital for financial firms. Unpublished Work. Accessed on [www.actuaries.org.uk/files/pdf/proceedings](http://www.actuaries.org.uk/files/pdf/proceedings)
- SMITH, L., TOSSANI, L. S. (2003b) Applications of Advanced Science in the New Era of Risk Modeling, Georgia, Casualty Actuarial Society,
- SMITH, N., CEBULLA, A., COX, L., & DAVIS, A. (2006) 'Risk Perception and the Presentation of Self: Reflections from Fieldwork on Risk'. *Forum: Qualitative Social Research*, **7**(1). Accessed on [www.qualitative-research.net/fqs-texte](http://www.qualitative-research.net/fqs-texte)
- SMITH, R. (2003c) 'Audit committees combined code guidance '. *Financial Reporting Council*, 1-52.

- SPIRA, L. F., & PAGE, M. (2003) 'Risk management: The reinvention of internal control and the changing role of internal audit'. *Accounting, Auditing & Accountability Journal*, 16(4): 640-661.
- STAHEL, W. R. (2004) 'The Role of a Chief Risk Officer, or CRO', *Risk Management Newsletter of Geneva Association*, Issue No. 36, November, pp. 1-3.
- STAHEL, W. R. (Ed.) (2005a) *The Art of CROs Networks*, *The Geneva Association Newsletter – Risk Management*, Issue No. 38, November, pp. 10-12.
- STAHEL, W. R. (2005b) 'Chief Risk Officers and their role', *The Geneva Association Newsletter – Risk Management*, Issue No. 38, November, pp. 1-4.
- STAKE, R. E. (1995) *The Art of Case Study Research*, Sage Publications.
- STANDARD & POORS (2006) 'Insurance Criteria: Refining the focus of insurer Enterprise Risk Management criteria'. *RatingDirect*.
- STANGE, S. M. (1990) *Audit Education and Phenomenological Research*, Krieger Publishing Company.
- STEBBINS, R., A. (2001) *Exploratory Research in the Social Sciences* Sage Publications, Inc.
- STEPHEN, F., TOM, B., STEPHEN M, GERRY, B., & JEREMY, B. (2001) *Enterprise Risk Management in the Life Insurance Industry*, Life Office Management Association (LOMA).
- STIRLING, A. (1998) 'Risk at a turning point?' *Journal of Risk Research*, 1(2): 97-109.
- STRAUSS, A., & CORBIN, J. (1999) *Basics of qualitative research: Grounded Theory procedures and techniques*, Newbury Park, CA: Sage Publications.
- STRETEGY ONE (2006) *Swiss Re Corporate Risk Survey*, Zurich.
- STRONGIN, S., & PETSCH, M. (1999) 'Creating Shareholder Value: turning risk management into a competitive advantage'. *The Journal of Risk Finance*, Fall, pp. 11-22
- STULZ, R. M. (1984) 'Optimal Hedging Policies' *Journal of Financial and Quantitative Analysis*, 19(2): 127-140.
- STULZ, R. M. (1996) 'Rethinking Risk Management'. *Journal of Applied Corporate Finance*, 9(3): 8-15.
- SUTTON, S. G. (2006) 'Extended-enterprise systems' impact on enterprise risk management'. *Journal of Enterprise Information Management*, 19(1): 97-114.
- SWISS RE (1999) *From risk to capital: an insurance perspective*, A Swiss Re Publication. Accessed on [www.Swissre.com](http://www.Swissre.com)
- SWISS RE (2004) 'The impact of IFRS on the insurance industry', *Sigma No. 4*. Swiss Re Publication. Accessed on [www.swissre.com](http://www.swissre.com)
- SWISS RE (2005) 'Insurers' cost of capital and economic value creation: principles and practical implications'. *Sigma No. 3*. Swiss Re Publication. Accessed on [www.swissre.com](http://www.swissre.com)

- SWISS RE (2006a) *Solvency II: an integrated risk approach for European Insurers*. *Sigma No. 4*. Swiss Re Publication. Accessed on [www.swissre.com](http://www.swissre.com)
- SWISS RE (2006b) 'Measuring underwriting profitability of the non-life insurance industry', *Sigma No. 3*, Swiss Re Publication. Accessed on [www.swissre.com](http://www.swissre.com)
- SZKODA, S. T., & CRIP, F. F. (1995) *Dynamic Financial Analysis in the P/C Insurance Companies Handbook*, Casualty Actuarial Society,
- TAYLOR-GOOBY, P., & ZINN, J. O. (2006) 'Current Directions in Risk Research: New Developments in Psychology and Sociology'. *Risk Analysis*, **26**(2): 397-411.
- TCHANKOVA, L. (2002) 'Risk identification – basic stage in risk management'. *Environmental Management and Health* **13**(3): 290 - 297
- TELLIS, W. (1997a) 'Application of a Case Study Methodology'. *The Qualitative Report*, **3**(3), September. Accessed on [www.nova.edu/ssss/QR](http://www.nova.edu/ssss/QR)
- TELLIS, W. (1997b) 'Introduction to Case Study'. *The Qualitative Report* **3**(2). Accessed on [www.nova.edu/ssss/QR](http://www.nova.edu/ssss/QR)
- TENNYSON, S. (1991) 'The Effect of Rate Regulation on Underwriting Cycles'. *CPCU Journal*, **44**(1): 33-45.
- THE BUSINESS ROUNDTABLE (2005) *Principle of Corporate Governance*, November. Accessed on [www.businessroundtable.org/pdf/CorporateGovPrinciples.pdf](http://www.businessroundtable.org/pdf/CorporateGovPrinciples.pdf)
- THILLINGHAST TOWERS PERRIN (2004) *Adding Value Through Risk and Capital Management*. Accessed on [www.towersperrin.com/tp](http://www.towersperrin.com/tp)
- THOMPSON, K. M., & BLOOM, D. L. (2000) 'Communication of risk assessment information to risk managers'. *The Journal of Risk Research*, **3**(4): 333-352.
- TOWERS PERRIN (2006) 'Insurers, ERM and Rating Agencies', UPDATE, July. Accessed on [www.towersperrin.com/tp](http://www.towersperrin.com/tp)
- TRAINAR, P. (2006) 'The Challenge of Solvency Reform for European Insurers'. *The Geneva Papers on Risk and Insurance: Issues and Practice*, **31**(1): 169-185.
- TRIPP, M. H., BRADLEY, H. L., DEVITT, R., ORROS, G. C., OVERTON, G. L., PRYOR, L. M., AND SHAW, R. A. (Ed.) (2004) *Quantifying operational risk in general insurance companies*, London, Institute of Actuaries.
- TSANAKAS, A. & Barnett, C. (2003) 'Risk capital allocation and cooperative pricing of insurance liabilities'. *Insurance: Mathematics and Economics*, **32**(2): 239-254.
- TUFANO, P. (1996) 'Who Manages Risk? An Empirical Examination of Risk Management Practices in the Gold Mining Industry'. *The Journal of Finance*, **51**(4): 1097-1137.
- TURNER, J. (2006) *Solvency II - The way forward*, London, Financial Services Authority, 6th April.
- TVERSKY, A. (1975) 'A critique of expected utility theory: Descriptive and normative considerations'. *Erkenntnis*, **9**(2): 163-173.



- TYSON, K. (1995) *New Foundations for scientific social and behavioral research: the heuristic paradigm*, MA: Macmillan USA.
- ULLBERG, E., RODRIGUEZ, E., & STORMBY, N. (2002) 'Risk Management: From Portfolio Strategy to Value-creation Systems Strategy'. *The Geneva Papers on Risk and Insurance*, **27**(3): 467-476.
- VALDEZ, E. A., & CHERNIH, A. (2003) 'Wang's capital allocation formula for elliptically contoured distributions'. *Insurance: Mathematics and Economics*, **33**(3): 517-532.
- VALSAMAKIS, A. C., VIVIAN, R. W., & TOIT, G. S. (2002) *Risk Management: Strategy, Theory and Practice*, London: Risk and Insurance Research Group.
- VAUS, D. (2001) *Research Design in Social Research*, Sage Publications Ltd.
- VEEN-DIRKS, P. V., & WIJN, M. (2002) 'Strategic Control: Meshing Critical Success Factors with the Balanced Scorecard'. *Long Range Planning*, **35**(4): 407-427.
- VERBRUGGE, J. (2003) 'University of Georgia Roundtable on Enterprise-wide Risk Management'. *Journal of Applied Corporate Finance*, **15**(4): 8-26.
- VERDUZCO, M. A. (2006) 'New Markets - New Regulation: The Latin-American Experience'. *Geneva Paper on Risk and Insurance: Issues & Practice*, **31**(1): 1-10.
- VERSCHOOR, C. C. (2005) 'Sarbanes-Oxley section 404 needs modification'. *Strategic Finance*, **86**(9): 17-18.
- WADE, J. (2003) 'Corporate Social Responsibility: opportunities and risks', in JOLLY, A. (Eds) *Managing Business Risk*, London: Kogan Page Limited, pp. 98-104
- WALKER, P. L., SHENKIR, W. G., & BARTON, T. L. (2002) *Making Enterprise Risk Management Pay Off*, Prentice Hall PTR.
- WANG, S. (2002) A set of new methods and tools for enterprise risk capital management and portfolio optimization, Casualty Actuarial Society,
- WANG, S. (2004) 'ERM: Myth vs. Reality'. *The Actuarial Review*, **13**(2): 9-10.
- WARD, S. (2001) 'Exploring the Role of the Corporate Risk Manager'. *Risk Management: An International Journal*, **3**(1): 7-25.
- WARD, S. (2003a) 'Approaches to Integrated Risk Management - a multi-dimensional framework'. *Risk Management - an international Journal*, **5**(4): 7-23.
- WARD, S., & CHAPMAN, C. (2003b) 'Transforming project risk management into project uncertainty management'. *International Journal of Project Management*, **21**(2): 97-105.
- WARTICK, S. L., & COCHRAN, P. L. (1985) 'The Evolution of the Corporate Social Performance Model'. *The Academy of Management Review*, **10**(4): 758-769.
- WILKINSON, A., & EIDINOW, E. (2003a) 'A brief introduction to building and using scenarios'. *Journal of Risk Research*, **6**(4-6): 295-296.
- WILKINSON, A., & ELAHI, S., & EIDINOW, E. (2003b) 'Riskworld scenarios'. *Journal of Risk Research*, **6**(4-6): 297-334.

- WILLCOXSON, L., & MILLETT, B. (2000) 'The Management of Organizational Culture. *Australian Journal of Management and Organizational Behaviour*, 3(2): 91-99.
- WILLETT, A. H. (1901) *The Economic Theory of Risk and Insurance*, Columbia University Press.
- WILLIAMS, J. B. (1938) *The Theory of Investment Value*, Cambridge, MA.: Harvard University Press.
- WILLIAMSJR., S., M. L., & YOUNG, P. C. (1998) *Risk Management and Insurance*, McGraw-Hill College.
- WILMOT., & PAISH, T. (1999) 'Need for Risk Management by Governments: A Challenge for the 21st Century'. *The Geneva Papers on Risk and Insurance*, 24(3): 383-396.
- WILSON, W. C. (1981) 'The Underwriting Cycle and Investment Income'. *CPCU Journal*, Vol. 34, pp. 225-232
- WISEMAN, R. M., & BROMILEY, P. (1996) 'Toward a Model of Risk in Declining Organizations: An Empirical Examination of Risk, Performance and Decline'. *Organization Science*, 7(5): 524-543.
- WOOD, O. G. J. (1964) 'Evolution of the concept of risk'. *The Journal of Risk and Insurance*, 31(1): 83-91.
- YIN, R. K. (1992) 'The Case Study Method as a Tool for Doing Evaluation'. *Current Sociology*, 40(1): 139-165.
- YIN, R. K. (2002a) *Applications of Case Study Research*, Sage Publications Ltd.
- YIN, R. K. (2002b) *Case Study Research: Design and Methods*, Sage Publications Ltd.
- YOUNG, P. C., & TIPPINS, S. C. (2000) *Managing Business Risk: An Organization-Wide Approach to Risk Management*, New York: American Management Association.
- ZANJANI, G. (2002) 'Pricing and capital allocation in catastrophe insurance'. *Journal of Financial Economics*, 65(2): 283-305.
- ZECH, J. (2001) 'Rethinking Risk Management: The Combination of Financial and Industrial Risk'. *The Geneva Papers on Risk and Insurance*, 26(1): 71-82.
- ZIMMERMAN, R. (1987) 'A Process Framework for Risk Communication'. *Science, Technology, and Human Values*, 12(3-4): 131-137.
- ZINN, J. O. (2004) *Literature Review: Sociology and Risk*. University of Kent at Canterbury, ESRC Priority Network Social Contexts and Responses to Risk, Working Paper No. 1.
- ZINN, J. O. (2006) 'Recent Developments in Sociology of Risk and Uncertainty', in ZINN, J. O., & TAYLOR-GOODBY, P. (Eds) *Learning about Risk*, Forum: Qualitative Social Research, Accessed on <http://www.qualitative-research.net/fqs/fqs-e/>
- ZONABEND, F. (1992) 'The monograph in European ethnology'. *Current Sociology*, 40(1): 49-60.

## Interview List of Industry Observers

Code	Full Name	Profession	Designation	Organization	Discipline	Type of Interview	Date of Interview
IO1	Hubert Mueller	Industry Consultant	Principal	Tillinghast Towers Perrin, USA	Finance	Conference Presentation in 2005 ERM Symposium, Chicago	2 <sup>nd</sup> May, 2005
IO2	James Lam	Industry Consultant	President	James Lam & Associates, USA	Finance	Conference Presentation in 2005 ERM Symposium, Chicago	2 <sup>nd</sup> May, 2005
IO3	John Kollar	Industry Consultant	CEO	Casualty Actuarial Society, USA	Actuary	Conference Presentation in 2005 ERM Symposium, Chicago	3 <sup>rd</sup> May, 2005
IO4	Orio Giarini,	Academics	Professor	Special Advisor, The Geneva Association, Editor, Geneva Papers on Risk & Insurance, Geneva	Insurance	Fact to face Trieste	4 <sup>th</sup> October, 2004 30 minutes
IO5	Ortwin Renn	Academics	Professor	Chair of Environmental Sociology at the University of Stuttgart, Germany	Social Science	Telephone	5 <sup>th</sup> August, 2005 at 12:00 O' clock London Time 1 hour
IO6	Peter Young	Academics	Professor	E. W. Blanch, Sr. Chair in Risk Management of the University of St. Thomas in Minneapolis, Minnesota, USA.	Strategy	Telephone	17 <sup>th</sup> November, 2005 (Thursday) at 16:00 1 hour
IO7	Prakash A. Shimpi	Industry Consultant Academics	Practice Leader, Enterprise Risk Management	Towers Perrin, USA	Finance & Actuary	Telephone	Wednesday, 6th July at 11:00am (NY Time) 1 hour
IO8	Prodyot Samanta	Financial Analysis	Director of ERM	Standards and Poor's, USA	Finance	Telephone	15 <sup>th</sup> August, 2005 at 17:00 London Time 1 hour
IO9	Shaun Wang	Academics	Director of the Actuarial Science programme	Risk Management and Insurance Department of Georgia State University, USA	Actuary	Telephone	2 <sup>nd</sup> August, 2005 at 16:00 London Time 30 minutes
IO10	Shyam Venkat	Industry Consultant	Principal	PriceWaterhouseCoopers, USA	Finance	Telephone	17 <sup>th</sup> May, 2005 1 hour
IO11	Stephen Manning	Industry Manager	Head of Risk Management	Lloyd's of London	Strategy	Face-to-Face London	Monday, the 13 <sup>th</sup> June 2005 at 14:30 1 hour
IO12	Steve Diacon	Academics	Professor of Insurance	Nottingham University Business School, UK	Insurance	Telephone	12 <sup>th</sup> August, 2005 at 12:00 O'clock 1 hour
	Daniel Schante	Regulator	Secretary General	European Committee of Insurers (CAE), Paris		Face-to-face	
IO13	Paul Sharma	Regulator	Head of Policy, Banking, Insurance and Securities,	Financial Services Authority	Prudential and Accounting Standard Department	Face-to-face	14 <sup>th</sup> October, 2004

APPENDIX

FOUR CASE STUDY  
REPORTS

CASE 1 (59 PAGES)

CASE 2 (41 PAGES)

CASE 3 (55 PAGES)

CASE 4 (60 PAGES)

**REPORT ON THE UNDERSTANDING,  
MOTIVATION, DESIGN, CHALLENGES  
FOR IMPLEMENTATION, AND  
PERFORMANCE OF  
ENTERPRISE RISK MANAGEMENT  
IN  
CASE 1**

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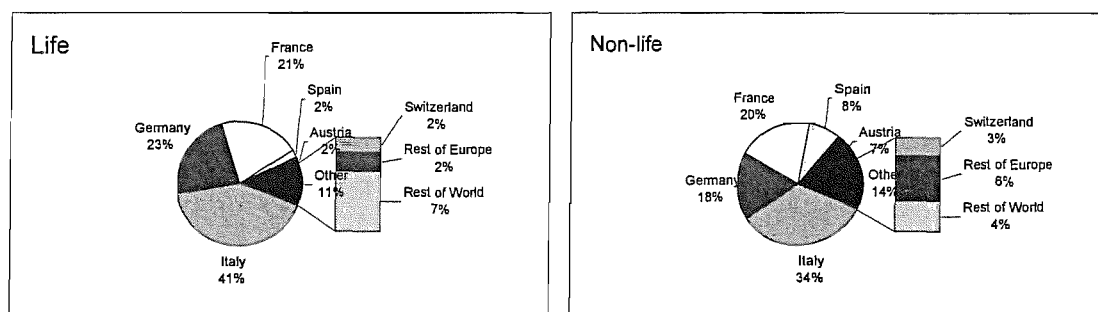
## SECTION 1

## A BRIEF OVERVIEW OF CASE 1

## 1. Corporate History

CASE 1 is Europe's third largest insurer. Incorporated in 1831 in Italy, the Group is currently established in over 40 countries. Although international, the group is concentrated in continental Europe; some 90% of its premiums come from 28 countries in the European Economic Area. The company operates through 107 insurance companies and 119 financial and real estate companies with 61,500 employees. CASE 1 is a European based insurer having a strong presence in Italy, Germany and France. However, the group draws much of its strength from an undisputed leading position in its home market of Italy, as seen in the figure 1C1, where geographical distribution of premium in 2004 is illustrated.

Figure 1C1: Market Share in 2005



Elsewhere in Europe, CASE 1 has a leading position in Austria and a strong presence in Spain, where it has a strong bancassurance agreement with a large regional bank.

2. Business Model<sup>1</sup>

The core business of the Group is insurance, with no major involvement in banking or asset management. Its mission is to be a leading insurance Group, measured by profitability, through serving primary retail and small and medium size enterprises using a multi-channel distribution.

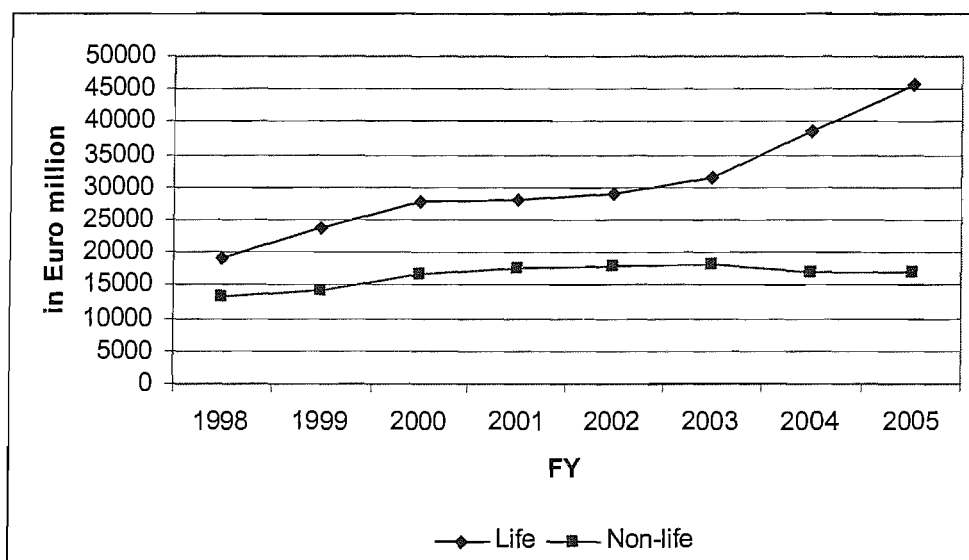
<sup>1</sup> All information included under this heading was collected from the annual reports (various years) of this organization.



As in Italy, CASE 1 uses the same business model as seen in most European insurers, as it believes in the value of strong brands when selling through proprietary channels such as tied agents, direct sales forces, and the internet. It also channels its products through third-party distributors, financial advisers and retailers and partnerships with stockbrokers and others including large distribution agreements with banks.

As a composite insurer, CASE 1 has three key lines of business (life, non-life, and asset management). The non-life portfolio is characterized by a low risk profile, as personal lines make up most of the total non-life portfolio. CASE 1 has strong product innovation capability. Moreover, it maintains its leadership position in pension products for individuals with both unit-linked and term life insurance. The financial results highlight a substantial growth in life business since 2003, as seen in figure 2C2.

Figure 2C2: Gross Premium Income of CASE 1



The portfolio of risk of CASE 1 includes mostly retail businesses (small business and personal lines markets). Moreover, 90% of its premium comes from Western Europe. Currently, CASE 1 is trying to accumulate all segregated local brand names under the umbrella of the Group through consolidation. It maintains the following financial ratings as seen in Table 1C1.

Table 1C1: Insurance Financial Rating for CASE 1 (as on 06<sup>th</sup> March, 2006)

Rating Agency	Rating	Outlook
A. M. Best	A+	Stable
Standard and Poor's	AA	Stable
Fitch	AA	Stable
Moody's	Aa3	Negative

Source: CASE 1 Homepage

### 3. Corporate Objectives

The following elements make up the current corporate objectives of CASE 1.

- Creating sustainable shareholder value
- Maintaining leadership in core European markets through a successful multi-brand and multi-distribution model
- Leveraging from local expertise on core insurance skills
- Continuing geographical expansion, in particular, Eastern Europe and Asia through joint ventures and partnerships
- Maintenance of AA rating

CASE 1 is predominantly oriented to the retail business in both in the life and non-life business. In order to achieve the corporate objectives an ambitious three year plan was launched by the CEO in January, 2003; to achieve some challenging financial targets, focusing on improvement of fundamentals. To achieve these targets, CASE 1 found it important to define a clear mission and to communicate goals to all internal employees. This also facilitated communication of CASE 1's strategy to external stakeholders'.

**Table1C2: Strategic Plan**

Corporate strategy		
2003-2005	2006-2008	2009 onwards
Focusing on value creation	-Operational improvement	Mission unchanged
Country-based initiatives	-Growth and innovation	Becoming a leading insurer measured by value creation
Developing the role of corporate centre	-Capital optimization -Enhanced governance	Accelerating further performance improvement

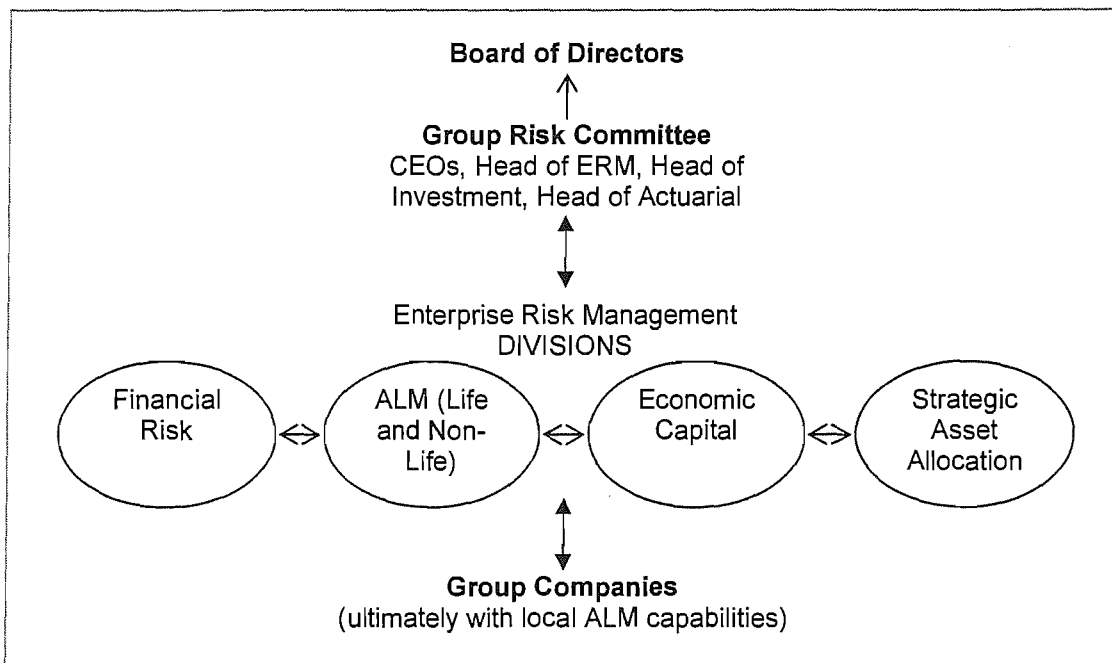
Source: CASE 1 webpage

The plan set down six clear targets, which CASE 1 calls KPI<sup>2</sup> (Key Performance Indicators). They are (i) Embedded Value; (ii) Return on Embedded Value (Normalized); (iii) Gross Premium Income; (iv) Combined Ratio for Non-Life Businesses; (v) New Business Value for Life Businesses; and (vi) Net Profit. The first two are considered the drivers of shareholder value and the rest, which are basically accounting figures, are considered as performance drivers. Moreover, their targets form a part of its risk management functions.

#### 4. Management

Despite being a decentralized group the management of CASE 1 in the past has demonstrated strong control over its many subsidiaries. Figure 1C3 illustrates its organizational structure.

Figure 1C3: Organizational structure of ERM



The operational impact of this structure (i.e., the application of ERM) is linked to strategic planning, performance measurement of business businesses, variable remuneration, solvency and leverage, asset allocation, product design and reinsurance.

<sup>2</sup> CASE 1 uses KPIs as a mean of tracking performance against targets.

## 5. Operational Management

Operational management has been revised in the past few years. The creation of a corporate centre in 2003 at headquarter has allowed increased control over the Group's operations worldwide. In addition, the business model has been streamlined with the creation of central functions such as asset management and purchasing, and of local country-specific IT and back offices.

Furthermore, an ERCM (Enterprise Risk and Capital Management) department was established in 2005 with four key responsibilities: group financial risk management, risk integration and performance evaluation of companies and line of businesses, capital allocation and reporting to shareholders (see figure 1C3). Prior to establishment of the ERCM department, the corporate finance department of the group corporate centre focused on risk management issues<sup>3</sup>.

## 6. Financial Management<sup>4</sup>

Financial management historically has been prudent, ensuring the maintenance of a very strong capital base. As part of this inheritance, CASE 1 does not actively manage its balance sheet. Following the implementation of more sophisticated actuarial tools in 2001, CASE 1 is now focuses primarily on economic performance measures. Since 2001 CASE 1 uses risk based stochastic models to allocate capital to successful business units on the basis of asset-liability risks at a 99.75% confidence level over a one year horizon.

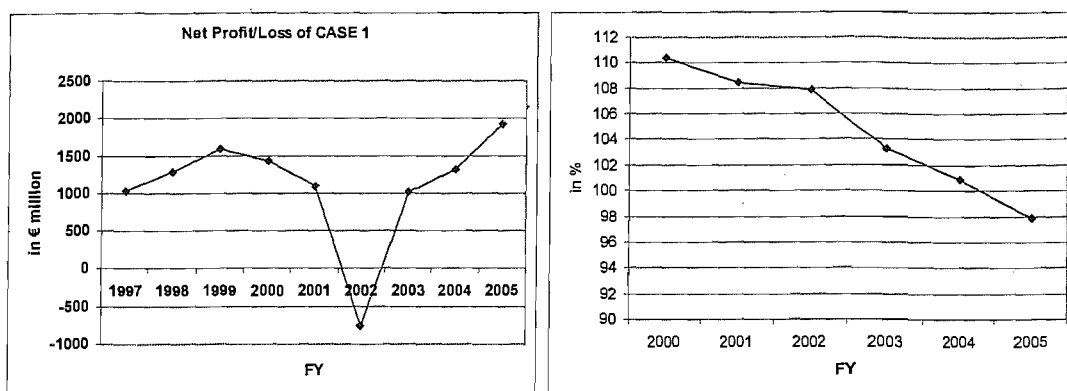
The group has maintained growth in profit since (other than 2002) as seen in figure 1C4. Life insurance is regarded as a very strong contributor to the Group's profit (see figure 1C4). Moreover, the investment income shows an upward trend since 2002 as seen in figure 1C5. It appears that CASE 1 has

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<sup>3</sup> Source: presentation slides of 1R13 in the ANIA and Macros Conference on "Solvency II: Challenging issues for insurance industry" in 2005, Milan.

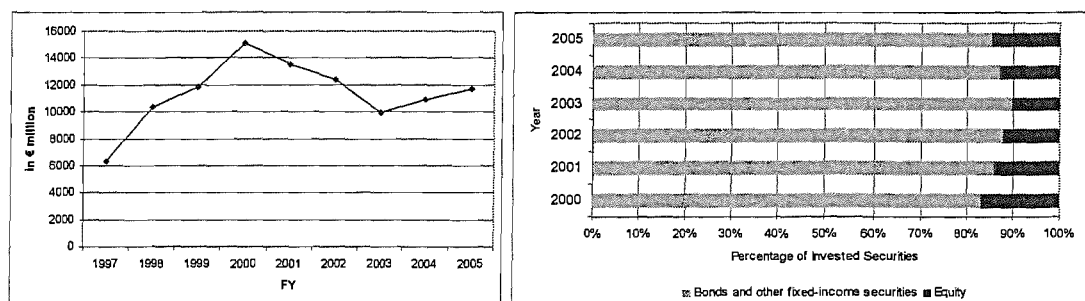
<sup>4</sup> Source: Research report of Standard and Poor's titled "Data budgetary of the quoted Italian insurance enterprises", 2005, Milan

Figure 1C4: Profit & Loss and Combined Ratio



strong asset management skills and an adequate asset-liability management (ALM) policy, which is managed at the corporate centre through a coordinated unit. CASE 1 traditionally maintains a strong and secure investment portfolio with a low exposure to equities as seen in figure 1C5.

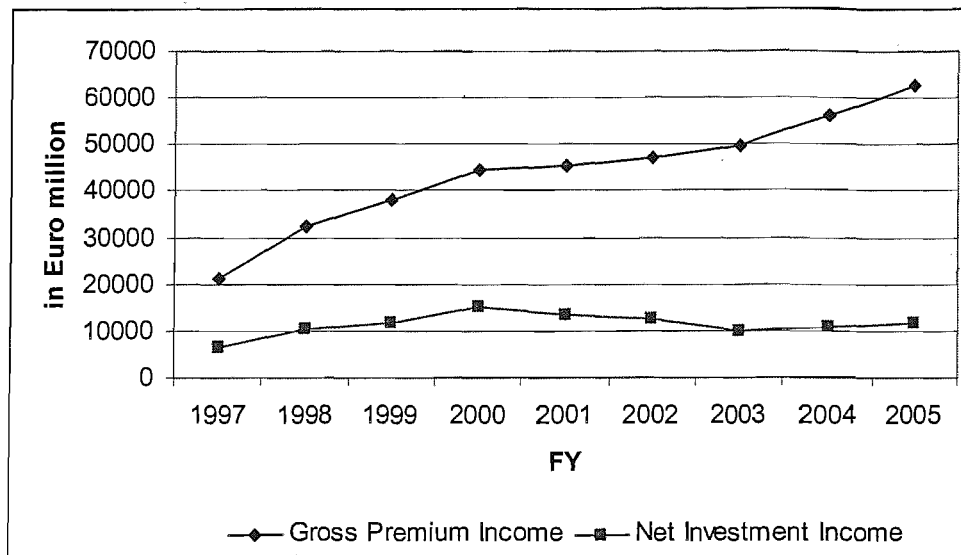
Figure 1C5: Net investment income and investment category



The overall exposure to equity investments has been decreased from 2000-2003 and investment bonds increased in that period. However, this trend reversed in the last two years. Credit risk is low, with 95% of bonds rated 'A-' or better. Government bonds make up for about 40% of the total bond portfolio. The largest concentration of corporate bonds is in the financial sector.

It is seen that CASE 1 has not suffered any significant credit losses in recent years. However, its investment income appears to maintain a downward trend compared to gross premium as seen in figure 1C6.

Figure 1C6: Gross Premium Income versus Net Investment Income



Holdings of derivatives are limited and remain under the strict control of the central investment department. All real estate investments are held at a subsidiary level but are maintained by Group properties. CASE 1 has started to invest in real estate funds to satisfy the demand of local subsidiaries to increase the equity weight in their portfolio.

## 7. Risk Management

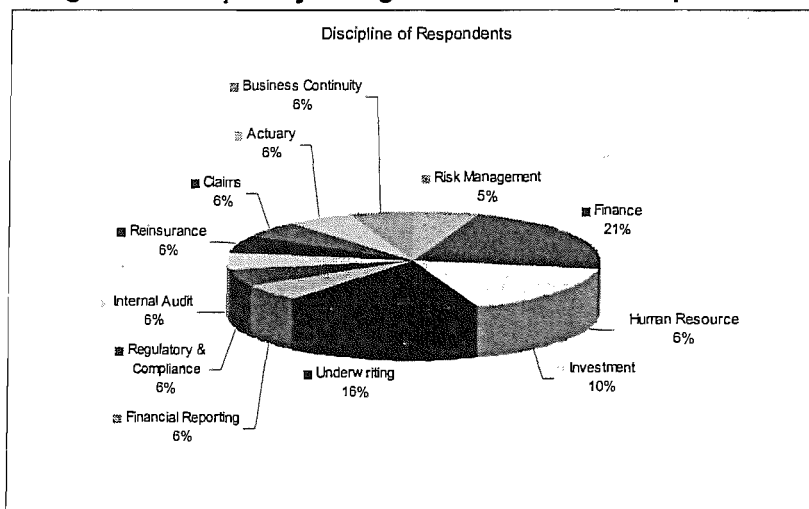
The risk management philosophy of CASE 1 is highly concentrated on central strategic asset allocation, reinsurance and risk control functions in asset-liability management (see figure 1C3). Group strategic asset allocation is fully integrated with risk and capital management functions. From the perspective of risk management, reinsurance is targeted to selectively increase retention levels based on risk-return trade offs, while leveraging diversification effects. For internal financial planning purposes, CASE 1 calculates economic capital every year. However, capital to achieve/maintain a financial rating (see table 1C1) is also calculated separately, where investment risk, insurance risk and operational risk are taken into consideration. Moreover, insurance and financial risk management and control have recently been enhanced through the implementation of procedures and guidelines established by the subsidiary companies. Additionally, a project has been initiated to create a

unified information flow for group companies' accounting and management data in accordance with IAS/IFRS accounting principles (Source: CASE 1 Annual Reports).

## 8. Background of interview respondents

A total of 18 people were interviewed in CASE 1 (list attached at the end of this APPENDIX). The first interview was held on 28<sup>th</sup> July, 2004 and the last on 01<sup>st</sup> June, 2005. The questionnaire survey was conducted during June-July, 2005 and the following pie chart illustrates the disciplinary background of the respondents.

**Figure 1: disciplinary background of interview respondents**



The figure suggests that finance staff dominated the respondent group (21%) followed by underwriting staff (16%), investment staff (10%) and others (each 6%).

It is important to note that the ERM initiatives of CASE 3 has been growing rapidly and the findings (which are based on the data collected largely during 2004) may not reflect the current development of CASE 3's ERM. However, the study attempts to include these more recent developments (e.g., establishment of an ERM department in 2005) since the researcher has kept constant contact with a key member of staff of the CASE.

## 9. Conclusion

The above description suggests that CASE 1 is a composite (both life and non-life business) primary insurer concentrating on retail business within the western European market. As the evidence suggests CASE 1 maintains a conservative policy and strategy in taking and managing risk; it remains financially strong even during 2001 to 2003, when the global insurance industry suffered from a severe financial crisis. Its risk management strategy focuses on profitability, measured in terms of six KPIs (viz. Combined Ratio<sup>5</sup> (non-life); Embedded Value<sup>6</sup> (life); Normalized Return on Embedded Value<sup>7</sup>; Value of New Business<sup>8</sup>; Gross Premium Income; and Net Profit) under a corporate finance perspective. However, CASE 1 is trying to achieve more consolidation to become as a single entity under a corporate brand.

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<sup>5</sup> Combined Ratio (for PandC Businesses) = Expense ratio + Loss Ratio; where, Expense Ratio = general and administrative expenses / net written premiums; Loss Ratio = (claims paid net of recoveries and reinsurance + change in provisions for outstanding claims net of reinsurance + premium refunds and profit sharing net of reinsurance) / net earned premiums

<sup>6</sup> Embedded Value = NAV adjusted + Value of Business in Force; where, Value of Business in Force = present value at valuation date of future profits from business in force year less cost of solvency capital.

<sup>7</sup> Normalized Return on Embedded Value (RoEV) = Return on the embedded value prior to the impact of investment and tax variances; where, RoEV = (closing embedded value – opening embedded value +/- capital movements/dividends) / opening embedded value

<sup>8</sup> Value of New Business = Present value of future profits from business issued in the year less cost of solvency capital, at issue date



## SECTION 2

### THE UNDERSTANDING OF ERM

#### 1. Introduction

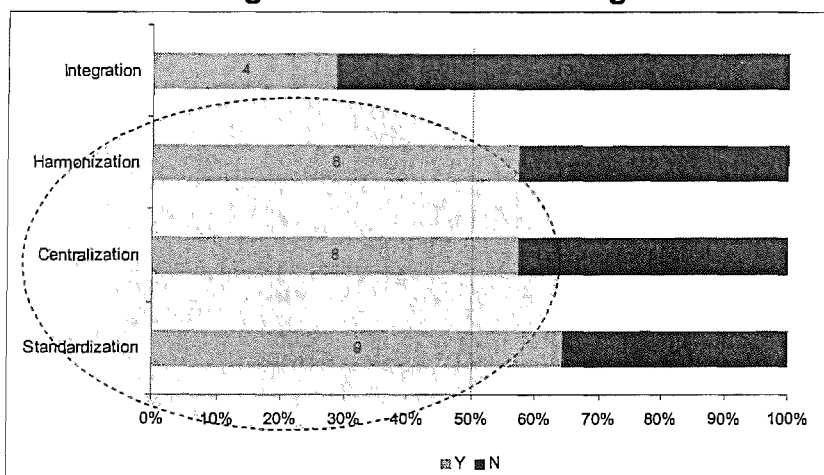
In line with the first research question, this section explores the understanding of ERM among staff in CASE 1. The objective is to discover the perception of staff from a range of disciplines, covering the nature of ERM in their everyday functions. The results of the questionnaire survey are presented in figure 1C8. Information obtained from interviewees is then analyzed through comparing and contrasting their relevant arguments. The results of the analysis are then benchmarked with the results achieved from the questionnaire survey.

Analyzing the data it is found that no consistent understanding of ERM exists in CASE 1<sup>9</sup>. However, it is concluded that the understanding of ERM amongst the interviewees can be categorized under four interrelated concepts: standardization, centralization, harmonization, and integration.

#### 2. Survey Results

The results obtained from the survey are illustrated in the following graph.

Figure 1C8: Understanding of ERM in CASE 1



It is evident from the above graph that ERM is regarded as standardization by the largest group of respondents. Only 5 respondents (36%) did not agree

<sup>9</sup> It was the situation until 2004. However, the interview respondents strongly believed that the situation will change in near future seeing the current initiative of the management toward ERM.

that this concept as closely linked to ERM with CASE 1. Centralization and harmonization were both regarded as the closest concepts by 8 persons (57%). Integration was seen as the closest concept by only 4 individuals (29%).

### 3. Analysis of Interviews

In interpreting the statements of the interviewees' four key concepts (viz. harmonization, standardization, integration, and centralization) emerged as being associated with their understanding of ERM. The following paragraphs illustrate the responses of the interviewees under each of these headings.

#### 3.1. Centralization

A number of respondents believed that ERM represented an attempt to aggregate risks at the level of a single company by business lines and by risk classes, while taking account of their interrelations. Respondent 1R8 argues, "currently we are developing a top-down approach to execute integration". However, it appears that the objective of the change is to set a unique corporate brand, which is targeted to drive a stronger presence of head office in subsidiary companies. In the process of branding, however, it was necessary to centralize some processes (e.g., the collection of information). Respondent 1R5 states, "this led to centralized decisions through a common strategy across the subsidiaries". The study further noted that in some countries (e.g., Germany) CASE 1 has a lot of brands. Although these subsidiary companies<sup>10</sup> do not communicate among themselves, CASE 1 is centralizing its German Holding. Respondent 1R10 states, "in this is the way we have built up a common standard for introducing and maintaining communication within the company".

#### 3.2. Harmonization

Respondents noted that standard policy terms and conditions could bring more transparency of the products, while are sold in different countries through its local companies. Unfortunately, they extensively vary even within European countries, mainly for regulatory reasons. Therefore, as respondent

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<sup>10</sup> 'companies' means the local subsidiary companies of CASE 1

1R14 argues, “calculating the integrated result of any particular line of business becomes more complex”. Moreover, harmonization is one of the issues for internal auditing; as respondent 1R17 states: “while auditing the internal control system, for example, we look through our audit matrix whether the companies have adopted best practices in terms of structure, skills, and methodology”. Consequently, a harmonized best practice helps CASE 1 to carry out its auditing work.

### **3.3. Standardization**

Standardization was regarded by most respondents as a very similar concept to harmonization. However, CASE 1 does not, at least for the purpose of corporate governance, aim to set up standards. Respondent 1R17 states, “We have to adopt the situation of the local markets in terms of statutory laws and changing economic characteristics, which are sometimes completely different from each other”. However, some respondents (e.g., 1R15) disagreed, arguing that standardization (in terms of adopting a common language) of key risk management terms and issues is a significant element in achieving the objectives of ERM. However, it is not clear from the views of the respondents if ERM is regarded as standardization in CASE 3.

### **3.4. Integration**

Integration is regarded by the respondents as a wider concept than the others. In addition to objective issues, integration is regarded as being associated with subjective issues like culture and understanding across geographical boundaries. Respondent 1R17 states, “The motivation of cooperation [harmonization] should come before integration, which is unfortunately very low in some of our local companies”. However, the term integration was found in terms of mapping and quantifying key risks. The study finds that, in the past, none of the risks which currently come under the ERM umbrella were quantified in CASE 1, rather they just existed. Respondent 1R15 argues, “A sum of capital was kept aside to run these risks without any logical basis”. Moreover, the study revealed that although there was a significant focus on risk in both the asset and the liability side of the balance sheet but these focuses often remained independent. Indeed,

bringing the segregated focuses together is seen as a difficult problem (1R15). At the beginning of the plunging capital market back in 2000, CASE 1 began to become aware of the risks related to the integrated nature of its balance sheet. CASE 1 then started to concentrate on consolidated risks related to both assets and liabilities (1R15). However, CASE 1 does integrate different risk assessments at the group level. It is found that the difference between the life and non-life insurance businesses causes difficulties in the integration process. Respondent 1R8 states, "by integration I mean the integration between risks classes (e.g., market risk, liability risk, technical risk) and also integration between companies located at various geographical locations". It is also found that although insurance risks are traditionally managed in aggregation, the integrated nature of asset-liability risk was not considered previously (1R15). The study finally revealed that considering the large size of the company, senior management finds integration for all core activities as the only way to control such a diversified group. However, as respondent 1R17 states, "prior to a central *integration* we probably need to *harmonize* the existing risk management functions and policies amongst our group companies".

#### 4. Discussion

The analysis suggests no consistent understanding among the interviewees in terms of four concepts (viz. 'centralization, harmonization, standardization, and integration). Respondents, who believe ERM is a process akin to centralization, think of it as a top-down approach (1R8) and a function of senior executives in the corporate centre (1R5). In contrast, respondents, who argue ERM is akin to harmonization within CASE 1, talk much about horizontal communications used to develop and adopt best practices across the organization (1R17, 1R14). The idea of best practice could be analogous to developing a common standard for all risk management functions. However, the idea of a common risk management standard was rejected by 1R17 who pointed to the isolated nature of expertise and knowledge existing in local companies across Europe. Respondents, who consider ERM as integration, hold mixed opinions. Some respondents (1R14, 1R17) see the process of integration from a broader perspective involving many

complexities. However, respondent 1R15 feels integration is crucial to attain the targets set out in the three year strategic plan. It was also discovered that all four levels (i.e., centralization, harmonization, standardization, and integration) are practiced in CASE 1; but only to the extent of managing the risk which occurs on the left hand side of the balance sheet (in the capacity of asset management). Integration was found to be important because managers in CASE 1 believes that without an integrated and consolidated view of the business it is difficult to take strategic decisions in a complex business environment.

The analysis of interview documents suggests integration as the closest concept to ERM, whereas, the survey result suggested that standardization is the closest. Surprisingly, the survey result, in fact, suggested that integration is the most remote concept. Moreover, centralization comes in between standardization and harmonization in the survey, whereas they are seen as two closely bonded concepts in the interviews. The following paragraphs attempt to explore the reasons for such inconsistencies.

## **5. Conclusion**

The survey and interviews clearly established that there is no consistent understanding about integration among the respondents. They just view it from their own perspective, depending on their background. To a respondent from audit 'integration' is a broader issue which needs a holistic consideration. However, to a respondent from finance, integration is a holistic concept, but strictly attached to the capital requirement considerations. One important finding is that, in addition to viewing these four concepts separately, they are often used interchangeably without any consideration of their critical meanings. This suggests that the four concepts are closely interrelated and often overlap depending on the perception of the respondents in the context of a particular problem.

Insurance companies, like CASE 1, manage risk as their core activity. However, most of them are not adequately aware about the intangible

process of risk concentration and accumulation. However, conceptualizing this internal process requires that to see the whole issue is seen from a holistic perspective. Importantly, the discussion established the fact that no one of the four concepts (viz. centralization, harmonization, standardization, and integration) represents the entirety of ERM. Each of them can be perceived as a section of total ERM, as they represent different parts (or levels) of the entirety. Interestingly, each of three parts is seen as the entirety of ERM by specific respondents in their own world.

Centralization is generally viewed as a top-down (or vertical) process controlled by the strategic managers. However, harmonization and standardization are both regarded as horizontal processes. Finally, integration is regarded as a combination of both a vertical and horizontal process, thus suggesting it closest to the concept of ERM described in the literature.

Briefly, the understanding of ERM amongst managers in CASE 1 is inconsistent and attached to four evolutionally stages (i.e., harmonization, standardization, integration, centralization) of ERM. However, one thing is clear to all respondents: that ERM is opposed to a departmentalized or silo type risk management. Another important thing is that ERM is called Value Based Management<sup>11</sup> in CASE 1. Whatever the name, it is clearly understood by the managers of CASE 1 that their organization is evolving in terms of ERM but their understanding of ERM is still limited to the function of capital management. However, it could not be clearly identified at what particular stage of the four levels of ERM evolution CASE 1 is currently at – because the stages are often overlaps. In essence, ERM in CASE 1 means an integrated assessment of the corporate risk profile in combining life risk, non-life (which includes catastrophe and liability) risks, and operational risks together.

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<sup>11</sup> VBM is an approach in managing the organisation. In such approach, organisation's overall aspirations, analytical techniques, and management processes are aligned to help the company in maximizing its value by focusing management decision-making on the key value drivers.

## SECTION 3

### MOTIVATION FOR ERM

#### 1. Introduction

In analyzing the views from the interviews and the questionnaire survey, the previous section suggests that ERM is regarded as a blend of centralization, harmonization, standardization, and integration. However, the conclusion suggests that the current understanding of ERM in CASE 1 remains somewhere in the overlapping area of these four concepts. In addition, the views of the respondents towards the understanding of ERM within these four concepts depend largely on their disciplinary background and their job responsibilities.

This section aims to explore the key driving factors for developing ERM in CASE 1. The section will also explore the origin of ERM and its evolution in CASE 1. In a similar manner to the previous section, statements of interviewees and the survey results will be compared and contrasted.

The leadership of CEO in the existing volatile economic market conditions is a key driving factor within CASE 1. However, the leadership was largely initiated by the current scheme of European regulation towards introducing a risk-based regulatory framework for European insurance companies in terms of solvency, financial reporting and corporate governance issues.

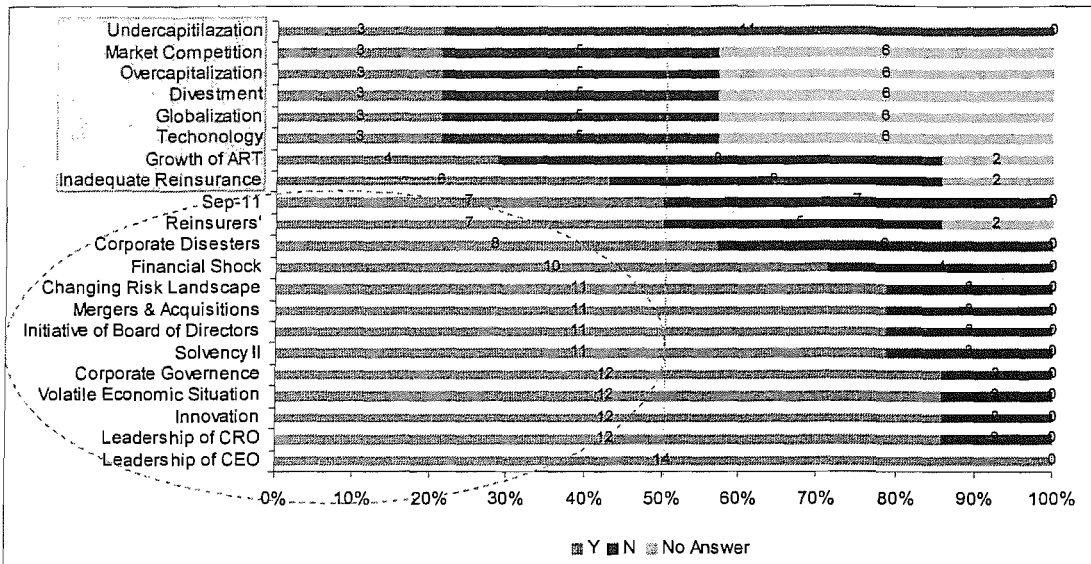
#### 2. Questionnaire Survey Results

Following is the survey result<sup>12</sup>.

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<sup>12</sup> The numerical figures in the graph represent the number of respondents who said that the "leadership of CEO" (for example) is a driving force of ERM or not.. Here, 42 respondents said Yes (Y), 3 said No (N) and 6 respondents did not answer (No Answer). This follows for others.

Figure 1C9: Driving factors of ERM



The survey results are illustrated in figure 1C9. The results indicate that all 14 respondents (100%) believe that the leadership of CEO is the key motivation for developing ERM in CASE 1, ranking it as number in 21 issues. This is followed by the initiative of CRO (or the equivalent person designated differently). Innovation, the volatile economic environment and corporate governance were each indicated as the key motivation for ERM by 12 (86%) of respondents. Solvency II (regulation), initiative of Board of Directors, merger and acquisitions and a changing risk landscape were all indicated as key motivations by 11 (79%) of respondents. Altogether 13 issues were mentioned by at least 50% of the respondents. Issues, such as inadequate reinsurance cover, globalization, market competition, technology etc. as seen in the top left hand corner of figure 1C9 were not considered as significant factors in influencing the development of ERM in CASE 1.

### 3. Analysis of Interviews

In analyzing the interview transcripts, a wide range of interrelated concepts emerged as factors influencing the motivation of CASE 1 towards the development of ERM. However, regulations, leadership, market competition, and economic volatility appeared to be key. The following paragraphs explore the views of respondents under each of these key drivers of ERM. Thereafter



they are compared and contrasted in combination with the survey results. Finally, conclusions are drawn through discussion of all relevant issues.

### **3.1. Leadership**

The leadership of the CEO and CRO were seen as key motivators to develop ERM in CASE 1.

#### **3.1.1. Leadership of CEO**

It emerged that the leadership of CEO played a key role in introducing ERM in CASE 1. As seen in the previous section, the three year strategic plan (2002-2005) led by the CEOs was the first step of CASE 1 towards developing ERM. Respondent 1R10 argues "first of all the initiative come from the new CEO, who decided that this three year plan was the most effective way to put the idea in front of the market". In addition, the role of management was also an issue, as respondent 1R15 states, "we also got a new Board of Management which really pushed us to look at ERM". The willingness of the chief executives to introduce a risk based management culture across the group supported the initiative of the senior management to implement ERM across CASE 1 (1R15).

#### **3.1.2. The Initiative of CRO**

It was observed that CASE 1 does not maintain the traditional hierarchical structure, including CFO and CRO, as seen in other organizations. There was a lot of discussion in CASE 1 concerning whether the company should have a CRO. In fact, CASE 1 does not have a CRO on the grounds that the CEO should be the ultimate CRO. As respondent 1R15 argues, "the CEO is the only person, who can turn the wheel of this big sophisticated intelligence system". However, the general view amongst respondents was that whether a position of CRO exists or not is not an important issue affecting the motivation to engage in ERM or in implementing it. However, the widely held belief is that the understanding of ERM throughout the organization is key to its success (1R2).

### 3.2. Volatile Economic Situation

Growing competitiveness in the marketplace because of rapid changes in economic factors has forced CASE 1 to improve the way it actually captures risks. Many respondents indicated volatility in the economic situation and the increased demand from shareholders brings the concept of 'shareholder value creation' which stimulated the drivers towards ERM. Respondent 1R4 states, "this is because the competition in the market was driven by a volatile economy and we had to improve our way of capturing risks." Several respondents suggested that the microeconomic risks definitely impact the success on both 'mergers and acquisitions' and the divestment decisions of CASE 1. Respondent 1R10 states, "an enterprise-wide risk management in the form of SWOT analysis could support us in effective decision making".

### 3.3. Regulations

A number of respondents indicated that the recent risk-based approach of regulators (e.g., Solvency II) also influenced CASE 1 to adopt an internal risk model. Further, they suggested that a Group like CASE 1 can not afford to be without an internal model, given the regulatory changes (1R4). Moreover, changes proposed to the international accounting standard acts as an external driver that pushes CASE 1 towards the adoption of these new changes, new methods, models and paradigms (1R1). In addition, the new environment of the financial reporting standards includes critical factors in the presentation of insurance accounts. The respondents widely believe that International Accounting Standard (IAS) is going to bring volatility and this is not positive news for CASE 1 because it has always been considered a low volatility company. However, the study noted a general fear that CASE 1 could become more volatile than it was in the past due to the implementation of fair value reporting standard (1R10). This fear was seen as an indirect driver towards ERM.

Since all the new (insurance) regulations are linked to Solvency II (1R8), it directly relates both internal and external factors to the economic changes in the market in terms of, for example, interest rates and equity prices (1R11). However, it was argued that arbitrary national regulation should not be an

impediment to achieving the economic benefits of being a Group for the customers and shareholders. Consequently, respondent 1R13 argues, "From the perspective of future regulation we see two principle factors. First, we run our business having regard to the capital employed, and, secondly we must remember our business is global. Solvency II needs to respond to each of these". It is evident to many respondents that a combination of globalization, the end of tariffs, more active shareholders, the EURO and sophistication of technology mean CASE 1 can no longer manage itself as a collection of individual companies, but as a single entity. Respondent 1R13 further states, "We have moved from being a portfolio manager to a synergy manager".

Regarding the reporting aspect of regulations, several respondents do not believe that excessive reporting can give a good insight into their solvency and performance. Respondent 1R15 argues "we believe that we have a risk based internal model. It might not be the most sophisticated in the market but that does not really worry us because we are interested in understanding risks on a macro basis rather than truly managing them on a micro level, giving much concentration on individual risks". This suggests that managers in CASE 1 want to manage it based on economics, with the hope that regulators will do the same (1R13). However, some respondents indicated that in the face of evolving risk based regulations it is important to understand their potential impact on the organization and to make sure that the group evolves in parallel with the evolution of legislation; so that the organization remains in a position to comply as best as possible while taking the advantages offered (1R7).

#### **4. Discussion**

The interviews revealed three key issues affecting the motivation of CASE 1 to develop ERM: (i) leadership; (ii) the volatile economic situation and (iii) regulations. Under leadership, the role of CEO and CRO were discussed. The volatile economic situation mainly relates to a growing concern regarding various economic factors, (e.g., market risk, political risk) (1R11). Finally,

discussions regarding regulations were limited to Solvency II, IFRS (1R10, 1R4) and Corporate Governance.

There was disagreement between the two sources of data in identifying the key issues influencing CASE 1 towards developing ERM (e.g., leadership, regulations, and volatile economic situations). Market competition, which is suggested as one of the key factors by the interviewees (1R4, 1R10, 1R15) is disregarded by the survey respondents. Likewise, globalization was not considered as important by the survey respondents but was seen as an important factor by the interviewees. All of this evidence represents an uneven perception amongst the respondents in identifying and prioritizing the driving factors of ERM.

## **5. Conclusion**

One of the key findings of the analysis is that the issues influencing the drive towards ERM are not isolated from each other. For example, the introduction of the three year strategic plan (1R10) by the CEO arose as a result of market demand in the face of growing competition (1R4). The key driver in developing this initiative was the CEOs reflection of an increased tension between success and failure. Moreover, regulations like Solvency II bind CASE 1 to link the internal factors with the external factors in calculating the overall solvency (1R4) and in producing structured reports (1R4, 1R10, 1R7). In fact, the volatile economic situation introduces many issues (e.g., regulatory changes, market competition, etc.) within managements' decision making environment; forcing them to consider how to cope with the potential volatility (1R10). The implementation of a fair value accounting standard could provide a facility to CASE 1 in calculating minimum capital requirement and solvency capital requirement. However, the interviews found no coordination between these two functions in CASE 1. Another driver is the initiative of Credit Rating Agencies in valuing the strength of insurers as they are considering a holistic approach. Finally, the analysis established that the leadership of CEOs is the key motivation of ERM, based both on the interviews and survey.

## SECTION 4

### DESIGN OF ERM IN CASE 1

#### 1. Introduction

The previous section established the leadership of CEOs as the key driving force towards ERM. It was also found that the CEOs are in turn motivated by two key factors (i.e., market competition and regulations). This section intends to describe the design of ERM in CASE 1. Firstly, the key influential elements on the ERM design have been noted from the interviews and the various views are compared and contrasted. Finally, an emerging model of ERM is developed from the findings. It is found that the key point of the design is the measurement of risks and making the various companies of the Group responsible for the risks they take; such behavior is then rewarded by appropriate capital deployment from the centre.

No questionnaire survey was conducted on this topic as sufficient information was obtained from the interviews.

#### 2. Analysis of Interviews

Analyses of the interviews suggest that CASE 1 has an ERM system which involves a risk model designed from a finance perspective. The key issues of the design of ERM in CASE 1 are:

Risk profile

Solvency

Corporate governance

Risk Appetite and Risk Tolerance<sup>13</sup>

Economic capital

Capital allocation

Diversification

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<sup>13</sup> Risk tolerance implies being reasonably comfortable with most uncertainty, accepting that it exists as a normal feature of business (Hillson, 2005)

## 2.1. Risk Profile

A risk profile, which represents a portfolio of key risks, dominates the design of ERM in CASE 1. It is important to note that different insurance groups require different capital management skills because of their different risk exposures. Respondent 1R7 states, "our organization is very much focused on personal line, small and medium size retail business". However, others are much more focused on the corporate sector or some specific large corporate international risks, therefore requiring a completely different form of assessment of risk. Consequently, as the study observes, the design of the risk management system depends on the company specific profile of risk.

## 2.2. Solvency

Maintaining solvency was found to be a key aspect of the design of ERM of CASE 1. Solvency regulations, both at the local and European levels, relate both internal and external factors to the markets, in terms of the volatility of asset prices, interest rates and equity prices. This objective is to remain in business despite surprises and also to comply with regulatory constraints. The respondents indicated that until now the focus of calculating solvency capital is on individual companies and only on a residual basis. However, the architecture of solvency is changing; as respondent 1R7 argues, "I think in the end the focus of our solvency will be on the entire group compared to individual components". In fact, when companies intend to grow further they need more capital to comply with new solvency rules, which work as a benchmark or a yardstick for their risk taking capability. Moreover, the changes in the solvency arena have had a remarkable influence on structuring the internal risk model of CASE 1. Respondent 1R4 states, "It [solvency] will enable us to see how things will develop and how this will actually be implemented". CASE 1 measures its solvency by comparing the available capital to the required capital using an internal model [1R15]. Within the current capital framework, CASE 1 calculates the amount of capital required in the increase of its equity exposure. Respondent 1R15 states, "This helps us to develop a risk management framework in line with the regulator's Solvency II model". Its previous model was not sufficient to provide an indication of its solvency for the regulators. Respondent 1R4 states, "our

current approach for risk management provides direction of building know-how expertise.” The respondents also noted that risk management issues in CASE 1 will be much clearer from a solvency and accounting point of view; in particular, in terms of the international accounting standard. Respondent 1R4 states, “I think that it will be much clearer in terms of providing a general picture of our competitive environment and also our solvency environment and regulations”. However, other respondents made it clear that maintaining solvency is very important in order to achieve the objectives, irrespective of the Solvency regulations (1R17).

### **2.3. Corporate Governance**

Internal control under corporate governance was found to be an important part of ERM in CASE 1. Some respondents believe that internal audit can do this job although it is not happening at the moment in CASE 1. However, the role of internal auditor is prominent in corporate governance issues. Moreover, respondents argue that operational risk is mostly an internal auditor issue: respondent 1R8 argues, “our biggest risk is connected to non-compliance to the rules, which is mostly related to the internal audit”. The respondents see the only way to cope with these kinds of events is to have a structured internal audit. Consequently, the respondents would like to see a new structure of internal audit having sufficient infrastructure in terms of expertise in managing the new dimensions of operational risk (1R8). However, the role of corporate governance is quite absent in the current risk management practice of CASE 1 and respondent 1R17 states, “I definitely feel that that risk management needs corporate governance – this is very important”. However, in general the respondents prefer that internal control from a risk management perspective is dealt with once ERM is established in terms of policy and standardization. Moreover, most respondents agree that there is an urgent need for future internal auditors to be educated to assess these kinds of issue.

### **2.4. Risk Appetite and Risk Tolerance**

Risk appetite has emerged as one of the key issues of CASE 1’s internal model. This is currently measured in terms of capital. The respondents

believe that at the strategic level it is important to decide the risk appetite of the group as a whole, the amount of business the Group is prepared to underwrite and how, by whom, in which countries, what products, and what amount of capital is required (1R7). Nevertheless, the strategic decisions are driven by the appetite for business. The appetite for risk in CASE 1 appears to mean the appetite for capital and the best way of managing risk (1R15).

## **2.5. Economic Capital**

The interviews suggest that capital is at the core of CASE 1's ERM. Moreover, return on capital is the main means used for measuring performance of both the business unit and at group level. Risk owners have to meet some pre-specified targets and these targets are set in terms of return on capital (1R8). The interviews revealed that, in addition to regulations, the evolution of ERM in CASE 1 is also coupled with two other issues: a number of dramatic events and the increased scrutiny of stakeholders on the organization's capacity in managing capital in relation to its risk exposures (1R7). However, the most important question for CASE 1 is the amount of capital it should have to manage its enterprise risk, which is clearly a strategic decision. Further, each of the business units has different exposures to risk because they operate in different markets. Moreover, they are influenced by local cultures and customer attitudes. The respondents suggested that the amount of capital CASE 1 should hold is also related to what type of rating it wants. Respondent 1R4 states, "We have a clear strategy of having and maintaining an 'AA' rating and that demands quite a substantial amount of excess capital". It is also noted that in calculating the amount of capital, CASE 1 uses a 1 in 400 years return period. While choosing this threshold CASE 1 takes into account its group risk attitude (risk aversion), risk appetite, and capital. However, the interview survey noted different views in the approach, metrics, and definitions (e.g., Risk Adjusted Capital) among staff working in different departments within head office. However, respondent 1R4 states, "we are talking about the same thing, at least from the marketing point of view". Therefore, two figures, one is based on 1 in a 1000 years and the other is 1 in 250 are not really comparable; possibly 1 in 250 is more conservative.



Capital also plays an important role in the integration of risks in CASE 1. It is observed that integration firstly allows the management to develop the scenarios (based on a 99.75% confidence interval) and assess the actual capital hold by different entities. This also provides an understanding of the impact of different management practices of different companies for their choices towards the allocation of capital in different business lines for non-life and for duration mismatch for life businesses. It is clear from the respondents that all business efforts of CASE 1 are forwarded on maximizing the return on capital, which is higher than the cost of capital adjusted for operational risk, political risk, and currency risk (1R14). Moreover, CASE 1 is currently undertaking a reinsurance optimization project which tries to use the corporate capacity as a buffer to increase the retention where the cost of capital is assumed to be less than the cost of reinsurance. Respondent 1R14 argues, "the reduction of retention can only exist if the cost of capital is higher than the cost of reinsurance". Respondents' find that risk and capital are closely related issues, as respondent 1R15 argues, "they [risk and capital] are 100% linked and managing this relation efficiently is the objective of our risk management".

It is clear that CASE 1 has changed its perspective from statutory capital to economic or risk-based capital, since relying on statutory capital proved no longer profitable. Respondent 1R10 argues, "statutory capital didn't give us the feeling of how the businesses are developing. In calculating economic capital we give different weight compared to statutory capital because we must allocate capital depending on the profit stream". Moreover, the concept of economic capital drives the integration of risks across the Group; 1R4 argues, "in estimating Group economic capital, we look both at assets and liabilities in a coherent framework". The emphasis on economic capital is also echoed by 1R5 while saying, "I think everything depends on the performance of return on economic capital as embedded in our three years strategic plan". However, the problem, as the study identifies, is that not everyone in the organization knows what economic capital means (1R8). The reasons for this

are explored in the next section while discussing the challenges of implementing ERM.

## 2.6. Capital Allocation

One of the challenges to CASE 1's ERM design is 'capital allocation'. Capital is allocated according to return. In Corporate Finance, enterprise risk is linked to capital investment decisions because it produces return. So the Corporate Finance Department must invest and allocate capital in various countries depending on the country-specific risk profile (1R10). The study further noted that capital allocation in CASE 1 is all about economic capital. 1R15 states, "we define economic capital as a process of allocating our capital. So capital allocation physically means to work out the amount of euros that each of our local companies needs to run their business based on an analysis of the underlying risks". At the moment CASE 1 is able to allocate capital every six months based on performance. It is seen that the business units are still at the stage of trying to understand what that means but some of them have reallocated capital locally because they have their own system. However, some individuals have no idea what this means or how the allocation of economic capital system is supposed to work. Consequently, every company is in a different stage in terms of implementation (1R15). Moreover, the strategy of allocating capital links capital with risk and this is precisely what CASE 1 is doing in its risk management functions.

The respondents suggest that the capital allocation model of CASE 1 is a stochastic model of the variability in the pay off of assets and liabilities, allowing for some diversification between different risk factors. It is a classic top-down model of the behavior of assets and liabilities. This system operates right down to the company level and within companies down to the main lines of activities. On the non-life side it is broken down between main portfolios (e.g., motor, non-motor and commercial). On the life side it is broken down between products with guarantees and without guarantees. Respondent 1R15 states, "that is done now for about 30 big companies across the group and for the smaller companies we look at them as a single cell".

## 2.7. Diversification

In CASE 1, diversification is seen as the way of reducing the amount capital necessary to allocate for the amount risk it holds. Viewed another way, insurance companies define their business as absorbing risk from households and companies, diversifying much of it away, and managing the remaining risk to produce sustainable returns to debt-holders and share-holders alike (1R13). The study finds that CASE 1 actually aggregates the results of each company and then for the group. It also takes all dependencies into account and the correlation between business lines to see the risk adjusted capital for each line at business level or company level. Respondent 1R4 states, "Capturing the correlation and the benefits of correlation we end up by aggregating all the individual pieces until we get to the group consolidated view". For example, in its Group Reinsurance Project, group risk adjusted capital is calculated from a bottom-up basis. However, measurement of risk at the portfolio level is actually a top-down process from the group wide perspective because it sums-up the risk capital calculated on a stand alone basis. Respondent 1R4 further states, "If we sum of all these up, then the result is much higher than the real Capital at Risk". Consequently, CASE 1 really needs to have diversification benefits at the Group level. It is found that CASE 1 traditionally decentralized heavily. It is just in the last three or four years that CASE 1 has begun to centralize three things: investment philosophy, co-ordination of insurance and reinsurance risks, and management of their capital base (1R15). In essence, respondents believe that all these three things need to be centralized in order to run an international group such as CASE 1. Moreover, in capturing the diversification benefits, which is considered a basic principle of insurance and there is no point to looking for these just within one territory when an insurer actually operates in many territories. Respondent 1R15 argues, "We have been very successful on that issue". One important issue about diversification is correlation. Moreover, the study finds that there are many different levels of correlation. However, the largest for CASE 1, as 1R4 states is "the correlation we get within the company between the assets and liabilities and between

different lines of business". The study finds that in addition to substantial diversification benefit within companies, CASE 1 gets benefits of diversification from geographical diversification of different companies across the world, and also from different lines of business (e.g., life and non-life).

### **3. Analysis of issues concerning design of ERM**

The design of ERM in CASE 1 is based on the principle that the market and industry will have to develop their approach to risk in terms of taking risks and managing risks. It is not only a question of how much capital an organization wants; it is also how much capital an organization would be able to save because of the efficient management of risk. So an organization like CASE 1 can make better use of capital. This means higher returns or higher capacity of growth for a combination of both (1R7).

The analysis concentrates on the following key issues: return on capital, solvency, the internal [economic] risk model, but focus is mainly on the return on capital. The calculation of the right amount of capital is not straight forward. It depends on the company specific risk appetite (1R7), which in turn is related to many other factors (e.g., risk profile (1R7), corporate strategy (1R7) and diversification benefits). All of these are associated with the internal risk model (1R7). In addition, solvency has a vital role to play in the design of ERM in CASE 1 (1R7; 1R4; 1R15, 1R10, 1R11; 1R17). However, at the moment in CASE 1 the focus is on strengthening the risk management of individual companies, but they are beginning to put the results together on a group-wide basis.

As stated earlier, diversification is recognized as the underlying risk management tool of the insurance business (Cummins, 2000). The imbalance between the benefits of diversification as embedded in the internal risk model, and its inadequate reorganization in the proposed solvency rule is seen as a concern of respondents in CASE 1. The capital allocation among business entities across geographical locations is operated on the basis of performance of risk and return from an economic perspective. However, the diversification

within risk type, across risk type, across entities within Europe (where approximately 90% of its business remains), is yet to be captured at the group level (for capital calculation purposes). This is because of complexities attached to calculating correlations among these items. Other than regulatory reasons, a number of issues influence CASE 1 to concentrate on capital adequacy. The shortage of capital is not a problem to CASE 1 and indeed there is overcapacity (excess capital). CASE 1 is mainly a retail insurer having less focus on catastrophe risks. Therefore, the gradual improvement of Net Combined Ratio (as seen figure 1C4) indicates a strong underwriting practice. Unlike the underwriting market, the performance of the capital market is a bit of worry for CASE 1 as illustrated in its reduction in equity exposures (see figure 1C5). In addition, the market economic factors like inflation, movement of interest rates, downturn of the capital market, and the performance of the insurance market suggest that adverse claim development, regulatory changes etc. could erode the capital base very quickly even though internal factors like management efficiency and control are strong. In the face of such a volatile situation the downgrading of the credit rating will add further momentum in the financial soundness and reputation (a rational interest, which is protected by not behaving against consumers' interests) of the Group.

It is understood that by the term 'value creation' CASE 1 means the present (or economic) value of the asset-liability portfolio (which is also termed 'embedded value'; as opposed to actuarial concept which relies upon contingent claims theory). CASE 1 measure such economic value as the difference between market value of assets and the market consistent value of liabilities. The market value of assets is obtained from the market as assets are tradable. However, calculating the market value of liabilities is difficult as there is no liquid market for liabilities. As a proxy measure CASE 1, in fact, use market value of an asset portfolio that replicates the payoffs from the liability portfolio, that is, with similar risk and maturity characteristics (Meer, 1999). The allocation of capital follows the principle of accountability: business units which under-perform are not tolerated, and the over-performing businesses are rewarded.

Four teams are involved in the design and implementation of ERM in CASE 1. The first team evaluates the overall solvency of the Group. The second team looks at the compliance of IFRS issues. The third team looks after the capital allocation issues and the fourth at the embedded value. However, the four teams use different approaches, but basic problem is the same: the calculation and allocation of economic capital. The design of ERM in CASE 1 involves a management process to identify, assess, manage, and control potential events or situations to provide reasonable assurance regarding the achievement of the organization's objectives and of course detecting and managing the challenges of overall solvency. The concept of risk in CASE 1 appears to mean capital and capital means two things. Firstly, it means solvency (do they have enough capital to cover the economic capital or the risk based capital?). Secondly, capital means return (are they able to generate sustainable return in excess of the cost of capital?). Therefore, from that perspective capital is core to manage two key matrices by which the owners will measure the progress in terms of solvency and performance (where the performance is measured in terms of return on capital).

The study also finds that CASE 1 has an efficient capital management and capital allocation strategy. Moreover, CASE 1 has identified a list of significant risks associated with the business. The result obtained through modeling key risks in terms of their potential consequences, interrelations, and diversification possibilities, guides CASE 1 to decide the amount of capital required to sustain these significant risks. Ultimately, the objective of determining the amount of capital, at least for solvency purposes, does not support the daily businesses but supports the extraordinary events. Moreover, the primary aim is to reward the capital that investors have provided, whilst offering quality products and services that adequately meet consumer demand.

As mentioned earlier, ERM is traditionally called Value Based Management (VBM) within CASE 1<sup>14</sup>. One of the core issues of VBM of CASE 1 is to quantify more precisely the Capital at Risk (CaT) at the best possible level to have the best possible view of the business. In the VBM process, CASE 1 is actually striving to enhance its return on economic capital performance. Consequently, CASE 1 should have the best possible estimation of Capital at Risk in order to achieve an accurate estimation of the return on capital. In fact, this issue is in turn connected to all other issues involved in the ERM process (e.g., capital allocation; performance measurement; and management incentives).

In summary, in designing and implementing ERM, CASE 1 is putting common measurement techniques into place where each of its business units will be measured in terms of risk and value using a common platform. This will then give a picture of its exposure to risk and profit from individual business units and business lines. In theory it is possible to optimize the exposures in different businesses, in different business lines, and in different geographical units in terms of minimizing risk and maximizing the value and return. Consequently, there is always a risk-return consideration because CASE 1 puts full effort to maximize its return on capital. Nevertheless, this means maximizing the return and minimizing the capital. Moreover, minimizing the capital means wanting to meet certain risk thresholds (risk tolerance), which means finding the right combination of risks to minimize the capital.

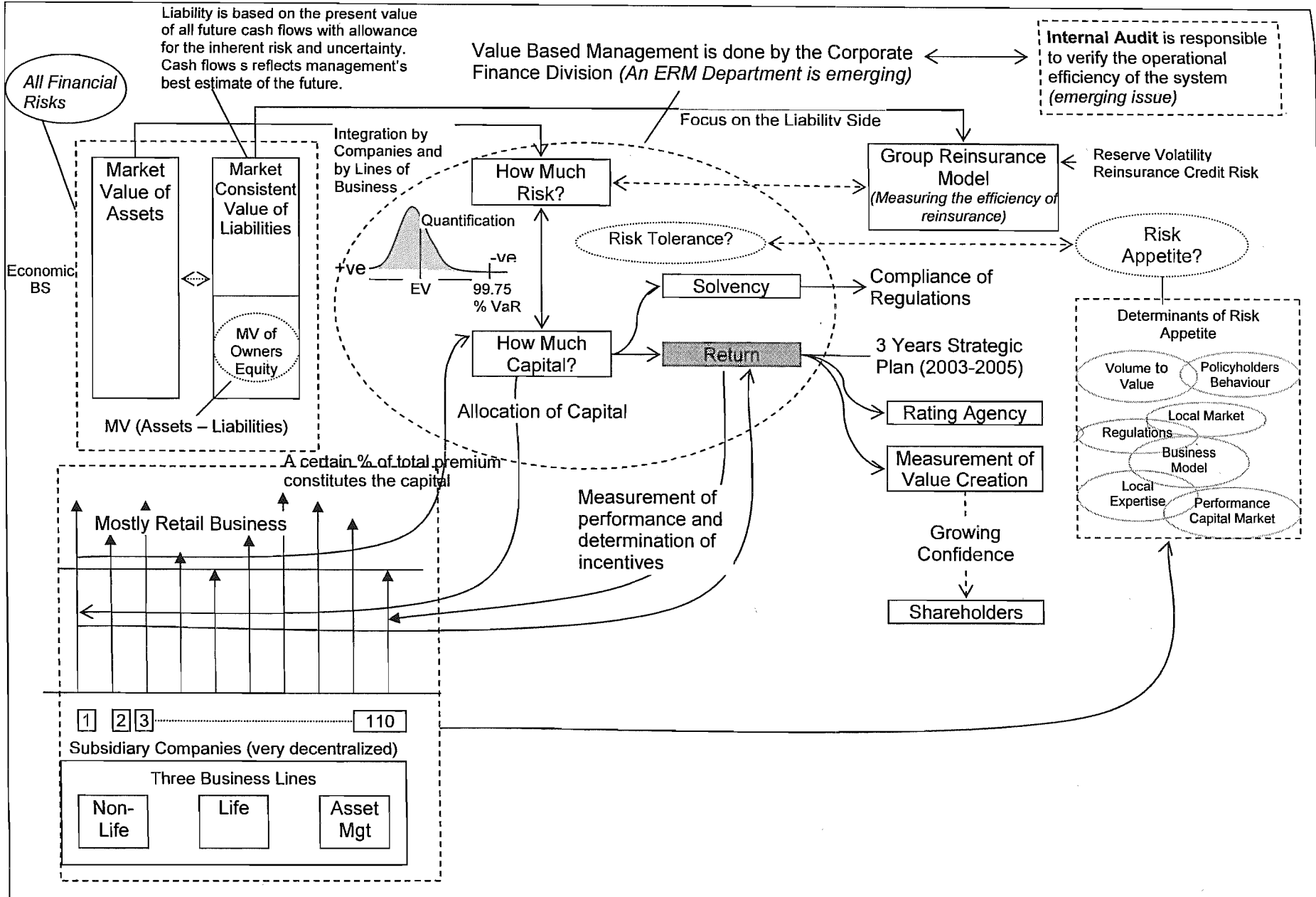
#### **4. A Conceptual Model of ERM**

Figure 1C10 brings together the results of the interview survey to illustrate the model of ERM practiced in CASE 1.

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<sup>14</sup> It is important to note that there are sufficient evidences that indicate the change of traditional VBM view towards a true ERM.

Figure 1C10:ERM Model in CASE 1





## **5. Description of the model**

The model of CASE 1's ERM summarizes in figure 1C10 (a group-wide standard to manage all kinds of risks) is based on three pillars viz. (i) risk measurement and capital allocation, (ii) risk governance, and (iii) promoting risk culture. Setting risk and return objectives is at the top of CASE 1's risk management initiative. These objectives provide local CEOs with guidance as to what risk is acceptable /unacceptable. It is important to mention here that the responsibilities as shown in figure 1C10 are allocated but not everything necessarily at the current stage.

### **5.1. Risk measurement and capital allocation**

In risk measurement and capital allocation, a group-wide internal stochastic asset-liability management (ALM) process operates for both life and non-life businesses. The output of the ALM is then used for strategic asset allocation, economic capital, future bonus rates, and reinsurance. An economic approach to cash flows, which remains at the centre of ERM in CASE 1 is executed upon allowing for profit sharing and guarantees, policyholder discretion (e.g., surrenders, extension options) and management discretion e.g., dynamic asset allocation. Moreover, the model introduces a common group wide economic capital methodology

### **5.2. Risk governance**

In the risk governance model, the Group Risk Committee made up of CEOs and Head of ERM, Head of Finance, and Head of Actuarial (see figure 1C3) is mainly responsible for setting up the Group's risk management standards and policy. The committee is also responsible for setting limits on asset allocation, insurance capacity, reinsurance and contract limits. In addition, it monitors any breach of limits, reviews economic solvency and the risk map of individual business units. Furthermore, the committee considers risk management proposals initiated by business units. In terms of the ERM activities, the committee documents

management decision rules, enforces standards (via Finance, Actuarial and Distribution department) and also develops local business units risk committees.

### **5.3. Promoting a risk culture**

In the corporate centre ERM interacts closely with asset liability management, strategic asset allocation and economic capital. Preparing risk management reports, proposing strategic actions to group risk management and implementing and monitoring decisions of group risk management provides the cultural change for risk management. ERM impacts culturally on group-wide risk and value management in capital allocation, strategic planning, performance measurement and management compensation, balance sheet structure and funding, asset allocation, product design and pricing, and reinsurance. In addition, developing the ERM for local business units, where local CEOs are responsible is considered by respondents as a part of cultural change in CASE 1.

The Risk Management Department (most recently the ERM department) is fully finance driven in CASE 1. As mentioned earlier, CASE 1 does not have a traditional CRO and CFO based in the management hierarchy. Instead they have a central finance department which drives the ERM across the organization. The internal audit department is increasingly involved in the operational issues of the risk management. Although the role of internal auditors is limited to corporate governance, in the future their expertise in technical issues is expected to grow extensively. The current initiative of getting a complete and closed model and methodology for quantitative risk management will require quality data, which is currently supplied by risk managers or internal auditors.

## **6. General discussion on the model**

The above Economic Capital Model (figure 1C10) is a stochastic model of the variability in the pay offs of the assets and the liabilities, allowing for some diversification between different risk factors. Built on a classic top-down approach, it models the behavior of the assets and liabilities. This is employed right down to company level and within companies it is employed down to the

main lines of activities. On the non-life side it is broken down between the main portfolios (e.g., motor, non-motor and commercial). On the life side it is broken down between the products with guarantees and without guarantees. This is undertaken now for about 30 large companies across the group. The model is tested to a 99.75% probability of survival over a one year period and exactly the same rule is applied to every portfolio. In addition, every portfolio is determined in terms of the € that are required to run these portfolios. The model allows management to go back and find ways of making the profit either by pricing higher or cutting costs.

As mentioned earlier diversification represents a huge impact on the capital that the Group needs. However, the question for management is how to allocate the diversification discount back to the local companies. In addition, alignment and adjustment of the methodology of calculating economic capital for the financial planning of the group with the solvency capital under regulatory guidelines is a huge political issue which will be tackled over next 2 to 3 years in the insurance industry as a whole including CASE 1.

Financial risk management, asset and liability management for both life and non-life, calculation and allocation of economic capital and strategic asset allocation are seen as the key functions of the newly developed ERM department (otherwise risk and capital management). This is supported by the ALM capabilities of the local companies. The CEOs, head of ERM, head of investment and head of the actuarial department sit in the Group Risk Committee (see figure 1C3). The operational impact of this structure (in other words, the application of ERM) is then linked to seven areas (viz. strategic planning, performance measurement, variable remuneration, solvency and leverage, asset allocation, product design and reinsurance). The first component determines how CASE 1 allocates capital into new businesses. Economic capital is allocated to existing markets, to new markets and to lines of business targeted to earn a minimum of a 10% return. The current rate for the return on economic capital for life is 10-

12% and for Property and Casualty it is 14-16%. The second component determines how to reward the managers. Measurement of management performance is based on return either on economic capital or its proxy (such as new business value, combined ratio). CASE 1 believes that its shareholders care only about profit, which is a big challenge. Paying the shareholders on the risk adjusted return is a big part of CASE 1's risk culture. The third component determines the management incentive and reward which is based on the return on economic capital. The fourth component determines the solvency and leverage performance, which is driven by a risk-based economic capital view, where solvency represents the difference between embedded value and economic capital. In addition, the strategic asset allocation decisions on equity, credit and interest rate exposures are taken against available economic capital. The output of ERM is also linked to the product design (e.g., in structuring the life financial guarantees based on the economic capital consumed). These are not done in a deterministic way. Finally, the cost of purchasing reinsurance is measured against the value of economic capital relief.

## **7. Conclusion**

The design of ERM of CASE 1 reflects its business model (which concentrates on retail business) and on the change of its culture from volume driven to value driven. Its business targets are close to the economy, which needs to be closely monitored to control short time volatility. The difficulty is that the short term focus does not value the long term business appropriately. The design of ERM comes with the strategy and this is a very much specific issue for both group and sub-groups. In terms of the strategy, the management has to decide the most effective method of allocating capital in respect of risks and the proper remuneration to stakeholders. From there it needs to decide which lines of business, which clients and the area of its risk exposures, procedures and who is authorized to do what, etc. At the beginning these issues were dealt in a very much more fragmented or departmentalized way. However, there has been a massive change, which was mainly driven by legislation. From the perspective of

future regulation CASE 1 sees two principle factors. First, running the business having regard to the capital employed, and, secondly the business is global. Previously [before the current approach to risk management] CASE 1 took risks but never quantified them. The balance sheet of an insurer is a bundle of risks. Now these risks are quantified in terms of capital requirements in order to remain in business. The study predicts that the concept of economic capital will be used more in future (rather than dividend) and this is important because cash flow and profit and dividend are not related to value creation. Nevertheless, an insurer can produce a profit and can also pay dividend but at the same time can destroy its value. It is evident that in the past CASE 1 paid a dividend even when it made operational losses.

## SECTION 5A

### OPERATIONAL CHALLENGES IN IMPLEMENTING ERM

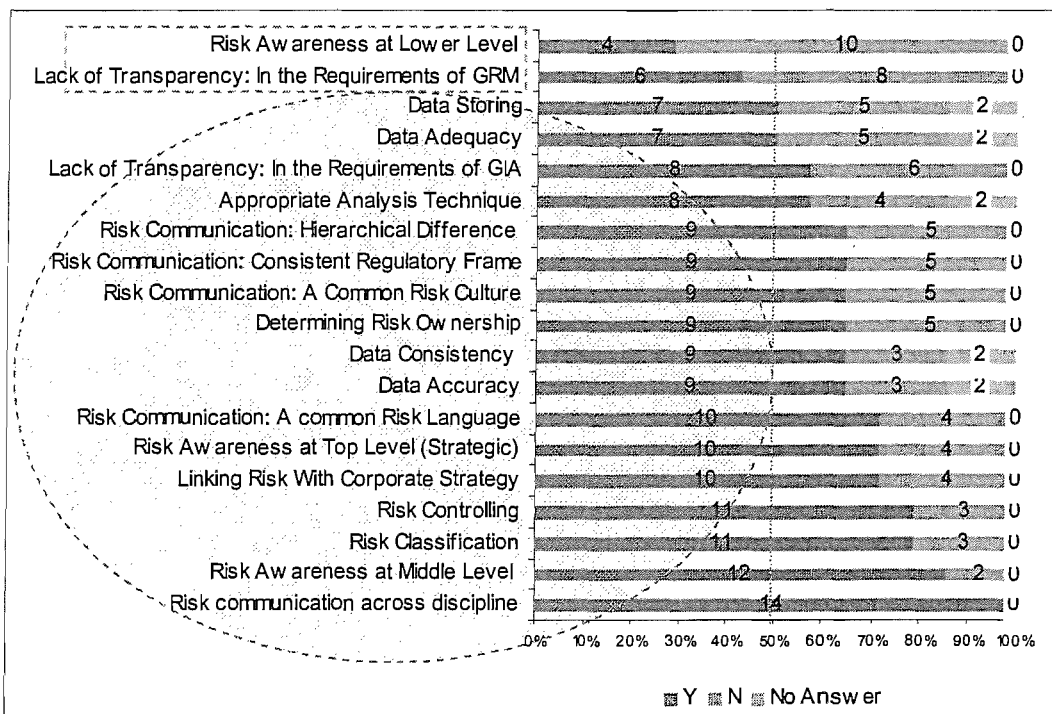
#### 1. Introduction

Section describes the key challenges faced by CASE 1 in implementing ERM. The challenges appear to fall into two categories: operational challenges and technical challenges. They will be discussed separately in section 5A and 5B respectively. The key issues have been derived from analyzing the interview transcripts and responses from the questionnaire survey.

#### 2. Questionnaire Survey Results

The survey results (see figure 1C11) suggest that risk communication across discipline is the key operational challenge in implementing ERM (14 out of 14 respondents identified this as a key issue: 100%) followed by risk awareness at middle level (86%: 12 out of 14 respondents). Risk classification and risk control was mentioned as key challenges by 79% of respondents.

Figure 1C112: Operational challenges in implementing ERM in CASE 1



One of the important features to emerge from the summary of respondents' replies shown in figure 1C11 is that out of the 19 issues identified as challenges of ERM 17 (90%) have been mentioned by more than 50% of respondents. This suggests that CASE 1 has a number of problems in implementing (in an operational sense) ERM.

### **3. Analysis of Interviews**

The interview revealed four key issues associated with the operational challenges in implementing ERM. They are:

Risk Communication

Risk Culture

Risk Awareness

A Common Risk Language

The following paragraphs discuss these issues in turn.

#### **3.1. Risk Communication**

Risk communication amongst both internal and external stakeholders is found to be one of the key challenges. Communication difficulties exist between departments in the local company (e.g., reinsurance data was available in the reinsurance department but claims data was needed to conduct portfolio modeling, and this was not available). However, one of the greatest achievements, after the evolution of ERM<sup>15</sup>, was greater a co-operation between various departments in communicating and sharing data in an improved way for their mutual benefit (1R4). Consequently, this was a fundamental breakthrough as seen from the interviews. However, there are sometimes difficulties because of the attitude and culture of the companies. Respondent 1R4 argues, "it is a complex issue and we must share the perfect understanding through intra-group communication". The study further finds that in some countries, like Germany, where CASE 1 has a lot of brands, companies do not communicate among

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<sup>15</sup> An ERM department at the head office was established in September, 2005.

themselves. However, CASE 1 is centralizing in a single entity. This act as a collector of all the information and the head of that single entity reports to the corporate. Respondent 1R10 argues, "this is the way we are building up a common standard for communication within the company". The study further finds that at the very beginning there were problems in communicating decisions (or messages) to the worldwide operation (although things are easy to understand in the corporate centre, because it basically launched plans and worked on the implementation of plans). Consequently, messages were clear to the corporate centre but it was not that easy to communicate them to local management or to enable them to understand the meaning or reason for some ratios and indices that local branches are required to consider to make sure that the risk they take, as a part of the Group is under control (1R11). Because of lack of communication, staff in CASE 1 often do not try to understand each other. Even when they are willing to attempt to do this they do not know how to do. Consequently, many don't see the advantages of [ERM]. Respondent 1R17 hopes that as a result of "may be the progress of the project [ERM], led by the Finance department things will change". Respondents also noted that barriers to enhancing communication exist across CASE 1. It is found that the retail financial services market in Europe remains largely segmented on national lines, because of natural barriers, such as language. Other constraints (e.g., tax) hinder the development of the single market and limit the delivery of cross border operational synergies in areas such as capital, risk, asset management and knowledge management (1R13). The risk based internal model is another issue for communication since this requires that risk be understood in broader terms rather than managing individual risks on a micro basis. Internal communication of this message is a slow and hard process. However, the external communication is now quite speedy. Nevertheless, implementation is now a matter of worry. It appears from the interviews that communication is a question of culture. In the past and still to some extent currently CASE 1 has a company culture which is oriented to safety (downside sense) and communications were often precise, safe, and conservative. Respondent 1R10 argues, "we were quite cautious and I



would say sometimes too cautious. In the past we were accused of being slow or not dynamic. We have some skepticism about dealing with risk but now our initiative for long term profitability is pressing us to change such a risk averseness culture". Although the communication is probably slow, currently the respondents believe that CASE 1 is absolutely on the safe side, and this is based on historically driven policy of the Group.

### 3.2. Risk Culture

The study finds that cultural barriers among the group companies, mainly because of geographical boundaries and people's perception and attitudes, are a challenge to implementing ERM. The study further finds that CASE 1 intends to implement ERM through culture and day by day business. Traditionally CASE 1 has a culture built on fragmented ideas and business models and all staff still do not know the meaning of certain terminology, such as economic capital. It seems that there is a clash between a market oriented culture, in terms of market valuation of a return on some risks and a book oriented culture<sup>16</sup>. However, this is just the beginning of a paradigm change (1R8). Essentially, the introduction of ERM is facing various challenges and this [the change of culture] is one of the challenges faced in the integration process of CASE 1. The cultural difference is related to age of different people. The study finds that historically, subsidiary companies of CASE 1 had their own culture, which was linked to the country culture. However, there has been a greater effort (which started in the mid 1990s) to create a group culture, brand name, image and corporate identity to help staff understand that they work in a large Group. The policy documents of CASE 1, for example, now bear a common group logo, which was not seen even 10 years ago. Respondent 1R5 argues, "there was not a group identity at all". In the process of branding it was necessary to centralize some processes (e.g., in the collection of information, which led to centralized decisions through a common strategy across the subsidiaries). However, this was implemented in

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<sup>16</sup> Based on historical information

CASE 1 in two steps: firstly, creating connections between head office and subsidiary companies through vertical integration and secondly between subsidiaries through horizontal integration – which is currently happening (1R5). Respondents noted that, in the past, the culture of communication in CASE 1 was top down. For example, top management used to speak with a local CEO saying, “I am investing in your company this amount of capital and tell me what you will give me back as return”. The local CEO then simply replied OK, I will underwrite this amount of premiums and will I make this amount of profits and ultimately I pay you this amount of dividend” (1R10). However, such a concept has dramatically transformed from the premium income and volume to profitability in terms of value oriented group KPIs. The staff of CASE 1 believe that a massive cultural change has taken place as today’s concept is related to the tangible value of the group in terms of embedded value and profitability. The new CEOs of CASE 1 have virtually changed local CEOs of all countries (either sacked or removed by other means). CASE 1 now operates with more financially aware and market driven staff. Respondent 1R15 argues, “the current generation is good ambassadors of a changing market oriented culture keep themselves away from volume driven business and concentrate more value driven business”. Respondent 1R15 further claims that CASE 1 has successfully managed the change of its culture in adopting the views of rating agencies; for example, where risk in execution of changes in economic perspective was identified as the biggest risk. Creating value of business is also a part of the changing culture in CASE 1. The creation of value is measured by return on capital. It is also evident that the previous management was less aware of such issues and less driven by value. They only believed in the volume of premiums by looking at the top line rather than bottom line. Respondent 1R15 further adds, “the new management has taken one step further; we look at the bottom line in addition to the top line based on our return on economic capital”. All such evidence suggests that CASE 1 now intends to align its traditional risk averse culture with the changing economy by introducing market economy and value creation concepts.

### **3.3. Risk Awareness**

Another operational challenge key to implementing ERM in CASE 1 is a lack of practical risk awareness among the internal stakeholders. The concepts of risk and risk management are quite developed in CASE 1 where people are [more or less] aware about risk. However, the challenge will be to implement these concepts [that exist in the corporate centre] in practice, particularly, in local companies. Respondent 1R11 states, "if we have a wonderful theory in the corporate centre but we are not able to apply the theory locally then all efforts are meaningless". Consequently, the challenge for CASE 1 is to implement the tools of risk management in the local companies. Respondent 1R11 further argues, "the challenges are the full implementation of ERM in the group level in order to provide the best solution". Market variables, like interest rates, are also a vital source in growing risk awareness. Respondent 1R10 states, "risk awareness needs to be changed because in the past the interest rate was double digit, which is currently below 4.25%. This is a significant risk to our guaranteed life products, which are obliged to pay the returns above 5%, it is basically a loss". Consequently, the study finds that risk awareness on the asset side and the liability side, in corporate governance structure, in corporate social responsibility and in the legal affairs etc. must always be taken into consideration.

### **3.4. A Common Risk Language**

The development of common risk language provides further complications for implementing ERM. The study finds that CASE 1 has a very simple objective [towards ERM] to manage risks in the most effective way, where strategy plays a central role. At the beginning risks were addressed in very fragmented or departmentalized way. However, there have been numerous changes (perhaps driven by regulation), which intends to introduce a common approach to address the strategy in a consistent and systematic way (1R7). Moreover, the idea behind a common risk language is very simple since the expectation of regulators and rating agencies, for example, are, in principle, the same. Respondent 1R7 states, "a common language in this respect could help us in preparing and providing

documents for them. Moreover, it could ensure accuracy". For technical purposes, say reinsurance optimization, DFA (Dynamic Financial Analysis) serves as a common language in taking account of all dependencies and the correlation between the lines of business to see the risk adjusted capital both at the business line level and company level (1R4). Respondents suggest that harmonization among various risk management tools is the first step towards producing a common set of financial projections; and the DFA model is the starting point. On the asset side, the study identifies harmonization between the asset classes and asset risks as a key issue since they use the same market consistent stochastic projection. Respondent 1R8 argues, "I know it is complex on the liability side but the liability cash flows are already harmonized in our company". The study also finds that the overriding objective of a common language in CASE 1 is to achieve a consistent set of results across the group. Such a common language is not only happening on the financial side but also in the HR functions. Respondent 1R5 states, "our European HRD Committee meets regularly every three months where all heads of HRD across Europe come around the table to discuss all the topics, to have a common line in terms of remuneration policies, reward policies". This is a new development for CASE 1. Although, a complete common risk language does not exist in CASE 1 it was clear from the interviews that in the future it will probably have appointed, nominated and created a fully fledged risk management department. Respondent 1R15 argues, "then we will start introducing a common vocabulary, a common ambition – we have such a plan. What we have at the moment is just the early seed of a risk management department". The analysis of respondents views further suggests that a common language has various dimensions (e.g., common measurement techniques) where the performance of business units are measured in terms of risk and return using a common platform (1R15). Regarding the significance of a common language the study finally concludes that since CASE 1 has many subgroups, it is very important for them to have a common approach both from a technical point of view and from an audit point of

view. Respondent 1R7 states, “surely our best practices are focusing on the audit point of view but we have to integrate these with the technical aspects”.

#### 4. Discussion

The analysis of the respondents views shows that the operational challenges focus on the functional capabilities of managerial judgment, integrity, intuition and experience. The interviews revealed insufficient effort has been exerted to identify developing risks, in particular, those that are hard to quantify but have high loss potential<sup>17</sup>. Although CASE 1 has a small crisis management team, it is totally neglected by the design of ERM. The crisis management unit mainly looks at IT security (1R16).

Risk communication across disciplines poses another problem. Coherent risk communication in CASE 1 is of growing importance for the benefit of ERM. The staff find it difficult to communicate their understanding of risk intelligently throughout the group. As 1R4 says “we must share the perfect understanding through intra-group communication”. Lack of internal communication and misunderstanding of risk among staff is a barrier in attaining the over-riding objectives of ERM. Those involved in financial risk management concentrate on the complex tools of risk measurement, capital calculation and allocation, but give less time to other issues (e.g., operational risk). Respondent 1R15 argues “I don’t want to loose any sleep thinking about operational risk, for the time being I worry much more about how we price the measurable risks”. Such an attempt to control the risk management functions by any specialized functions hinders interdisciplinary communication.

Adequate reliable data for modeling risk is another challenge. Even where consistent data is available, no attempt was made to minimize the practical difficulties of assembling them for statistical measurement and modeling

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<sup>17</sup> Extreme or residual risks

purpose. As 1R4 says, "we face numerous challenges in capturing data". A common language is actually not easy and this could, as the study finds, be the only way to develop an ERM framework. However, the study finds that this will probably be solved over time. Most importantly, a common risk language could be introduced under the intervention of the financial market and solvency regulators. This is because both International Accounting Standard and Solvency II will require much more detailed disclosure. It is probably important to decide now the best disclosure system. However, the respondents believe that the various disclosure policies of CASE 1 will come together on a common ground during the implementation phase of ERM (as they are connected, especially when issues regarding modeling and risk adjusted capital estimation are considered). Consequently, regulators (either solvency regulators or financial market regulators) play a vital role in promoting the establishment of a common approach in CASE 1. However, the fundamental question is in how much detail the regulators will define the models and the approaches.

## **5. Conclusion**

Both the questionnaire survey and the analysis of the interviews suggest that communication of risk across disciplines is the key problem facing the promotion of ERM in CASE 1. This issue is not an isolated issue but related with many other organizational factors such as culture and involvement of a single disciplinary field (which in this case is corporate finance). All these areas require a similar understanding (through a common risk language) in order to solve the key operational challenges.

**SECTION 5B**

**TECHNICAL CHALLENGES IN IMPLEMENTING ERM**

**1. Introduction**

The previous section evaluates the key operational challenges in promoting ERM. Some of these challenges are very technical in nature and need separate specialist treatment. This section deals with the technical challenges.

**2. Questionnaire Survey Results**

**Figure 1C123: Technical challenges in implementing ERM in CASE 1**

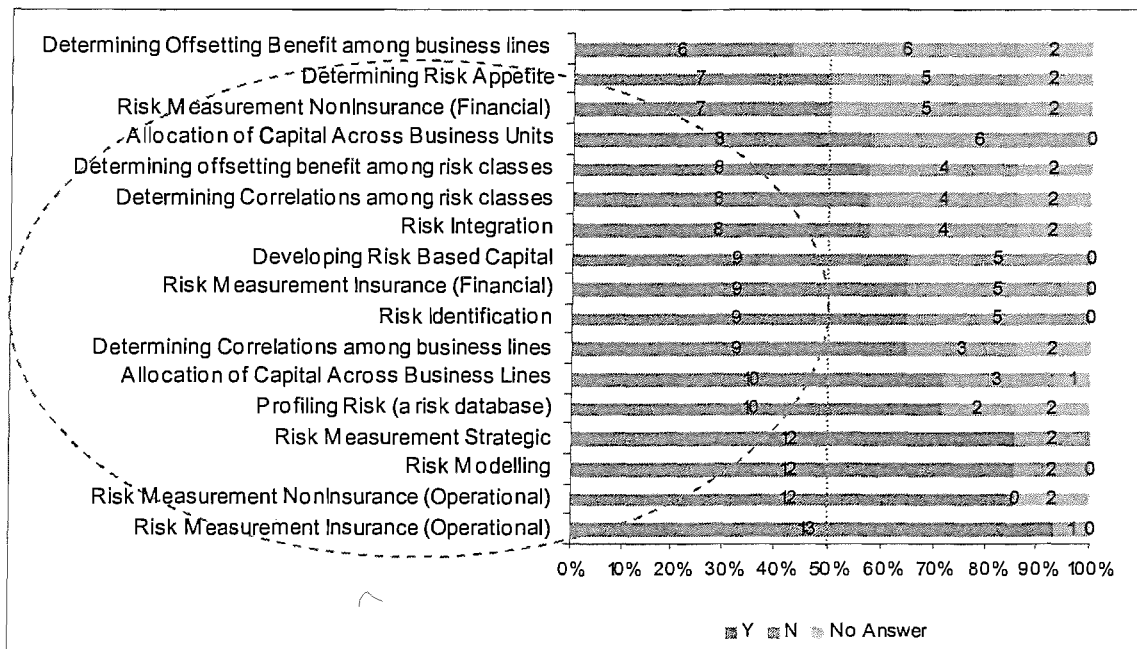


Figure 1C12 shows a list of 17 elements, identified by survey respondents as technical challenges to the implementation of ERM in CASE 1. The measurement of operational risk on the insurance side is recognized as the most important technical challenge (93% of respondents); this is followed by the measurement of operational risk on the non-insurance side, risk modeling and measurement of strategic risks (86% of respondents).

### 3. Analysis of interviews

The following two key technical challenges emerged from the interviews:

Risk Measurement

Risk Modelling

#### 3.1. Risk Measurement

The respondents suggest that without a meaningful measure of how much capital the businesses of CASE 1 need, there is no chance of assessing the performance of the business (which is the return on capital). This suggests that it is important to have a reasonably sound measure of capital. However, it is not only important from the perspective of risk management but also important from the perspective of achieving the success of the Company as a whole.

Respondent 1R15 states, "if we look at all of the directional shapes of the regulators, it is clear that they are all now beginning to talk about an economic measure of risk capital, which we are already doing". The study further noted that although CASE 1 has not achieved full integration but it is moving in that direction. Respondent 1R4 states, "in our Group Reinsurance Project we measure the group risk adjusted capital calculated from a bottom-up basis to see how the measurement of risk at the portfolio level actually gets reduced". Risk measurement is also important to capture the diversification benefits, where the sum of risks at group level is less than the sum of risk capital calculated on a stand alone basis. Risk measurement goes to the heart of ERM. The study previously found that in the past CASE 1 did not have any coordinated risk management in place. In addition, there has not been any attempt to really create a central head office function to manage risks. What CASE 1 has is really an extension of the chief executive's office doing some risk measurement and trying to raise awareness in some parts of the group. However, as respondent 1R15 states, "Now we have developed the architecture of risk measurement and management in the group, including risk management units in the local



companies". In addition to the finance function, risk measurement is also a challenge for the audit function. Respondent 1R18 states, "within the internal control framework we, on one side, investigate the net measurement of the risk, and, on other side check the management process to identify, assess, manage, and control potential events or situations to provide reasonable assurance regarding the achievement of organization's objectives".

### **3.2. Risk Modeling**

The respondents believe that CASE 1 has an efficient capital management and capital allocation model, where it works with a listed number of risks. The model drives its whole business in terms of what it does: setting consequences, their interrelations and effective diversification. After modeling them in the above terms CASE 1 decides the amount of capital required to sustain adverse events (or shocks). Respondent 1R7 states, "the capital is not to support the daily business but to support the extraordinary events". For the second pillar of the proposed Solvency II, the major objective is to set up a consistent level of asset liability modeling at Group level. The respondents believe that the modeling would mainly be conducted on a country basis because much of it is related to the products in local markets. Respondent 1R7 states, "our local products have different futures and different risk elements". Moreover, different futures need to be backed by different types of assets and CASE 1 is still concentrating on improving its knowledge in the modeling of liability to non-life portfolios (1R4). The study noted that in the past investment and disinvestment was not related to the model of risk control. However, with the launch of the new three year strategic plan CASE 1 has a guideline to support their decisions with a detailed risk analysis (1R11). In addition to the measurable risks, the modeling of operational risk (mostly unmeasurable) is another problem for CASE 1. Respondent 1R15 states, "It is difficult to model our operational risk. We can spend five years working out some models and measure the risk of fraud in our business of a computer malfunction. At the end of it we might come up with the figure which could be 6 or could be 12". Based on the BASEL II definition of

operational risk, CASE 1 does not think that it has much operational or transaction related risk attached to its business portfolio. Respondent 1R15 argues, "I don't believe that anybody up there who has a good understanding of operational risks ... I don't loose any sleep about it. For the time being I worry much more about how we price the measurable risks".

#### **4. Discussion**

Although CASE 1 uses a principle based (as opposed to rule based) internal risk model, it does not acquire a detailed picture of its overall risk exposure. The analysis revealed that linking the amount of required (and regulatory) capital with the company specific risk profile is a matter of concern in CASE 1. Moreover, making the risk profile transparent for internal purposes must come first. It is also found that the internal model of CASE 1 does not provide sufficient scope to allocate economic values to each liability in calculating the capital requirement. However, the initiative of the Group Reinsurance Project could lead to such a requirement.

The measurement of risk is also complicated. Risk is commonly measured either in terms of the expected value of a given probability and severity of adverse effect or an amount of loss in the confidence percentile limit for a particular time. However, both the measures are subject to assumptions, thus leading to imperfect managerial decisions (Haimes, 2006).

#### **5. Conclusion**

The long list of technical challenges, identified by respondents to the questionnaire survey to implementing ERM is a significant worry for CASE 1. The key difference between the findings of the interviews and the questionnaire survey is that the analysis of interviews identified only two major issues (viz. risk measurement and risk modeling). The questionnaire survey identified further issues like risk appetite, risk integration, risk identification. This may have arisen because of during the interview corporate finance staff spoke on these two

issues but the staff from other disciplines did not. This could mean that the people who have financial background and eventually deal with ERM do not see the other factors as a challenge. In contrast, the people who work beyond finance see many technical problems, in particular, identifying and profiling risks. These findings support the view that there is an uneven understanding of ERM within CASE 1. However, it is clear that it is the financial risks, in particular, the asset-liability risks that dominate the risk profile (or risk landscape) of CASE 1. Moreover, no consistent method is practiced to determine the risk tolerance, although solvency, in terms of capital, constitutes the forces of risk tolerance for CASE 1.

## SECTION 6

### THE PERFORMANCE OF ERM

#### 1. Introduction

The objective of this section is to evaluate the effectiveness of the practice of ERM in CASE 1. Though the performance of the ERM function is an important but unsolved question, inadequate attention to this issue was given by the respondents during interviews. It appears that the six KPIs serve as the scale for measuring the performance of ERM in CASE 1.

#### 2. Objective of ERM

A full understanding of ERM is yet to be established in CASE 1 and questions regarding the performance of ERM were very poorly answered by respondents. The objective of CASE 1 in developing ERM appears to be to make sure that it remains a viable player in the insurance market in the long run. Respondent 1R15 argues, "we want to remain as one of the viable growing European insurer". The study suggests that in order to consolidate its businesses in the global insurance market place, CASE 1 needs to ensure a long standing good reputation and a good relationship with the markets. Moreover, CASE 1 most importantly needs to retain enough profitable capital. CASE 1 thinks that it has sufficient capital, its reputation is also rising, and the relationship with the market is improving. Consequently, CASE 1 does not want to disappoint markets. However, it is a matter of finding a good mix between what the markets are happy with and what it [CASE 1] thinks is achievable given its risk appetite.

The respondents suggest that ERM in CASE 1 is an open process. Respondent 1R11 argues, "I see that all the different management rules and capital allocation processes across the group are changing over the time". Consequently, this makes it difficult to measure the performance of ERM. However, some respondents (e.g., 1R18) think that the return on economic capital and the return

on embedded value (a measure of available capital) could be thought of as measures of the performance of ERM.

### **3. Benefits of ERM**

One of the important benefits of ERM in CASE 1 is that it helps in the taking of strategic decisions (e.g., investment in different countries). Respondent 1R9 argues, "investment in Belgium is highly secured compared to China, which involves high operational, political, regulatory, and currency risks but offers attractive return on the invested capital". Another respondent 1R10 states, "at the moment the concept of ERM seems perfect to establish a common feeling about the company's risks". Another benefit appears to come from is adding shareholder value. The respondents believe that the main reason for the organization to exist is to create value for its shareholders. Respondent 1R15 states, "one way of demonstrating value creation is our solvency, which, in turn, is directly related to the return on capital". Furthermore, risk management in CASE 1 is directly linked to value management and value management in turn has implications for performance measurement. Here solvency and performance are regarded as important issues. Respondent 1R15 further adds, "we are undertaking ERM because of our best interests without any regulatory requirement". To another respondent 1R8, ERM allows CASE 1 TO better understand the impact of different management of different companies in their choices towards managing risk in terms of capital. The respondent categorically stresses, "It [ERM] allows me to see if the management of this company has enough capital to increase the amount of equity". Moreover, it is important for solvency assessment at the level of the single company.

The respondents believe that CASE 1 is more transparent than their competitors in a number of issues (e.g., embedded value, economic capital, return on economic capital: the KPIs), which are calculated on a half-yearly basis. In addition, CASE 1 has produced a three year strategic plan (2002-2005) where,

as respondent 1R7 states, “many of these indicators have become strategic objectives and we always keep our external community informed on the achievement of these objectives”. It is also noted that the three year strategic plan is designed to produce more return on the capital [12%] for the shareholders, which CASE 1 believes is a decent return. However, in last three years the return on capital was only 9%. Respondent 1R15 states, “as a massive insurance company with capital of €22 billion, we are going to see the rise of return from 9% to 12% in a period of three years”. Most respondents believe that this is a remarkable achievement.

#### **4. Potential demerits of ERM**

Despite the many benefits of ERM some respondents think otherwise. They argue that having total similarity across the company is dangerous, but that it is important to have consistency in the methodologies and in the processes. Traditionally, many things like underwriting, pricing, reinsurance claim payment, etc. were done independently (or fragmentally). However, issues related to corporate finance (e.g., capital management, risk management, asset management) were handled centrally because of their global nature. However, as respondent 1R15 states, “we have a whole range of fragmented functions in the middle”.

#### **5. Analysis**

The views of respondents as discussed above do not provide any clear understanding on how the performance of ERM could be measured. However, it is implied that the six KPIs serve the purpose of measuring the performance of the three year industrial plan. Clearly, such a deterministic approach to measuring the performance of ERM is risky for two primary reasons. Firstly, it ignores all soft initiatives or efforts of the team simply because they are not measurable in terms of financial figures. Secondly, there is a possibility of losing decent corporate customers who believe in long term value. However, there could be an excuse on the grounds that a major part of its premium comes from

the retail business. But it should be remembered that in order to meet a target (as set forth in the three year strategic plan) in a real value creating sense, the attitude of the retail customers will change instantly because they do not have the capability (or even intention) for long-term value. If their confidence is lost, it would be very difficult to restore.

All the KPIs are focused on the analytical approach in terms of quantifying risks and measuring the costs and benefits of various solutions. They probably add short-term value in terms of profitability. However, the analysis suggests that the real long-term value remains with the cross-disciplinary internal dialogue between various parts of the organization. This value in terms of efficiency and effectiveness is hard to measure numerically.

## **6. Conclusion**

The process of evaluating the performance of ERM is complex and difficult. Since risk management decisions are linked to uncertain and immeasurable phenomenon over a long time horizon, the performance of ERM needs to align with the uncertainty under judgmental consideration. Therefore, it is worth measuring the benefits in terms of opportunity cost of intangible terms other than the monetary evaluation between risk and return. Although, such an alternative analysis is logically acceptable it would be difficult to apply in practice because of its apparent complexity, cost, and requirements of time and human resources.

Table 1C3: List of the respondents

Code	Full Name	Designation	Discipline	Location	Type of Interview	Date of Interview	Time
1R1	Andrew Simpson	Head of Statistics, Actuarial and Control	Actuary	United Kingdom	Face-to-face	02 December, 2004	1 Hour
1R2	Cristiano Borean	Asset Management	Finance	Italy	Face-to-face	22 <sup>nd</sup> October, 2004	1 Hour
1R3	Derek Stimpson	Head of Reinsurance	Reinsurance	United Kingdom	Face-to-face		1 Hour
1R4	Dott. Andrea Carlesi		Reinsurance	Italy	Face-to-face	22 <sup>nd</sup> October, 2004	1 Hour
1R5	Dott. Giuliano Dovera	Manager HRD	Human Resource	Italy	Face-to-face	22 <sup>nd</sup> October, 2004	1 Hour
1R6	Dott. Marina Donati		Corporate Sustainability	Italy	Face-to-face	22 <sup>nd</sup> October, 2004	1 Hour
1R7	Dr. Alessandro Dona	Vice Director	Regulation and Compliance	Italy	Face-to-face	21 October, 2004	1 Hour
1R8	Edoardo Malpaga	Risk Integration	Corporate Finance and Capital Allocation	United Kingdom	Over the telephone	21 <sup>st</sup> April, 2005	1 Hour
1R9	Frances Stapleford	Head of Legal and Claims (Global Risk)	Claims	United Kingdom	Face-to-face	02 December, 2004	1 Hour
1R10	Gianluca Colocci	Head of Corporate Finance	Finance	Italy	Face-to-face	21 <sup>st</sup> October, 2004	1 Hour
1R11	Marco Maffioli	Manager in Corporate Finance	Finance	Italy	Face-to-face	21 <sup>st</sup> October, 2004	1 Hour
1R12	Massimo Orsini	Deputy Divisional Director	Underwriting	United Kingdom	Face-to-face		1 Hour
1R13	Mel Carvill	Head of Strategy and Corporate Finance	Corporate Finance	Italy	Presentation at the Macros Solvency II Conference	23 <sup>rd</sup> November, 2005	1 Hour
1R14	Nazareno Carni	Area Manager	Underwriting	Italy	Face-to-face	22 October, 2004	1 Hour
1R15	Paul Caprez	Head of Capital Allocation	Finance	United Kingdom	Face-to-face	28 <sup>th</sup> July, 2004 25 <sup>th</sup> October 2004 10 <sup>th</sup> of March, 2005	1 Hour 1 Hour 1 Hour
1R16	Peter F. Bransby-Zachary	Secretary and IT	Business Continuity Management	United Kingdom	Face-to-face	02 December, 2004	1 Hour
1R17	Peter Puschel	Chief Internal Auditor	Internal Audit	Italy	Over the telephone	01 <sup>st</sup> June, 2005	1 Hour
1R18	Steven Spano	Chief Financial Officer (Global Risk)	Finance	United Kingdom	Face-to-face	02 December, 2004	1 Hour



**REPORT ON THE UNDERSTANDING,  
MOTIVATION, DESIGN, CHALLENGES  
FOR IMPLEMENTATION, AND  
PERFORMANCE OF  
ENTERPRISE RISK MANAGEMENT  
IN  
CASE 2**

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## SECTION 1

### A BRIEF OVERVIEW OF CASE 2

#### 1. Introduction

CASE 2 provide insurance products and services in over 130 countries with offices in 28 countries. The Group is organized into three main regions (i.e., United Kingdom, Scandinavia, and International) and is one of the top three insurers across the Nordic region, with a market share of around 10%. CASE 2 is the third largest insurer in both Denmark and Sweden and is also number one in the Baltic states of Latvia and Lithuania. Its businesses in Scandinavia are primarily written through the Internet, call centers and tied agents. A small but increasing volume of commercial business is written through brokers.

Figure 2C1 illustrates its premium income from different geographical locations.

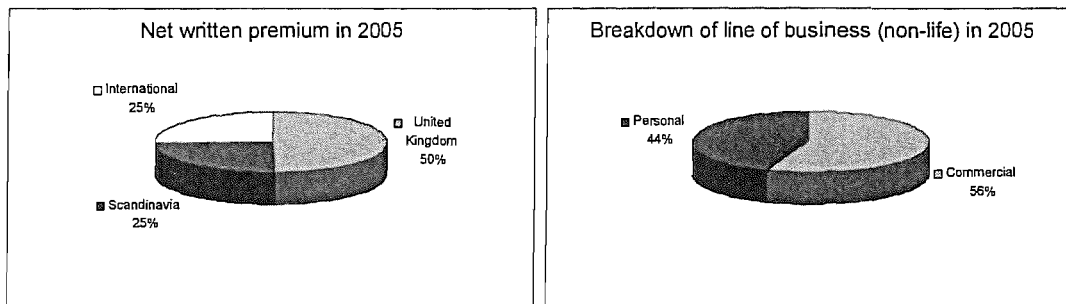


Figure 2C1 shows that in 2005, approximately 50% premiums come from the UK (where it is the second largest general insurer), with 25% each from International (operating 21 countries) and Scandinavian (Nordic region) businesses.

The information presented below with regard to the history, business model, corporate objective and strategy of CASE 2 are collected from various sources, including its webpage, annual report, and analysts' reports. In order to maintain the confidentiality of the specific source of data (e.g., year of annual reports) are avoided intentionally.

## **2. Corporate History**

CASE 2 has been operating for almost 300 years. The current Company structure was created in 1996 following the merger of two of the largest insurance companies in the UK. In the United Kingdom CASE 2 is the second largest commercial insurer, with a market share of over 10%. Its commercial business provides property, motor, liability and selective specialty products, with focused value propositions for specific customer and broker segments. CASE 2 is one of the top three personal household and motor insurers and its direct operation under a reputable brand name currently has over two million active policies. CASE 2 operates a multi-distribution capability enabling CASE 2 to write business through brokers, as well as direct and online.

## **3. Business Model**

Over the last two years the CASE 2 has undergone significant restructuring and now focuses on general insurance business. Its strategic objective is to run general insurance businesses with strong market positions that deliver sustainable profitable performances. CASE 2 operates in over 130 countries. The business of CASE 2 is well positioned in its chosen markets, with all core businesses achieving strong returns. While CASE 2 looks to build upon the positions of its core businesses, it continues to reduce the Group's exposure to the US (which does not fit with the Group's strategy and risk appetite). In recent past CASE 2 has made significant progress in reducing the Group's exposure in the US. At the international level, CASE 2 has operations in over 21 countries across the world, including Canada, Ireland and Italy. It also has businesses in the developing regions of Latin America, Asia, Middle East, India and China. In the international market CASE 2 writes insurance for individuals' (primarily household and motor insurance) and for small to medium sized commercial customers who also have large and specialty risks<sup>1</sup>.

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<sup>1</sup> Source: Annual Report

#### **4. Corporate Objectives**

The Corporate Objectives of CASE 2 fall under three broad headings (viz. structure and business focus, leadership and culture, and balance sheet). The corporate objectives of CASE 2 are framed on three core principles: integrity, performance, and responsibility. It is committed to act with openness, fairness, integrity, and diligence. Moreover, it promotes a positive and challenging high performance culture. In addition, acting responsibly as individuals and as a company applies to the management of its business, its approach to corporate risk and its interaction with key external stakeholders.

#### **5. Corporate Strategy**

In 2004, CASE 2 has undergone significant restructuring and is now a focused general insurance business. Its objective is to run general insurance businesses with strong market positions that deliver sustainable profitable performance. CASE 2 has implemented an operational improvement programme to enhance operational efficiency, control and the customer experience. It believes that the key to delivering against its strategy is having the right culture and right people. It is focused on developing talent through the creation of an environment where responsibilities and accountabilities are clearly defined, people are challenged and performance rewarded. It further aims to continue to embed a performance culture across the Group. Its strategy is based on a disciplined approach to delivering quality earnings and its financial objectives<sup>2</sup>.

#### **6. Risk Management**

The Board of CASE 2 has reviewed the Group's appetite for risk, establishing a new Risk Management Framework in 2004. This framework, overseen by the Board Risk Committee, is designed to manage the risk of the Group failing to achieve its business objectives. The revised Risk Management Framework ensures not only that CASE 2 is compliant with the FSA Prudential Sourcebook but also that it addresses all of the risks it faces. The new framework also led to a

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<sup>2</sup> Source: Annual Report

change in the way that it approaches its reinsurance both in terms of the assessment of reinsurers' credit risk (with a central function to assess their financial strength) and the way in which it structures its reinsurance program.

The Board Risk Committee, which meets monthly, comprises the executive directors and other executive management. Its purpose is to define the Group's risk appetite prior to approval by the Board, approve policy and minimum standards that are consistent with the appetite, ensure risks that are outside the appetite are mitigated in an appropriate manner and oversee and challenge the Group's risk management processes. The Committee achieves these objectives by considering reports from risk specialists both internal and external to the Group, and by reviewing Group level risk management information.

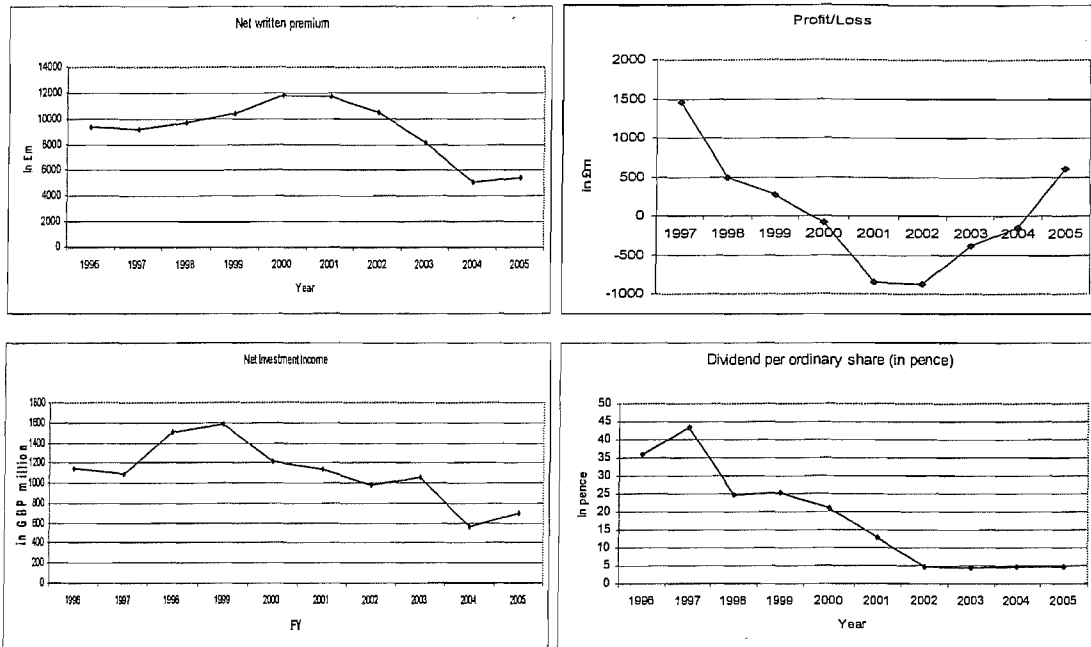
The Board of CASE 2 has overall responsibility for the Group's systems of risk management and internal control and for reviewing their effectiveness at least annually. The systems are designed to manage, rather than eliminate, the risk of failure to achieve business objectives and can only provide reasonable and not absolute assurance against material financial misstatement or loss. Executive management has the responsibility for establishing and implementing appropriate systems and controls in their own areas of remit. The Group Risk Management Framework provides the mechanism through which risk management and control is embedded throughout the Group. Each business is required to follow a consistent process to identify, assess, manage and monitor their key risks. A central risk management function (the Group Risk function) oversees this process and reports progress to the Board Risk Committee<sup>3</sup>.

Figure 2C2 illustrates the four key financial indicators (e.g., net written premium, profit & loss, net investment income and dividend payout) of CASE 2's performance.

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<sup>3</sup> Source: Annual Report

Figure 2C2: Key financial indicators



### 7. Background of Interview Respondents

A total of fifteen people have been interviewed for the purpose of the study, a list is attached at the end of this document.

Figure 2C3: Professional qualifications of interview respondents

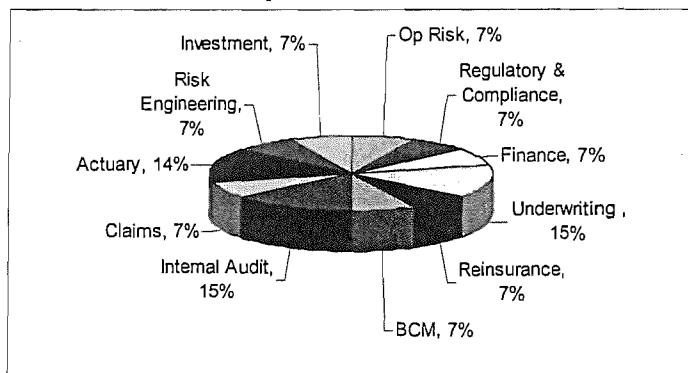


Figure 2C3 illustrates the background discipline of the respondents of 15 interviewees, 15% are from internal auditing, 15% are from underwriting, 14% have an actuarial science background, and the rests are distributed equally between finance, investment, operational risk, reinsurance and business continuity. The key point here is that the respondents came from interdisciplinary backgrounds and this gives the opportunity to consider an interdisciplinary view of ERM.



## SECTION 2

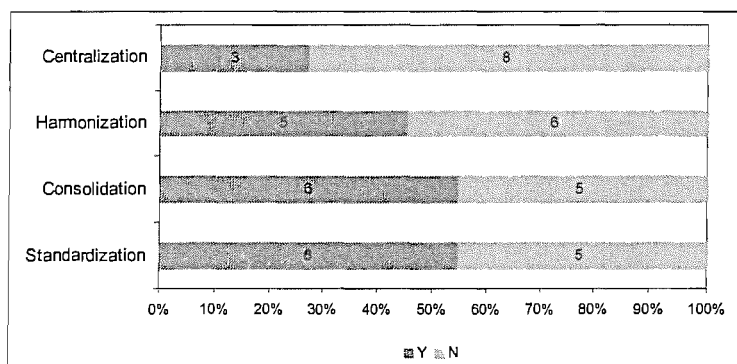
### THE UNDERSTANDING OF ERM

#### 1. Introduction

The objective of this section is to study the understanding of the staff of CASE 2 for ERM. Following the method used for CASE 1, the section will firstly explore the questionnaire survey results and the interviews will be analyzed. Thereafter, the survey results will be compared and contrasted with the findings of the analysis. Finally, conclusions will be drawn.

#### 2. Questionnaire Survey Results

Figure 2C4: Understanding of ERM



The results shown in figure 2C4 indicate that 6 out of 11 (55%) survey respondents identified both standardization and consolidation as the closest concepts to ERM within CASE 2. Harmonization and centralization were identified as being associated with ERM in CASE 2 by 45% and 27% of respondents respectively.

#### 3. Analysis of Interviews

The following paragraphs describe the key concepts associated with ERM, as identified by respondents.

### **3.1. Centralisation**

Respondents indicate that risk management has been an integral part of the way CASE 2 manages its business on a decentralized basis. However, until four and a half years ago there was no attempt to co-ordinate their functions. One respondent 2R7 says "it was a management culture that said we wish to manage this business on a decentralized basis with very little centralized control, very few centralized checks and balances. The only focus of centralized risk management before this time (three and a half years ago) was a small attempt to centralize operational risk management, particularly in the area of Business Continuity Management. This argument was contrasted with another respondent (2R9) who says "previously the risk management functions in the finance department were more centralized and we are now tending to decentralize functions".

### **3.2. Harmonisation**

From the views of the respondents it is clear that businesses in the CASE 2 are primarily responsible for managing risks. One respondent 2R15 argues, "it is our role in the centre to formulate policy guidelines that are aimed at ensuring harmony across the group". It is found that CASE 2 maintains three lines of defense system in its organizational structure to ensure that risks are continuously detected and managed at every stage of operation. CASE 2 has achieved a very substantial level of compliance with the integrated framework of insurance risks. This can be demonstrated (as 2R7 argues). Moreover, CASE 2 did some gap analysis work in early 2005 with each business unit around the world against all of its risk management definitions. The responsibility of risk management is divided at different levels in the corporate centre and the business units. However, it is argued by several respondents that it is particularly important to have some sort of cohesive view of risk at the top level (executive committee; audit committee and board) where all strands of risk come together. If risk reports are presented in an inconsistent fashion (three or four types of measurement methodologies) then top management is not going to be able to take any consistent decisions. One respondent 2R7 argues, "we [the top

management] nevertheless like to see a simple but comprehensive view of risk.” Pricing of risk was found to be the core to all risk management issues in CASE 2. Its pricing of risks is a direct result of the companies risk profile, management’s appetite towards risk, market competition and the business plan. In addition, pricing is an essential element in the actuarial consideration of reserving. One respondent 2R5 argues, “the lack of a consistent view of all of these interrelated issues, at least from our actuarial point of view, may lead to inaccurate pricing”. The arguments clearly emphasize the role of ERM in bridging the inconsistent frameworks from risk pricing to management responsibilities across CASE 2 – this argument suggests that ERM is seen as harmonization.

### **3.3. Standardization**

The study finds that the investment function of CASE 2 has been outsourced and the centre controls the investment functions which are scattered across different geographical locations. It is important to see how the local investment committees run and how they make decisions. One respondent indicated that the key idea is to ensure individuals know each other and to make sure that a uniform or common standard exists for investment management across the group (2R11). Similarly, this is true in pricing of products where designing standard models is necessary. Traditionally CASE 2 had a great deal of flexibility to calculate premiums depending upon the structure of policy documents. One respondent 2R12 argues, “it is a huge amount of work for us to come up with a standard pricing structure of any single line of business. I think harmonization among various policy documents is essential at this stage”. Nevertheless, as the study suggests, CASE 2 is historically weak in this area. In addition, the interview survey suggests that the recent changes in the risk management practice in CASE 2 provide a challenge to its standard reporting practice. As 2R2 states, “instead of presenting our audit report in the traditional format we now include the cause and potential implication of any non-compliance”. The arguments clearly indicate standardization of methods and tools of managing risks is a key element

of ERM. Moreover, standardization was found to be closely associated with harmonisation.

### **3.4. Integration**

The interview survey suggested that it is not the intention of CASE 2 is to integrate its business but rather to try to get a greater understanding of the factors which produce insurance risk and then make sure that within each business those factors are properly understood, analyzed and dealt with. One respondent 2R7 argues, "Nonetheless we wouldn't try to integrate lines of business which are essentially different – that we would certainly never try to do". Essentially senior management should see the integrated picture in taking prudent decisions. However, a clear understanding is very important at each stage of operation. People who are engaged in the day to day pricing of risks, particularly setting technical price, need to have a thorough understanding on why and which reserves are built up both at the case level and the bulk level; the way in which the reserves have been calculated. As 2R12 argues, "They particularly need to understand if there is believed to be any deficiency of those reserves levels for any reason or whether there is any surplus in those reserves". In complying with the massive regulatory changes in the insurance industry initiated by FSA for last couple of years, CASE 2 believes they have to take an integrated view of their business. The sophistication in the measurement of risk is just an example. Integration is also necessary among various departments as 2R12 states, "I think that some departments' (i.e., actuarial department, underwriting, claims, reinsurance) need to be more integrated in order to bring on a common level. However, I don't think it exists with us at the moment". Managers in CASE 2 believe that it is important to explain to each other why they want it and why they are doing the job since then they are more likely to attract good staff. Currently, many staff do not understand the significance of what actuaries, for instance, want from them. The study finds that this is a communication issue. All the information suggests that CASE 2 is undoubtedly heading over time towards an integrated view of risks, a position where

everything captured in a single document, whether they are related to insurance, credit, liquidity risk or operational risk. One respondent 2R7 states, "This is to help our senior management (e.g., the executive committee and the audit committee) to make discussion".

#### **4. Discussion**

Integration of lines of business is probably not the idea of ERM in CASE 2. Each separate line of insurance businesses is subject to different influences on price and those are driven by the nature of the product itself. Therefore, looking at the rating of any insurance product there may be a number of different factors which would influence the price of that product. Therefore, it is important to look at the pricing of each product on a disaggregate basis and build up a price centrally from components – and that's the way CASE 2 tackles pricing of any line of insurance business anywhere of the world. Pricing is simply one of many aspects of risk management providing only one of the elements of the risk management framework. The analysis discovers a clear message about the importance of individual treatment of risks in CASE 2. For example, risks on underwriting include pricing risk and managing the aggregation of risks. On the claims side the risks are very much around claims leakage, handling claims and reserving (which is partially a claims function and partially an actuarial function for bulk reserves). Consequently, it is important to look at claims and underwriting separately although they both make a contribution to the overall risk of the Group. Interestingly, one respondent 2R15 argues, "I like to talk just about the risk management without the word 'enterprise', because to me it [ERM] has a lot of difficulties ...". The difficulties that the respondents indicate are that ERM is used in the narrower sense beyond the technical and compliance issues. As 2R15 further argues, "When I hear people talking about enterprise-wide risk management, I think that they are talking about something narrower". There is difficulty in defining the understanding of risk of staff in CASE 2 because it depends on their background – staff from different backgrounds appear to have different understanding of the same issue.

The questionnaire survey established both standardization and consolidation (i.e., integration) as equally close to the concept of ERM. However, the interview survey suggests that they are two separate issues within the central concept of ERM. These are seen differently by respondents depending on their professional background. The inconsistency between these two surveys exists because respondents perceive ERM across a multidimensional range, where the context of the prevailing situation plays the key role. Consequently, the perception of ERM varies at different levels of the management hierarchy.

## **5. Conclusion**

The above discussion suggests that the understanding of ERM is an inherent part of the strategy setting processes and the link between the strategy and risk is absolutely critical. The survey results suggest that strategy and risk are a little disconnected in CASE 2 but that they are getting closer (in particular, for credit, market, liquidity, and insurance risks).

## **SECTION 3**

### **MOTIVATION FOR ERM**

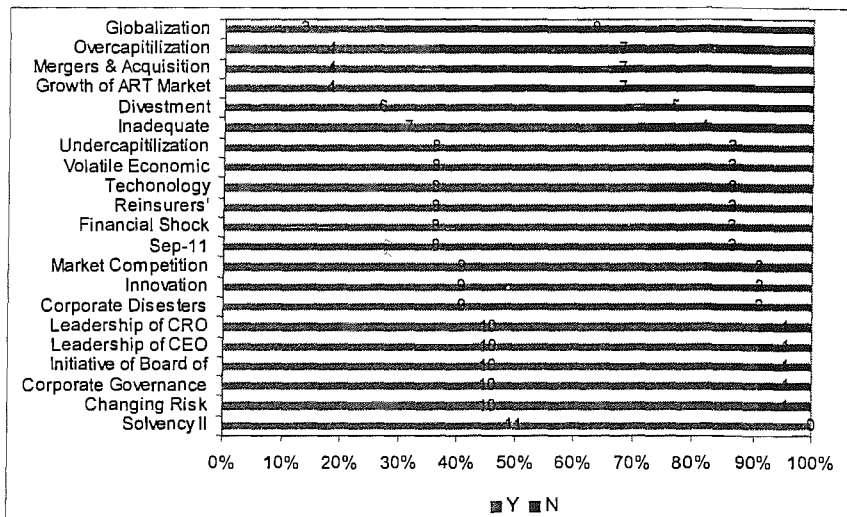
#### **1. Introduction**

It is evident that risk management is an integral part of the way CASE 2 manages its business on a daily basis. But until four and a half years ago there was no attempt to co-ordinate and to take an overview from the corporate centre because of the management style in place in the organization at that time. The previous management culture focused on a decentralized system with very little centralized control and very few centralized checks and balances. Risk management was controlled by the office of the CEO. Then Risk Management solely focused on traditional operational risk management: particularly in the area of Business Continuity. Moreover, CASE 2 did not concentrate much on any individual type of risks (e.g., operational, market, credit, and liquidity) but decided to manage the whole business holistically, partially to meet the demand of investors for higher returns and most importantly to meet the regulatory requirement. In fact, the then CEO did point out the demand of investors for having some greater risk management activity in the entire group. Subsequently CASE 2 began the development of the risk management framework by rolling out and embedding it across all areas of the business worldwide.

The section is structured as follows. Firstly, the questionnaire survey results will be presented. Secondly, the analysis of the interviews will be explored under key headings. Thereafter, a brief discussion will be undertaken and finally the conclusion will be drawn.

## 2. Questionnaire Survey results

Figure 2C5: Driving forces of ERM



The results of the questionnaire survey shown in figure 2C5 suggest that respondents identified regulations as the key motivating factor for ERM in CASE 2. All respondents (100%) identified Solvency II and 91% identified Corporate Governance as key driving forces. These factors are clearly followed by the changing risk landscape (91%) and the leadership of senior executives (including the leadership of the CEO, CRO and Board of Directors) – all mentioned by 91% of respondents.

## 3. Analysis of Interviews

The following paragraphs describe the key driving forces identified in the interviews.

### 3.1. Leadership

The initiatives of both CEO and CRO were found to be the key driving forces of ERM in CASE 2. They are discussed below.

#### 3.1.1. The leadership of CEO



The interviews revealed that under the leadership of the previous chief executive, the top management (four and a half years ago) believed there was no reason to have a greater central overview of risk management, particularly in the insurance area. However, the chief executive did realize that the investors of CASE 2 wanted some sort of greater risk management activity, in particular, within the insurance area. Consequently, four and a half years ago, CASE 2 began to develop its risk management framework and to roll it out to the fragmented functions worldwide. One respondent 2R7 argues, "recently, we have been trying to link the insurance risks with non-insurance risks (e.g., market, credit, liquidity and operational)". Such arguments are also supported by 2R15, who said, "if our new CEO was not concerned about the understanding of risk in terms of compliance issues then we would not have made progress". The interviews identified a real culture of accountability and leadership as a prerequisite for ERM in CASE 2.

### **3.1.2. The Leadership of CRO**

A positive culture of risk comes very strongly from the new risk director. This is essentially a top to bottom process. Respondent 2R13 argues, "it is not an evolving issue rather it is just imposed from the top of the organization". The interviews identify that this is the view of the top management of how the company (CASE 2) is going to be run. However, it was clear from the interviews that success of the venture requires people to take local ownership and to admit responsibility for the consequences.

### **3.2. Volatile Economic Situation**

The interviews further suggested that one of the main factors behind the introduction of coordinated risk management in CASE 2 was the quality of results. During 2001-2003 the financial results were not at the level that the CEO was happy with (see figure 2C2). This led to the organization into looking hard at itself. Respondent 2R7 argues, "at the core was the weak results and also failure of the organization to look at ways of addressing some of the causes that

immediately became apparent". Hence there was a realization that a greater control and greater risk management activity for insurance risk at the centre was required. It was clear from the interviews that CASE 2 had experienced a very hard time, caused by many unfortunate events (e.g., the departure of the CEO, imposition of regulatory fines, and controversial coverage from the business press due to the unsatisfactory financial performance). All of this bad publicity ultimately established CASE 2 as a troubled insurer. Such things also gathered momentum from a range of issues (e.g., high-scale exposure on asbestos liabilities in the United States, flood losses in the United Kingdom and the overall affect of the September 11 incident). All of these unfavourable incidents affected the share price of CASE 2 quite badly during 2000 and 2001. In such a distressed situation the company decided to sell the entire life business in 2001 and to remain in business purely as a non-life insurer. One respondent 2R13 states, "it was really a combination of undesirable events that led us to develop a more integrated approach to risk management and they prevailed over a period of a couple of years".

### **3.3. Regulations**

The interviews did suggest that regulations are a key driver influencing the motivation of CASE 2 towards developing ERM. It actually wants to see the broader benefit of its risk management initiatives. However, CASE 2 does not want to deviate too much from the regulators' agenda. One respondent 2R13 argues, "I think that mismatch between our initiatives and those of regulators' will disadvantage us. We do not want to go ahead of the regulatory curve because we do not know the potential consequences". This argument was supported by 2R7, who states "we believe our initiatives are a wonderful and conceptually rigorous approach towards a perfect ERM but they all can be turned out simply because of the disagreement of regulators". The respondent 2R15 disagrees: "I think regulation is quite an important driver of our modern risk management". In fact, there is a tendency to believe that the practice of risk management in the banking sector is far more advanced than in the insurance sector and the

initiative of regulatory reform driven by the FSA will bring a remarkable change in insurers' governance and risk management arrangements. The study, however, revealed that the most significant risk in the area of regulation and compliance is the risk of not identifying and interpreting regulatory requirements that are faced by CASE 2 in their operating jurisdictions. However, from a group perspective some respondents believe that the key risk is more strategic, namely, determining the right amount of capital. 2R15 states, "Capital and strategy are key risks for the group". The survey, however, suggests that although CASE 2 initiated a change in its risk management practice well before the imposition of current regulatory obligations, the execution of FSA requirements (in particular, submitting reports within specific deadlines) certainly provided enormous momentum to the risk management efforts.

#### **4. Discussion**

The questionnaire survey results suggest that regulation, changing risk landscape, leadership of board of directors, CEO and CRO were the key driving forces of ERM in CASE 2. The interview survey finds the same issues contributed towards the evolution of ERM in CASE 2. However, careful analysis of the data suggests that these issues are not isolated from each other but they essentially depend on both time and context throughout the development of ERM.

#### **5. Conclusion**

It is clear that risk management has been an integral part of the way CASE 2 manages their business on a devolved basis. However, there was no attempt until three and a half years ago to co-ordinate it and to take an overview from the centre. The insurance industry as a whole has experienced a lot of problems because they did not manage risk proactively in the past, thus resulting in a loss of a significant amount of capital and shareholder value. So there is an effort currently underway in CASE 2 to overcome the gap through introducing sophisticated risk management practice. However, the interview survey

suggests that the danger at this stage is that CASE 2 (and the whole insurance industry in general) is expecting to come up the curve very fast (probably within 2 to 3 years), whereas the banking industry took about in 10 to 15 years to reach the same point. Nevertheless, whilst a lot of progress has already been achieved there is still a long way to go in terms of risk culture, risk awareness, risk communication, and most importantly in terms of understanding of risk.

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## SECTION 4

### Design of ERM in CASE 2

#### 1. Introduction

The section describes the design of ERM in CASE 2. The analysis was conducted on the basis of the data collected through interviews but respondents were found to be insufficiently aware of the different elements of ERM (at least from an interdisciplinary perspective). Consequently, inadequate data prevented a sketch of a conceptual model for ERM of CASE 2 to be drawn (unlike the other three CASES). Moreover, no questionnaire survey was conducted for this section similar to other CASES.

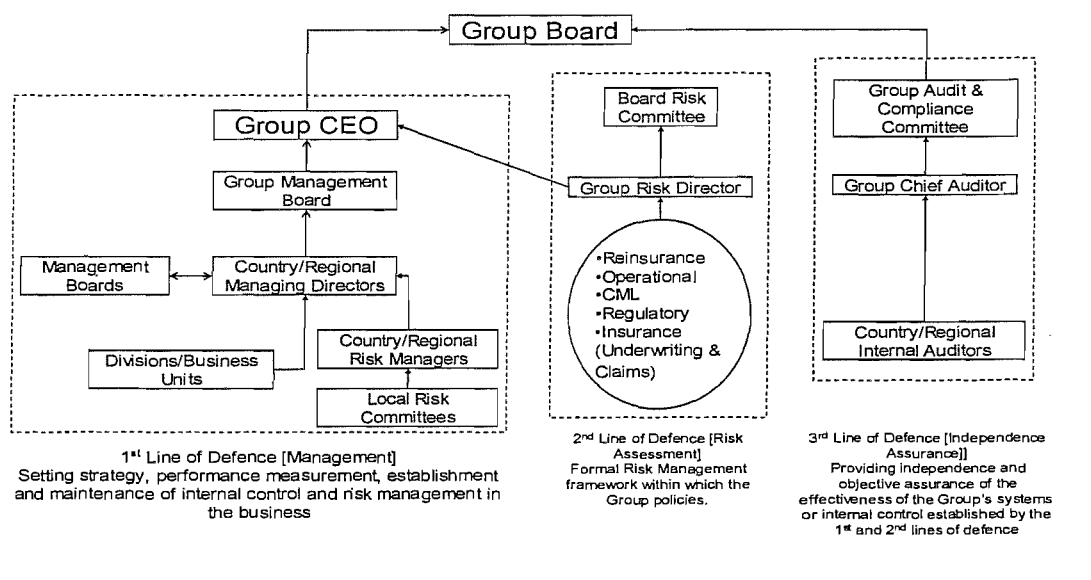
#### 2. Analysis of interviews

The following paragraphs describe the elements in the design of CASE 2's ERM as obtained from the interviews.

##### 2.1. Corporate Governance

The study finds that CASE 2 operates a three-line defense structure as seen in figure 2C6.

**Figure 2C6: Organisational structure**



It is seen that first line of defense involves businesses take risks and primarily is responsible for managing risks. The group risk management team operates in the second line of defense. It is principally responsible for the management of risk in creating policies, structuring frameworks and formulating efficient ways of managing risks. It receives reports from the operational level, who act according to group policies and guidelines. The group risk management team then analyzes these reports and reports up to the board risk committee for decisions. The audit function formulates the third line of defense (2R15). In 2004 CASE 2 strengthened its risk assessment and compliance functions, which has driven improvements in all key control, accounting and management information processes. In addition, CASE 2 is committed to manage its business in a socially and environmentally responsible manner, which has been reinforced by increasing interest in Corporate Responsibility as a risk and compliance issue (Source: Annual Report of CASE 2).

## **2.2. Capital**

Calculation of regulatory capital is regarded by many respondents as a vital issue in CASE 2 under the current regulatory regime of FSA. One of the regulatory requirements is ICA (Individual Capital Assessment). Respondent 2R12, who is currently assigned to develop a framework of ICA states “my job is effectively 100% affected by the recent changes in FSA Prudential Sourcebook”. The study finds that in the end the Group ICA will ultimately include all sorts of risk factors (e.g., risk pricing, determining risk tolerance of each individual business line and ultimately, of the group etc.). In this work, the capital is charged based on the risk profile and even the overall risk culture of the Group. However, CASE 2 believe that with a stronger capital base and less risk on the balance sheet it is well positioned to meet the challenges of the changing regulatory landscape (Source: Annual Report of CASE 2). The interview survey found that cost of capital was at the centre of the design of ERM in CASE 2, and this triggers the underwriting and financial policies and strategic decision making.

## **2.3. Economic Capital**

The economic view of capital (i.e., risk-based capital) is seen as a dominating issue in the design of ERM in CASE 2. It was clear from the interviews that the concern about economic capital comes more from regulatory issues. However, CASE 2 has constraints on how much can write depending on its capital position and respondents expressed a lot of the concerns on regulatory issues (e.g., ICA in terms of estimating capital and allocating capital). These issues are still evolving and respondent 2R13 states, “the concept of economic capital is yet to fit into our risk management framework, while the entire group is concerned. However, it is not happening at the moment”. Several respondents indicated that effective economic capital allocation can play a key role in bringing the tangible benefits of ERM. However, the current risk management concern of CASE 2 is clearly associated with the regulatory environment. However, 2R13 argues “it indeed is encouraging but there is a slight caution of going too far from the line of the regulators”. The interview survey however concludes that the economic

capital model approaches will ultimately drive the business decisions of CASE 2. The respondents believe that the risk management decisions in CASE 2 need to be made in a capital context. However such an approach will change business processes, decision making processes and strategy setting process. One respondent 2R15 argues, "at the moment we could not reach there [full implementation of ERM] but in the near future much higher quality management information will come through this process at this [corporate] level".

The interviews did not reveal much in-depth information on other issues such as risk profile, risk based capital, capital allocation, diversification, risk appetite, risk tolerance, etc. Although these are clearly significant issue, from the information obtained from the interviews it is clear, they are not well developed in CASE 2. Consequently, a conceptual model of ERM in CASE 2 did not emerge from the interviews.

### **3. Analysis of the statements**

The interview survey suggests that CASE 2 has not developed any specific ERM model to drive its risk management planning at the Group level. This supports the findings of the previous section, where the understanding of ERM was found to be one dimensional (either finance, or insurance). However, the fulfilment of regulatory requirements (e.g., FSA's ICA) are pressing CASE 2 to develop an ERM model, which again remains isolated from its other established holistic type risk management practice (e.g., insurance and claims functions). Nevertheless, the evidence suggests that the corporate governance issues and the practice of operational risk management (which is seen as very strong) might play a central role in the design of ERM in CASE 2.

### **4. Conclusion**

In reviewing the findings of the interview it is seen that ERM is still an evolving concept in CASE 2. Since no consistent understanding of ERM exists, the design



of ERM is in its early stage in CASE 2. However, sufficiently strong evidence was were found in the interview survey, that ERM will emerge in near future.

## SECTION 5A

### Operational Challenges in Implementing ERM

#### 1. Introduction

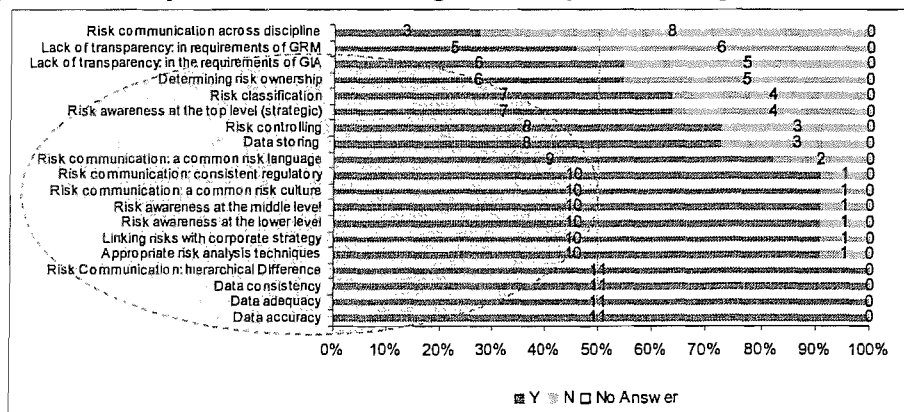
The objective of this section is to explore the operational challenges in implementing ERM in CASE 2.

Sections 5A and 5B are structured as follow: Firstly, the results obtained from the questionnaire survey are presented. Secondly, the findings of the analysis of the data obtained from the interview survey are developed. Thereafter, a discussion based on there findings is undertaken. Finally, a conclusion is drawn.

#### 2. Questionnaire Survey Results

Figure 2C7 illustrates the operational challenges in the implementation of ERM as identified in the questionnaire survey in CASE 2.

**Figure 2C7: Operational challenges in implementing ERM in CASE 2**



The survey result shows that all respondents identified data accuracy, adequacy, consistency and risk communication across the hierarchy as the key operational challenges for CASE 2 in implementing ERM. These are followed by appropriate risk analysis techniques, linking risk with the corporate strategy, risk awareness

at lower and middle levels, and risk communication to develop a common risk language and a consistent regulatory approach (90% of respondents).

### **3. Analysis of interviews**

The following paragraphs describe the key operational challenges in implementing ERM as identified from the interviews.

#### **3.1. Risk Communication**

Respondents indicated that the internal audit department of CASE 2 takes a holistic view of the business because it deals with all departments. One respondent 2R2 (who works in the internal audit department) argues, “we have the opportunity to share best practice across the business globally.....we understand how the businesses operate in silos”. The study however finds that in addition to the Group Internal Audit, the Finance department through its Group Risk unit also operates across the Group. In addition, respondents believed that for a smooth flow of information (risk communication) it is essential to have a fluid organisational structure with constant changes in the team. One respondent, 2R6 (who also works in the audit department) states, “The continuous sharing of knowledge and information brings us [internal audit] more and more awareness of the dependencies between the functions of divisions and businesses”. Interestingly, it is found that the people working in the audit department of CASE 2 see that the impact of a risk, which actually originates in one area of business, is ultimately borne by another area or business. Understanding of the dependencies across the various business lines was clearly seen in the interviews as an important issue for CASE 2. The study further finds that a lot of audit functions are similar to the functions of Global Risk<sup>4</sup>, in particular, for operational risk management. Essentially, both departments are taking a risk based approach in their work (2R13). However, Global Risk is much closer to the business and has an expert risk role (2R4). However, interviews suggest a little communication of information between these two departments and concludes that there is definitely a need for internal audit staff to communicate better with

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<sup>4</sup> Global Risk is seen as analogous to Enterprise Risk in CASE 2

the risk management functions. A similar thing happens elsewhere, as 2R12 states, "I model something in the ICA, another colleague of mine models something in the operational risk and somebody else is modeling investment risk. Interestingly, I am not sure we communicate well enough to ensure that everything falling in between is covered". The study finds that there definitely exists a communication gap between departments in terms of what they doing. Consequently, the lack of linkages of various functions (e.g., investment and treasury) is a big challenge for CASE 2. However, to some other respondents' communication is not a problem. For example, 2R9 argues, "I don't think communication is a big problem; because we have both formal and informal discussions, conferences etc. on regular basis [within our finance department]. We have to communicate, as otherwise we couldn't get anything done".

Nevertheless, the study suggests that communication is not only important for risk management but also for other functions (e.g., managing the claim reserving process). Compliance in respect of regulatory enforcements (e.g., Sarbanes Oxley Act in the US) also needs effective risk communication across the organisation because these regulations force managers to document the risk management process. The study identified some other areas in CASE 2 where communication is necessary. One of them is communication between the pricing (a part of underwriting) and claims and reserving. The communication between global risk and internal audit is another significant issue. One respondent 2R5 argues, "we need interdepartmental communication because we need to know what's going on with the underlying business".

### **3.2. Risk Awareness**

Risk awareness was found to be a challenging issue for the implementation of ERM in CASE 2. The study revealed that some departments, (e.g., internal audit), noticed the changes in its risk awareness with the development of ERM. It was seen that internal audit was previously operating at too lower level, in particular in drawing its findings and making recommendations. This meant that

the impact of their recommendations and findings were probably not that significant and were not necessarily focused on areas where the probability of large financial loss or chance of losing opportunities of the business were greatest. In addition, internal audit in CASE 2 in the past, did not necessarily look at the efficiency of control or effectiveness due to its traditional approach of auditing. Rather, they just looked at the control around an issue. They made recommendations for putting in new controls but very rarely recommended removing controls, because they were really not sure about its effectiveness and efficiency. Respondent 2R2 says, "I would be very surprised if internal audit have done that before. They only just said, control failure here, put it right, or absence of the control, so put it right". However, the interviews revealed that internal audit now looks for the root causes that triggered the control failure and its implications (or impact) on the business in addition to the identifying the problems themselves. Essentially, all of such enquiries help them to make realistic recommendations. It was also found that the ERM framework of CASE 2 concentrates on growing the risk awareness of the local business units. 2R13 states, "to be honest I think the key [in most of our ERM initiatives] is to build local awareness and capability". Several respondents argued that it is important for the group that local businesses understand the risk that they accept in connection to their own capability. In this sense awareness is currently not in line with the centre. If the local business units understand the Group Risk Profile, in particular the risk capital, they don't go to the centre and ask about their risk appetite. Actually, it is argued, they should be able to do it themselves (2R7). However, it can primarily be initiated at the centre but after that the role of the centre becomes one of bridging the gap [between local and centre]. Respondent 2R13 argues, "I think it comes in the next step of our ERM". It is the view of the corporate centre, as revealed from the interview survey, that local businesses should understand and develop their own risk management model rather than being provided with it from the centre. However, it is felt that local units need to be controlled from the centre. The interviews further suggested that local businesses must be sufficiently aware about the risk they take and should have

enough capability to handle them efficiently while operating under the Group. However, this approach does not exist at the moment. In summary, the awareness of risk (which is closely associated with its culture) in CASE 2 is a significant challenge to effective implementation of ERM.

### **3.3. Risk Culture**

The interview survey found that the role of its traditional risk culture is a challenging issue in implementing ERM in CASE 2. However, a change is currently happening. For example, the internal audit role is changing by moving away from a policemen role to a role of adding value. Respondent 2R2 states, "I see our [internal audit] role is moving much more towards risk management". Internal auditors ultimately assure the company that the controls are in place and they are effectively applied. In addition, respondents interviewed suggest that the audit functions are split between a control insurance role and a value adding role, looking at risk from a much higher level (2R6). The study further finds that the Board of Directors of CASE 2 wants to have a more effective internal audit function for regulatory reasons and also at a high level there is a very real desire that internal audit changes to an added value role and from a rubber stamping things. Respondent 2R2 states, "the board wants to know what could damage the business, what opportunities are missing and how that can be fixed". The interviews also suggested that internal audit in CASE 2 is more interested in concentrating on a risk based auditing approach and properly considering risks across the business rather than taking a fragmented approach. Respondent 2R14 argues, "we are becoming more dynamic".

Furthermore, on the underwriting side, CASE 2 has been establishing a culture of risk management (underwriting and claims) for over four and a half years and embedding it right through its businesses worldwide (2R7). It was clear from the interviews that four and a half years ago there was no attempt to co-ordinate and to take an overview of group's underwriting and claims functions from the centre. This is because no such management style was in place in the organization at

that time. In fact, CASE 2 had a management culture while supported businesses being managed on a decentralized basis, with a very little centralized control (2R7). However, as the interviews suggest that the only focus of the centralized risk management CASE 2 had four and a half years ago was operational risk management, particularly in the area of Business Continuity Management.

The interviews also revealed a culture of fragmented risk management. As 2R11 states, "I just look at ERM purely from the view of investment. To me it [ERM] means a sort of corporate volatility that will hit the balance sheet". The study finds that in the name of ERM the investment staff try to make sure that volatility (whether it is in assets, underwriting, or elsewhere) does not present them with a surprise in their overall profit and loss results. From their perspective, Group Risk should establish a system that controls such volatility (surprises) from the corporate point of view, by looking at the overall credit exposure of the Group (2R9).

The study further noted that in introducing a common risk culture CASE 2 are specifically developing local ownership of capital, where Group Risk is trying to remove the disaggregate view of capital rather than to calculate it centrally. Respondent 2R13 states, "we are trying to align our different risk appetites by a common numerator to establish a standard policy to address our common risk appetite". However, for actuarial staff the central idea of ERM is to bring everything under CRMT (Capital Risk Management Framework); although CASE 2 is currently doing things separately (2R12).

The culture of valuing performance of the organisation is another issue because CASE 2 traditionally focused on the financial results but not on what was needed in reserves or for the actuarial loss ratio. Respondent 2R5 states, "I think on the reserving side Group Risk should focus on the type of issues like 'is there a link between the actuarial reserving results (loss ratio) and pricing assumptions". Moreover, some respondents believe that it is important to look at the reliability of

the underlying financial results and the understanding of business leaders and pricing leaders about the true financial results. In such circumstances the understanding of Group Risk was questioned (2R5). In summary, looking at risk in a fragmented fashion is a cultural issue in CASE 2. However, changing such an isolated approach is gaining momentum due to the adoption of ERM.

### **3.4. A Common Risk Language**

The development of a common language of risk to help understanding of staff across CASE 2 was seen by many respondents as a challenging issue. It was seen as important for local businesses to take the ownership of risk rather than to always depend on the centre. However, as 2R13 argues “they [local businesses] should have a minimum level of understanding regarding the exposure of risk they [local businesses] underwrite on behalf of the Group and the risk appetite of the Group”. In addition, the local businesses must have a deep understanding of risk measuring, risk profiling etc. (2R4). However, the study finds that the function of the centre is more advisory in telling people what to do and making sure that there is a consistency [common approach] throughout the group (2R13). The interviews suggest that the businesses should have a fundamental understanding of some basic things like the meaning of insurance risk, operational risk, and the boundary between those risks. However, there is currently an extensive debate about them. One respondent 2R15 argues, “I am not sure if we have yet established a common language but I think we have come a long way towards a common understanding. However, there are still more to be done.”

### **3.5. Data**

Inadequate and inaccurate data is another challenge faced by CASE 2 in implementing ERM. Respondent, 2R12 argues, “we are very poor in maintaining our data and it [past claims data necessary to make reserving triangles] is one of our valuable assets”. The study finds that on some occasions basic checks of data were not done and it worried the technical people (e.g., actuaries) that if the



same data is going to pricing then there are a possibility of setting wrong prices. This is also the case for operational risk where calculations is done at the geographic region level rather than business units in order to calculate the overall operational risk of the Group. Respondent 2R13 states: "although such calculations can not reflect the amount of operational risk that our Group bears such inability is partly because we are constrained by inadequate reliable data".

#### **4. Discussion**

One big concern that arises from the interviews is the inconsistency found between the people in the center and overseas offices. Respondent 2R5 states, "when I was in the USA it [ERM] made no sense at all to me. Now I am in Group Corporate Centre, ERM makes more sense". Some respondents believe that ERM has been effectively communicated [by the Group Risk Management] to the technical people such as actuaries. However, the question of the purpose of Group Risk still remains unanswered at different levels of CASE 2. The study identifies a problem both at Group Risk level and local operational risk level. Local risk managers have not communicated the objectives of ERM effectively. Respondent 2R5 further states, "having now worked here [the corporate centre] for a year I worked closely with Group Risk. I help them on reserving issues. I think it needs to be clear what their role is, and I think they do actually perform a valuable role". The study further identifies a lack of communication between Group Risk and others, which is certainly hinders the Group Risk in achieving its mission. However, respondent 2R9 (who works elsewhere) states, "we receive a massive volume of documents [from the Group] and it takes considerable time for us to find the actual issue.....we want some simple bullet points, clear guidance". Tax planning could be an example where the local businesses need clear guidelines in order to find how much appetite they require to be in line with the group culture. Consequently, the study revealed that Group Risk needs to define its role clearly, and prior to that, they themselves need to understand what they are trying to achieve. Importantly, Group Risk, in playing their co-ordinating role, needs to work with people, such as local experts. However, the respondents

are keen to see that how the approaches of the new risk director (who arrives shortly in CASE 2) differs from the previous risk director.

Regarding the awareness of risk the study noted that the corporate centre intends to know whether risk is being efficiently assessed and managed locally and whether local staff understand the tools and techniques. However, building up such local capability is a big challenge for CASE 2. The study finds that this actually comes from ownership, which depends upon whether the right people are put in the right places and are building up their expertise. This requires a cultural change and will be a long process. However, this needs a very good and understandable group policy and CASE 2 is now developing such a policy.

Regarding culture the study identified obvious problems in changing the culture because a number of businesses have emerged over the year across different countries. Moreover CASE 2 has widely different systems of managing and monitoring risks. Therefore, getting consistency of these systems is problematic and this requires a change in behavior and risk awareness. These remain the biggest challenges. However, a change of culture is a slow process and CASE 2 has got regulatory and other deadlines and also needs to meet shareholders expectations. All these issues must be tackled simultaneously. The study of CASE 2 finds that risk culture and risk awareness are two very much connected issues.

## **5. Conclusion**

It is evident that staff of CASE 2 are risk averse, showing a tendency to avoid risks, delay decisions and to delegate to others. The local risk functions of CASE 2 clearly need to be better trained and better educated: to work better with the businesses and to integrate themselves with the businesses. Moreover, the UK risk team needs to be more embedded into the UK business and good communication is necessary between Group Risk and local risk businesses. However, the study could not explore whether there remains good

communication between the local areas. Clearly, local risk functions do not know what they need to do and what they need to achieve. Respondent 2R5 states, “until we achieve such quality, we have no hope [of an effective ERM system]”. However, the key challenge for CASE 2 is to align the established holistic risk management practices (e.g., underwriting and claims, operational risk) with the financial approach of risk management.

## SECTION 5B

### Technical Challenges in Implementing ERM

#### 1. Introduction

As a continuation of the previous section, this section explores the technical challenges of ERM in CASE 2.

#### 2. Survey Result

Figure 2C8: Technical challenges in implementing ERM

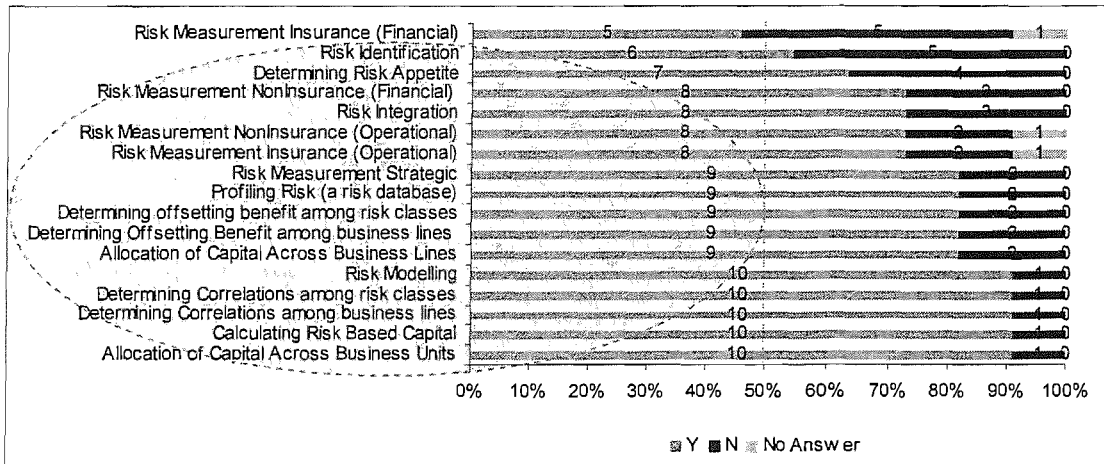


Figure 2C8 indicates that 90.91% respondent (10 out of 11) thinks the following issues are the key technical challenges in CASE 2: allocation of capital across business units, calculating RBC, correlations among business lines and risk classes; and risk modeling.

#### 3. Analysis of the interviews

The following paragraph describes the key technical challenges in the implementation of ERM as identified from the interview survey.

##### 3.1. Risk Modeling

In order to develop a company specific system of interpreting capital assessment respondents believed that CASE 2 must put in place capital modeling that enables it to calculate the right amount of capital they need to finance

businesses. In the mean time CASE 2 have chosen a model which has been piloted in the UK region and this model factors all of the significant risks into broad categories. However, this is not currently happening in CASE 2 as respondent 2R15 argues: “we talked about it but still we have to go quite a some way to being able to do that on a group wide basis”.

### **3.2. Correlations**

Determining interrelations (or correlations) among various types of risk and also lines of business is another problem. For example, pricing inevitably depends on reserving. 2R12 argues, “If we inadvertently get our reserving wrong either at the case level or at the overall level then we will almost certainly get our pricing wrong”. Consequently, they have to be interrelated because if one is wrong then the others are almost certainly wrong.

## **4. Discussion**

The questionnaire survey identified a range of technical challenges to the implementation of ERM (e.g., capital allocation, calculation of risk based capital, determining correlation and calculating diversification benefits, and so on). However, the interview survey identified only two issues (e.g., risk modeling and correlations) as key technical challenges of ERM in CASE 2. In fact, these issues are interrelated but the views of the respondents varied extensively as they appeared to see the issues from their specific disciplinary background. This suggests that the staff interviewed were not aware of the technical issues in a holistic sense. However, this is not unexpected given the findings of the previous section, where no design of ERM emerged for CASE 2. However, the surveys established that the staff of CASE 2 are aware about the complexity attached to ERM, which may help CASE 2 when ERM is properly designed and implemented in practice.

## **5. Conclusion**

As suggested by questionnaire survey, there exist many technical challenges of ERM in CASE. However, the expertise which exists in CASE 2 (remains scattered throughout the organization) provides strong hope that the technical challenges will be overcome with the actual development of ERM (in terms of designing and implementing).

## **SECTION 6**

### **PERFORMANCE OF ERM**

#### **1. Introduction**

The section intends to explore three facts: what is the performance of ERM in CASE 2, how is the performance of ERM evaluated, and what are the key challenges in evaluating the performance of ERM in CASE 2. Like other CASES, no questionnaire survey was conducted for this section and the analysis is based solely on the interview survey.

#### **2. Analysis of interviews**

The interview survey revealed that CASE 2 pays little attention to the measurement of ERM performance. However, the study finds that there is a lot of focus on shareholders in the ERM initiative of CASE 2. This reflects to a large degree concerns about the ways the assets are being managed and the changes that CASE 2 have put in place at the top of the company around meeting the needs of the shareholders. One respondent 2R13 states, "we had a very difficult relationship with the shareholder for several years but this is getting better. It sounds like we are more interested in protecting the value of shareholders rather than the policyholders, and that's certainly to be the case". The study finds that this is because shareholders have had an increased profile, and there have been huge question marks about the efficient use of capital within CASE 2 and returns for the shareholder.

Regarding the benefits of ERM in CASE 2, respondents noted that ERM could provide a more consistent approach, greater understanding of the driving influences that impact the insurance business, and could lead to a greater reliability of results. However, greater consistency in decision making and more assessment of whether the guidelines are correct could lead to more positive financial results (2R7).

### 3. Conclusion

Theoretically, ERM covers all risks (both quantifiable and unquantifiable) whatever the size, source and nature but practically within CASE 2, ERM is the management of quantifiable large risks. It is seen that the holistic treatment of insurance risk still drives the ERM of CASE 2, which the study regards as a silo approach to ERM. The study suggests that CASE 2 needs to work out a clear set of objectives of ERM and the rationale of ERM (i.e., why ERM is necessary if the objectives are to be achieved). Simultaneously, CASE 2 should also identify the reasons for the absence of ERM (i.e., why in practice ERM is not taking place). Importantly, these questions should be answered in terms of its existing culture, business patterns and market expectations. These are the issues the study identifies as the key challenges for CASE 2 if it is to develop an effective ERM system. In summary, CASE 2 recently gave much thought to developing a comprehensive ERM system to increase shareholder value but the benefits are not yet observed.

The design of ERM (i.e., risk model) within CASE 2 is clearly targeted at minimizing the cost of capital. The calculation of risk based capital (economic capital: which serves as a measure of risk) is its main concern. Moreover, ways of calculating risks (VaR, TVaR) and measurement of diversification benefits (after taking the interrelations among various risk classes) are key challenges for ERM in CASE 2. The key focus of ERM should not be to manage risks in silos (even large risks). In addition, a tendency is observed in the Group Risk to give a separate treatment of large risks because their accumulations (as seen in catastrophes) worry senior management of CASE 2. Interestingly, this type of understanding remains within a group of senior level technical people (who are the risk experts) but these ideas are not properly communicated throughout the organization. A potential misunderstanding was observed between the people responsible for managing operational risk (a new job) and the role of internal auditors. Since, the analysis noted overlaps in their responsibilities. The key difficulties of internal auditors in managing operational risks are 'independence',



which is believed to be their core professional ethic. However, operational risk management is emerging as function close to both insurance and financial risk management. Although there is no direct evidence available, CASE 2 has no procedure in place to measure its performance. ERM is at a very early stage in CASE 2 and its demerits are not yet visible. However, there is a growing concern about systemic risk. Another view concerns the concept of ex-ante and ex-post assessment of ERM – some argue that the value of ERM can only be measured ex-post. Another view suggests ERM functions are similar to R&D, where the outputs are not always tangible. The key issue is that CASE 2 is poor performance during 1999 – 2004 badly threatened the trust and credibility of its shareholders and this needs to be rebuilt through improved performance. Consequently, there is an extreme pressure on profitability. In summary, the risk management in a holistic sense emerged as the top-most issue for CASE 2 as a mean of minimizing cost [of capital] to deliver profit while maintaining sustainable growth.

Table 1: List of interview respondents

SL NO	Code	Full Name	Designation	Discipline	Location	Type of Interview	Date of Interview	Time
1	2R1	Antony Stoffel	Specialist Team Manager (claims functions)	Insurance	Horsham	Focus Group	29/11/2004	1 hour
2	2R2	Barrie Homes	Senior Internal Auditor	Internal Audit	Ledenhall Court, London	Face-to-face	03/11/2004	1 hour
3	2R3	Barry D. Richer	European Operations Manager	Risk Solutions Global Consulting	Ledenhall Court, London	Face-to-face	21/12/2004	1 hour
4	2R4	Bill Courtney	Credit, Market & Liquidity Risks Director, Group Risk	Finance	Horsham	Face-to-face	06/10/2004	1 hour
5	2R5	David Innes	Manager, Group Actuarial	Actuary	Horsham	Face-to-face	21/12/2004	1 hour
6	2R6	Ed Dobinson	Operations Manager, Group Internal Audit	Internal Audit	Ledenhall Court, London	Face-to-face	15/10/2004	1 hour
7	2R7	Harry Driver	Director, Insurance Risk	Underwriting & Claims	Group Corporate Centre, London	Face-to-face	25/10/2004	30 minutes
8	2R8	Ian Ross	Business Continuity Manager	Business Continuity Management	London	Face-to-face	31/08/2004	30 minutes
9	2R9	John Davison	Deputy Director, Group Taxation	Finance	Group Corporate Centre, London	Face-to-face	21/12/2004	1 hour
10	2R10	Mike Coglan	Group Reinsurance Manager	Insurance	Group Corporate Centre, London	Face-to-face	06/10/2004	1 hour
11	2R11	Naren Dutta	Investment Director, Group Investment	Finance	Group Corporate Centre, London	Face-to-face	03/11/2004	1 hour
12	2R12	Paul Mumford	Actuarial Pricing	Actuary	Horsham	Face-to-face	29/11/2004	1 hour
13	2R13	Paul Pritchard	Group Environmental Consultant	Operational Risk & Corporate Sustainability	Group Corporate Centre, London	Face-to-face Telephone	25/10/2004 13/08/2004 31/08/2004 14/04/2005	1 hour 1 hour 1 hour 30 minutes
14	2R14	Phil Bell	Technical Insurance Manager	Underwriting	Ledenhall Court, London	Face-to-face	15/10/2004	
15	2R15	Susan Puddephat	Head of Regulatory & Compliance	Regulatory & Compliance	Group Corporate Centre, London	Face-to-face	31/08/2004	1 hour

**REPORT ON THE UNDERSTANDING,  
MOTIVATION, DESIGN, CHALLENGES  
FOR IMPLEMENTATION, AND  
PERFORMANCE OF  
ENTERPRISE RISK MANAGEMENT  
IN  
CASE 3**

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## SECTION 1

### A BRIEF OVERVIEW OF CASE 3

#### 1. Introduction

CASE 3 is an insurance-based financial services provider with an international network. It focuses on both life and non-life insurance businesses. It offers a comprehensive range of Property Casualty and life insurance products for individuals, as well as insurance and risk management solutions for small businesses and corporate and multinational customers. Its three largest markets are North America, the United Kingdom and Continental Europe, where Switzerland, Germany, Italy and Spain account for roughly 80% of its total premium volume. Its business is geographically well diversified, and the company is well positioned in terms of market knowledge. CASE 3 is the global number one in international business and the number two provider of insurance solutions for large global corporations (based on broker statements), serving customers in 128 countries.

#### 2. Corporate History

Founded in 1872, CASE 3 is an insurance-based financial services provider with a global network. CASE 3's headquarter is in Switzerland, and it has offices in more than 50 countries and employs about 57,000 people.

The position of risk officer in CASE 3 was first established in 1997 following the introduction of a Group Risk Policy in 2001. Prior to that date risk issues came under the office of chairman, which incorporated many other functions. However, by active centralized risk management began with the office of Chief Risk Officer (CRO) which was established at the beginning of 2002. Prior to this there was a very loose network used to preserve and collect quality data but there was no consistent method of risk communication among businesses. Moreover, the governance structure was not as clearly defined as it is today. Thereafter, the Risk Management Leadership Team, which essentially consists of all Risk Officers of the business segments and the Group Risk Management executive staff led by the CRO, was established.

CASE 3 closely monitors the implementation of strategic and tactical decisions as well as its operating performance at the Corporate Centre. In addition, CASE 3 increasingly functions as one team that speaks with one voice and represents one company.

### 3. Business Model

CASE 3 was traditionally a diverse financial organization including both insurance and financial services. However, recent changes in its business model indicate more concentration in the insurance business rather than financial services. In addition there appears to be a slight increase in its business performance.

**Figure 3C1: Key Performance Indicators**

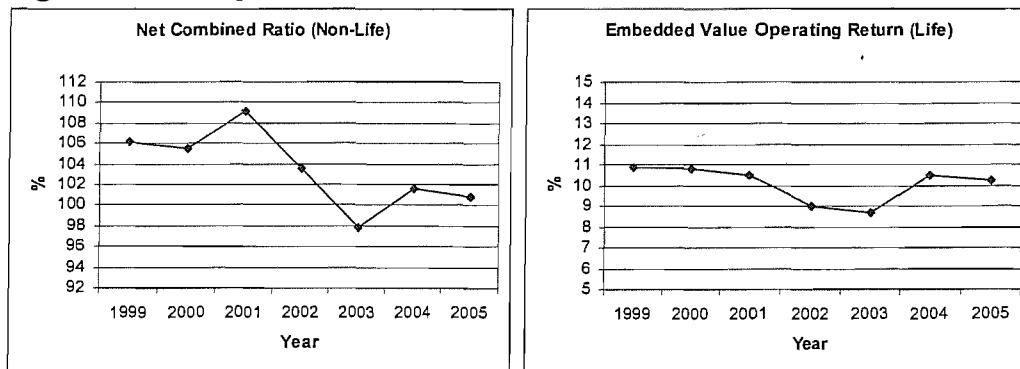


Figure 3C1 illustrates that the Combined Ratio, which is regarded as a key performance indicator (KPI) in general insurance operations, has been decreasing from 2001. In addition, the trend of Embedded Value Operating Return, which is a KPI of life business, maintains an increasing trend with few exceptions. They illustrate considerable growth of both life and general insurance business.

CASE 3 wants to be a company built on performance excellence, where it and its clients' interests are aligned. Clearly, its goal is to make earnings more resilient, given the volatile nature of the insurance industry, and also less dependent on the fluctuations of financial markets.

In 2002, following the appointment of a new CEO, CASE 3 set out on the path towards restoring profitability, with a very clear focus on core insurance activities. First, non-core businesses like banking and asset management



were divested. CASE 3 also closed or divested activities that were either in peripheral markets or did not meet its planned rate or return. Second, operational and financial discipline was placed on top of the agenda. It recognized that disciplined underwriting, with tight claims management and cost and expense containment, were indispensable in an environment characterized by low investment returns. (Speech of CASE 3's CEO: 2004). The initiatives were aimed at earning its cost of capital for long run through mastering the fundamentals of core insurance business.

#### **4. Risk Engineering**

As a company engaged in the business of assuming and managing risk, CASE 3 helps its customers in managing their risk beyond purchasing adequate coverage against insurable risks; these risks include strategic, operational, market, financial and credit risk. Moreover, CASE 3 offers its customers help in analyzing and mapping the interactions among these different risks (3R7).

#### **5. Corporate Objectives**

The investment strategy of CASE 3 is geared towards generating a more stable income, while paying appropriate attention to the complex requirements of its insurance liabilities. It values clear customer focus and a strong global presence. Currently, the life insurance business is under fundamental reform. Moreover, risk management activities to mitigate catastrophic risks are an integral part of its strategy,

In 2002, CASE 3 undertook a strategic review of its business and the following conclusions were released (Source: CASE 3 Homepage).

- a need for improved financial discipline
- a need to strengthen balance sheet and reserves
- a need for businesses to focus more closely on delivering operational income

This single-minded focus on implementation of their strategy is driven by increased attention to financial discipline, better process management and centralization to key decisions.

## 6. Financial Management

Figure 3C2 illustrates the profit and loss of CASE 3 for the last six years.

Figure 3C2: Net Profit & Loss and Gross Written Premium

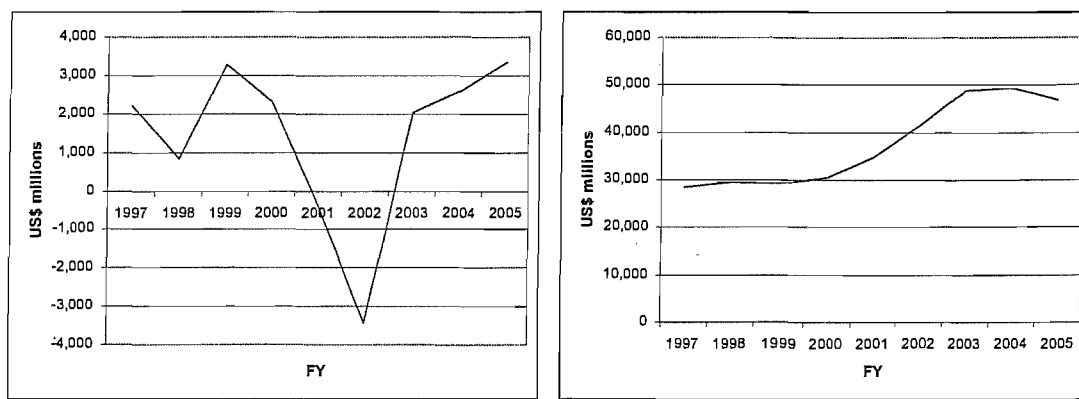
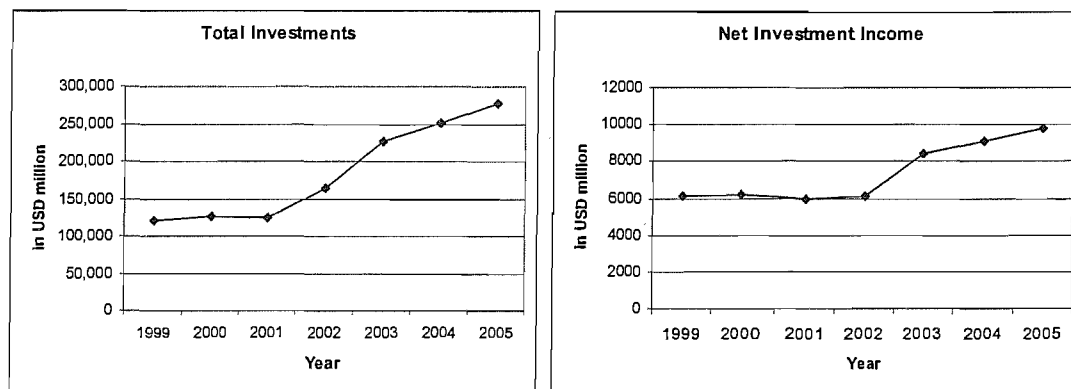


Figure 3C2 shows that CASE 3 has gone from a USD 3 billion dollar loss to a USD 2.5 billion profit within three years. Figures 3C3 illustrate the growing total investments and net investment income of CASE 3 during 1999 – 2005.

Figure 3C3: Group Investment and Net Investment Income



## 7. Risk Management

As a major, global insurance carrier CASE 3 as a Group helps customers around the world to manage a broad range of business and personal risks. In turn CASE 3 faces a number of risks (i.e., Group Risk), which it categorizes

under three types: insurance risk, investment and credit risk, and financial risk. In CASE 3, insurance risk is perceived as the type of risk that is transferred to them (as an insurer) by customers through the underwriting process. As a composite insurer, CASE 3 has two sources of insurance risk: general insurance business, and life insurance business. Investment and credit risk is associated with the investment portfolio, reinsurance agreements and other counterparty credit risks. Finally, financial risk is associated with currency fluctuations and management of the relative duration of assets and liabilities. In order to hold adequate liquid assets available to fund liability cash flows when due, CASE 3 manages its overall asset/liability matching exposure and oversees the activities of local asset/liability management committees. It monitors relative asset and liability durations at both a business and a Group level. This process enables CASE 3 to manage its exposures to interest rates, equity market risks and other financial risks, in particular for insurance and investment contracts. In addition, CASE 3, as a global insurer, is exposed to various foreign currency risks. CASE 3 uses derivative financial instruments to manage risks related to its capital, assets and liabilities and commitments to third parties, and employs these instruments to mitigate the risks posed by changes in foreign currency rates and interest rates. It addresses the risks posed by derivatives through a stringent policy that requires approval of a derivative program before transactions are initiated, and by monitoring open positions

## **8. Risk Governance**

The Board of Directors of CASE 3 establishes the Group's corporate risk management framework. In turn, the Audit Committee of the Board assesses whether management is addressing risk and control issues in a timely and appropriate manner. The Audit Committee of the Board receives reports regarding the Group's risk profile and mitigation actions. Moreover, the Group has additional audit or risk committees at all levels of the organization that regularly review risks.

The Chief Executive Officer, together with the Group Executive Committee, oversees the Group's performance with regard to its risk management policies as well as the further development of these policies when required. The Chief Risk Officer reports to the Chief Executive Officer. The Group also benefits from the cooperation of its network of risk management and functional specialists within each business as well as at Corporate Centre (where it has dedicated managers for various types of risk) Group-wide risk management policies specify risk tolerance boundaries and authorities, reporting requirements, and procedures for referring risk issues to senior management. The Group regularly monitors its risks through analyses and reports, and through relevant risk modeling.

#### **9. Group Risk Profile**

The Group systematically and regularly identifies a wide range of possible risk scenarios in the business units and the centralized Group functions. Through its Total Risk Profiling process, the Group assesses each risk scenario strategically for probability of occurrence and for the severity of potential consequences. The Group then develops, monitors and implements appropriate action plans.

#### **10. Risk Methodologies**

Group Risk Management monitors the risk issues identified and reports regularly to senior management and the Group's audit and risk committees. In addition to risk-specific monitoring and modeling, the Group takes a holistic view with risk-based capital (RBC) modeling. This type of modeling measures the difference between what the Group expects in a normal business-operating environment, and in worst-case scenarios. The Group defines risk-based capital as the capital needed to protect its policyholders against worst-case loss (which the Group defines as an event with a one-in-2000 probability of occurring in one year). The Group continues to embed RBC modeling into

its organization and decision-making, such as allocating capital to lines of business. (Source: Annual Report<sup>1</sup> of CASE 3).

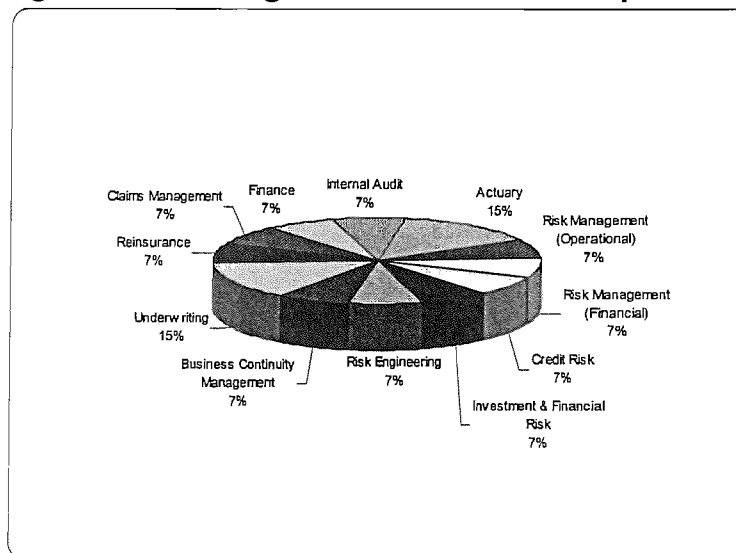
### 11. Group Risk Policy

CASE 3 introduced the Group Risk Policy in 1998; this included risk tolerance boundaries for a variety of risks. As a result of adopting Group Risk Policy, CASE 3 now have relevant data, reports, risk owners, quarterly reporting on their risk profile, guidelines for compliance with these boundaries and action plans to address instances of noncompliance. This includes procedures to agree on an exception to the risk boundary or a mitigation action, including who is responsible for completing the mitigation action and who verifies its completion. Updating the risk policy manual is an ongoing project because of organizational changes, fluctuating capital adequacy levels etc. The most significant revision made so far was its decision to systematically change the word “should” to “must.” This was a major step toward putting teeth in the risk policy and providing the means for Internal Audit to verify compliance (1R13).

### 12. Interview respondents

A total of staff of CASE 3 has been interviewed for the study, a list of which is provided at the end of this APPENDIX.

**Figure 3C4: Background of interview respondents**



<sup>1</sup> Years of Annual Reports were not mentioned thought the thesis. This is to keep the case studies anonymous.

Figure 3C4 illustrates the background discipline of the 15 respondents, where 15% are underwriters and another 15% are actuaries. The rest of the respondents are from different backgrounds such as investment, finance, credit risk, internal audit, risk management, reinsurance, insurance claims management, and business continuity. Each of these professions represented by is 7% of the respondents.

## SECTION 2

### UNDERSTANDING OF ERM

#### 1. Introduction

The objective of this section is to investigate the understanding of the nature of ERM amongst CASE 3's staff. The views of the respondents are analyzed and then compared and contrasted. It is found that the term ERM is not officially used in CASE 3 but four key layers of risk management exist with CASE 3 (i.e., centralization, harmonization, standardization and integration). Each of them is explored separately in the following paragraphs.

#### 2. Questionnaire Survey Results

Figure 3C5: Understanding of ERM

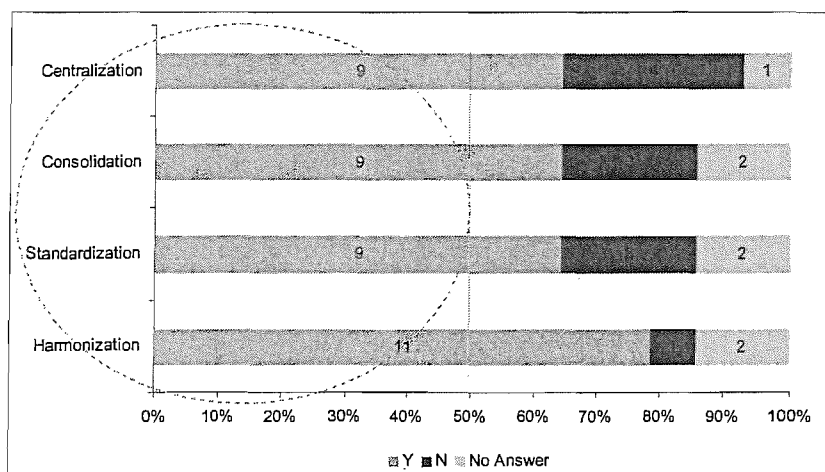


Figure 3C5 illustrates that 11 people out of 14 (79%) of the survey respondents identified harmonization as the closest concept to ERM. This is followed by standardization, consolidation, and centralization (identified by 64% of respondents).

#### 3. Analysis of the interviews

The following paragraphs describe the understanding of the nature of ERM amongst staff within CASE 3. This understanding appears to correspond with four main layers of conception associated with risk management.

### 3.1. Centralization

The interviews suggest that the current CEO is very committed to transparency, and this acted as the main motivation for CASE 3 to take a more centralized approach to finance, including risks. He has also created large business segments, each with a profit and loss responsibility. Respondent 3R14 argues: “the initiative of CEO has clearly moved the organization onwards to a bigger and better organized business with more centralized focus on financial risks”. The interviews also revealed that the centralization of critical functions like finance and risk provided more transparency (3R14). The respondents used the term ‘centralization’ quite often. However, its meaning to many appears to be still unclear. For example, respondent 3R14 often used this word but also stated: “I do not find any immediate danger from this centralization because we haven’t tried to centralize things”. In fact centralization is a transition to another level of risk management, which has brought consistency in all risk management initiatives in CASE 3 in recent years (3R9). At the moment, the quality of risk management in CASE 3 is down to local management. Earlier CASE 3 was a federation of 360 independent businesses but with the arrival of the new CEO there was a decision to centralize the key processes in order to create one single entity. 3R10 sees centralization as a means of taking control: “we are now in a situation where the centre has taken control in terms of issuing guidance of risk management within claims”. Moreover, reinsurance, as a risk management tool within CASE 3, primarily involves the controlling of threat scenarios of insurance risk, operational risk, and credit risk (3R9). The interviews also indicate that CASE 3 went through a very difficult time with capital constraints and therefore became very reliant on reinsurance to implement its recovery strategy. In addition, CASE 3 has a very large credit exposure to reinsurers, which ultimately influences the reinsurance buying strategy of the Group. These findings lead to the motivation to achieve control over reinsurance. Another key driver towards centralization was the investigation of an internal audit function whose objective is to give the executives and the audit committee reliable assurance that controls and risk management are working properly (1R8). In summary, centralization was



found to be a significant issue in constituting the understanding amongst staff of the nature of ERM in CASE 3.

### **3.2. Harmonization**

The interviews suggest that although the same risks exist in various geographical locations of CASE 3 a key concern of the interviewees was the management of the risk accumulation (or the systemic risk) issue. It appears that there exists an imbalance between the risk management initiatives of different parts of CASE 3. Group Risk Management was initiated to establish a corporate standard across the Group by controlling and mitigating risks through a common risk standard. According to 3R14, "this is like a funnel", where the objective is to achieve a common standard through harmonizing all diverse policies and practices on similar issues. It is all about setting criteria and monitoring compliance through best practice. A good example is the current Business Continuity Management (3R6), which is found to be more or less homogenous over the group. This delivers business tools whereby the businesses store their entire plan and their performances can be reviewed centrally (3R6). However, the problem of harmonization is inconsistency; for example, underwriters have their own views of pricing risk. They have established their own control processes and procedures (e.g., underwriting authorities) and they have pricing reviews and pricing monitoring tools, which extensively differ from other bodies like treasury and investment. Another example of this inconsistency is the difficulty CASE 3 has in developing a consistent control framework; as it is unlikely that all businesses face similar problems in similar situations (1R8).

### **3.3. Standardization**

It is found from the respondents that the corporate centre provides the framework, policy, standards, guidelines and tools. In addition, most of the work of the corporate centre involves controlling and monitoring, often on site (3R6). As a new discipline with CASE 3, risk management needed to be standardized by modifying processes and accepted practice. Therefore, a more or less homogenous standard across the group is regarded as important (3R5). For example, some respondents argue that it is important to have a

standardized risk management tool whereby all the plans are stored and then reviewed centrally without going outside (3R13). It is expected that over time the ERM will settle and as 3R5 argues: "it has needed to be standardized and to have modifying processes developed as accepted practice".

Standardization is regarded as having a positive and useful effect by offering a guarantee that all participants will behave within certain standards and this reduces operational risk (as seen in CASE 3's risk assessment exercises) (3R15, 3R8). The goal within CASE 3 is to have an accepted risk management model available which the management can use in making similar decisions in the face of unclear alternatives. CASE 3 employs a structured risk assessment process that requires disciplined self-assessment across the enterprise. Senior management at the enterprise level participate in this process, as do the managers of business units and key functional areas, such as human resources, IT, and finance. CASE 3 also have participation from the managers in charge of significant projects (such as outsourcing of electronic workstations and applications development). The process starts with creating a "vulnerability catalogue" containing pre-set scenarios resulting from the senior management team's self-assessment, as well as other scenarios set by risk management and underwriting and from the local self-assessment process (3R15). The key steps in the process are:

- Identifying vulnerabilities
- Setting risk profiles and boundaries
- Determining key risk indicators and potential impact
- Assessing the need for actions to mitigate the risk
- Determining which individuals are responsible for those actions, and for verifying that the recommended actions have been taken.

This is a remarkably thorough process and has resulted in the completion and compilation of 120 and 150 assessments each year (1R13). In summary, standardization is found to be an important element of respondents' understanding of the concept of ERM in CASE 3.

### 3.4. Integration

The classic finance function of CASE 3 was always integrated. As 3R11 says: “we always tried to achieve this [integration]”. However, some evidence suggests that the silo approach works fine in specific situations; as 3R9 says, “I think most of the time you don’t have to worry about silos as to a certain extent of risk exposures silo works fine and we do not need integration”. The interview survey suggests that it is only in extreme situations, where perfect or near to perfect correlations exist, where CASE 3 believes it important to understand the potential impact of risk on the whole Group. Other than that most respondents (in particular, those who work at the branch level), find the silo approach works well for managing risks. For capital modeling, CASE 3 also integrates silos by a forming correlation matrix using coefficient factors developed by actuaries. The respondents believe it important for some capital requirements to integrate the risks but they argue that the day-to-day management of risks can be adequately performed in silos. However, some respondents suggest that the silo type approach misses at least two critical aspects of risk management: the corporate risk appetite (broadly discussed later) and the identification of threats and opportunities of resultant risks, which emerges from the combination of many risks.

The interview survey revealed the fact that integration is mostly used for capital management in CASE 3. The capital framework involves looking at insurance risk (based on underwriting reserving), credit risk, market risk, liquidity risk, group risk and operational risk. These are considered in a holistic framework for modelling purposes. Treating them individually could enable CASE 3 to make an assessment of the capital required for each entry. However, respondents believe that to explore the aggregate risk requires that they look at their interactions. Consequently, an integrated model automatically takes care of correlations and interactions (3R14). If the risks are modelled on an individual stand-alone basis then it is necessary to find some way of looking at the interactions or correlations among them. Generally this integrated approach requires less capital than if they are added up on a stand-alone basis. While establishing risk based capital at the group level, CASE 3 uses a similar type of integration. It involves the collection of data

and the calculation of capital against each risk type. This provides an amount of capital for underwriting risk, reserve risk, market risk, and credit risk and CASE 3 then develops a correlation matrix. It is understood from the view of the respondents that integration is a synonym for ERM within CASE 3. This links all strategic, financial, and operational risks (3R14, 3R12). In the end, as 3R9 suggests, "it is managing the reputation of our group and managing our bottom line issues so that we do not get surprise". Consequently, it is clear that the concept of integration goes beyond capital modeling. In summary, integration was found to be the closest concept to ERM amongst respondents in CASE 3. However, such an understanding is motivated by risk modeling and capital management issues.

#### **4. Discussion**

From the analysis of the interviews, it appears that out of four layers, three (harmonisation, standardization and centralisation) are practised in isolation in CASE 3 but the remaining one, integration appears to be a consolidation of these three layers. The following discussions intend to discover the linkages amongst these four layers of understanding of ERM in CASE 3.

In a similar fashion to other large insurance Groups, CASE 3 is exposed to three sources of risk: (i) investments (assets), (ii) policies (liabilities) and (iii) operations (management). CASE 3 employs asset management functions to manage the financial risks of investments, reinsurance, co-insurance and securitisation for the risks of liabilities and corporate governance for the risks of operations. In addition, asset-liability management is an established tool in CASE 3; in particular, for life insurance functions (as dynamic financial analysis for non-life). However, corporate governance (self regulation on roles, responsibilities and structures), with the ultimate objective of controlling fraud and system abuse throughout the Group. It is assumed that no individual management of any of the three sources of risk represents an integrated form of risk management. Consequently, ERM in this sense should be an integration of all three components – best termed as asset-liability-operation (ALO) management. This is built on three pillars: centralisation,

harmonisation and standardisation. Moreover, it is interdisciplinary because such integration involves the disciplines of finance, economics and management. Since the operation involves humans and systems, it becomes necessary for ALO to include subjective (behavioural) aspects with the objective (mathematical) phenomena. From this perspective, the conclusion is that ERM is a interdisciplinary subject involving finance, economics, management and psychology; in short, the philosophy.

Indeed the output of integration provides a consolidated picture, but the gaps in the process of implementation in CASE 3 are clear. It is found that in the integrated report the departmental/unit heads (e.g., credit risk, operational risk, business continuity) report the status of their responsibilities to the Group CRO, who in turn reports to the Audit Committee and the Group Executive Committee in a consolidated form. However integration in CASE 3 is built around silos at different level of the organizational hierarchy. It appears that at the lower (business unit) level centralization, harmonization, and standardization hold simultaneously in line manager's functions. However, as the concept of integration goes upwards, the integration comes in line with either of them. In fact, risk management policies in CASE 3 at the business unit level are still defined and practiced by risk types (e.g., market risk, credit risk, and operational risk). The view in CASE 3 is that only when the silo approach works satisfactorily for each risk type then a holistic approach be reasonably applied. 3R5 argues: "I think we need to manage risk in silos to start off with and later we need integration – we need both." To some staff like 3R11, integration gives a holistic view as s/he argues: "it [integration] gives me more concrete information, which helps me to put limits on taking risk and also control the exposure of risks". Integration forces 1R12 to challenge the historic treatment of risk thus helping CASE 3 to understand the future shape of events.

In summary, the four layers were found closely associated and almost inseparable when ERM is viewed from an operational perspective. It is clear from the discussion that at the operational level, three layers (e.g., centralization, harmonization, and standardization) happened simultaneously

and their combined result represents integration. However, at the top level (which represents the view of the Group) each layer individually bears significant meaning and the concept of ERM involves elements of each of them.

## **5. Conclusion**

The study noted that while most of the respondents have a common idea of ERM, which is the management of risks in an integrated framework, they vary extensively in terms of their understanding. While underwriters are concerned about managing the potential ultimate loss of a block of business, the concentration of the finance manager goes to the management of risks on the balance sheet. Interestingly, the study did not find any conceptual understanding that is common amongst respondents. This could be the lack of a common mindset regarding the core values and principles of CASE 3. Clearly, a common standard and methodology in managing risk is essential to bring a common understanding of ERM across CASE 3.

## SECTION 3 MOTIVATION FOR ERM

### 1. Introduction

The objective of this section is to identify the driving forces forced ERM in CASE 3. Analysis of interviews suggests many interrelated issues as described below.

The section is structured as follows. Firstly, the questionnaire survey results will be presented. Secondly, the analysis of the interviews will be explored under key headings. Thereafter, a discussion will be undertaken and finally the conclusion will be drawn.

### 2. Questionnaire Survey Results

**Figure 3C6: Driving Forces of ERM in CASE 3**

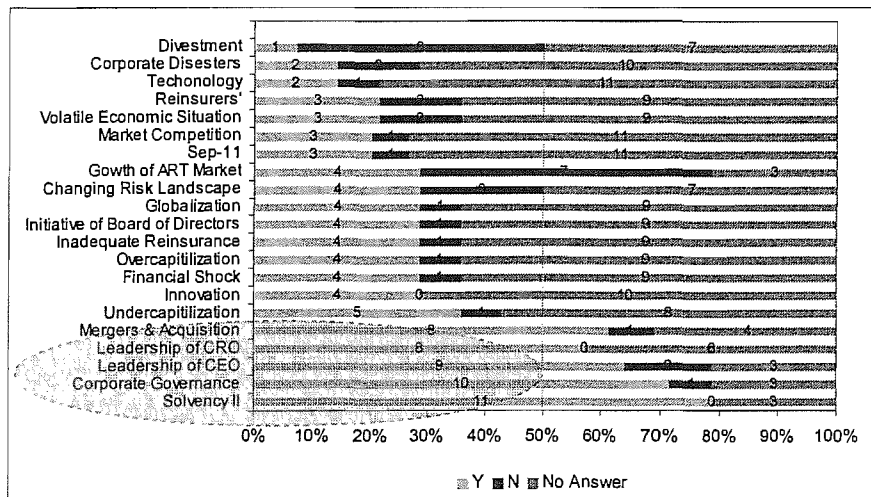


Figure 3C6 suggests that the questionnaire survey respondents identified regulations (in terms of Solvency II) as the key motivating factor towards ERM with 79% identifies Solvency II and 71% identifies Corporate Governance as key driving forces. These are followed in importance by the leadership of senior executives including the CEO (71%) and CRO (64%).

### **3. Analysis of interviews**

The following paragraphs describe the key driving forces under each of the main headings identified for the interview survey.

#### **3.1. Leadership**

The role of the CEO and the CRO were found to be prominent in the motivation for ERM in CASE 3. They are discussed below.

##### **3.1.1. The role of Chief Executive Officer**

Many respondents identified ERM to be a task of senior management. The evolution of ERM started after CASE 3 faced a major crisis during 2001 (following the departure of the Chairman and the CEO). The current CEO, who was appointed in May 2002, placed risk management at the top of the agenda of CASE 3 (3R12). It was found that the CEO encouraged open debate regarding ERM. This arose because, as a new appointee, s/he was unfamiliar with many internal issues. S/he felt it was important to become familiar with these issues. As 3R12 argues "it is a very good exercise for a new CEO to have a list of all key risk management issues that can impact the business and the sustainability of the business". Respondent 3R8 also argues "s/he [the CEO] is still in the process of grabbing the business. Quite naturally s/he doesn't know about some of the backwaters and some of the risks that his/her business is running." In addition, the pressure of regulators is another issue, as it affects his/her discretion to manage the risk of the organisation as a legally approved person. It can be seen that CASE 3 has developed some procedure like Total Risk Profiling (a database of key identifiable risks) but these were never brought together in a holistic framework, because of lack of leadership. As 3R13 argues: "I guess the former chairman was advised either by his own Board of Directors or by some consultants that this [a holistic framework] is something we need to do and then we hired a CRO from the banking industry". The CEO of CASE 3 has an accounting background, and s/he has a firm commitment to transparency, integrity, accountability focusing to a centralized approach from a financial risk management perspective. S/he believes that this is the way to establish a bigger and better organized business (3R3).



All the arguments suggest that the CEO is the ultimate CRO (3R12). Despite the evidence supporting the leadership of the CEO as one of the driving factors of ERM in CASE 3, a counterargument suggests that the CEO has limitations in managing risks. For example, 3R7 argues: "CEOs usually have a very limited vocabulary. They only understand three words: dollars, euros, and pounds – they understand them very much - they can only read stock market charts". Such a counterargument suggests that the CEO needs somebody who can assist him in managing risks enterprise-wide, or at least to help improve his ERM credentials.

### **3.1.2. The role of Chief Risk Officer**

The interviews revealed that CASE 3 has a lot of expertise and experience in risk management and they are gearing up to a different level. As 3R5 states: "we had a paradigm change in risk management in the group during 1996-97 because of the appointment of a new Chief Risk Officer in the Group". The then Group CRO came from one of the big four audit firms and he [the Group CRO] actually instituted the risk policy manual during 1996-97. That was fundamentally a big step and a big change, and what CASE 3 is seen to be doing now is regarded by respondents as just a transition to another level of risk management. This argument can be linked with the findings concerning the understanding of the concept of ERM in CASE 3, where four levels in the evolution of ERM were identified.

Despite the opinion of several respondents, supporting the leadership of the CRO as the key driver towards ERM, the role of the regulations is also regarded as important. For example, 3R13 argues: "given all the existing [and also evolving] regulations we would have to have one Group CRO. It isn't a question of do we want one; it is a question of, we have to have one. So we have one".

### **3.2. Regulations**

Clearly the new regulations are forcing CASE 3 to think about ERM a lot more closely (3R14). It was argued that the key concern of the regulators is protecting the customers through ensuring market discipline (IO13). The

regulators realised that companies like CASE 3 can become insolvent as a result of some potential adverse movements of the economy, including the hidden nature of emergent risks. Consequently, they [the regulators] really want to make sure that companies have a sustainable operation to maintain the commitments they make to the stakeholder community (3R12). This is also supported by 3R12, who argues: “clearly there are many new levels of regulations that would require ERM even if we hadn’t already discovered it or discussed it. We [insurance companies] accept risks and we also get rid of risks. Consequently, risk becomes a sort of different question for us”.

Pressure from local regulators, like FSA in the UK, to adopt local regulations (e.g., UK Prudential Sourcebook) influenced CASE 3 to develop ERM. For example, 3R5 states: “we are legally obliged to our prudential regulator [FSA] to implement the requirements as contained in the newly introduced Prudential Sourcebook, which effectively suggests that we take an enterprise-wide view of the risks we face in our core business operations”. In essence, the regulatory requirements influenced CASE 3 to codify some of its ERM initiatives thus stimulating the naturally evolving issues of ERM. 3R13 argues: “we are actually getting a largely modified version of the naturally evolving ERM due to the influence of regulations”. Interestingly, ERM is happening faster in the local companies of CASE 3 (at least in the UK) than at Group level, and the study identifies the influence of regulations as a key factor.

It is important to note that most of the arguments supporting regulations as the key driving force in establishing ERM in CASE 3 came from the local offices rather than Group Head Office. However, some criticism for establishing regulations as a key driving factor for ERM was also noted - basically from the Head Office staff. For example, one of the respondents 3R3, who is a member of the senior management team at the Head Office, argues that: “we don’t want to be managed by regulators. We want to do what is prudent for us, which is simply a means of trying to maximize the net present value of the cash flows for our security holders”. Clearly 3R3 does not look at regulations as a motivation for ERM. Senior management of CASE 3 does not want to have the regulators make their decisions. They think that CASE 3 is ahead of the curve in terms of ERM compared with the market

### **3.3. Innovation**

The study revealed that almost all of the respondents view risk as a new and evolving discipline and see ERM as a natural step towards managing risk across the organization (3R5). Moreover, risk management is an integral part of the responsibilities of all staff in all disciplines. ERM, being a new interdisciplinary and subtle (not obvious) subject has taken the generic shape in CASE 3 over time. The study suggests that ERM is getting standardized in CASE 3 in terms of modifying processes and accepted practice. However, currently there is not any established accepted practice. Nevertheless, staff of CASE 3 are thinking carefully about what is the best way of managing risks and also there have been various lessons in the past from which CASE 3 staff are trying to learn lessons. This is echoed by 3R12: "ERM is an evolutionary process for us and I believe in the next 10 years we are going to see a lot of developments". Moreover, 3R2 argues that risk taking supports financial innovation and risk sharing in CASE 3.

### **3.4. Globalization**

The interviews revealed that there was nothing seriously wrong within CASE 3 in its traditional (silo based) type of risk management (TRM), although it depends on how one views TRM. It is suggested that there is an increased awareness of the complexity of the world, which is a direct result of globalisation impacting on economic systems (Cummins, 2000, Berger, 2000). In addition, mergers and acquisitions as a part of globalisation added further complexity and momentum towards developing ERM. More importantly, as the history of CASE 3 suggests, it was very successful until it reached a certain size. Its financial position was threatened because crash because its system becomes too complex. Respondents indicated that about three years ago CASE 3 was really a federation of 360 independent businesses and all of its work concentrated on managing these independent businesses fragmentally. Moreover, its US\$ 400bn of invested assets, including third party assets, were managed through external investment subsidiaries located in 100 –150 countries around the world. One of the respondents, 3R12 suggests: "such complexity in managing CASE 3 as a single entity certainly

put stronger emphasis on risk management because we urgently needed to bring some structure into the complexity". As a result of uncontrolled expansion, CASE 3 paid a painful price in experiencing losses on some speculative business operations like credit derivatives. 3R4 argues: "we [being an insurance company] were probably not the best manager in credit derivatives. This is because we could not price credit derivatives properly. Moreover, we have had some bad experiences in this high risk business". This argument was also supported by 3R9: "our company went through a very difficult time in the recent past and we had capital constraints. Consequently, we became very reliant on reinsurance". Another respondent, 1R12, argues: "we must be able to optimise the risk reward balance". The study certainly identifies complexity as a result of globalization as one of the key drivers towards in ERM in CASE 3. In fact, ERM introduces tighter control on governance arrangements and best practice across the separate businesses to build a working relationship. In addition, CASE 3 has had 25 different divestitures (either sold or shut down) in the recent past and CASE 3 has concentrated more on the remaining markets where it believes it has a better position. In that sense CASE 3 is now less diversified than it was previously. Moreover, CASE 3 is now more focused on the markets where it has a better advantage in terms of market share and resources. Additionally, CASE 3 is now less diversified and this provides less scope for operational risk globally. One of the respondents, 3R10, states: "such actions [drawing a boundary for operations] dramatically reduced our exposure to risks".

#### **4. Discussion**

The above discussion summarises two contradictory views. One argument suggests that regulations are one of the key drivers of ERM in CASE 3. However, another argument suggests that ERM is a natural evolutionary process (in terms of innovation). The first argument notes that the regulatory convergence between insurance and banking actually forces insurers to adopt more banking type risk management practice to achieve a more mature risk management discipline. The interviews suggest it was as an innovation which actually triggered ERM in CASE 3. Clearly, CASE 3, because of its

diversification of business structure is less exposed to systemic risk compared to other financial institutions, such as banks (Llewellyn, 1999). However, insurance by its very nature concentrates heavily on downside (pure) risk because the key concern is to maintain commitment towards policyholders. Instead of trading the assets actively like banks, insurance companies maintain a very stable investment portfolio (3R5). However, the study notes the emphasis is increasingly towards that of the banking industry (i.e., more speculative), where the business cycles are shorter thus increasing the value of a more holistic view of risk management. Clearly the insurance industry is now taking more systemic risks due to regulatory influence than it had previously because of its well diversified nature (3R3). This is contradictory because if ERM is a natural evolution then any influence from third parties (preferably regulators) will interrupt the natural evolutionary process. If the natural evolution and influence of the regulators occurs simultaneously then a conflict of interest between these two parties is more likely because their objectives are different. Consequently, two distinct frameworks of ERM are likely to be developed to serve two different purposes. The current regulatory initiatives of providing risk based regulations might minimise the gaps between them, but it depends on the maintenance of trust between the two parties. Finally, it is worth remembering that there are distinct limits to the achievement of regulation and supervision. Whatever the extent of the regulation, nothing could remove the responsibility of risk from the senior management. As (Llewellyn, 1999) argues, "external regulation and supervision by official agencies is not an alternative to robust and effective internal supervision processes and responsibilities". Moreover, the interview survey established innovation as a priority of leadership (in particular, leading accountability and opportunity (March, 1987)), which in effect motivated ERM in CASE 3 along with other factors. In addition, the events of 11 September 2001 caused considerable loss to CASE 3. Although, the leadership and support of senior executives are clearly identified as key factors in the questionnaire and interview survey, the events of September 11 caused a considerable loss to CASE 3. Consequently, risk management concepts, tools, techniques and models were revised and strengthened to sustain the company from any future similar events (or surprises). In summary, no

particular factor was established as the sole driving force of ERM in CASE 3, because all the factors were found interrelated to each other. Above all, it is the combination of all factors with different weights in different situations or from different perspectives that promote ERM in CASE 3.

## **5. Conclusion**

The analysis suggests that regulation is either a zero or negative sum game (where the costs exceed the benefit) for big players like CASE 3. Regulations forced CASE 3 to shape ERM in a particular manner (probably bringing the initiatives of ERM as close to the economy) utilizing many other motivation factors (e.g., leadership, globalization, etc). In addition, the motivation of ERM in CASE 3 was heavily promoted by innovation with the support of the CEO's leadership, which in turn relates with many other factors discussed above.

## SECTION 4

### DESIGN OF ERM

#### 1. Introduction

This section explores the structure of ERM in CASE 3. A range of key elements relevant to the structure of ERM are noted and they are then linked together based on the views of the respondents. The output of this section provides the basis for a structure of ERM of CASE 3, which is presented later in this section. The model which emerges from the analysis identified an economic capital model for extreme risks only. It is targeted to produce sufficiently accurate information to develop risk-based capital to facilitate capital management decision-making for complying with requirements of regulators and rating agencies. Since a robust structure of ERM should maintain a balance between its various components, over emphasis on any specific issue is likely to unbalance the structure of ERM in CASE 3.

#### 2. Analysis of interviews

The analysis of the data introduces many interrelated issues associated with CASE 3's structure of ERM. The following are the key elements, and they are discussed below.

- Risk Appetite and Risk Tolerance
- Risk Profile
- Diversification and Risk Offsetting
- Risk Based Capital

##### 2.1. Risk Appetite and Risk Tolerance

The interview survey indicates that CASE 3 undertook an exercise to define its risk appetite and risk tolerance but confusion still exists in conceptualizing these. One respondent, 3R12, argues: "actually they [risk appetite and risk tolerance] are very much the same and at the moment and I don't see any difference between them". Another respondent 3R14 argues similarly: "I think they [risk appetite and risk tolerance] mean the same thing but I tend to use

risk tolerance". The study finds that understanding the distinction is important because it goes to the heart of the design of ERM. It emerged from the views of the respondents that risk appetite is important at a local company level whereas risk tolerance is of concern at the Group level. In other words risk tolerance is a function of risk appetite, the notion of which depends on and affects a set of broad issues (e.g., business model, culture, perception of management and individual in conceptualizing risks, and market competition). Working in a fragmented fashion is not a real risk for CASE 3 because it has the opportunity to monitor the parts very closely (3R14). However, it would be interesting to see how the parts behave when they come together to develop the risk tolerance for the entire group. The respondents find a lot of uncertainty associated with risk tolerance. Some respondents believed that it is important to focus on how the parts of the businesses aggregate in terms of their respective risk limits. 3R12 argues: "we want to make sure that parts [as a representative of local risk appetite] work correctly in terms of our group risk tolerance, where we add most value". Another important feature is that "risk tolerance" is used as a synonym of "loss tolerance". Consequently, there is a focus only on the downside of risk, whereas "risk appetite" considers both loss and opportunity.

The study concludes that in CASE 3 risk appetite is a broader issue, which reflects its culture, risk preferences (choosing the best from different combinations of risks), the pattern of business built on the attitude of its operating market, the expectation of its customers and the expectations of owners and employees. However, risk tolerance in CASE 3 is a subset of risk appetite expressed in terms of calculated risk, which the company is capable of accepting from the broader perspective of risk in order to achieve its specific corporate objectives. Consequently, the risk appetite of CASE 3 represents the degree of risk it is exposed to and risk tolerance is the amount of risk the company is actually willing to accept. Consequently, the study finds that the term 'risk appetite' is insufficiently understood within CASE 3. The further the risk tolerance level of an organization is from its risk appetite, the more vulnerable it is to not achieving its objectives and this threatens the



success of its ERM. The principle suggests that the accuracy of risk tolerance level is a key ingredient for the future success of CASE 3's ERM system.

## **2.2. Risk Profile**

The first step of the ERM model in CASE 3 is to identify the key significant risks, which are then linked to the economic risk capital discussed below. Understanding the significant risks is core issue in profiling risks. The exercise is used to explore the risk landscape by identifying risks, specifying their characteristics in terms of frequency and severity and then plotting them onto a two dimensional space, consisting of frequency (in probabilistic term) on one axis, and severity (usually in monetary terms) on the other. The graph facilitates the identification of risks of various degrees within the scale between low and high. The high-impact and high-probability exposures draw the particular attention of senior management in determining appropriate risk management strategies. 3R12 argues: "the risk profile identifies all risks and classifies them according to their frequency and severity. We use it set our ERM program in terms of calculating risk tolerance of both business units and Group, and also developing risk mitigation strategies".

## **2.3. Diversification and Risk Offsetting**

Calculating the diversification benefit is debatable because no agreed methodology has yet been developed in risk classes in CASE 3. Moreover, calculating the correlations among various risk classes and allocation of diversification benefit into the risk profile is another issue which is yet to be researched in CASE 3. Diversification and offsetting are two interrelated terms and they must be thought of simultaneously. Moreover the principle of diversification works better in the event of isolated extreme events, where risks are independent.

Another aspect is operational risk and the principle operated in CASE 3 is, as 3R14 states, "the more diverse the company the more the operational risk". Consequently, it is important to think about the effect of operational risk within the enterprise while considering the merits/demerits of diversification.

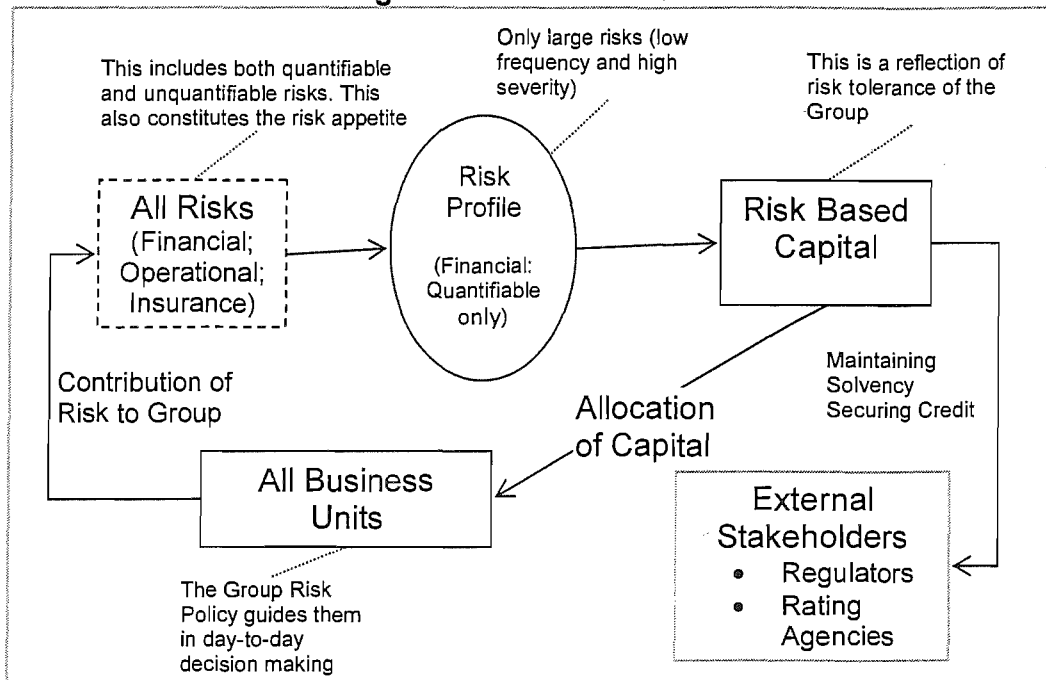
Respondent 3R15 argues: "it is important for us to concentrate on big issues (e.g., underwriting the large commercial businesses across geographical locations)". The interview survey finds that CASE 3 is beginning to realize the potential affect of these issues on their business; as 3R14 argues: "we are not doing that now but we are getting there slowly". In summary, it is understood that although diversification and risk offsetting is a big issue in the design of ERM within CASE 3, but the interview survey suggests that the infrastructure to capture the real diversification benefits is yet to be established.

#### **2.4. Risk Based Capital**

The respondent revealed that a large global insurer like CASE 3 holds capital to support its risk position from three key sources: trading of assets (investments); liabilities (policies) and operations. Determining the amount of the Economic [risk adjusted] Capital is therefore a key to the development of the ERM model. The study revealed that pricing of products and liabilities and managing the exposures within the risk tolerance level are key characteristics of Economic Capital in CASE 3. Respondent 3R3 argues: "one of the key objectives of our economic capital model is to reduce capital consumption". The interviews suggest that the availability of capital is another issue which affects the design of ERM in CASE 3. 3R3 argues: "we have got enough capital [available capital] to meet the expectation of shareholders". In essence, CASE 3 has excess capital and allocating it into the profitable businesses is a challenging issue. Moreover, the role of asset-liability management is at the heart of ERM (3R11). The asset-liability committee of CASE 3 works under the enterprise risk and governance framework, which describes how to measure capital. It is seen that CASE 3 operates in a fair value system where the emphasis is on risk scenarios. The system calculates the amount of capital necessary to hold for a range of risks (e.g., reserving risk, credit risk, investment, market, and asset-liability risk, operating risk, liability risk, catastrophe risk, reinsurance credit risk, etc.). In order to determine the amount of capital, CASE 3 looks at various return periods in the context of available capital. The capital management team then works with group investment to look at this in the context of asset allocation strategy

based on the target and the impact under 'what if' scenarios. All of them help to generate a capital figure. Figure 3C7 illustrates the structure of ERM of CASE 3.

**Figure 3C7: Structure of ERM**



In CASE 3's ERM system, the significance of risk in terms of propensity and severity is a key issue (termed here as "risk profile"). Then the corporate governance issues are assessed to decide who is responsible for looking after these [quantifiable] risks. This is monitored by the governance committee of the board. It is a two-way dialogue between the corporate center and legal entities located at different geographical locations.

The interviews suggest that CASE 3 integrates silos only for modeling purposes (of risk-based capital) but not for day-to-day risk management functions. In the capital models, risks are picked up from the silos (either risk types or individual lines of business), which then form a correlation matrix (3R5). Respondent 3R3 argues: "we are probably now the only life insurance company in Europe that adopts such a comprehensive method of calculating the risk based capital". It is revealed that CASE 3 started this kind of capital measurement methodology at the end of 2001. The interviews revealed that

ERM helps CASE 3 to create and improve shareholder value through risk-based decision-making and capital allocation linked to risk profile (3R3).

The analysis finds that the whole idea of the risk-based capital focuses on the sum of the assets that match liabilities (and in particular the technical provisions) and that on whether the assets representing the solvency capital requirement are adequate to meet the risks of the business. The concern of CASE 3 is that there should not be double counting of risks. However, the relationship between two interrelated issues (i.e., valuation of technical provision and calculation of solvency capital) is a topic of further debate. The internal risk model of CASE 3 is beginning to form an enterprise-wide view of its risk tolerance and to develop a useful tool for "risk oriented" decision-making. This activity is closely linked to the risk-based capital development work of CASE 3. Moreover, CASE 3 is developing and using loss distributions for the major categories of risk in response to the requirements of regulators. The difference is that CASE 3, in contrast to regulators, is looking at different probability levels; as 3R3 states: "we focuses on one major risk event every 50 years instead of one in 2000 years (which is regarded as the typical measure for rating agency evaluations)". The individual risk-type loss distributions are then brought together with mathematical functions that allow CASE 3 to introduce sensitivity ranges for correlations between the risk types they then run simulations to develop an aggregate distribution (3R3).

### **3. Discussion**

One objective of CASE 3's internal risk model is to arrive at a reasonably accurate and accepted understanding of the major risk drivers. Another objective is to model the impact on the aggregate risk tolerance of changes in its business model (such as increased retentions in the non-life businesses or more credit risk in the bond portfolio) to use as a supplement to its planning process. CASE 3 believes that internal risk model (ERM model) will enable it to capture changes in its risk profile and the risk tolerance boundaries of significant risks. In addition, the model is capable of developing stress tests or scenario tests as required by regulators. CASE 3 further believes that testing

of the model will facilitate it to engage its senior management team in understanding Group risk appetite and identification of risk [drivers]. Furthermore, this modeling capability could be useful to enhance its Group disclosure policy. In addition, an effective design of ERM will facilitate discussions with regulators, analysts and rating agencies.

#### **4. Conclusion**

Clearly, the key purpose of the ERM model within CASE 3 is to show that the company preserves adequate capital, proportionate to the key risks it holds on its book of business. What has emerged from the analysis is merely a “dark technical box”, which ignores the social and ethical issues of risk that CASE 3 encounters in its everyday operation (e.g., communication and culture). The model provides solutions for the quantifiable risks which it can accommodate (i.e., the quantifiable risks). The model is clearly incomplete because it is silent about the remaining risk (mostly unquantifiable in terms of traditionally used statistical techniques). In essence, an ERM model should have dual objectives: firstly to help the organization to reduce uncertainty in achieving its objectives, and secondly to allocate resources to build stakeholder value with a full understanding of both the positive and negative potential of the risks involved. Although the model used by CASE 3 does attempt both objectives, it is limited by the issue of the uncertainty with which it considers quantifiable risks and concentrates only on the value of the shareholders rather than other stakeholders. Importantly, creation of sustainable value of the firm does not depend only on profitability but also on reorganization to remain solvent and to maintaining a strong underwriting capacity over the long term. Above all, the bias in introducing parameters (assumptions) limits the scope of capturing the full spectrum of risk that CASE 3 faces (for example, pricing and underwriting of insurance risks) and this boundary certainly affects the managers in taking financial decisions.

## SECTION 5A

### OPERATIONAL CHALLENGES IN IMPLEMENTING ERM

#### 1. Introduction

In the next two sections (5A and 5B) the key operational and technical challenges to the implementation of ERM in CASE 3 are explored. The purpose of section 5A is to describe the operational challenges CASE 3 faces in implementing ERM.

Sections 5A and 5B are structured as follows: Firstly, the questionnaire survey results will be presented. Secondly, the analysis of the interviews will be explored under key headings. Thereafter, a discussion will be undertaken and finally the conclusion will be drawn.

#### 2. Questionnaire Survey Results

Figure 3C8: Operational Challenges in implementing ERM

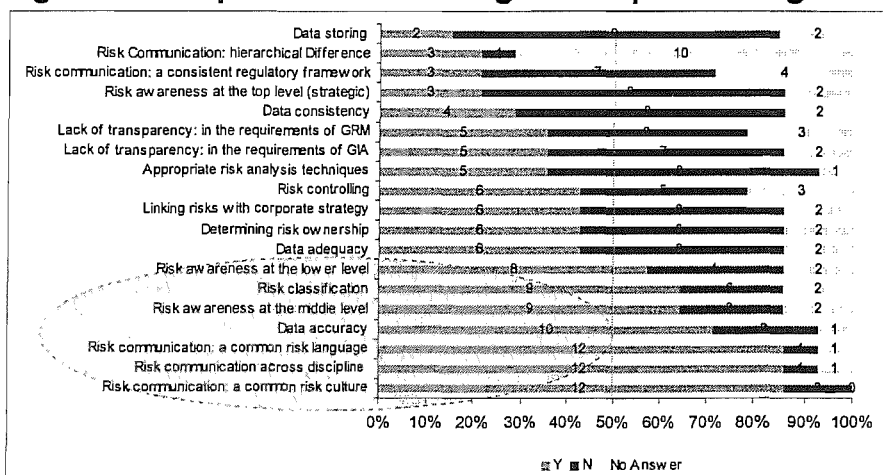


Figure 3C8 illustrates that risk communication was identified by 86% of survey respondents as the key operational challenge to ERM. Other key challenges appear to be the accuracy of data for risk modeling and reserving purposes, risk classification and risk awareness (by 71% of the survey respondents).

### 3. Analysis of interviews

The following paragraphs describe the key operational challenges. These are classified under four headings.

- Risk Perception
- Risk Communication
- Risk Culture
- A common risk language

#### 3.1. Risk Perception

The affect of risk perception among staff from various disciplines was found to be one of the key challenges. It is noted that the disciplinary approach towards risk management in CASE 3 depends on the backgrounds of the staff, who design the ERM. For instance, 3R14 argues “actuaries are suited well to risk management issues in CASE 3 because of their disciplinary understanding of loss distributions, correlations, aggregation models and also their understanding of the insurance business”. Several respondents suggested that because finance people do not have a professional background in insurance, their approach towards risk management differs significantly from that of actuaries. However, when CASE 3 looks at the aggregated aspects of risks [quantifiable risks] all [financial, investment and actuarial and strategic people] need to agree (3R12).

The perception of risk is broadly categorized in CASE 3 as acceptable risk and perceived risks. Acceptable risk is best seen as the result of a decision process, where risks are analyzed according to particular decision criteria. Theoretically, these two categories are closely interlinked but the market in which CASE 3 practices ERM does not support this linkage. This is because the risk perception of the staff in CASE 3 (particularly those who drive ERM) is rational and they use limited input information (although this should not be the case) to make their own commercial evaluation of risk. Consequently, there exists a gulf between perceived risk and accepted risk.

### 3.2. Risk Communication

It is found that the communication of risk is a process rather than an outcome in CASE 3. Because insurance companies are made up of people, personal relationships are important. It is necessary to actually talk to each other quickly on subjects both formally and informally. CASE 3 has around 62,000 employees and the head of Group Risk Management sits on various global committees (e.g., the global underwriting committee) and this is the way in which CASE 3 tries to bring together staff from different disciplines from around the world. One respondent 3R13 argues "it is a mechanism for communicating risk knowledge to each other". They essentially bring different issues into a common framework. Personal relationships were also found to establish a risk communication channel. The staff of CASE 3 see the benefit of having working relationships which are developed through monthly meetings or telephone conversations. One respondent, 3R1, argues "our communication is not so much a matrix structure. It is the people that make structure work".

CASE 3 operates a matrix management system, which they regard as essential for running a good risk management system. In essence, no particular employee controls the matrix of the organization and 3R1 argues "it is more about personal relationships. It is important to everybody to understand their particular role clearly even in a complicated management structure, where everything fixes together". Consequently, risk management within the system is not actually by any particular person or department but is more of a system.

The study revealed that some functions are already close to each other (e.g., group risk management and group internal audit) in terms of ethical issues where enterprise risks are concerned (3R15). So there is some coincidence in terms of ethical and philosophical views. However, as 3R8 argues "in terms of core functions, audit is about audit and group risk management is about risk management". The ultimate objective of group internal audit is to provide reliable assurance to the board about the Company's functions and the functions of group risk management need to be audited as well (3R8).



However, the study identifies that their reporting may be different but their ultimate goal in terms of managing the risk of the organization coincides very much.

The staff of CASE 3 see communication of risk as a learning process to provide information amongst different departments. However, respondents indicate that the communication of risk within CASE 3 is critical; in particular, in assisting the Group to understand its risk appetite (3R12). In addition to its internal purposes of managing risks, respondents also point to the vital role that communication plays in developing on-going relationships with external stakeholders for the future interest of the organization. The respondents (3R10, 3R7) also suggest that internal and external communication is closely linked together. 3R8 argues: "A strong internal communication of risk supports the external communication as a proxy of our organizational culture".

### **3.3. Risk Culture**

It has often been argued by several respondents (e.g., 3R14, 3R1, 3R13) that a corporate culture of over-stressing the downside elements of risk may result in the organization missing hidden opportunities [upside], with a resulting loss of competitive advantage. It is noted that the culture of managing risks in CASE 3 still remains within the boundary of a silo mentality. It is revealed that approximately 10 –15 years ago the responsibility of risk management in CASE 3 was under the office of the chairman. 3R3 states: "I wouldn't say that we had a culture of real and active risk management". Respondent 3R7 also supports this view.

Similar to other insurance companies CASE 3 had a culture of writing and controlling business fragmentally through individual business units. In fact it had approximately seventy business units around the world and they operated very independently. The implication, as described by 3R14 was that "the job of risk officers was very difficult because everybody responded to them independently and this made it difficult to obtain any meaningful information."

At that time risk management in CASE 3 was purely risk transfer. However, the current approach of risk management in CASE 3 tries to look at the opportunities in the face of uncertainty. Several respondents from the corporate center argue that the silo approach is necessary. For example, it does not mean that the silo type risk management in CASE 3 is obsolete. 3R5 argues: (who do not work in the corporate centre) "we still need to manage risks in silos like market risk, credit risk". Interestingly, the central document (Group Risk Policy) defines policies and practices to manage risks in silos. However, CASE 3 has a long term vision to manage risks holistically when each individual silo works well. Moreover, 3R7 (who works at the corporate centre) has a different view. He argues "principally our biggest challenge is the silo mentality people who do not take the interdisciplinary perspective. We can only approach our Group risk in an interdisciplinary manner so that's why we have to break down silos". Nevertheless, this confirms the fact that for the functioning of a large group like CASE 3 both the silo and the holistic type of risk management is necessary. In fact many respondents in CASE 3 argue that it does not need integration for day to day risk management but, as 3R5 argues "it [integration] is important to help understand the potential impact of extreme events when observing the whole picture".

As CASE 3 is in the risk business, poor risk management is another issue of changing culture. Respondents indicated that a lot of policies are not priced appropriately, which makes CASE 3 vulnerable, and it is necessary to look at risk in a broader context. In order to ensure that CASE 3 as a Group collects an appropriate amount of money it is necessary to put appropriate limitations on the risks at the branch level. As respondent 3R9 states: "controlling from the centre is important to ensure that risks at the branch level are quantified as accurately as possible to detect the threat scenarios."

It is found that people at the corporate centre in CASE 3 basically work against the silo approach. They intend to bring the whole management team together because they see the interaction and dependency of different areas of the business. They view it as a cultural issue and a very long process. CASE 3, as a large insurance group, has staff from different countries with

cultural differences. Clearly, such cultural differences influence its risk analysis and management functions. Some respondents argue that it is important to motivate them to achieve the ultimate objectives of the group and this can only be done through effective communication. One respondent, 3R12, states “we need to change our culture”. Staff at the corporate centre also get support from the branch staff; as 3R11 [who does not work at the corporate centre] states: “I am a great believer in mixing up the expertise as it is possible to capture huge benefits in mixing different professions”. It seems that the centre is not much worried about the silo type risk management as transparent and meaningful information is their key concern in building the ERM framework; 3R14 states “I think risk management in our business unit level is actually very good. I am not much concerned with small problems in the business”. In fact, the corporate centre is mainly worried about big problems, where they need much better information. In summary, the cultural issues were found to be one of the key operational challenges in CASE 3 implementing ERM. In summary, cultural differences between the centre and the local branches in perceiving risks in terms of silo and holistic perspectives trigger key challenges to the effective implementation of ERM in CASE 3.

#### **3.4. A Common Risk Language**

For the purpose of aggregation, it is necessary to see how risks accumulate. A common language helps towards a consistent way of measuring risks in the process of aggregation. A common way of defining risk management terminologies is the first step towards developing a common language. 3R14 argues “I am ‘insured’ or ‘reinsured’ means different things in different places”. As a part of the process of establishing a common language, CASE 3 has a network called the risk management leadership team, where the senior executives (who represent different departments) communicate a common set of objectives to each other. In addition, all parts try to get a set of common definitions to understand things in a meaningful way. 3R14 argues “this is the only way to quantify and aggregate risks”. The Group Risk Policy constitutes a common risk language because it provides a methodology to identify and classify risks. In addition, the way CASE 3 rates the scenarios maintains a

common standard. 2R12 states “we do a lot of work to make sure that the language that one business unit uses to talk to another business units are understanding”. A common language is also important to compare various aspects of risk across different aspects of business. It is revealed that the purpose of a common language is to set common minimum standards that all business units know will be applied equally across the organization.

#### **4. Discussion**

At the corporate level CASE 3 looks for the overall view of all risks that are faced by the enterprise and, in particular, how different types of risks can aggregate (or accumulate) to build unexpected outcomes. The business units deal with individual risks as a part of their daily operations. However, the focus of ERM actually centers on those less frequent but much lower probability events because they can suddenly come together in a way that could cause severe harm to the organization. One respondent 3R14 argues “it is not our job [as a part of ERM] to worry about 5% more or less revenue. We are working to develop the ability to monitor and think ahead on how risk could come together to threaten the enterprise in a substantial way”. This means that ERM does not really need to look at risk in silos, such as natural catastrophic risk, where CASE 3 has good data (audited), and sophisticated models. In addition, CASE 3 has sufficient mechanisms and expertise to comment on the accuracy of the models in these areas. The same analogy is applied to credit risk when CASE 3 looks at the individual parts to monitor and making sure that [credit risk] remains within the tolerance level. Staff of CASE 3 believe that it is not in these areas, where the real risk of the Group remains. This is because the silos are watched by the corporate centre very carefully. However, the worry of the corporate centre is how and when the risks of the silos may come together in an unexpected way that would harm the bottom line issues of the organization very severely. As 3R14 argues, “We [in our ERM] are more focused on how the pieces aggregate. Definitely we want to make sure that the pieces work correctly within our risk tolerance level but it is the aggregation where we add or lose most value”. The analysis finds similarities between the questionnaire survey and the interview survey and

concludes that risk communication in terms of disciplinary differences and culture are key operational challenges in implementing ERM in CASE 3.

## **5. Conclusion**

The study revealed that CASE 3 has developed a very good internal control framework focusing on risk management, but the key problem is its implementation. One respondent 3R12 (who works in the policy making and implementation department) states “we need support from both the actuarial and the finance departments to implement the framework”. The study also finds that ERM is a complex issue but that is why CASE 3 needs a interdisciplinary team to implement it. As 3R8 argues: “if we have only economists and actuaries then at the end of the day we could probably produce a set of numbers. However, the output would probably be very hard to understand for general applications”. Such arguments suggest ERM is a interdisciplinary subject, linking finance and psychology (e.g., behavioral finance) and respondent 3R12 argues “risk management is about humans, about systems and how do they work together.” However, as the analysis establishes, there clearly exists a lack of interdisciplinary understanding in CASE 3. Another local (branch level) respondent, 3R11, also supports this concept: “I am a huge believer in an interactive form of management”. In fact, such interactions get people closer to form an interdisciplinary team. The study further revealed education is the core of developing an interdisciplinary understanding across CASE 3. Certainly, this is the only effective and efficient way of overcoming the challenges in implementing ERM in CASE 3

## SECTION 5B

### TECHNICAL CHALLENGES IN IMPLEMENTING ERM

#### 1. Introduction

The previous section evaluates the key operational challenges in promoting ERM. This section (5B) deals with the technical challenges. Explain the

#### 2. Questionnaire Survey Results

**Figure 3C9: Technical Challenges in Implementing ERM**

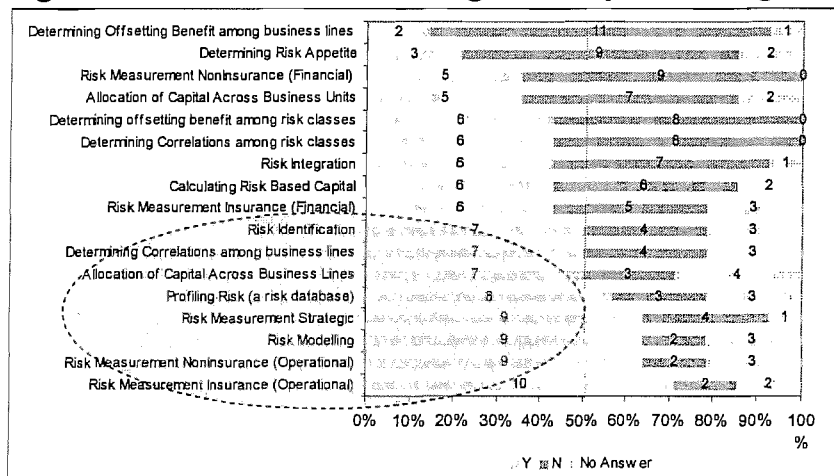


Figure 3C9 suggests that 71% of the survey respondents identified the measurement of operational risk (that arose from insurance related functions) as the key technical challenge to implementing ERM. However (i) operational risk arising from the non-insurance functions (in particular financial), (ii) risk modelling and (iii) strategic risk management were found to be challenges by 64% of the respondents. Profiling risk was found to be a challenge by 57% respondents and allocating capital and determining correlations across business lines were indicated as the key challenges by 50% of the survey respondents.

### 3. Analysis of interviews

The following issues were identified as the key technical challenges to the implementation of in ERM.

- Risk identification
- Risk correlations (and concentration)
- Risk diversification
- Risk integration or aggregation
- Counterparty aggregation
- Risk measurement
- Risk modeling
- Risk tolerance boundary
- Risk based capital

Each of these is not discussed in turn.

#### 3.1. Risk Identification

The objective of risk identification in CASE 3 is to list issues which can impact the business and the sustainability of the business. It is argued by respondents that at the beginning of the risk management process it is important to have early risk identification and assessment tools to determine which risk risks can harm the bottom line (e.g., reputation) of the organization and how. 3R7 argues "risk identification is a critical and challenging step of our enterprise-wide risk management". 3R12 echoed this view and argues "we first have to really understand our exposures and we have a very robust system for identifying the exposures". It is understood that a lot of work have been undertaken in CASE 3 on this issue under the topic of risk profiling (3R12). One of the challenges of risk identification, as 3R7 states is: "how far should one look backwards and forward?". It appears that CASE 3 usually looks backwards for three years (3R12) and simulates catastrophe risks which are likely to occur in 1 in 2000 years (3R3) for capital calculation purposes.

Emergent risks like worldwide pandemic (e.g., bird flu), global warming, and nanotechnology are thought the biggest risk for CASE 3. However, they usually do not receive much attention in the traditional form of risk management. As 3R13 argues “if that’s what we thought I don’t see anybody doing anything about it [emergent risks]”. They are basically treated as ‘bad luck’ because there no mechanism exists to determine the extent of their potentiality, as they accumulate at a very fast rate.

One of the key problems in the identification of risks, as the study discovered, is inadequate data. 3R13 states “if we had proper data then it could help us to understand the emerging nature of risk”. The insufficiency of data hinders CASE 3 in identifying its problems, thus leaving potential risks without any action; like discontinuing new businesses in the known earthquake zone. The respondents argue it is important for CASE 3 to avoid unnecessary risks it [CASE 3] hasn’t thought about. This is echoed by 3R5 who states: “right now we have a leak in our underwriting system”. This indicates that there always remain hidden risks in underwriting (for example) which is a matter of concern to CASE 3. Consequently, risk identification should be a continuous process.

Several respondents suggest that it is important for CASE 3 to develop a culture where risk is identified at each and every stage of operation, by all level of employees, and then communicated accordingly. 3R14 states “in hedging risks of financial guarantees we probably don’t focus much on its ultimate effect on the whole organization”. However, as part of having a robust framework people at all levels should look at the sources of risks, think about them, and identify them so either they or somebody else can deal with them. That is what CASE 3 really needs because a single department or unit can not do it all (3R12). Indeed, the framework has to empower people to identify the sources of risks.

CASE 3 uses a number of ways to identify risks and one of these is Total Risk Profile (TRP) as described in previous section. In addition, the quarterly risk group warning package [audit committee material] complements all operational reporting. This focuses on the routine issues (such as routine



checking to confirm the implementation of risk policy in dealing with new exposures). 3R14 argues: "the information which emerges from TRP helps us to look at how risks come together". Despite the advancement of scientific knowledge and technology life is subject to even more uncertainty. It was clear from the respondents that the concept of emergent risks (unknown of unknowns) is crucial to the survival and success of CASE 3 because there exists so little meaningful data. Consequently, the data inadequacy and consistency is one of the key challenges to effective risk identification.

### **3.2. Risk Correlations (and concentrations)**

Correlation of risk is an important element of the assessment of regulatory capital (e.g., Individual Capital Assessment) for FSA. For this purpose it is necessary to look at the nature of each type of risk and more importantly at how they come together. Respondents indicated that the capital assessment framework of CASE 3 involves looking at insurance risk (underwriting and reserving), credit risk, market risk, liquidity risk, group risk, operational risk etc.; and they all need individual consideration for modeling purposes. In attempting this, the capital assessment team looks at their correlations (or interrelations) in a number of ways, from a stand alone basis to integrated basis. However, calculation of correlations are problematic as the correlation matrices, are quite subjective (3R2). This arises because it is difficult to get evidence for the level of correlations to fit into statistical concepts to form underlying distributions. Consequently, correlations are subjectively categorized in terms of high-medium-low and they are assigned to the factors accordingly. Clearly, capturing the interrelations of risks brings opportunities in the form of competitive advantage (3R3) but they [correlations] can only be detected for large events. This suggests that most of the time management of CASE 3 does not worry about risks attached to small events. Consequently, traditional risk management is better for silos and they do not need integration (3R5). This is because they are often independent.

The study discovered that the enterprise risk tolerance model of CASE 3 looks at the economic impact on earnings or on surplus. The model focuses

on earnings at the 1-in-10, 1-in-50, and 1-in-100 years' probability levels, based on varying the correlation assumptions between risk categories. One respondent 3R14 argues "it is critical to evaluate this sensitivity because the correlations are largely judgment based, since little empirical data is available". From a management perspective, CASE 3 assumes that nine years out of 10 represent 'business as usual' and one year out of 10 CASE 3 experiences an 'extreme' event(s).

### **3.3. Risk Diversification**

In the calculation of risk based capital, the benefit of risk diversification is seen as a big issue. CASE 3 holds capital for the risk it underwrites in various geographical locations, and, consequently, it is an advantage if the risks are not sufficiently correlated. Such a situation suggests less capital needs to be held compared to that which would be suggested if the individual risks were simply summed. However, this potentially changes the strategic decisions and 3R11 argues "that is why we hold a life Company and a non-life Company within our Group". All the arguments suggest that in the case of a sufficiently diversified portfolio of risk, risk correlations lessen, which provides the opportunity to insurers to charge less capital for risks they hold.

### **3.4. Risk Integration or Aggregation**

The literature suggests that ERM looks at the overall view of all risks faced by the enterprise. However, it is important to look at how different types of risk can aggregate to provide unexpected outcomes (3R14). Theoretically speaking ERM should combine all risks together, but practically it has different phases. The first phase is operational and this is not an important issue for the CRO. However the main issue for the CRO concerns unexpected events that do not happen frequently. The day to day risks are managed in general operations and they in fact do not need integration. The main concentration of ERM in CASE 3 goes to risks that are hidden and are less prominent. ERM looks at more forward looking issues, but not the day to day issues. One respondent 3R12 argues "It is not all risk. We are dealing with very significant risks".

### **3.5. Counterparty Aggregation**

A major effort undertaken in 2003 was to aggregate risk information by counterparty. This includes data on exposure at default, risk limits, correlation between risk categories, counterparty contribution to risk-based capital, and quarterly monitoring. CASE 3 seems is typical in that this type of information (e.g., credit-related exposures in its investment and insurance portfolios) comes from numerous and separate data sources. Also, investment and underwriting decisions are made in separate parts of the organization, such as surety underwriting and investments. One respondent, 1R14, argues “we therefore had to assemble the required information somewhat manually with the help of the risk network and determined correlation factors to arrive at a loss given default for each of the major counterparties”. CASE 3 is now in the process of setting limits by rating category and developing procedures so that its aggregate exposure information and risk boundaries are available to its underwriting and investment decision-makers. This is a new risk management tool that CASE 3 did not have before.

### **3.6. Risk Measurement**

The interviews revealed a lot of complexities in the measurement of risks (for example, the development of stress conditions in terms of an appropriate horizon (e.g., 1 in 200 years)). In addition to appropriateness, transparency is also an issue, where the tractability and allocation to the components that drives risks are difficult. One respondent 3R3 argues “we find it difficult to communicate the calculation of risks to others because the methodology we use is often based on assumptions in the face of insufficient reliable data”. This clearly suggests that in order to get necessary acceptance an appropriate risk measure should match both the business realities and, in particular, the culture of the firm. Another respondent 3R11 suggests “we need a clear understanding of how we measure risk and what that actually means. I just struggle sometimes to relate that [risk measurement] to operational life where its actual application takes place”. In addition, it is important to ensure that the methodology employed for risk measurement is

thoroughly consistent across risk type (viz. market risk and investment risk) and also across the techniques of quantification (e.g., VaR or TVaR) using Monte Carlo Simulation. Respondents 3R4 argues: "these statistical risk measures are limited to a certain exposure of risk". All of these arguments suggest the need of a common language for a common way of measuring risks across CASE 3.

### **3.7. Risk Modeling**

Many respondents noted that since the introduction of computers, risk modeling has become much quicker and more accurate. In the pre-computer era, modeling a catastrophe was a long and laborious process: nowadays highly sophisticated software programs allow for thousands of different scenarios to be modeled quickly. Of course, before the software can work, it needs to be fed with a considerable amount of data about historical disasters and the latest scientific findings. The result is obviously dependent on the quality and quantity of that data. With the help of computer simulations, thousands of different catastrophe (e.g., hurricane, earthquake etc.) scenarios with changing parameters can be modeled. Courses of real storms and hurricanes are incorporated with meteorological models. The more storm scenarios are run through, the higher the probability that one of them will match with a real future hurricane. Once the potential course of a hurricane has been modeled, it is projected on to a geographical map that contains data on insured objects. The insurer can now calculate the potential individual loss per object, which is the basis for premium calculations. By adding all individual losses it can get the potential total loss for its whole portfolio. This figure obtained should then be reflected in reserves.

The study identifies that the work of risk modeling in CASE 3 (which is probably similar in other CASES) follows the work of nuclear engineers' Probabilistic Risk Analysis, which investigates: what can go wrong, how likely is that to happen; and what are the consequences if it does happen. Although quantitative, the modeling of financial risks (scientific model) in CASE 3 is also consumes subjective data, which are assumption-driven (e.g., scenario

generation). Moreover, others (e.g., underwriting, claims) use non-scientific models based on assumptions, and subjective assessment techniques (intuitive risk assessments).

### **3.8. Risk Tolerance Boundary**

The interviews revealed that in order to calculate the risk tolerance level, CASE 3 is implementing metrics for probability and severity scenarios that will allow it to aggregate and run simulations as a proxy approach to measuring risk capital (3R3). In this approach, the management at the corporate center prioritizes the highlighted risks (as done by business units) based on the risk tolerance and frequency of risk in terms of various probabilities (3R2, 3R3). The work of risk tolerance is ultimately linked to the risk-based capital of the Group (3R12). However, 3R5 argues: "the Group Risk Policy included risk tolerance boundaries for some specific risks".

### **3.9. Risk Based Capital**

The interview survey suggests that in addition to the capital requirements of market observers (e.g., regulators and rating agencies), CASE 3 is developing its own view of risk-based capital (i.e., economic capital). Inconsistencies in the regulatory requirements amongst various geographical locations were one of the key difficulties in calculating economic capital for CASE 3 (3R3, 3R14). Notwithstanding, CASE 3 does not necessarily follow or adopt any of them. However, the objective of CASE 3 in calculating RBC is to find the common denominator and utilize that standard throughout the enterprise to assess capital adequacy, allocate capital, and measure performance (1R14).

## **4. Discussion**

The questionnaire survey identified operational risk measurement, risk modelling, profiling risk, and allocation of capital, risk correlation and risk identification etc. as the key technical challenges of ERM in CASE 3. The interview survey also finds them challenging issues but added some new issues (e.g., risk diversification, risk tolerance, risk integration, risk based capital etc.). However, the in-depth analysis suggests that they all interrelated

while come under the design of ERM but present different degrees of significance in terms of the concentration and context of the situation when they are being considered.

Being a large insurer, it is not a big issue to CASE 3 to understand and manage insurance risks. In general, due to the sophistication of expertise, core insurance risks are generally not critical to any big insurance enterprise. However, the focus is on the aggregation of financial risks, insurance, investment and others, and especially how they may correlate to impact the enterprise in low probability scenarios in the whole risk landscape.

Like any other financial services firm, creating and capturing the diversification benefits is clearly an operational challenge for CASE 3. However, CASE 3 has become increasingly aware of the importance and complexity of operational risk and how it relates to the internal control framework. Moreover, it understands the urgent requirement to align and complement the efforts. Such restructuring, on the one hand, enabled it to gain increased control and profitability thus decreasing its operational risk to a great extent. On the other hand, it now has a more effective model of risk as a result of the many organizational changes (including divestitures and wind-downs). Although, in such contraction has arguably resulted in some loss of diversification in its overall risk profile, its risk analyses suggested that this impact has been more than offset by a substantial decrease in operational risk (1R15).

## **6. Conclusion**

CASE 3's risk management function is based on its assessment of an economic view of risk (Nikolaus von Bomhard, 2006). In order to create economic value in the long term, it is important for insurers to earn more than their cost of capital. CASE 3 realizes that this is the only way to be capable of creating lasting valuable relationships with customers, agents, brokers, and shareholders and also of providing rewarding opportunities for employees. The stakeholder community relies on insurers' capability of fulfilling their

promises and the financial strength of insurers provides the foundation on which the fulfillment of these promises is built.

Since ERM mostly deals with the uncertain future, the key problem for ERM in CASE 3, as the study identifies, is the lack of quality information about potential events in terms of frequency and severity. The second problem is the appropriate way of dealing (or shaping or processing) this information, which in essence, includes a range of items such as understanding and shaping this information (which is modeling and measuring the risks in probabilistic terms), grappling with the interrelations which lie within this information, sharing (or communicating) this information meaningfully to a broader community.

## SECTION 7

### PERFORMANCE OF ERM

#### 1. Introduction

The staff of CASE 3 believe that their enterprise-wide risk management system can provide access to a central depository of all risk management related documents. In addition, it will also supply tools for identifying and profiling for the purpose of modeling, measuring, and monitoring continually. The following paragraphs analyze the views of the respondents and suggest that the real value of ERM with CASE 3 should not be limited to short-term gains in terms of profitability

#### 2. Analysis of interviews

The following paragraphs analyze the points raised by the respondents.

ERM is emerging as a best practice in CASE 3. Its different businesses across different parts of the world are exposed to similar risks and the accumulation provides a systemic risk, which CASE 3 wants to control at the centre. As a part of best practice, Group Risk Management can improve performance by changing corporate standards across the business to mitigate such systemic risk (3R1). Clearly, there is a benefit in this but there is a great tendency to try and replicate what is carried on further down the organization (3R13). However, a cost benefit analysis for ERM is difficult. 3R7 argues, "how do you measure it [the performance of ERM] if you avoid a loss". Nevertheless, almost all respondents find benefits from ERM. 3R8 (who works in the audit department) states: "there are lots benefits of ERM, for example, if we have confidence in the risk management process it will help us target our work". The interviews also revealed that the ultimate goal of risk management is often misunderstood. For example, the general conception about risk management is mitigation of every risk, which is not true. Risk management in CASE 3 is really there to optimize the balance between risk and return. If there is a risk then there is also an opportunity and the job of risk management is to balance the trade-off. 3R12 states: "that is the essence of



risk management". Some other benefits (quality management perspective) are mentioned by the respondents (e.g., maximization of shareholder value, capital budgeting, strategic asset allocation, incentive and compensation). In addition, successful implementation ERM could, as some respondents believe, provide easy access to capital, thus assuring a high credit rating.

### **3. Discussion**

No clear cut answer has been obtained from the respondents about how the performance of ERM is measured in CASE 3. However, there remains an indication about the independent measurement of the performance of ERM by third parties assessment (e.g., regulators, rating agencies and analysis of financial analysts). Historically, rating agencies consider important quantitative factors (e.g., risk-based capital, statutory profits, financial leverage, etc.). They also consider qualitative factors (e.g., diversification, market position and ownership profile). Similar arguments apply to the compliance to regulations. Above all, the key point is that because the notion of ERM is not yet established fully and consistently in CASE 3, they are a long way from effectively measuring the performance of ERM.

### **4. Conclusion**

Although contributing positively to the strategic decision making issues is the key objective of ERM, the study fails to uncover such a linkage. The study, however, concludes that CASE 3 is still about measuring the performance of ERM. The study however suggests that the real value of ERM with CASE 3 should not be limited to short-term gains in terms of profitability. Although the long term benefits of ERM are difficult to measure in numerical term the concept of ERM is about changing the culture of the way CASE 3 runs its business. Consequently, the ultimate benefit appears to be only the identification of risk as a potential harm, but in changing views towards the opportunities for reward as well.

Table 1: List of interview respondents

SI No	Code	Respondent	Designation	Discipline	Type of Interview	Location	Date of Interview	Time
1	3R1	Alan Woof	Chief Underwriting Officer (UK)	Insurance	Face-to-face	United Kingdom	01 <sup>st</sup> December, 2004	1 hour
2	3R2	Caroline Barlow	Corporate Actuarial Director (Finance)	Actuary	Face-to-face	United Kingdom	10 <sup>th</sup> December, 2004	1 hour
3	3R3	Douglas B. Niemann	Head of Investment and Financial Risk	Finance	Face-to-face	Zurich	10 <sup>th</sup> Nov 2004 03 <sup>rd</sup> Sept 2004	1 hour 1 hour
4	3R4	Elisabeth Messner	Head of Group Credit Risk Management	Finance	Face-to-face	Zurich	11 <sup>th</sup> November, 2004	1 hour
5	3R5	Gerald Dodds	Chief Risk Officer (United Kingdom)	Accounting	Face-to-face	United Kingdom	01 <sup>st</sup> November, 2004	1 hour
6	3R6	Giancarlo Bombardieri	Head of Corporate Information Risk and Business Continuity Management	Operational Risk	Face-to-face	Zurich	11 <sup>th</sup> December, 2004	1 hour
7	3R7	Hans Peter Frei	Head of Group Risk Engineering	Insurance	Face-to-face	Zurich	10 <sup>th</sup> December, 2004	1 hour
8	3R8	Kevin Allen	Director Group Audit (General Insurance)	Accounting	Face-to-face	United Kingdom	30 <sup>th</sup> November, 2004	1 hour
9	3R9	Mark Talbot	Head of Group Reinsurance Management	Insurance	Face-to-face	Zurich	11 <sup>th</sup> November, 2004	1 hour
10	3R10	Matt Cottrell	Claims Performance Manager	Insurance	Face-to-face	United Kingdom	30 <sup>th</sup> November, 2004	1 hour
11	3R11	Penny James	Director of Financial Reporting (General Insurance)	Finance	Face-to-face	United Kingdom	10 <sup>th</sup> December, 2004	1 hour
12	3R12	Rene Manser	Head of Group Risk Management Policy	Operational Risk	Face-to-face	Zurich	28 <sup>th</sup> June, 2004 02 <sup>nd</sup> August, 2004	1 hour 1 hour
13	3R13	Timothy Mitchell	Global Chief Underwriting Officer (General Insurance)	Insurance	Face-to-face	United Kingdom	01 <sup>st</sup> December, 2004	1 hour
14	3R14	Wayne Fisher	Group Chief Risk Officer	Actuary	Face-to-face	Zurich	11 <sup>th</sup> November, 2004	2 hours
15	3R15	Ebed Mwandembe	Head of Operational Risk		Telephone	Zurich	21 <sup>st</sup> December, 2005	45 Minutes

**REPORT ON THE UNDERSTANDING,  
MOTIVATION, DESIGN, CHALLENGES  
FOR IMPLEMENTATION, AND  
PERFORMANCE OF  
ENTERPRISE RISK MANAGEMENT  
IN  
CASE 4**

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## SECTION 1

### A BRIEF OVERVIEW OF CASE 4

#### 1. Introduction

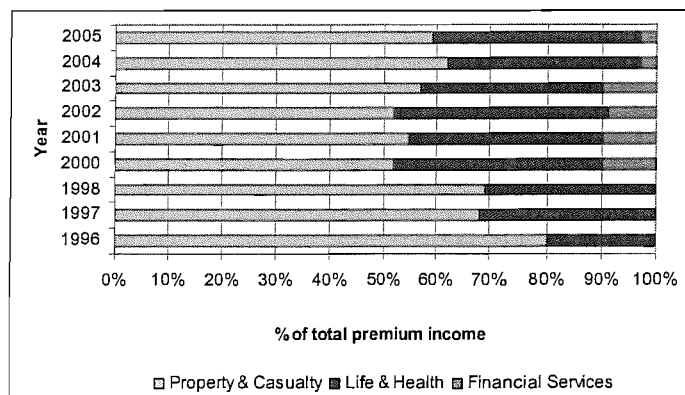
The following paragraphs provide some historical information (background) about CASE 4 and explore some strategic issues regarding business planning within CASE 4's environment. Sources of the data have not been included in order to protect the identity of the CASE.

#### 2. History<sup>1</sup>

CASE 4 was founded in 1863, and is now one of the world's largest wholesale business enterprises. Its customers are large owners of risk, predominantly insurance companies, but also some Fortune 500 companies in specific business sectors. CASE 4 operates in 130 locations around the world through 70 offices. Geographically, two thirds of the company's premiums are generated in Europe, almost a quarter from US and the remainder from Asia, Africa and Australasia.

The portfolio of business carried out by CASE 4 consists of reinsurance, primary insurance (both Property and Casualty (P&C), and life and health) and financial services as seen in Figure 4C1. CASE 4 is the world's second largest reinsurer (in terms of net premium earned in 2005) and the world's largest life and health reinsurer (source: Presentation Material of CEO of CASE 4 available on its homepage).

**Figure 1: Premium income of three different business sectors**



<sup>1</sup> Source: Speech of CASE 4's CEO

History suggests that CASE 4 changes its business mix from time to time. 1985 was a remarkable year for CASE 4. At that time reinsurance business made up 64% of total Group net premium income and non-life reinsurance was the dominant business (contributing 85% to the book of business). Life business represented just 15%. And primary insurance contributed 36% (split between non-life and life in the same proportions as the reinsurance portfolio). Competition in the reinsurance industry was heating up during that time. Many primary insurance companies established their own reinsurance arms, putting additional competitive pressure on professional reinsurers. Also during that period, the captive insurance and reinsurance industry experienced a boom as corporate clients started to look for alternative ways to finance their increasingly complex risk. This took premium out of the direct market and put pressure on reinsurers to develop new skills in dealing with industrial clients. Given such circumstances in 1985, CASE 4 set its strategy based on the conclusion it reached regarding the need for the wholesale risk industry; it was assumed that primary companies would not need (or would require to a lesser extent) the wholesale insurers at some point in the future, because of their increasing capacity to underwrite risks. Consequently, CASE 4 decided to diversify into primary insurance and related services. In the face of such an uncertain future, CASE 4 then bought some computer services companies and some primary insurance companies<sup>2</sup>. Unfortunately, the strategy was based on the wrong assumptions because the wholesale risk industry grew much faster than the primary risk industry in the period after loss and some nine years later CASE 4 divested itself of everything it had acquired and went got back to Property and Casualty (P&C) and the life reinsurance business.

### **3. Strategic Issues<sup>3</sup>**

The decision to focus activities on the core business of reinsurance was based on a number of factors. First, the primary insurance business was underperforming, dogged by losses and complex administrative processes that would have taken significant capital and management resources to turn around. At the same time, because of capacity shortages and sharply rising rates, the reinsurance market was offering more

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<sup>2</sup> Quoted from an internal publication

<sup>3</sup> Source: Speech of CASE 4's CEO

significant opportunities. This was achieved through the conclusion of a strategic project led by an academic. The study broke the reinsurance value chain down into its component parts and analyzed the value proposition of each in a systematic way. Interestingly, the study identified risk management in a wider sense (rather than simply reinsurance) as being CASE 4's core skill. In the context of the new and more wide-ranging mission of offering risk management services to clients, the strategic project identified the following four options in developing the corporate strategy of CASE 4:

- Focus on reinsurance
- Focus on insurance
- Focus on services, including the development of insurance and reinsurance-related services
- Focus on investments (with insurance and reinsurance operations generating investment capital)

Taking the academic study into the consideration, CASE 4 introduced a concept of 'integrated security' for clients in early 1986, covering a range of services from risk assessment through risk financing to claims management. The new strategy involved retaining reinsurance as the core business while developing it innovatively and at the same time expanding the existing primary insurance business – particularly personal lines business – and associated services. Where appropriate, new primary insurance and service capabilities would be acquired and enhanced. In addition to the expanded scope of client services, CASE 4 sought to increase and deepen its direct contracts with the end customer (namely, the individual and corporate policyholder), aiming to improve customer focus and identify innovation potential. It was also felt that a major advantage of this strategy was its flexibility and its inherently evolutionary nature. A key goal was to develop the individual business sectors of primary insurance, reinsurance and services as separate and successful, but complementary, parts of the company that could be combined as client needs demanded.



A fundamental refocusing of CASE 4's strategy towards concentrating on the core reinsurance business was carried out under the leadership of the CEOs in 1994 and 1997 respectively. The direct insurance and remaining service operations were divested, and in the course of the following years, the company developed the life and health reinsurance business and financial services operations.

#### **4. Current strategic priorities**

After a structural change in terms of strategic positioning, the following have been determined as CASE 4's current strategic priorities.

- Actively manage the cycle for profits;
- Optimize organic and transactional growth;
- Extend leadership in Asia; and
- Accelerate the balance sheet through risk securitization.

At the core of implementing these strategic priorities capital management has been established as a key corporate function. CASE 4 has identified that a strong capital base is the key factor for its continued success. However, they argue that a continued focus on sustainable profitability in core business and prudent capital management is essential to maintain a strong capital base. CASE 4 realize that this requires an in-depth understanding of the economics of the relationships with clients, ensuring these relationships are profitable for CASE 4 and provide value to the client. The Economic Value Management Methodology, which applies a consistent economic performance measure to all activities, also adds transparency.

CASE 4's corporate philosophy, which is important if it is to achieve the above strategic priorities, defines the general standards which guide the Group's business decisions. It rests on four core values:

- Efficiency, governing quality and cost-effectiveness;
- Excellence, defining CASE 4's standards of knowledge and expertise;

- Integrity, ensuring that the highest standards of ethical conduct are met in business dealings; and
- Sustainability, setting the balance between CASE 4's economic, social and environments responsibilities.

The principle of sustainability, which is creating economic value while preserving natural resources and acting responsibility towards society, forms an integral part of CASE 4's long-term business perspective. In this context, climate change is highly relevant to CASE 4, as the phenomenon is likely to increase the loss burden from fluctuations in natural catastrophes. In addition, CASE 4 engages in continuous dialogue with stakeholders to establish a clear understanding of the risks and opportunities associated with climate change. Risks continuously evolve and change over time thus shifting the conditions of insurability. For CASE 4, identifying relevant changes in the risk landscape<sup>4</sup> and understanding how they may affect the business is important for continued success. Increasing pressure on natural resources, the climate and eco-systems, as well as threats to social cohesion, may lead to insured losses resulting in claims on insurers and ultimately on CASE 4. In addition, growing stakeholder concern over unsustainable trends in raising expectations regarding responsible corporate behavior is likely to change the perception of what liability means. CASE 4 has a strategic interest in addressing the risks emanating from these trends and is committed to developing efforts and/or providing new risk transfer solutions. CASE 4 has taken care to firmly embed the principle of sustainability in its governance and management setup and gives the topic an important place in its risk dialogue with stakeholders<sup>5</sup>.

## **5. Organizational Structure**

Organizationally, CASE 4 is structured into two parts, a Corporate Centre and three Business Groups as seen in Figure 2:

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<sup>4</sup> Risk landscape (or profile) is a multidimensional framework, which involves an exercise to describe how risks interfere with each other, how they accumulate and so on in the best possible way.

<sup>5</sup> CASE 4 publication "Sustainability Report 2004".

Figure 4C2: Organizational Structure

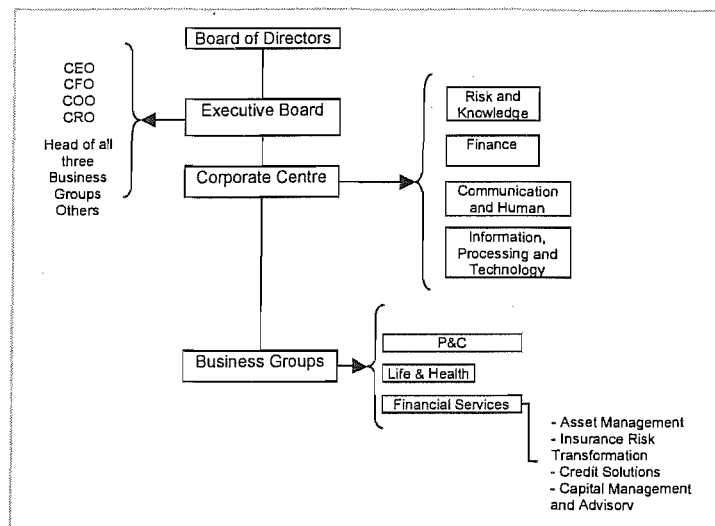


Figure 4C2 illustrates that CASE 4's corporate centre has four divisions (Risk and Knowledge, Finance, Communications and Human Resources, and Information, Processes and Technology). The three business groups are Property and Causality, Life and Health and Financial Services. The Risk and Knowledge division was formerly known as "Reinsurance and Risk", when Product Management and Risk Management were combined (including some governance issues). Later the Product Management was shifted to the P&C Business Group. The reason behind connecting 'risk' with 'knowledge' is "to pick up a common corporate philosophy whilst establishing a common understanding about the fundamental issues of underwriting, finance and investment knowledge" (4R5). The networking of knowledge in CASE 4 provides storage for and exchange of information. This is a risk because CASE 4 finds always new issues. The Financial Services Business Group (FSBG) was established to efficiently deliver a comprehensive range of capital management products to its core clients. It has four segments comprising asset management, investment banking (advisory and capital markets), credit solutions and risk solutions. Its core priorities are convergence between capital and insurance markets, cross-selling of risk transfer and corporate finance solutions, securitization both in terms of product offering for clients and a capital management tool for the Group, strategic and practical asset allocation and management, and finally third party asset and asset-liability management

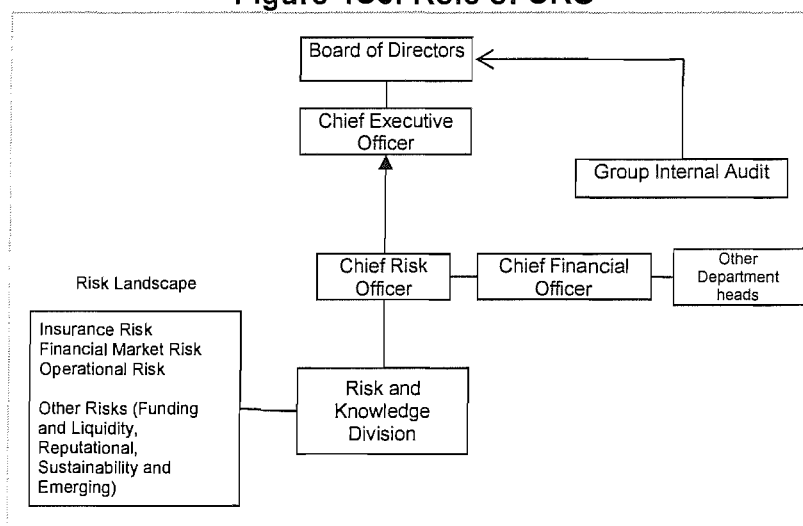
business. Over the last two years the FSBG and Group Risk Management (GRM) have worked more closely than ever before, for instance, in the implementation of group risk management policy and operational risk management, where FSBG has prior experience when dealing with clients (4R7).

As the innovative capabilities depend on having an organizational structure in place, CASE 4 leads ERM across the industry. The study finds that the organizational structure puts the right people (with the right execution abilities, innovation skills and values) in the right jobs.

## 6. Risk Management

The decentralization of business activities and the increasing complexity of transactions, performed in various units and involving many different skills, have led to the creation of a stronger Group Risk Management in parallel with the formation of the business groups and the separation of tasks between the Corporate Centre and the business groups.

Figure 4C3: Role of CRO



Headed by the Group CRO (see Figure 4C3 for the position of CRO), the Group Risk Management (established in early 2001) forms a part of the Risk and Knowledge Division (Annual Report of CASE 4). In addition, a committee named "Group Risk

Management Committee” operates to co-ordinate ERM and to promote an open risk culture. CASE 4 is regarded as the leading (re)insurance company involved in corporate sustainability<sup>6</sup>. Moreover, CASE 4’s overall corporate social responsibility (CRS) performance is above the industry average ([www.innovestgroup.com](http://www.innovestgroup.com)).

The key risks for the reinsurance industry in general, and CASE 4 in particular are catastrophes and their accumulations (Pressman, 2006). Natural hazards are still a key concern due to their cumulative risk properties and the huge capacity that must be allocated to cover them. In spite of major annual fluctuations, a trend has emerged over the past 30 years showing a dramatic rise in natural catastrophe insurance losses (see Figure 4C7). This increase is principally a result of rising population densities in general and greater insurance penetration in high-risk areas. It is assumed that the natural hazard losses are likely continue to rise (Coomber, 2006).

The management of risk and capital is a core competency for CASE 4. Risk Management evaluates the amount of risk adjusted capital needed to support the classes of business written. Capital management assesses total risk bearing capital and is responsible for timely capital supply. CASE 4’s dynamic risk and capital management functions ensure that the company is adequately capitalized at all times and that it has sufficient financial flexibility to profit from new business opportunities as they arise.

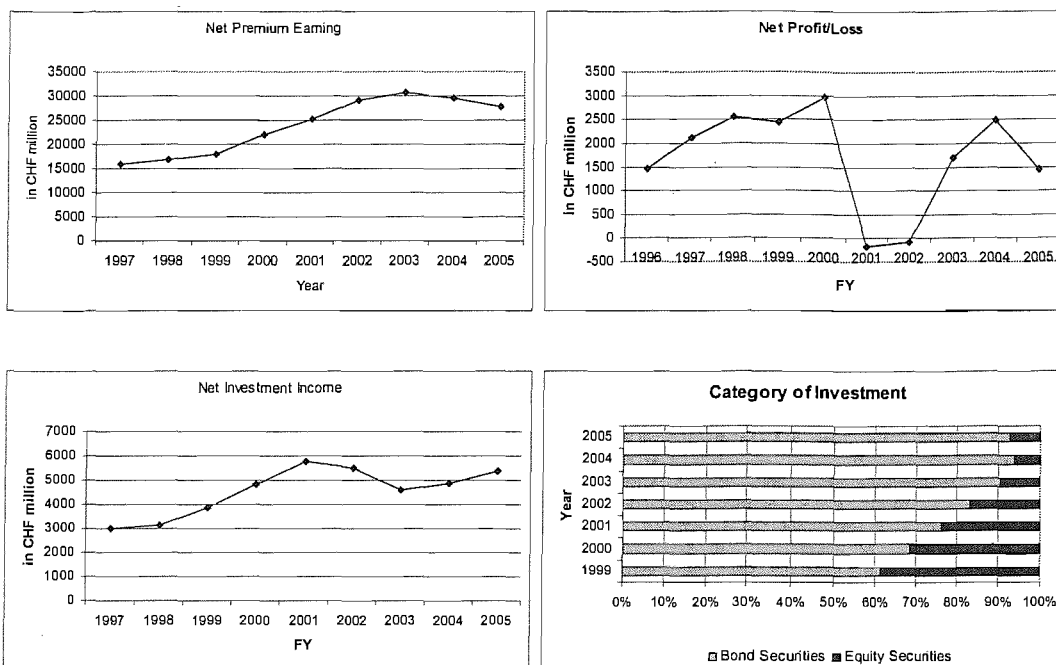
## **7. Financial performance**

Figure 4C4 illustrates some of the key performance indicators of CASE 4.

Figure 4C4: Key performance indicators

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<sup>6</sup> Corporate sustainability is a business approach to create long term shareholder value by embracing opportunities and managing risks derived from economic, environmental and social developments ([www.sustainability-indexes.com](http://www.sustainability-indexes.com)).



The figures illustrate that the net premium earnings of CASE 4 have increased sharply since 1999. CASE 4 sustained a big loss in 2001, which continued into 2002. However, the profit pattern shows a sharp increase during 2003/4, but this falls again in 2005 (mainly due to extraordinary natural catastrophe claims including those generated by Hurricane Katrina). The investment income also accelerated from 1998 with a temporary break during 2002/03.

## 8. Background of interview respondents

For this study CASE 4 allowed seven of its staff to be interviewed (although views of six others were noted from their presentations in various conferences on similar issues). A list of interviewees is attached at the back of this report. Moreover, the respondents are at the top of the management hierarchy. However, speeches and presentations by some of the key executives in attendance at investor/analyst conferences have also been used as sources of data. Consequently, the structure of this CASE report is different from the other three. For example, there remains inadequate data to explore the understanding and motivation of ERM through a process of comparing and contrasting different views. Since most interviewees work almost at the same level, little variation exists in their views. Moreover, only one out of the seven people responded to the questionnaire survey. Two interviewees expressed

their inability to complete the questionnaire. One interview respondent (4R4), who retired in the meantime, stated: "I have tried to fill in Y or N in your tables and had to give up for the simple reason that I am no longer active in the company. Since my retirement reorganization is taking place. I do not like to give a biased view in answering to your questions." This respondent further added that: "in many instances there is no black and white (Y/N) answer to the questions you asked". Another interview respondent 4R8 suggests: "most of the issues included in the questionnaire are subjective and are not clearly understood. Moreover, they are not big issues in the context of our current risk management practice. In fact, I have multiple answers for most of the questions". Respondent 4R13, who participated in the questionnaire survey also suggested: "[while taking my Y/N answers] please bear in mind that some of the questions are ambiguous and therefore leave room for subjective interpretation. Both questions and answers need further clarification." In such a situation, the unanswered questionnaires were filled out by the researcher himself using the contents of the interview transcripts. This is to maintain uniformity with the other CASES. A list of the respondents is included at the end of the report.

## SECTION 2

### UNDERSTANDING OF ERM IN CASE 4

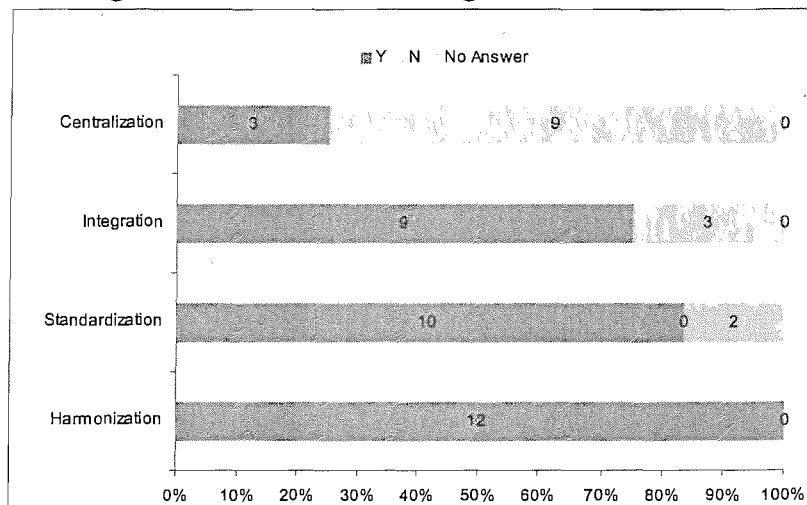
#### 1. Introduction

This section explores the understanding amongst staff of ERM in CASE 4. The method of investigation followed here is similar to the other three CASES. Firstly, the questionnaire survey results are discussed. Then the results from interview survey were analyzed. Thereafter, the survey results were compared and contrasted with the findings of the analysis. Finally, conclusions were drawn.

#### 2. Questionnaire Survey Results

The graph in Figure 4C5 illustrates the survey results.

Figure 4C5: Understanding of ERM in CASE 4



The results shown above illustrate that all 12 (100%) respondents identified harmonization as the closest concept to ERM in CASE 4. Standardization and centralization were identified as being associated with ERM in CASE 4 by 83% and 75% of the respondents respectively.

#### 3. Analysis of interviews

It is revealed from the interviews that CASE 4 aims to manage its total risk in terms of the volatility it has in its book of results. In general, its aim is to protect the bottom line.



Risk measurement is important as it enables CASE 4 to know the amount of the cost of risks. How this risk influences the bottom line is the ultimate goal of CASE 4 (4R5). Different patterns to the understanding of ERM emerged from the interviews.

### **3.1. Group Risk and Capital Management**

The interviews revealed that the term ERM is not used in CASE 4. Respondent 4R4 states: "We never use the term ERM, rather we called it integrated corporate risk management". It is understood that as a global reinsurer, CASE 4 has various sub-units or legal entities across geographical locations. The local units have to fulfill local regulatory conditions (such as solvency). Consequently, each local entity has a unique risk management system. However, CASE 4 as a whole always focuses on the group. In order to integrate all legal entities in terms of their contribution to risks of the Group, CASE 4 finds it is necessary to work on diversification<sup>7</sup> based on a process of the internal intra-group "retrocession". The principle is that the local entities shift risks to Group Capital, which incurs costs; the Group then allocates such costs of capital to the local entities in proportion to the amount of their shifted risks. The entire process broadly consists of two steps: first of all CASE 4 tries to accumulate all risks shifted to the Group by all the legal entities and manages the accumulated risk on a common basis. For instance, CASE 4 (Germany) writes European windstorm businesses in countries A, B, C and D. CASE 4 (Italy) writes windstorm in F, G, and H countries. The potential accumulation of these two sets of risks can only be captured at group level and that is what 'integrated' means to CASE 4. So the main focus of the GRM function is integration of risks while considering room for diversification at the group level (4R5).

### **3.2. Different perceptions on ERM**

One view of ERM in CASE 4 is that it helps to smooth out the volatility of results. From this perspective the risk management process, in terms of detection, analysis, quantification, calculation of risk appetite and finally mitigation is their conceptualization of ERM. However, there remains a key concern about relevant and significant risks, which need to be addressed under an ERM framework. 4R4 states:

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<sup>7</sup> Risk offsetting does not make any sense. A portfolio of uncorrelated risks reduces capital requirements.

“in selecting relevant risks we for instance reach to an area of operational risk where the human factors are so important that we can never say easily which risk is significant and which is not.” Another view of conceptualizing risk is aligning risk management with strategy. In this sense, ERM does not manage strategic risk. ERM looks for risks around setting the strategy into a business plan. From this philosophical perspective ERM is closest to the concept of uncertainty management.

The interview survey finds the terms centralization, harmonization, and standardization are important issues but, as 1R4 states, “these terms have nothing to do with the definition [of ERM]”. In fact, CASE 4 was found to be a much decentralized organization. The goal of ERM in CASE 4 is certainly not to centralize risk management but is aimed at bringing all pieces of risk information together and presenting them in an integrated manner. The interviewees believe that risk management must be decentralized as much as possible. The interviews also revealed that the risk management process is not fully harmonized in CASE 4. However, it employs harmonized risk measurement methods, meaning that CASE 4 has formalized the language it speaks group-wide on how to measure the risk (for example, risk adjusted capital), which helps to measure performance of the businesses.

In CASE 4, ERM is an evolving function and the pattern of development appears very diverse as respondent 4R4 states: “I am not surprised”. What we want to do is think about one group with one capital base. The objective is to survive during a big shock”.

### **3.3. ERM and Corporate Strategy**

CASE 4's ERM does not focus on managing strategic risks; rather it manages the execution of strategy which entails risks. 4R5 argues: “the corporate strategy does not guide ERM. Essentially, ERM has to try to understand strategy, specifically the execution of strategy”.

### **3.4. ERM and Economic Value Management**

ERM in CASE 4 is a part of economic value management, which represents a consistent valuation of asset and liabilities in a fair value manner (4R1, 4R10, 4R12). This is used because of the shortcomings of traditional accounting methods in producing real "Economic Net Worth". The concept of Economic Capital starts by looking at cash flows (such as expected value every year) but these cash flows could in principle depend on the information entail between two periods of time. Moreover, the cash flow itself depends on the underlying concept of 'put' and 'call' options.

### **4. Conclusion**

Although ERM in CASE 4 is perceived as a holistic phenomena of all risks it faces, this perception is not reflected fully in the design of ERM, which is currently used for calculating economic capital and risk appetite. The managers interviewed do not necessarily believe that concepts such as harmonization, standardization, centralization, integration are important for ERM. Such an understanding might be because of their top level position. However, the perception may vary from the perception of staff working at the middle or lower levels. However, respondents were found confident about their understanding on ERM, which is something core to the business of CASE 4.

## SECTION 3

### MOTIVATION FOR ERM IN CASE 4

#### 1. Introduction

This section explores the motivation of ERM in CASE 4. The method of investigation followed here is similar to the other three CASES. Firstly, the questionnaire survey results were discussed. Then the interview surveys were analyzed. Thereafter, the survey results are compared and contrasted with the findings of the analysis. Finally, conclusions are drawn.

#### 2. Questionnaire Survey Results

Figure 4C6: Driving forces of ERM in CASE 4

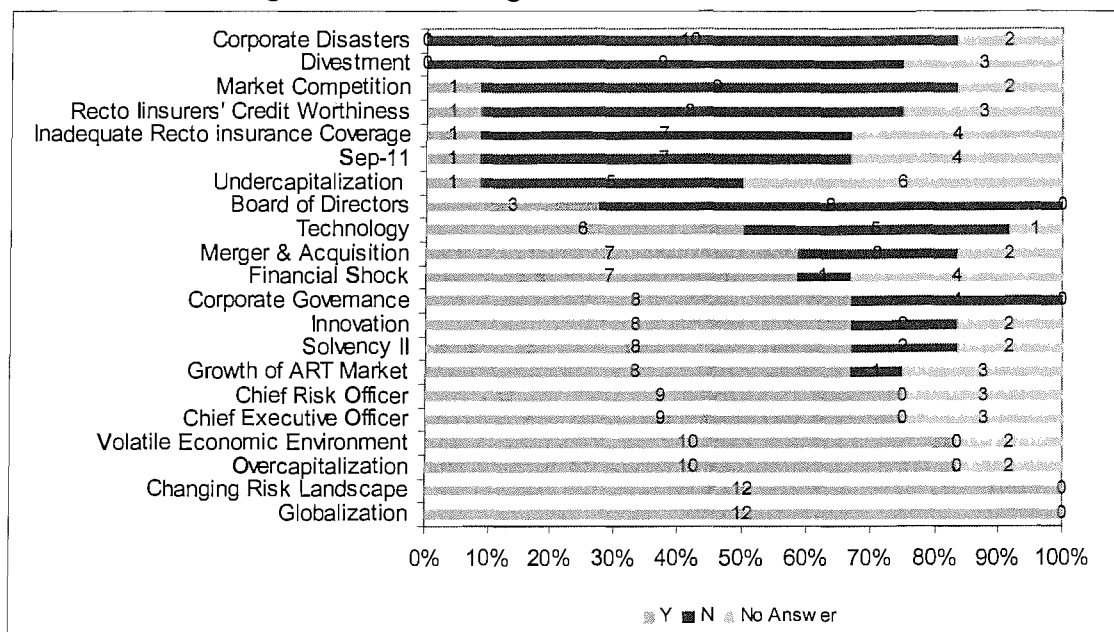


Figure 4C6 summarizes the results of the interview survey and indicates that all 12 respondents (100%) identified globalization and a changing risk landscape as the key driving forces of ERM. This is followed by overcapitalization and a volatile economic environment (with support of 83% of the respondents). Moreover, 75% of the

respondents indicated that the leadership of the CEO and the CRO are key motivations for delivering ERM in CASE 4.

### **3. Analysis of interviews**

It was evident from the interviews that the following events triggered a change in the strategic direction in CASE 4, pushing it to concentrate on risk management, and in the process acting as motivations towards the development of an ERM system:

- Market Competition
- Catastrophes
- September 11 and Corporate Disasters
- Performance of Equity Market

Each of these is described below.

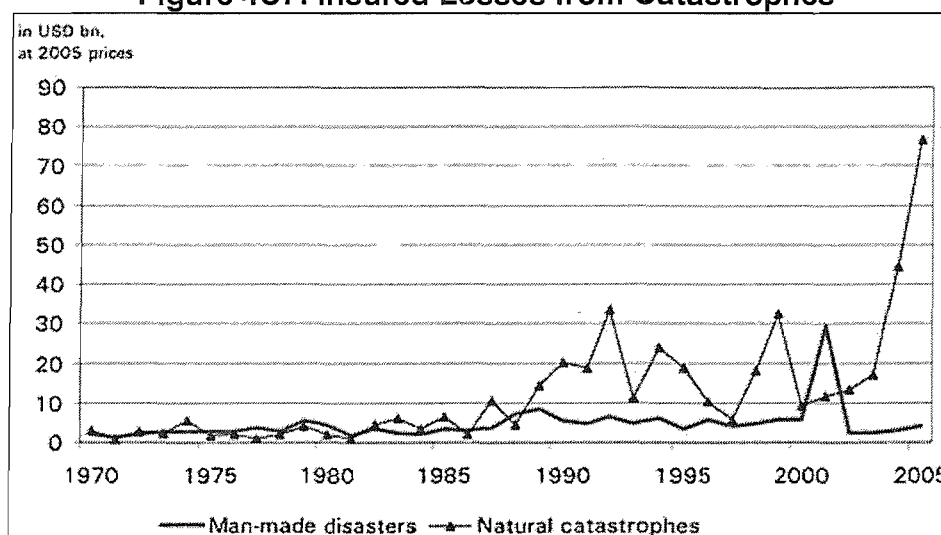
#### **3.1. Market competition**

CASE 4 faced a variety of challenges presented by its marketplace. The 1990s saw significant structural changes in the insurance industry, primarily driven by deregulation of rates and conditions and an increasing globalization of the industry. Mirroring developments in the direct insurance marketplace, the reinsurance sector increasingly faced consolidation and change, with a smaller number of large, globally active players set to dominate, as well as structural changes (4R9). The accelerating consolidation of the direct insurance industry meant that many insurance companies were able to retain more risk. 4R4 states: "As a reinsurer we focus on a broader portfolio of new and sophisticated skills, often in the financial and capital management area, to maintain our market position". The interview survey found that development of alternative risk transfer solutions and the growth of asset liability management services are two such examples. However, CASE 4's strategy throughout the 1990s was designed to take advantage of these trends and to position the company as a leading player in its chosen markets – with a clear focus on reinsurance and business-to-business insurance solutions.

### 3.2. Catastrophes

The insurance and reinsurance industry as a whole experienced a number of very difficult years in the early 1990s as natural catastrophes and man-made disasters soared to unprecedented levels. Figure 4C7 shows the amount of losses suffered by the global insurance industry during 1970-2005.

**Figure 4C7: Insured Losses from Catastrophes**



**Source:** Swiss Re Sigma Study: "Natural and man-made catastrophes 2005"

The dramatic increase in catastrophe losses prompted a significant number of insurers and reinsurers to reduce their exposure to this business. A number of reinsurers (including Lloyd's: an important source of catastrophe coverage) withdrew from the market, resulting in a severe capacity crunch, which led to an increased demand for reinsurance. CASE 4 took advantage of this promising catastrophe insurance market and wrote profitable businesses with partners, while strengthening securitization.

### 3.3. September 11 and Corporate Disasters

For CASE 4, the tragedy of 11 September led to the company's largest financial loss in its 143 year history (4R2). Together with other large losses and a reduction in realized capital gains, CASE 4 reported a massive net loss for the year 2001, the first net loss for the company since 1868 (CASE 4: Annual Report). In addition to the financial loss, CASE 4 had another bitter experience following the events of September 11. In

addition, other events (such as the collapse of Enron and WorldCom) also affected CASE 4 in terms of strict corporate governance laws (for example, Sarbanes Oxley, 2000) (4R11).

### **3.4. Performance of equity market**

A loss of confidence in future earnings led to major losses in global equity markets in 2001 – 2003 affecting CASE 4's equity portfolios. It emerged that CASE 4 itself experienced a substantial impairment, mainly on its equity portfolio during that period of time. Consequently, CASE 4 reported a loss in two consecutive years (2001 and 2002). Moreover, the dividend of CASE 4 was reduced in 2003 for the first time since the San Francisco earthquake in 1906.

## **4. Discussion**

In searching for the motivation for CASE 4 to develop ERM, a number of factors have emerged from the interviews. However, it appears that the key motivation for ERM in CASE 4 is the business model, which focuses on the reinsurance of catastrophe risks. Traditionally, CASE 4 dealt with large risks (in contrast to primary insurers). The interviews revealed that CASE 4 operates worldwide to facilitate geographical diversification. The practice of catastrophe risk management is well developed in CASE 4, which has been practiced for the last 20 years (4R1). It is seen in the literature review that for large reinsurers like CASE 4, the solvency issue arises only in terms of its capacity to bear catastrophe losses. Analysis of interviews and other publications finds that each catastrophe loss of CASE 4 has been managed on a stand-alone basis, which in effect uses an integrated risk management technique (Shimpi, 2001). As an insurance event, catastrophe risks are fairly uncorrelated across geographical locations. However, other risks (such as, financial, credit, and operational) which are attached to all of these insurance events are correlated at the central level. Consequently, at the central level, when all such insurance events are considered in a single portfolio, then these correlations must be managed. The interviews suggested that, although conceptually different, ERM and catastrophe risk management have operational similarity (1R4) in CASE 4, as the catastrophe model includes insurance, credit, and market risks in an integrated framework.

Another issue is the huge amount of excess capital (this is not an isolated issue for CASE 4 but a general case in the reinsurance industry) with less scope for investment for adequate returns. The Economist wrote: "The insurance industry is in trouble. The main reason is that it has too much capital. Shareholders should ask firms to give it back to them (January: 1999)". Consequently, increased pressure from shareholders for higher return on their investment is a key driving force towards ERM in CASE 4. In summary, the analysis finds two key driving forces of ERM in CASE 4. One is internal: the concern for managing catastrophe risks in the face of an increasing upward trend. The other is external: shareholders' pressure asking for higher returns on their investments. These internal and external issues jointly put pressure on CASE 4 to manage risks in a holistic manner.

## **5. Conclusion**

Financial security is seen as the key to the success of CASE 4. Unlike primary insurers, reinsurance companies are beyond the control of solvency regulations, but this will not be the case in the future (4R10). Consequently, reinsurance companies rely on their own expertise and invest in knowledge and CASE 4 is a knowledge based company (4R11). Moreover, CASE 4 is a global wholesale company, and receives premiums upfront against the promise to make a payment against an event at some point in the future. Consequently, securing constant financial security is very important in order to protect and expand its business. CASE 4 introduced a system to forecast its own future and it started investigating the securitization of insurance risks in the same way as the banks were securitizing credit risk, mortgage risks etc. 4R5 states: "ERM is surely an evolving function". Risk diversification is the foundation of the wholesale business. It is evident that CASE 4 started to invest in skills in that area at the beginning of its venture.

Clearly catastrophe events concern CASE 4 and drive most of its strategic changes. As a wholesale business, CASE 4 insures pick risks (that is; high severity and low frequency risks such as earthquake, hurricanes and so on). Such risks cannot be diversified, using the law of large numbers. Consequently, the principle of



diversification, does not apply to CASE 4 in the same way as it applies to primary (and retail) insurers. Nevertheless, basis risks (high severity and low frequency) are expensive as it is more expensive to hold the top layer of such risks in the balance sheet on an economic basis. Consequently, CASE 4 prefers to securitize pick risks without depending on retrocession (4R2). In the last five years CASE 4 has been securitizing pick risks following the practice of the banking industry (4R5). However, equity capital is very expensive and securitization reduces the capital requirement in the balance sheet and increases the margin on the risk that CASE 4 retains. All this means is that that these pick exposures increase the volatility in CASE 4's balance sheet. Such volatility has at least two implications: either the capital becomes more expensive or CASE 4 needs to transfer to some other risk carriers (which, in CASE 4's situation is essentially the capital market). Consequently, CASE 4 transform risk into tradable fixed income instruments and then sells them to the capital market. Such transactions push capital requirements down by providing intangible capital to CASE 4's balance sheet. CASE 4 calculates that US\$ 1.00 of intangible capital becomes US\$1.37 in cash in its balance sheet (4R11) through securitization. Consequently, volatility goes down.

Since organizations should follow strategy, the relationship between the nature of the business and the strategic objective must be aligned. CASE 4 has designed a strategic map, which systematically combines processes, people and money, utilizing the expertise of three business groups (see figure 4C2). As such, CASE 4 established a uniform way of measuring return on risk in the entire firm, including product development and segmentation of clients irrespective of the types of risks.

In summary, these discussions suggest that it is the business model, commensurate with the environment of the marketplace (which encompasses the types of risk CASE 4 insure and the type of clients CASE 4 serves) that essentially motivated CASE 4 to manage all its risks in a combined framework. 4R5 states: "ERM is driven by market, competition, geography, and changes in the environment. It is dynamic".

Consequently, innovation to maintain and grow its market position is the key motivation for CASE 4's ERM.

## SECTION 4

### DESIGN OF ERM IN CASE 4

#### 1. Introduction

This section describes the design of ERM in CASE 4. The objective is to identify the elements which constitute CASE 4's ERM system and how are they interrelated. The data collected from the interviews and views drawn from the internal and external presentations provide key sources of information.

#### 2. Analysis of data

The design of ERM in CASE 4 follows a three Pillar approach:

- Pillar 1                                      Quantitative Risk Management
- Pillar 2                                      Risk Governance
- Pillar 3                                      Transparency in Risk Reporting

The following discussions describe the design and activities carried out by CASE 4 under each Pillar. All the information used in this section was collected from a presentation event of CASE 4 (by a group of senior staff).

##### 2.1. Pillar 1: Quantitative Risk Management (QRM)

The key issues for QRM in CASE 4 are:

- Sound valuation and risk measurement
- Quantitative risk limits and monitoring system
- A reliable capital adequacy framework

QRM involves a constant drive to identify and quantify all risks and their interdependencies. Putting all risks into one single model, the Internal Risk Model (IRM), determines the amount of capital needed to carry these risks. In addition to determining the amount of capital required to support all risks, the risk model provides valuable insights to ensuring the allocation of overall risk-taking capacity into specific lines of business.

CASE 4's internal risk model is based on two important principles. Firstly, an asset liability management (ALM) approach is used to assess risk and to measure its net impact on the economic value of both assets and liabilities. Secondly, the impact of risk is measured on an integrated basis, taking into account the fact that a single risk factor can impact upon different sub-portfolios and different risk factors can exhibit dependencies. Based on this principle, CASE 4 obtains the probability distribution for the Group's annual economic profit and loss, specifying the likelihood that profit or loss will fall within any given range (4R5).

The following topics summarize the four key features of CASE 4's internal risk model.

- Risk Landscape
- Risk Quantification
- Risk Modeling
- Distribution of Economic Profit and Loss

Each of these are discussed in turn:

#### **2.1.1. Risk Landscape**

Risk landscape is a map of the portfolio of all CASE 4's all risks (4R4). CASE 4 distinguishes all its risks into two categories. They are core risks and ancillary risks (4R2). CASE 4 takes core risks as a part of its core business activities, which are mainly reinsurance and investment.

Core risks are then split into the following three categories (see figure 4C8):

- Insurance risk
- Financial market risk
- Credit risks

Insurance risks are carried in its P&C and life and health business groups. They arise from incurring a financial loss as a result of Property and Casualty, or Life and Health insurance events. Financial market risk is the risk of assets and/or liabilities being negatively impacted on by changes in financial market risk factors, such as equity market prices, interest rates, credit spreads, foreign exchange rates or real estate prices. Credit risk is the risk of incurring a financial loss due to adverse changes in the creditworthiness of counterparties of CASE 4 and/or third parties. All of these risks are quantified and integrated into one model (4R5).

The ancillary risks are also split into the following three narrow categories:

- Operational risk
- Funding and liquidity risk
- Compliance and reputational risks.

CASE 4 defines operational risk as the risk of incurring a direct or indirect loss due to inadequate or failed internal processes, people, systems, external events or non-compliance with regulation resulting in regulatory penalties, or a total or part inability to operate properly. Funding and liquidity risk arises from the inability to meet short term financial obligations or to raise funds in the markets to finance commitments at a reasonable cost. CASE 4 finds reputational risk is the risk that a particular event or behavior will affect the organization and negatively impact on stakeholders' perception of the Group, thus impairing its ability to operate effectively. Only a part of these risks are quantified in CASE 4's risk model. Consequently, by using the term 'all risk' for the purposes of the Internal Risk Model (IRM), CASE 4 is referring to those risks which are quantifiable in its risk landscape (4R2).

### **2.1.2. Risk Quantification**

Risk landscape provides a list of risks for quantification. One very important principle of CASE 4's risk management is that risk is quantified in a market consistent metric, which entails a so called 'economic balance sheet' as shown in figure 4C8. The asset side of such a hypothetical balance sheet includes the market value of assets (which is

normally available, or at least can be approximated because of their tradable characteristics). Determining the market value on the liability side is difficult because of the non-existence of a liquid market. Consequently, the values of the liabilities are approximated using discounted cash flow techniques (4R5).

It is important to mention here that CASE 4's IRM is concerned only with pick risks, which lie in the tail of a probability distribution, because of their high severity and low frequency nature. A significant part of quantifying the exposures to these types of risks depends on the accuracy of their modeling using advanced statistical techniques. The following discussions will emphasize how CASE 4 models and aggregates the exposures of these pick risks.

### **2.1.3. Modeling pick risks and aggregating their exposures**

CASE 4 undertakes these in four steps. They are:

- Modeling risk factors and their dependencies
- Simulating risk factors
- Modeling the portfolio exposures of risk factors
- Evaluation

They are each discussed in turn:

### **2.1.4. Modeling risks factors and dependencies**

The modeling of tail risks includes two basic elements. They are:

- Modeling risk factors
- Dependency structure

As mentioned above, CASE 4 does not model all risks; it is the really the large risks that contribute to the tail (4R2, 4R5). So firstly, CASE 4 identifies the major risks which influence the tail and secondly, all the dependencies between these risks (because many of these risks are correlated). Statistical models, using historical data, are used to model risk factors. This is typically done for financial market risk. In addition to

statistical models, expert judgments and scientific models are also used to model risk factors. Moreover, CASE 4 also underwrite very different risks (i.e., emerging risk: climate and earthquake, cyber-risk, GM and Nano technology, terrorism, human pandemics); where history does not help much. In fact, CASE 4 takes risks which are very infrequent (for example, 1 event in 100 or 500 years). These include natural catastrophes where it is not enough to look at history. More importantly there is a changing risk landscape which cannot be predicted based on past events (4R5). So CASE 4 develops threat scenarios, using scientific methods (such as stress testing and scientific models or scenario testing in case of insufficient reliable data). These are to develop expected scenarios or simulated scenarios and the probability/severity curves are based on unobserved losses and potential changes to risk drivers (4R4).

#### **2.1.5. Simulations**

CASE 4 simulates a large amount of new outcomes of each risk factor to explore what the world might look like on a one-year time horizon. For example CASE 4 performs 800,000 different simulations with different input parameters to explore the outcomes of the S&P 500 index within a one-year period (4R4). Up to this point CASE 4 only simulates the future pattern of the external world. However, the internal world, which is specific to CASE 4, is explored in two steps: portfolio exposures and evaluation, as described below.

#### **2.1.6. Portfolio exposures**

This step looks at CASE 4's own position by modelling the portfolio exposure to all of the risk factors, CASE 4, for example, looks at the S&P 500 where, say, CASE 4 has US\$ 1 billion of exposure. All kinds of derivatives are taken into account in calculating the exposure. This step provides the real net position of CASE 4 in terms of these risk factors.

#### **2.1.7. Evaluation**

In the evaluation stage, CASE 4 aggregates the curves of each of these risk factors in order to drive the economic profit and loss distribution, which shows some upside trends from equity risk but there is a more prolonged downside (tail of the distribution

comes mainly from the insurance risk side). The quantification part of risk management is really about finding out the degree of risk on this curve. In particular, it involves calculating the exact tail of this distribution and finding out how much capital CASE 4 can lose (1 in 100 years). The base capital requirement is derived from this distribution. The base capital requirement is then compared with the available capital<sup>8</sup> to determine the adequacy of CASE 4's capitalization. A more detailed description of the calculation of the capital adequacy ratio will follow in the discussion below.

The interview study revealed that CASE 4 has developed its own model over the last ten years and the model has been reviewed twice by an academic institute. Indeed, CASE 4 uses various models for financial risks, in particular, which are also capable of considering insurance risks. This model can capture both insurance risks and financial risks quickly in a dynamic environment in terms of a changing risk landscape, due to both external and internal factors (such as changing business mix and new products, and developing new correlations). However, this model is only capable of dealing with extreme risks which influence the tail behavior of the distribution curve. Consequently, the drivers of the model in the case of insurance risks are natural catastrophes, liability, D&O (Directors and Officers), claims inflation, terrorism and lethal epidemics, which are categorized as low frequency and high severity events. Despite the high quality of mathematical calculations in producing the results for decision making, CASE 4 believes that ERM should not be relied only on models. This is because the data which form the basis of the models do not often reflect reality fully and accurately (4R5).

## **2.2. Pillar II: Risk Governance**

The Group's corporate governance regime sets out in detail in its Group Code of Conduct how the core values are brought to life in daily operations.

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<sup>8</sup> CASE 4 determines the amount of available capital for buffering against adverse claims experience as follows: first, it adjusts published shareholders' equity for unrealized gains and losses on the investment portfolio and for economic values of liabilities, insofar as neither of these is recognized in the published balance sheet. It then deducts goodwill, and adds capital items that meet the underlying principles of loss absorbency and performance, such as hybrid capital and equalization reserves. The total amount of available capital is then calculated after deduction of the tax impact on these adjustments.



### 2.2.1. Principle of Risk Management in CASE 4

In CASE 4, risk management is based on four guiding principles that are applied throughout the Group:

- **Controlled Risk Taking:** Financial strength is important to CASE 4's business. The Group's overall risk limits are clearly defined. Within these limits risk-taking activities are directed towards businesses that provide shareholders with attractive risk adjusted returns (Source: CASE 4's Annual Report).
- **Clear Accountability:** CASE 4 operates on the principle of delegated authority. Business units are accountable for the risks they take and their incentives are aligned with CASE 4's overall business objectives.
- **Independent Risk Management Function:** To avoid conflicts of interest, risk taking activities have independent oversight.
- **Open Risk Culture:** Risk transparency and responsiveness to change are integral to CASE 4's risk control process which is designed to effectively facilitate timely risk mitigation. CASE 4 has institutionalized processes to facilitate risk management knowledge sharing at all levels.

The above principles of risk management affect risk governance which is more about compliance and organizational issues. Questions such as: 'Is the risk management organization really independent?' or 'Are guidelines and responsibilities clear and are all the processes working? need to be answered'. Since taking risk is obviously CASE 4's core business, this needs to be undertaken in a controlled fashion. 4R7 argues: "This is why we have a whole controlling system in place. This is to ensure the accountability in terms of the principle of delegated authority". The interviews suggest that the business groups in CASE 4 are primarily responsible for the risk they take. In addition, an independent risk management function is important to CASE 4 to help avoid conflicts of interest. In addition, an open risk culture is one of the most important elements of CASE 4's risk governance system, though it is difficult to achieve.

### 2.2.2. Risk Management Organization

Figure 4C3 indicates that the ultimate responsibility for the CASE 4's Group Risk Management principles and policies lies with the Board of Directors, which is also

responsible for approving CASE 4's overall risk tolerance. In the respect of developing an independent risk management organization, the CRO of CASE 4 reports directly to the Group CEO. The Group CRO is responsible for implementing the risk management framework across the Group. The Group CRO is then supported by the head of the GRM (Group Risk Management) department. This group of 28 staff focuses on collecting risk data, maintaining the model, developing the model, making all the risk calculations, making reports to the Executive Board (EB) and the Board of Directors, for operational risk management and for contact with the three business groups (see figure 4C2). The Group CRO leads the group-wide risk management function, which includes GRM and the risk management departments in each of the business groups. CASE 4 has three business group CROs. As the business groups are much closer to the business, they create models for their own use, which provide inputs to GRM to develop group risk models.

Figure 4C2 also illustrates that the whole organization is then supported by a series of committees at every level. At the Board of Directors level, CASE 4 has a finance and risk committee, investment committee and audit committee. On the Executive Board (EB) it has an EB Committee, the Group Capital and Capacity Allocation Committee and the Group Products and Limits Committee. The EB Committee decides on urgent business transactions and establishes principles for dealing with catastrophes and accumulation risks. Within the Executive Board Committee the CFO is responsible for the business planning process and strategic asset allocation. The Group Capital and Capacity Allocation Committee is responsible for allocating capital and capacity, approving strategic asset allocation and any changes to internal risk and capital methodology including the framework risk management and retrocession. The Group Products and Limits Committee determines the Group's product policy and standards, grants reinsurance and counterparty credit risk limits and decides in large or non-standard transactions. Then CASE 4 has the Group Risk Management Committee, which ensures the co-operation between the four CROs and an extended circle of people in the finance area. In summary, the Board of Directors is responsible for the risk management principles and policies. The Executive Board is more for

implementing the risk management framework and the CRO leads the global risk management function, with specific goals to implement the risk management processes, including the promotion of an open risk culture throughout the organization.

The Finance division and the Risk and Knowledge (R&K) division maintain a close relationship. The Finance Division supports the Group's global leadership by maintaining a unified capital base for the Group's activities in co-operating with the R&K Division to assess and balance the Group's overall risks and returns (CASE 4 Annual Report)

CASE 4's risk management processes include four key steps (e.g., identifying, quantifying, managing, and reporting Group's total risk exposure). The following paragraphs discuss them in some detail.

### **2.2.3. CASE 4's risk management process**

CASE 4's risk management process is divided into three phases. They are risk identification, controlled risk taking, and risk reporting and steering.

#### **2.2.3.1. Risk Identification**

The ultimate goal of risk identification is to be able to weigh risks and benefits associated with new developments. The risk identification phase consists of three key stages. They are:

- Emerging Risk Detection
- Assessment and Evaluation of Emerging Risks
- Responses to Emerging Risks

CASE 4 finds it is crucial to detect emerging risk as soon as possible and to do so, it employs a risk detection technique called "SONAR (Systematic Observation of Notions Associated with Risk). This is a communication network operating across CASE 4 to detect and communicate uniform signals on various issues which may pose potential threats to the business (4R8). The issues that SONAR considers include technological

changes (such as nanotechnology), socio-cultural changes, and emerging risks (including terrorist threats, long-tail liabilities, asbestos, obesity, ageing population, cyber crime, and natural catastrophes). The process develops a common understanding on emerging risk issues through a comprehensive dialogue with key stakeholders. Depending on the classification of these emerging risks CASE 4 then takes different actions. For instance, risk mitigation through exclusions in contract wordings, increasing public awareness on climate change (Sayan, 2003), supporting new product development initiatives, etc.

#### **2.2.3.2. Controlled Risk Taking**

Controlled risk taking is more relevant to CFO rather than CRO in CASE 4. The controlled risk taking phase occurs in two stages. They are:

- Planning process
- Risk taking activities

During the planning process, which is mostly executed at the corporate level, much concentration is given to identifying business opportunities commensurate to the risk tolerance level. In addition, risk taking capacity is delegated across the business unit levels and is then controlled within the tolerance limits.

#### **2.2.3.3. Risk Reporting and Steering (or monitoring)**

The key features of the risk reporting system in CASE 4 include data collection, risk calculation, and reporting on risk landscape. Depending on the outcome of risk reports, CASE 4, in the monitoring phase, reviews the limits of risk taking, including hedging activities. The analysis suggests that CASE 4 produces at least three key risk reports at the Group level (the ALM Report, Credit Risk Report, and Liquidity Report). Moreover, these risk reports include three key issues; capital adequacy, top risks, and key risk management issues. These reports are then submitted to the Executive Board and to the Board of Directors for strategic decisions.

The ALM Report is mainly about financial risks. It specifically looks at the match between assets and liabilities, including the duration risk and interest rate risk. This is issued quarterly and often contains some stress scenario analyses. It is found that CASE 4 has a unique credit risk management function, where it tries to capture all credit risk exposures across the company. It captures credit exposures not only on the asset side but also within the credit insurance business. These are all captured in one report which is issued monthly. Finally, the liquidity report provides information on liquidity risk and is issued quarterly.

### **2.3. Pillar III: Risk Reporting**

CASE 4 finds that even Pillars I and II together may not be enough to prevent bankruptcy in the worst cases. So the third Pillar, which is risk transparency in risk reporting issues, is seen as crucial. It is regarded as one of the most critical phases of CASE 4's risk management. Risk transparency is about risk culture and encourages the stakeholders to ask questions, such as: "Are we transparent about the risk reports?"

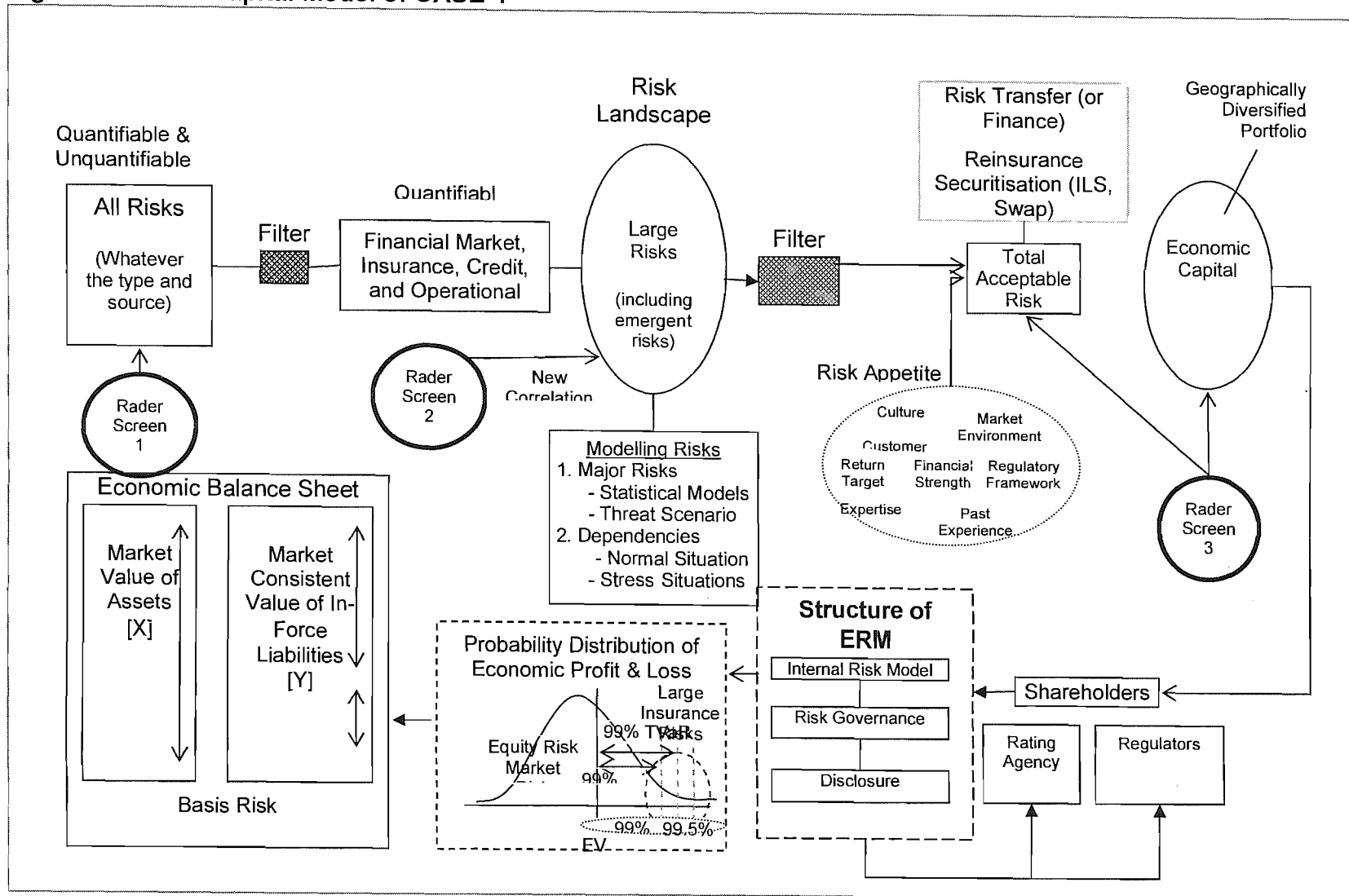
In summary, CASE 4 finds it important to take into account all three Pillars of risk management. The first Pillar introduces the risk model, where measurement and correlations amongst different types of risks are the main concern. This helps to build a true picture about its risk landscape. In the risk governance area, under the second Pillar, CASE 4 has a large and independent risk management function. Finally, the transparency area, covered by the third Pillar helps CASE 4 to get some sensitivity figures and some VaR figures about its risk landscape in order to increase risk transparency for its stakeholders.

Figure 4C8 illustrates the overall design of ERM. The integrated risk model helps CASE 4 to understand how risks accumulate and how they diversify within CASE 4's portfolio (4R12).

## 2.4. Description of the ERM Model

The theoretical framework of ERM developed from the literature suggests that ERM should consider all risks. However, CASE 1 filters these 'all risks', using an imaginary Radar Screen 1 (as seen in figure 4C8) and captures only numerically quantifiable risks in terms of a predetermined probability of failure over a certain period of time. In addition, only a subset of all quantifiable risks is considered by CASE 4's ERM system. Only large risks, including emergent risks (which are best described as the unknown of known risks) are considered for the next stage of ERM. Another Radar Screen (2) continuously operates with the portfolio of quantifiable risks to calculate their potential frequency and severity using various statistical techniques. However, the volatility and dependency among them always remains the key concern. Another filter is then used to calculate total acceptable risks, which are essentially linked to the risk appetite of the firm. In fact, risk appetite is a complex topic as it includes many subjective issues such as organisational culture, customers' preference, market environment and so on.

**Figure 2: Risk & Capital Model of CASE 4**



These factors are very specific to the firm and difficult to quantify. Various techniques, including both capital markets and money markets are used to transfer and finance the total acceptable risk. A variable amount of capital is then deployed to finance these total acceptable risks. These actions illustrate that cases are dealt with by first calculating the risk and then choosing among the available and alternative risk-return combinations. A third Radar Screen (3) comes into operation at this stage to observe the changes in the total acceptable risks; this is used to adjust the amount of capital (commonly known as economic capital). Modelling of this economic capital is then linked to the first Pillar of the ERM system. The first stage deals with the internal risk model. It includes calculation of economic capital in terms of total acceptable risks. The second stage includes internal control in terms of corporate governance issues, as a process of risk reduction. The third stage deals with the transparency of disclosure to stakeholders (regulators, rating agencies, and shareholders). It is seen that a dynamic relationship exists between total acceptable risk and the economic capital results in an economic balance sheet. This hypothetical balance sheet provides updated information to the stakeholders about the strength of the organisation both in financial and operational terms.

#### **2.4.1. Economic Capital Framework**

It is found in the literature review that the accounting balance sheet is not appropriate for decision making purposes. One key principle of CASE 4's risk model is that risks are measured in a purely economic framework but not in an accounting framework. To do this, CASE 4 constructs an economic balance sheet which is based on a market consistent evaluation.

#### **2.4.2. Valuing Assets**

It is relatively easy to calculate the economic value of assets because of their liquidity. However, on the liability side it becomes more difficult to get market consistent valuation of in-force liabilities. The difference between these two is available capital, which is basically the capital exposed to risk. CASE 4 then models risk by looking at the change of available capital within a one year time

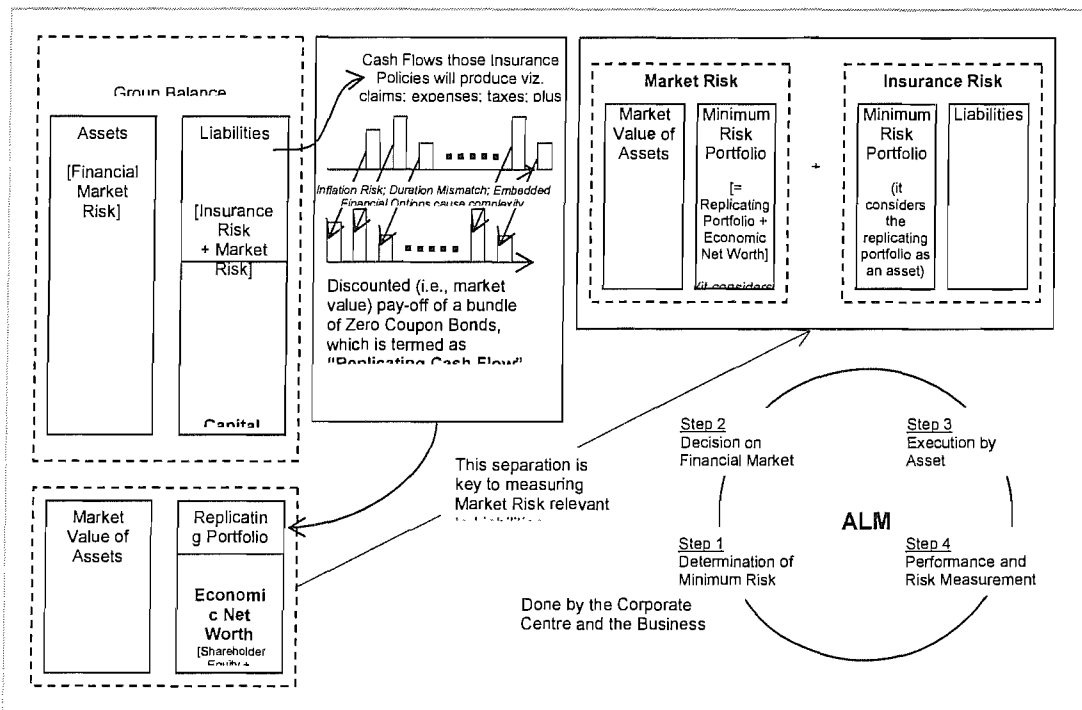


horizon. It is important to say that the risks that CASE 4 actually looks at are the risks in the tail. CASE 4 tries to take one figure out of this tail such as 99% VaR or the 99% Tail VaR, which calculates the minimum amount of capital CASE 4 needs to hold to cover a 1 in 100 year event (4R12).

### 2.4.3. Valuing Liabilities

One of the key problems in the economic balance sheet method is measuring the market consistent value of liabilities. Figure 4C9 illustrates how CASE 4 values liabilities in a market consistent basis, particularly those which are not publicly traded.

**Figure 4C9: Model of valuing liabilities in market consistent basis**



In valuing liabilities, CASE 4 uses an established method which basically looks at all the cash flows which these liabilities will produce (premiums, claims, expenses, taxes, capital costs - because these cash flows are not deterministic, they are not risk free, and there are certain risk that they are higher or lower and this will need capital allocated). Figure 4C9 states that upon determining these cash flows, a replicating portfolio of cash flows is constructed. A replicating portfolio is a portfolio of market traded assets which mirrors exactly these cash

flows. This mixed portfolio, which is similar to a typical zero coupon bond, is then discounted like a yield curve. For example, a claim payment of \$100 expected three years from now is matched with a three-year zero coupon bond with a maturity value of \$100. This is a standard method to value liabilities economically. In practice, the replication of insurance liabilities is a challenging process. Inflation risk, duration mismatch and embedded financial options all add complexity to the analysis.

In theory, the total return required by shareholders depends on the level and types of risks undertaken by the insurer. Underwriting and investment are the core activities of an insurer; they expose the company's capital to insurance and financial market risks. Therefore, the cost of capital for an insurance company can be analyzed by examining each of these sources of risk separately (1R4). The instrument used to separate the two costs of capital components is the replicating portfolio (see Figure 4C9). However, the separation is artificial, as in real life companies operate in an integrated fashion. For example, investments decisions usually take into account the duration and volatility of the insurance business portfolio (4R12). However, this breakdown is necessary to ensure correct calculation and allocation of cost of capital (SwissRe, 2005).

Replicating portfolios are used in insurance to simplify the determination of the value of insurance liabilities. The replicating, or hedged, portfolio for a non-traded liability is defined as the portfolio of traded market instruments whose cash flows match as closely as possible the corresponding cash flows of the liability being replicated. It is seen in the literature that replicating portfolios are routinely used in finance to find market-consistent values for cash flows that are not actively traded. If non-traded assets were not priced consistently with traded cash flows, then investors would arbitrage the difference by purchasing the cheaper cash flow and selling the more expensive one. This principle is known as the no-arbitrage principle.

#### **2.4.4. Asset Liability Management (ALM)**

CASE 4 regards its ALM tool, for separating market risks from insurance risks, as the key element of its ERM system. For liabilities, which are taken on the insurance side, CASE 4 constructs a so called Minimum Risk Portfolio based on these replicating portfolios. The Minimum Risk Portfolio is a benchmark, comprised of market indices which reflect the replicating portfolios for net insurance liabilities plus the amount of economic net worth. This portfolio is created such that it contains no market risk, thus hedging all potential market risk CASE 4 has in its liabilities. This essentially means the interest rate risk is hedged. In addition, it also hedges potential options (4R5). This Minimum Risk Portfolio is then given to the Chief Investment Officer (CIO), who treats it as a liability, as the CIO must deliver a return to the insurance operation (4R3). On top of this, CASE 4 sets limits on selected assets in order to be able to take some market risks, because it is good for diversification (4R5). In this way CASE 4 clearly separates market risks from insurance risks. The benefit of this is that the Minimum Risk Portfolio, which is the base line for the CIO, gives an exact understanding of the starting point for the risk taken (either interest rate or equity risks).

### **3. Key Observations of Three Pillar Risk Management**

The above description of the three Pillars risk management model of CASE 4 suggests the following.

- Classification of risk into categories (core risk and ancillary risk) drives the construction of a risk landscape. However, the emphasis is on quantifying core risks. In addition, only quantifiable risks are used in constructing the internal risk model.
- Due to the constantly changing nature of risk factors, in terms of emergence of new risks and dependencies, the internal risk model needs utmost flexibility to accommodate the changes.

- Measuring risk in a purely economic framework (instead of using a traditional accounting framework) is a key principle of CASE 4's internal risk model. However, there is no perfect way of measuring risks. Each method has specific limitations.
- Available capital, calculated on an economic basis, represents the capital exposed to risk. The difference between the market value of assets and market value of liabilities results in 'available capital'. In accounting terms this available capital is approximately equivalent to the sum of the shareholder equities and some hybrid capital.
- CASE 4 does not model all risks. Only the large risks which contribute to the tail (that is; the catastrophes) are considered for modelling purposes. Scenario Analysis based on stochastic simulation, is a popular tool in modelling risks. Because of the correlated nature of catastrophe risks, diversification benefits are important in determining the amount of capital required to fund these risks.
- From a finance perspective, risks need to be supported by capital. However, capital is costly. The more risk CASE 4 takes the more capital it needs to hold. Consequently, the fundamental objective of the risk management practiced by CASE 4 is to reduce (or minimize) the cost of capital.
- Constructing a replicating portfolio of cash flows is the key to valuing liabilities.
- Asset Liability Management is a key tool of risk management in CASE 4. In addition to tactical decision making, ALM represents a direct measure of value.

- The more risks are uncorrelated the more diversification benefit arises. Risk concentration reduces the benefit of diversification. The accumulated sum of a portfolio of risks is less than their individual sum if and only if the risks are fully uncorrelated.
- Since risk models are not always dependable and also do not capture the full spectrum of risks, risk governance is important for managing risks.
- The combination of, quantitative and qualitative risk management needs to be transparent for both internal and external purposes. CASE 4 places much emphasis on the requirement for risk reports to be transparent.

#### **4. Conclusion**

Risk management in CASE 4 is not a rigidly defined process; rather it is more an ongoing one. CASE 4 goes far beyond the defensive approach of risk management to limit downside. This requires actively optimizing the portfolio of risks from a risk-return perspective and managing the cycle using appropriate tools (4R5). It is evident that CASE 4 has structured its risk management programme into three Pillars using the same terminology as that proposed by Solvency II. Pillar I has to apply a quantitative methodology in order to define capital adequacy using the quantitative aspects of risk management. Pillar II ensures professional responsibility in terms of guidelines and committees' decisions, which represent the qualitative aspect of risk management. Finally Pillar III ensures transparency of Pillar I and II issues through disclosures. This model determines the capital required to support the risks CASE 4 underwrites. Moreover, it allocates risk-taking capacity to business lines. ALM (which measures the impact of risk on the economic value of asset and liabilities) and an integrated view, taking risk dependencies into account are found to be two key features of this model.

## OPERATIONAL RISK

In the design of ERM in CASE 4, management of operational risk was found to be an emerging concept. The following paragraphs describe the understanding of operational risk within CASE 4 and the challenges CASE 4 faces in this area. An in-depth discussion of operational risk was not included in other case reports because of insufficient data but information obtained for CASE 4 allows a more detained discussion of this issue.

### 1. Defining Operational Risk in CASE 4

It has been explained previously that CASE 4 distinguishes operational risks from its core risks (see section 1 of this report). CASE 4 identifies two sources of operational risk (bad luck<sup>9</sup> and bad housekeeping<sup>10</sup>). CASE 4 defines operational risk as “the risk of direct or indirect loss resulting from inadequate or failed internal processes, systems, or from external events (4R5)” These include risks to reputation and to the implementation of strategy. The risks that it deliberately underwrites as its core business, as well as strategic risks and the risk of change in its business volume are excluded from the definition of operational risk.

However, as 4R4 says: “operational risk is all about how to run our household”. It was also noted above that the ultimate objective of ERM in CASE 4 is to add shareholder value. One might ask, is it important to manage operational risk to achieve this objective? From the data it is evident that the core of operational risk management is how the management runs CASE 4. However, it is not actually how management primarily wants to create value for its shareholders. It is evident that, like other insurance agents, CASE 4 primarily wants to create value for shareholders by taking insurance risk, financial market risk and credit risk on its books. To create value for shareholders CASE 4 prices risks efficiently using its expertise to acquire premiums and then invest the money. If return exceeds

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<sup>9</sup> Bad luck is used in the sense that an event that has not happened once in 20 or 50 years, happened this year; so it was bad luck.

<sup>10</sup> Error in pricing risks, for example, due to underwriting mistakes (poor quality of assessing risks) is an example of bad housekeeping.

cost then value is added for the shareholders. However, CASE 4 can only do that if its household is in order. If CASE 4 is disorganised then it is difficult to know who should be doing what. As 4R4 argues: "if we don't comply with regulatory requirements and if money is just lying around and all employees are just going to the company's bank account and drawing up cash for no reason then we are not in a position to actually serve the purposes of creating value for shareholders". It is clear that adding shareholder value is the primary objective of managing operational risk. However, in order to develop a sound foundation for doing business through managing other types of risks, the significance of managing operational risk comes into play. That is why CASE 4 always explores losses when they happen by asking: "was it bad luck or was it bad housekeeping?" (4R4). Due the nature of business, insurance companies cover insurance losses where the possibility of something happening is always expected and it was just bad luck that it happened. However, if the underwriters, for instance, make mistakes in determining the risk adjusted price for that product then it was due to bad housekeeping. However, there can be instances due to the combination of both.

### **1.1. Evolution of Operational Risk in CASE 4**

It is important to know the course of evolution of operational risks in CASE 4. In order to capture the process of evolution the next paragraphs discuss both the previous and current situations.

### **1.2. The Previous Situation**

The insurance industry has been regulated for many years and in such a regulated market, where CASE 4 is incorporated, it was important to underwrite a great volume of business. For instance, in motor businesses in the country of origin the premium tariff as determined by the government was more or less the same irrespective of company. Consequently, the focus was mainly on writing a lot of business and not necessarily on competitive behaviour, without much focus on operational error.

### **1.3. The Current Situation**

Consequently, the previous focus was on not on having an efficient organisation. However, this has changed now the market has been deregulated and competition has come into play. Under such conditions having a very sound household became more important for CASE 4, which stood for concentrating on the value of shareholders (4R4). 1R4 states: "We want to have a lot of capital but we also want to find a lot of business which provides good return to capital. Therefore maximizing capital just for the shareholders is certainly not an issue".

One might ask whether regulation has promoted the focus on operational risk management. It has been established that CASE 4 always tries to run above the curve of regulation through its own initiatives (until 2005 the reinsurance industry was excluded from solvency regulations). However, the tendency is clearly that in order to earn money it is necessary to depend a little bit on luck while focusing on the top line of businesses. In a general sense it can be said that change is not necessary when an organisation is doing well. However, in a competitive environment, operational risk appears as a significant element.

In addition, the Basel II initiative has implications for the growth of operational risk management. This is because the products designed by the Financial Services Business Group (FSBG) of CASE 4 are blended in nature (see section 1 of this report) and close to banking products, where different elements are combined. In the FSBG, CASE 4 also has employees who are used to working for banks. So clearly the idea of operational risk management as contained in Basel II has spread throughout the company (4R4). In addition to Basel II, the capital adequacy regulations in Europe, known as Solvency II, contain elements of operational risk management, which will influence the current initiative of CASE 4. Moreover, following some corporate scandals in the financial sector, some regulatory agencies (including the FSA) have required insurance companies to come up with a capital model for operational risk. This will again force CASE 4 to think about operational risk in more detail. It is also evident that



operational risk is receiving more attention in CASE 4 because of its international expansion, which might not be the case for a national level insurance company (4R4).

#### **1.4. Key driving force of Operational Risk Management in CASE 4**

From the above discussion it is clear that regulation of operational risk management in the insurance industry is just evolving. However, CASE 4 has many years' experience with various elements of operational risk. However, under the specific heading of operational risk management it has only a couple of year's experience. Most importantly, this was actually initiated by management who clearly understood that effective management of operational risk is a means of achieving a competitive edge. Consequently, CASE 4 initiated a process designed to manage its operational risk efficiently.

In conclusion it is evident that operational risk has always been a topic in CASE 4 but systematically it has been driven more by the business groups. This probably started from the late 1990s to 2000 depending on the business groups. The main focus of operational risk is the IT sector, where CASE 4 has invested a lot in the past and plans to invest more in the future (4R9).

#### **1.5. The role of Operational Risk in CASE 4's ERM**

As discussed above CASE 4's ERM includes both quantitative and qualitative aspects. From a quantitative perspective, CASE 4 has developed a Group Risk Capital Model (GRCM) (see figure 4C8 in this report) where it tries to identify all dependencies between insurance, financial market and credit risks (but not yet operational risk). In addition, although quantification is important, just focusing on quantification is too simple (4R4). However, CASE 4 expects that sooner or later the GRCM will include operational risk, not as a stand-alone item but also involving interdependencies with core risks. From a qualitative perspective, identifying risks, governance, policies, risk appetite, risk tolerance and also transparency is included in CASE 4's corporate governance framework. This is

where most of the operational risk exists. However, CASE 4 finds it difficult to quantify operational risk (4R10), as this depends on the understanding of reward measures, where calculating the frequency is not a precise science. This is because the elements of operational risks depend on the organisation, the culture, the management style and the existing market, where the companies are not perfectly identical (4R5). Consequently, operational risk always depends on the environment, and, more importantly, it is context-driven in CASE 4. Therefore, it is not a question about how precisely to measure, but it is a question of prioritization in order to understand the risk landscape (4R4). For the ERM framework, it is more important for management to reach an agreement on which operational risk the organisation can live with and what specific actions are needed to manage them rather than just putting emphasis on quantifying the exact figure [of operational risk]. For the safety of the organisation it is important to focus on the bigger rather than smaller operational risks. This is why 4R4 argues: "I think quantifying or measuring operational risk is helpful; but it is always about knowing it. It is more a question of ranges and setting priorities and not being too precise". In contrast, there is a lot more data on the financial risks, facilitating back testing of the model, because it is not so context dependent. For instance it is evident that CASE 4 has changed its organisational structure over the last 10 years a couple of times. Consequently, operational losses, which happened 10 years ago, are no longer relevant today. 4R4 states: "It is better to just forget it as they will not happen any more". Therefore, it is clear that operational risks heavily depend on management styles, culture, and organisation. It is important to mention here that every company has a different culture and that is why it is always extremely difficult to manage. Managing these issues depend on a subjective view. Because it is subjective then there are many different views to be considered. Consequently, it is more difficult to decide the large risks (4R4). In effect, CASE 4 concentrates on a list of large operational risks, where the magnitudes are based on experts' broad opinions (4R5).

### **1.6. Level of Awareness of Operational Risk in CASE 4**

It is evident that the awareness of operational risk as a threat has just been created in CASE 4. So it is something that is now on the radar screen and has become an issue. Since operational risk was not on the radar-screen beforehand what needed to be delegated to line management was not made explicit. The effect of deregulation has also had some impact on this growing awareness. However, it is very difficult to convince management about something for which there is no evidence that it is an important issue.

### **1.7. Operational Risk Management Department versus Internal Audit Department**

CASE 4's Group Operational Risk Management is responsible for the integrated view of CASE 4's operational risk landscape. The GORM department works in close co-operation with the business groups and the corporate centre (4R5). The business groups take operational risks in performing their operational duties. Therefore, they are responsible for the risks which arise as a result. The Group Risk Management sets standards to support implementation and promote best practices with the ultimate goal of minimizing exposure to operational risks as far as reasonable from a cost/benefit perspective (4R5). It is evident that there was some overlap in the past between the responsibilities of Group Risk Management and Group Internal Audit. The board of directors is responsible for determining strategy and top management then actually executes the strategy. The board of directors mandates internal audits to check how appropriately management is executing the strategy. It has emerged that these roles explicitly or implicitly have been mixed up. 4R4 argues: "the roles and responsibilities need to be revisited". It is revealed that to some extent Group Internal Audit has also taken on tasks that are actually management tasks; so Group Internal Audit on the one hand has been performing management tasks and on the other hand has been trying independently to assess management. Conflicts have arisen as a result that could be dangerous for CASE 4 (4R4).

## 2. Key observations on Operational Risk

The above description of CASE 4's operational risk management suggests the following principles/observations.

- Although all types of risks bear some sort of operational element, separation of operational risk from financial risks is possible and important.
- Operational risk has two aspects (or sources): bad luck and bad housekeeping. However, the focus of the management of operational risk is to establish very sound housekeeping.
- Deregulation in the marketplace and growing awareness (following some recent corporate scandals) are the key driving forces in the emergence of operational risk in the insurance industry in general, and in CASE 4 in particular.
- Operational risks are context driven. Management culture, organisational set-up, and the desires of the staff who manage risk constitute the context of operational risk.
- Sharing and learning information across the organisation is very important for the growth of operational risk management. 'Live by example' promotes awareness of operational risks across the organisation.
- The management of operational risks does not explicitly drive value of the organisation. However, management of operational risk provides competitive advantage.
- Identification and management of operational risk is the line managers' responsibility. The Group Risk Management (GRM) provides guidelines

and tools to assist the line managers. However, the interest of GRM is to see the bigger picture and ensure that operational risks are managed in a consistent manner across the organisation.

- The key challenge for operational risk management is to get the balance right. Over emphasizing the identification of operational risks could imbalance the ERM system. A database of operational risks is essential and work to develop a database is in progress in CASE 4.
- There exists a conflict of interest between the Group Operational Management and Group Internal Audit in CASE 4 in managing operational risks. This is because of their overlapping functions with respect to operational risk management. The responsibility of these two departments in managing operational risk needs to be revisited. An independent risk function is important to avoid a conflict of interests.
- Unlike financial risks the main focus of operational risk management in CASE 4 is not quantification and modelling. Rather the key focus is to see the context from a broader perspective, to determine the priorities for the development of a dynamic risk profile (or risk landscape) of the organisation.
- Providing incentives to individual employees (or business units/departments) in reporting operational risks is important for the effective growth of quantitative risk management. CASE 4 believes that operational risk reporting should be a bottom-up process.
- A centralized system of managing operational risk is dangerous for the organisation as flexibility is seen by CASE 4 as the key to success in managing operational risk. In addition, such a centralized system could expose the organisation to systemic risk.

- CASE 4 believes that the success of operational risk depends on the management arrangements in place and the capability of the organisation in building and maintaining trust' of the stakeholders. Loss of reputation is the ultimate consequence of poor management of operational risk.
- Diversification is closely linked to operational risk. The more diversified the organisation, the more operational risk it bears.

## SECTION 5

### CHALLENGES OF ERM IN CASE 4

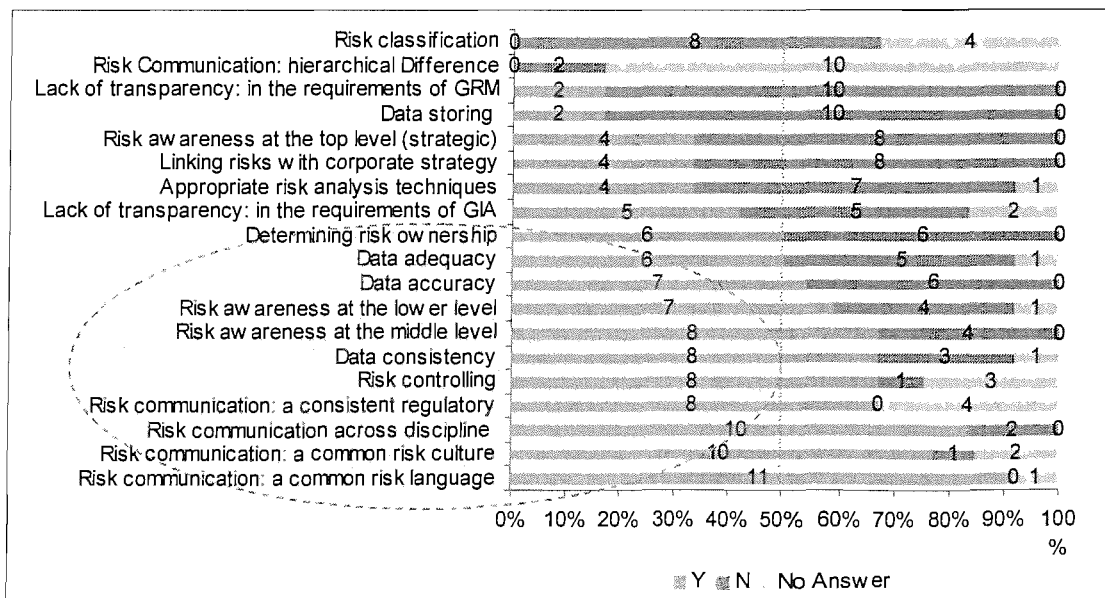
#### 1. Introduction

The following key challenges towards implementing ERM in CASE 4 have emerged from the interviews. It was difficult from the inadequate data to specifically differentiate between operational and technical challenges. Therefore, they are discussed in one combined section under the following headings.

- Risk Measurement
- Risk Securitization
- Determining the Right of Capital
- A Common Understanding
- Economic Value<sup>1</sup>

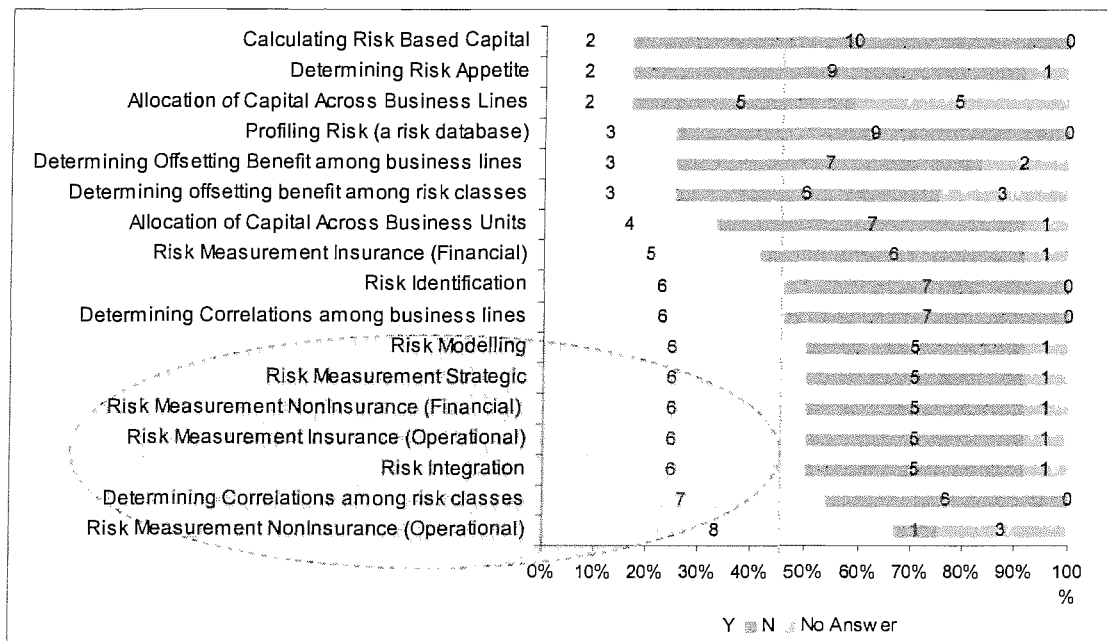
#### 2. Survey Results

**Figure 4C10: Operational Challenges of ERM in CASE 4**



The survey results summarized in Figure 4C10 indicate that 11 out of 12 respondents (91.67%) identified risk communication problems arising from the lack of a common language as the top challenge to the ERM. This is followed by risk communication because of the absence of a common risk culture and risk communication because of the barriers between disciplines (83.3% of respondents).

**Figure 4C11: Technical Challenges for ERM in CASE 4**



In Figure 4C11 it is seen that 8 out of 12 (67%) respondents suggest operational risk (from non-insurance side) measurement is the top key technical challenge in implementing ERM. Thereafter, determining correlations among risk classes was selected as the second key challenge by 58% of respondents. This is followed by risk integration, operational risk (insurance side), then financial and strategic side by 50% of respondents.

### 3. Analysis of Interviews

The following paragraphs analyze the key issues (mentioned above) that arose from the interviews.



### **3.1. Risk Measurement**

VaR is one of the primary tools CASE 4 uses for setting risk acceptance (or trading limits in market risks). VaR measures the adverse impact that potential changes in the risk (or liability) (or market rates and prices in the case of market risk) could have on the value of the portfolio over a specified period of time. VaR includes risk diversification in the underlying portfolio. The GRM in CASE 4 calculates VaR at a 99.5<sup>th</sup> percentile level using a one year time horizon (4R5). 4R12 states: "This means that, assuming a static portfolio over one year, there is a 0.5% chance that loss will exceed VaR". CASE 4's ERM is based on the principle of sub-additivity which assumes that: "combining two sufficiently uncorrelated portfolios should not create more risks". Under the percentile conception, VaR is a point measure (that is; the value of a distribution of outcomes at a single point). The point is defined using a percentile. Such risk measures only focus on a single point of the distribution and practically capture no information for the decision-maker regarding how the tail of the distribution behaves (4R2). CASE 4 acknowledges the limitation of VaR as it focuses only on the tail of a distribution, which limits applications where a more sophisticated capture of upside risk behavior is considered desirable (4R12).

### **3.2. Risk Securitization**

CASE 4 securitizes its risks through insurance-linked securities (ILS). This provides CASE 4 with an alternative way of offloading risks (4R4). Instead of providing capacity with company-owned assets, the risk is placed in the capital markets through catastrophe bonds. The 'sponsors' of the bonds pay a coupon rate to investors for catastrophe protection, and if a catastrophe occurs that 'triggers' the bond (each bond has a unique trigger mechanism) and investors may lose some or the entire bond principal, which is paid to the sponsor to cover losses. For investors, catastrophe bonds offer attractive returns and, because they are unrelated to other securities offer a way to diversify and reduce portfolio risk. The challenge to risk securitization in capital market for CASE 4 lies in structuring the programme (4R1).

### **3.3. Issues in Determining the Right Amount of Capital**

As part of the risk management programme CASE 4 needs to overcome a conflict of interest between shareholders and policyholders in determining the right amount of capital. The two groups have different risk profiles. Shareholders tend to have 'speculative' risks (with both upside and downside risk), while policyholders are concerned with 'pure' risk (downside). Shareholders are interested in getting the maximum return for their investment and do not want to see idle capital on the liability side of the balance sheet (4R8). They are not interested in how efficient the organization is to manage capital but they want to get the maximum return for their investment. However, policyholders are interested in seeing a strong capital base of their insurers so that their potential claims are met. 4R1 argues: "Risk management will have to make sure that risk taking takes place in a controlled way in order to satisfy both shareholders and policyholders". Indeed, capitalization depends on the business model as the liability businesses need a different capital structure from property business.

The interviews suggest that capital adequacy is important to CASE 4 for a number of reasons in the current insurance industry environment. Overall, a shortage of capital is not a problem for most insurers operating today. In the view of many respondents, there is overcapacity in the industry, but situations change over time. Overcapacity has intensified competition in the market for insurance products, driving a relaxation in underwriting standards. While combined ratios (a measure of an insurer's overall underwriting profitability) are improving, the improvement largely reflects a lack of 'catastrophes' with their resulting surge of claims, rather than strong underwriting practices. In many cases, loss reserves were not increasing commensurate with premium growth and profitability was driven by attractive financial market returns, rather than by core underwriting activities. However, the situation has changed in recent years as CASE 4 is now investing more in secured fixed income securities (see figure 4C4). All these conditions (including the increasing uncertainty attached to the underwritten risks) suggest that capital adequacy will become a more significant issue for

CASE 4 in the future. Of course, a strong capital base is an important determinant of more risk taking, but this is also dependent on good business position and strategy, management acumen, liquidity and cash flow, and favorable trends in key insurance markets. From a strategic point of view the final goal of CASE 4's ERM is to use as little capital as possible and to write as much business as possible with the existing capital (4R5).

### **3.4. A Common Understanding**

The interviews find that irrespective of an individual's disciplinary background, the staff of CASE 4 understand what risk management is about (at least the basic issues of ERM) and what is their role is in the ERM system. However, the level of understanding differs across disciplines. For example, an interest rate risk manager knows very well how to find the best hedge rate risk, while an underwriter knows how much should be invested to cover for the US hurricane risk or European windstorm or Japanese typhoon risk. They are specialists but in general everybody has to have an idea about the overall risk management concepts (4R5). Risk Management in CASE 4 is, of course, everyone's responsibility. 4R4 argues: "Nobody, including the Group CRO understands everything". All these arguments establish that CRO should possess a body of knowledge (or at least should possess represents a body of multidisciplinary knowledge). This is an important part of CASE 4's ERM style. 4R5 argues: "Specialists are very sophisticated but sometimes I wonder what their models deliver and that does question the outcome".

### **3.5. Economic Value**

Clearly CASE 4 is seeking to understand the relations between catastrophe risks and capital while putting emphasis on the 'economic value' model. The overall approach concentrates on ensuring a very basic question: "Are we adequately capitalized to support the major catastrophe risks in our risk book?" The study finds that the concept of Economic Balance Sheet is central to CASE 4's risk management practice. Measuring economic capital enables CASE 4 to quantify risks, linking these risks with specific business activities, calculating the required

amount of capital, cost of capital, allocating capital, and determining the risk-adjusted returns. All the arguments suggest that the economic valuation framework of CASE 4 is based on a very sound and appropriate economic paradigm (4R8).

#### **4. Conclusion**

Being a wholesale insurer the ERM process of CASE 4 was found much more centralized where most of the operational challenges for ERM are linked to global market issues/development such as insurance (underwriting) cycle, uncertainty attached with emergent risks (such as nanotechnology, human pandemic). The technical issues related to their ERM were not found to be very much problematic because CASE 4 has a strong team of quantitative professional who are capable of researching and developing new techniques to manage their risks.

## SECTION 6

### PERFORMANCE OF CASE 4'S ERM

None of the respondents' view or the material supplied by CASE 4 was able to provide a clear indication of how the performance of the ERM system is measured. The only conclusion that can be drawn is that CASE 4 does not give any priority to this fact.

In addition to the performance of its ERM system, CASE 4 is more worried about its credit rating. 4R1 states: "From an insurance company perspective we need a strong rating". In the absence of solvency regulations (reinsurers come under solvency regulations from 2006) it is more important for CASE 4 to ensure its financial soundness to customers and investors. Consequently, achieving and maintaining a targeted credit rating is a very important issue for CASE 4. Being a reinsurer, CASE 4 deals with large catastrophe risks. Previously, the concern of rating agencies was concentrated on the adverse reserve development and reduced operating earnings. However, the rating criteria have been widened in recent years. In addition to solvency (adverse reserve development and operating profitability in long-tail business), issues such as liquidity (flexible options for raising capital), sound track record of financial performance and management quality are also included in the rating criteria. However, the rating agency model varies with CASE 4's internal model in a variety of ways (for example, diversification benefit) (4R12). Moreover, the expectation of cedents is not limited to creditworthiness of reinsurers in cases of catastrophic loss, but the guarantee of providing coverage for new business is also an important factor. Such a dynamic environment pushed CASE 4 to bring a balance among its risk, return and resources in order to maintain its position as an attractive sustainable business partner. Consequently, Integrated Risk Management was introduced to ensure such balance. In order to strengthen the balance sheet IRM incorporates all asset and liability risks, capital management, disciplined underwriting, securitisation of pick risks and efficient claims management. However, there

appears to be no system in place for specifically assessing the performance of the ERM system in CASE 4.

Table 1: List of the respondents

SI No.	Code	Full Name	Designation	Discipline	Location	Type of Interview	Date of Interview	Time
1	4R1	Alfred Bloch	Senior Business Group Advisor in Property & Causality Business Group	Insurance	Zurich	Face-to-face	1 <sup>st</sup> March, 2005	1 hour
2	4R2	Ann Godbehere	Group CFO	Finance	Zurich	Presentation in investors meeting	23 <sup>rd</sup> Nov 2004	20 minutes
3	4R3	Benjamin Meuli	Chief Investment Officer	Investment	New York	Presentation in the investors conference	in 15 <sup>th</sup> June, 2005	30 minutes
4	4R4	Bruno Porro	Chief Risk Officer (retired on 31 <sup>st</sup> December, 2004)	Insurance and Risk Engineering	Zurich Geneva	Face-to-face	1 <sup>st</sup> March, 2005 7 <sup>th</sup> April, 2005	1 hour 30 minutes
5	4R5	Christina Momenteral	Group CRO	Group Risk Management	Zurich New York	Presentation in the Investors' meeting Presentation in the investors meeting	23 <sup>rd</sup> Nov, 2004 15 <sup>th</sup> June, 2005	30 minutes 30 minutes
6	4R6	David Godfrey	CRO, Business Group Financial Services	Business Risk	London	Telephone	2 <sup>nd</sup> March, 2005	1 hour
7	4R7	Gordon Scott	Chief Internal Auditor	Internal Audit	London	Face-to-face	10 <sup>th</sup> March, 2005	1 hour
8	4R8	Hans Peter Wurmli	Head of Financial Market Risk	Mathematician	Zurich Zurich Zurich	Face-to-face Face-to-face Face-to-face	28 <sup>th</sup> Nov 2003 28 <sup>th</sup> June, 2004 10 <sup>th</sup> Nov 2004	1 hour 1 hour 1 hour
9	4R9	John Coomber	Group CEO	Insurance	New York	Presentation in investors meeting	15 <sup>th</sup> June, 2005	30 minutes
10	4R10	Markus Seifert	Head of Group Operational Risk Management	Operational Risk	Zurich	Face-to-face	6 <sup>th</sup> April, 2005	1 hour
11	4R11	Michael Koller	Head of Group Regulatory Affairs	Regulatory & Compliance	Zurich	20 PROGERS Meeting, Geneva Association	4-5 November, 2004	30 minutes
12	4R12	Pablo Koch Medina	Head of ERM	Mathematician	Zurich	Workshop presentation in Investors Meeting	23 <sup>rd</sup> Nov 2004	30 minutes
13	4R13	Peter Shore	Head of Risk Disclosure	Financial Risk	Zurich	Face-to-face	6 <sup>th</sup> April, 2005	30 minutes