Tony Merna – to my loving mother; an inspiration

Faisal Al-Thani – to my family
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Introduction

1.1 INTRODUCTION

If you can’t manage risk, you can’t control it. And if you can’t control it you can’t manage it. That means you’re just gambling and hoping to get lucky.

(J. Hooten, Managing Partner, Arthur Andersen & Co., 2000)

The increasing pace of change, customer demands and market globalisation all put risk management high on the agenda for forward-thinking companies. It is necessary to have a comprehensive risk management strategy to survive in today’s market place. In addition, the Cadbury Committee’s Report on Corporate Governance (1992) states that having a process in place to identify major business risks as one of the key procedures of an effective control system is paramount. This has since been extended in the Guide for Directors on the Combined Code, published by the Institute of Chartered Accountants (1999). This guide is referred to as the ‘Turnbull Report’ (1999) for the purposes of this book.

The management of risk is one of the most important issues facing organisations today. High-profile cases such as Barings and Railtrack in the UK, Enron, Adelphia and Worldcom in the USA, and recently Parmalat, demonstrate the consequences of not managing risk properly. For example, organisations which do not fully understand the risks of implementing their strategies are likely to decline. Marconi decided to move into a high-growth area in the telecom sector but failed in two distinct respects. Firstly, growth was by acquisition and Marconi paid premium prices for organisations because of the competitive consolidation within the sector. Secondly, the market values in the telecom sector slumped because the sector was overexposed owing to debt caused by slower growth in sales than expected.

1.2 WHY MANAGING RISK IS IMPORTANT

The Cadbury Report on Corporate Governance Committee Working Party (1992) on how to implement the Cadbury Code requirement for directors to report on the effectiveness of their system of internal control
lists the following criteria for assessing effectiveness on the identification and evaluation of risks and control objectives:

- identification of key business risks in a timely manner
- consideration of the likelihood of risks crystallising and the significance of the consequent financial impact on the business
- establishment of priorities for the allocation of resources available for control and the setting and communicating of clear control objectives.

The London Stock Exchange requires every listed company to include a statement in its annual report confirming that it is complying with this code, or by providing details of any areas of non-compliance. This has since been re-enforced and extended by the Turnbull Report (1999). The Sarbanes-Oxley Act (2002) is similar to the Turnbull Report. This Act introduced highly significant legislative changes to financial practice and corporate governance regulation in the USA. The Act requires chief executive officers (CEOs) and group financial directors (GFDs) of foreign private registrants to make specific certifications in annual reports.

In today’s climate of rapid change people are less likely to recognise the unusual, the decision-making time frame is often smaller, and scarce resources often aggravate the effect of unmanaged risk. The pace of change also means that the risks facing an organisation change constantly (time related). Therefore the management of risk is not a static process but a dynamic process of identification and mitigation that should be regularly reviewed.

1.3 GENERAL DEFINITION OF RISK MANAGEMENT

The art of risk management is to identify risks specific to an organisation and to respond to them in an appropriate way. Risk management is a formal process that enables the identification, assessment, planning and management of risks.

All levels of an organisation need to be included in the management of risk in order for it to be effective. These levels are usually termed corporate (policy setting), strategic business (the lines of business) and project. Risk management needs to take into consideration the interaction of these levels and reflect the processes that permit these levels to communicate and learn from each other.

The aim of risk management is therefore threefold. It must identify risk, undertake an objective analysis of risks specific to the organisation,
and respond to the risks in an appropriate and effective manner. These stages include being able to assess the prevailing environment (both internal and external) and to assess how any changes to that prevailing environment would impact on a project in hand or on a portfolio of projects.

1.4 BACKGROUND AND STRUCTURE

This book provides background knowledge about risk management and its functions at each level within an organisation, namely the corporate, strategic business and project levels.

Figure 1.1 illustrates a typical organisational structure which allows risk management to be focused at different levels. By classifying and categorising risk within these levels it is possible to drill down and roll up to any level of the organisational structure. This should establish which risks a project is most sensitive to so that appropriate risk response strategies may be implemented to benefit all stakeholders.

Figure 1.1 illustrates the corporate, strategic business and project levels which provide the foundation for this book. Risk management is seen to be integral to each level although the flow of information from level to level is not necessarily on a top-down or bottom-up basis. Merna and Merna (2004) believe risks identified at each level are dependent on the information available at the time of the assessment, with each risk being assessed in more detail as more information becomes available. In effect, the impact of risk is time related.

Figure 1.2 illustrates the possible outcomes of risk. The word ‘risk’ is often perceived in a negative way. However, managed in the correct way, prevailing risks can often have a positive impact.

![Figure 1.1 Levels within a corporate organisation (Merna 2003)](image-url)
Risk management should consider not only the threats (possible losses) but also the opportunities (possible gains). It is important to note that losses or gains can be made at each level of an organisation.

1.5 AIM

The aim of this book is to analyse, compare and contrast tools and techniques used in risk management at corporate, strategic business and project levels and develop a risk management mechanism for the sequencing of risk assessment through corporate, strategic business and project stages of an investment.

Typical risks affecting organisations are discussed and risk modelling through computer simulation is explained.

The book also examines portfolio risk management and cash flow management.

1.6 SCOPE OF THE BOOK

Chapter 2 discusses the concept of risk and uncertainty in terms of projects and investments. It then outlines the sources and types of risk that can affect each level of an organisation.

Chapter 3 is a general introduction to the topic of risk management. It summarises the history of risk management and provides definitions of risk and uncertainty. It also describes the risk process, in terms of identification, analysis and response. It then goes on to identify the tasks and benefits of risk management, the risk management plan and the typical stakeholders involved in an investment or project.

Chapter 4 is concerned with the tools and techniques used within risk management. It prioritises the techniques into two categories, namely
qualitative and quantitative techniques, and describes how such techniques are implemented. It also provides the elements for carrying out a country risk analysis and briefly describes the risks associated with investing in different countries.

Chapter 5 outlines the risks involved in financing projects and the different ways of managing them. The advantages and disadvantages of risk modelling are discussed, and different types of risk software described.

Chapter 6 is concerned with portfolios and the strategies involved in portfolio selection. Bundling projects is examined and cash flows specific to portfolios are analysed. Various methods of cash flow analyses are discussed.

Chapter 7 is specific to the corporate level within an organisation. It is concerned with the history of the corporation, corporate structure, corporate management and the legal obligations of the board of directors, corporate strategy and, primarily, corporate risk.

Chapter 8 is specific to the strategic business level within an organisation. It discusses business formation, and defines the strategic business unit (SBU). It is primarily concerned with strategic management functions, strategic planning and models used within this level. Risks specific to this level are also identified.

Chapter 9 is specific to the project level within an organisation. It outlines the history of project management, its functions, project strategy and risks specific to the project level.

Chapter 10 provides a generic mechanism for the sequence and flow of risk assessment in terms of identification, analysis and response to risk at corporate, strategic business and project levels.

Chapter 11 describes a number of corporate governance codes and how they address the need for risk management.

Chapter 12 introduces the Basel II framework and discusses, in particular, how probability default (PD) and loss given default (LGD) are addressed and other operational management issues.

Chapter 13 describes how quality management can be used to manage many of the risks inherent in organisations and how quality related risks can affect the profitability of an investment.

Chapter 14 provides Case Study 1 which investigates the pharmaceutical industry and illustrates the typical risks in a drug development process (DDP) and how many of these risks can be mitigated.

Chapter 15 provides Case Study 2 which shows the risks associated with the procurement of crude oil and the sale of refined products. This
case study also addresses the risks in the supply and offtake contracts and utilises Crystal Ball as the simulation software for modelling and assessment of risks.

Chapter 16 provides Case Study 3 which describes the development of risk registers at corporate, strategic business unit and project levels and the development of a risk statement for a specific project.

The final chapter, Chapter 17, provides Case Study 4 which describes how the major risks at each level of a corporation can be identified and quantitatively analysed and then summarised to develop a risk statement for shareholders.
2

The Concept of Risk and Uncertainty and the Sources and Types of Risk

*Man plans, God smiles*  
(Hebrew proverb)

*Fortune favours the prepared*  
(Louis Pasteur)

2.1 INTRODUCTION

Risk affects every aspect of human life; we live with it every day and learn to manage its influence on our lives. In most cases this is done as an unstructured activity, based on common sense, relevant knowledge, experience and instinct.

This chapter outlines the basic concept of risk and uncertainty and provides a number of definitions of them. It also discusses the dimensions of risk and the perception of risk throughout an organisation. Different sources and types of risk are also discussed.

2.2 BACKGROUND

Uncertainty affects all investments. However, uncertainty can often be considered in terms of probability provided sufficient information is known about the uncertainty. Probability is based on the occurrence of any event and thus must have an effect on the outcome of that event. The effect can be determined on the basis of the cause and description of an occurrence. For example, the cause, description and effect can be illustrated by the following:

*Crossing the road without looking* will most likely result in *injury*.

Figure 2.1 illustrates the concept of risk in terms of uncertainty, probability, effect and outcome.
Once the probability, cause and effect of an occurrence can be determined then a probability distribution can be computed. From this probability distribution, over a range of possibilities, the chances of risk occurring can be determined, thus reducing the uncertainty associated with this event.

The authors suggest that uncertainty can often be interpreted as prophecy, since a prophecy is not based on data or experience. A prediction, however, is normally based on data or past experience and thus offers a basis for potential risk.

### 2.3 RISK AND UNCERTAINTY: BASIC CONCEPTS AND GENERAL PRINCIPLES


*All projects involve risk—the zero risk project is not worth pursuing. Organisations which better understand the nature of these risks and can manage them more effectively can not only avoid unforeseen disasters but can work with tighter margins and less contingency, freeing resources for other endeavours, and seizing opportunities for advantageous investment which might otherwise be rejected as too risky.*

Risk and uncertainty are distinguished by both Bussey (1978) and Merrett and Sykes (1983) as:
A decision is said to be subject to risk when there is a range of possible outcomes and when known probabilities can be attached to the outcome.

Uncertainty exists when there is more than one possible outcome to a course of action but the probability of each outcome is not known.

In today’s business, nearly all decisions are taken purely on a financial consequences basis. Business leaders need to understand and know whether the returns on a project justify taking risks, and the extent of these consequences (losses) if the risks do materialise. Investors, on the other hand, need some indication of whether the returns on an investment meet their minimum returns if the investment is fully exposed to the risks identified. (Merna 2002) suggests:

we are at a unique point in the market where players are starting to recognise that risks need to be quantified and that information about these projects needs to be made available to all participants in the transaction.

Therefore identifying risks and quantifying them in relation to the returns of a project is important. By knowing the full extent of their gains and/or losses, business leaders and investors can then decide whether to sanction or cancel an investment or project.

### 2.4 THE ORIGIN OF RISK

The origin of the word ‘risk’ is thought to be either the Arabic word *risq* or the Latin word *riscum* (Kedar 1970). The Arabic *risq* signifies ‘anything that has been given to you [by God] and from which you draw profit’ and has connotations of a fortuitous and favourable outcome. The Latin *riscum*, however, originally referred to the challenge that a barrier reef presents to a sailor and clearly has connotations of an equally fortuitous but unfavourable event.

A Greek derivative of the Arabic word *risq* which was used in the twelfth century would appear to relate to chance of outcomes in general and have neither positive nor negative implications (Kedar 1970). The modern French word *risqué* has mainly negative but occasionally positive connotations, as for example in ‘qui de risque rien n’a rien’ or ‘nothing ventured nothing gained’, whilst in common English usage the word ‘risk’ has very definite negative associations as in ‘run the risk’ or ‘at risk’, meaning exposed to danger.

The word ‘risk’ entered the English language in the mid seventeenth century, derived from the word ‘risque’. In the second quarter of the eighteenth century the anglicised spelling began to appear in insurance
transactions (Flanagan and Norman 1993). Over time and in common usage the meaning of the word has changed from one of simply describing any unintended or unexpected outcome, good or bad, of a decision or course of action to one which relates to undesirable outcomes and the chance of their occurrence (Wharton 1992). In the more scientific and specialised literature on the subject, the word ‘risk’ is used to imply a measurement of the chance of an outcome, the size of the outcome or a combination of both. There have been several attempts to incorporate the idea of both size and chance of an outcome in the one definition. To many organisations risk is a four-letter word that they try insulate themselves from.

Rowe (1977) defines risk as ‘The potential for unwanted negative consequences of an event or activity’ whilst many authors define risk as ‘A measure of the probability and the severity of adverse effects’. Rescher (1983) explains that ‘Risk is the chancing of a negative outcome. To measure risk we must accordingly measure both its defining components, and the chance of negativity’. The way in which these measurements must be combined is described by Gratt (1987) as ‘estimation of risk is usually based on the expected result of the conditional probability of the event occurring times the consequences of the event given that it has occurred’.

It follows then that in the context of, for example, a potential disaster, the word ‘risk’ might be used either as a measure of the magnitude of the unintended outcome, say, 2000 deaths, or as the probability of its occurrence, say, 1 in 1000 or even the product of the two – a statistical expectation of two deaths (Wharton 1992). Over time a number of different, sometimes conflicting and more recently rather complex meanings have been attributed to the word ‘risk’. It is unfortunate that a simple definition closely relating to the medieval Greek interpretation has not prevailed – one which avoids any connotation of a favourable or unfavourable outcome or the probability or size of the event.

The model shown in Figure 2.2 suggests that risk is composed of four essential parameters: probability of occurrence, severity of impact, susceptibility to change and degree of interdependency with other factors of risks. Without any of these the situation or event cannot truly be considered a risk. This model can be used to describe risk situations or events in the modelling of any investments for risk analysis.

The use of a risk model helps reduce reliance upon raw judgement and intuition. The inputs to the model are provided by humans, but the brain is given a system on which to operate (Flanagan and Norman 1993).