

CHAPTER 2

THEORETICAL FOUNDATIONS

In this chapter, the theoretical foundations related to the Enterprise Risk Management System and its framework is discussed.

2.1. ENTERPRISE RISK MANAGEMENT SYSTEM

2.1.1. Definition and Features

There are many meaning of the enterprise risk management system defined by the Risk Management Standards, here is an example of the definitive meaning:

The Australian/New Zealand Risk Management Standard describes risk as *"The chance of something happening that will have an impact upon objectives. It is measured in term of consequence and likelihood. It may be event, action or lack of action. The outcome is nearly always unwanted."*

Generally speaking, Enterprise Risk Management is a business tool to manage the uncertainties that stand in the way of achieving their strategic, operational, and financial objectives. Organisations are suggested to think of risk as:

- Anything that gets in the ways of the achievement of objectives
- Inevitable and function of our objectives and the way we do business
- Anything that threats diminution of the company's assets or franchise

Risk management methodologies are designed primarily to help managers identify the actions required to maximise the organisational objectives being achieved, something managers have been doing as an integral part of their approach to strategic control and corporate performance management. As a result, risk management systems, being implemented across organisations today, have much in common with systems designed to the management of organisational strategic performance. This implies a considerable probability for duplication and effort, particularly when the implementation of a risk management system is regarded as a distinct and additional management activity.

There are many similarities between risk management and performance management, such as tracking progress objectives, regularly review by management, measurement activity, significant differentiators are also apparent from the literature reviews as well as from the case studies. While strategic control uses performance management frameworks such as Balanced Scorecard to identify and monitor what should happen risk management frameworks initially focus on the identification of what should not happen.

Successful companies have a global, enterprise way of looking at risk. They do not consider risks separately. They put all their risks together and look at the company's total risk exposure. They view the company as a whole and aggregate the risks at a

total company level. They have also found ways of measuring all risks in portfolios in a proper way, and a way to quickly assemble data from different trading systems around the world. Companies have changed their way of looking at their business. They have left the vertical model, i.e. broken down by business lines, for the horizontal way of thinking.

Risk management plays a vital role in a business's competitive strategy and secondly to explore related risk assessment techniques and applications.

The fundamental understanding of risk management in the areas of competitive and risk assessment are discussed in this section.

2.1.2. Integrating Risk Management to Corporate Strategy

Risk management should be considered as a part of the corporate strategy that is diffused down to an operational level and integrated into all aspects of the business to ensure it is recognised as an integral aspect of the business.

A risk management strategy, corporate strategy, aims to develop a risk management philosophy and awareness. A corporate strategy can be expressed as a policy. The information included in a policy can include (AS/NZS 4360:1999):

- The objectives of the policy and rationale for managing risk;
- The links between the policy and the organisation's strategic/corporate plan;
- The extent, or range of issues to which the policy applies;
- Guidance on what may be regarded as acceptable risk;
- Who is responsible for managing risks;
- The support/expertise available to assist those responsible for managing risks;
- The level of documentation; and
- The plan for reviewing organisational performance in regard to the policy.

The leading businesses of tomorrow will succeed by preserving and creating value, for example, excelling at developing products, meeting customers expectations, entering new markets, reducing costs and increasing shareholder value. On each of these fronts effective enterprise risk management can mitigate problems, enhance opportunities and increase return on effort and investment.

Ensuring the business and strategic initiatives for effectively managing the basic competences risks preserves and creates value. Businesses that focus on preserving and creating value can utilise risk management as a competitive advantage. This effective risk control on the basics enables a business to manage overall risk more effectively this enables these businesses to take advantage of opportunities that their competition considers threats (Galloway and Funston 2000).

2.1.3. Integrating Risk Management to Organisational Cultures

The most important goal of the integration into the culture is achieving a common understanding of risk across all functions and business units, as in general risks are not specific to one function or business unit. For example the risk of a financial downturn has flow on effects on to recruitment.

The culture of a business is determined by the senior management's commitment to promoting the desired outcome. Senior management must focus on the culture, believe in the corporate strategy and be determined to be involved in the strategies fulfilments. Enhancing competence and integrity in a business culture is critical to the development and maintenance of a risk management culture. Effective communication of risk ensures integrity of knowledge; mistakes are forgiven while covering up is not.

In a highly competitive business environment businesses encourage each business unit to develop bold strategies for enriching their competitive advantage, they are also encouraged to assess the risks of developing alternative strategies if the original plan does not eventuate. This results in a business that is resilient to risk and takes advantages of opportunities proactively through superior planning and anticipation (Galloway and Funston, 2000).

Attracting, developing and retaining strong operational staff will enhance competitiveness and reduce risk. A risk management culture focuses on supporting competency development by training and transferring risk knowledge.

2.1.4. Nature of Risks

Many listed companies, in the stock market, view the risk as:

- Anything that gets in the ways of the achievement of objectives
- Inevitable and function of our objectives and the way we do business
- Anything that threatens diminution of the company's assets or franchise

There are various forms of risk. Some of the risks which companies may face are discussed as follows:

Technical Risks:

According to Keey (2000), Technical Risk is a major factor but not the sole component of engineering risk, which include other aspects such as commercial, organisational, political and social factors. It arises because of the likelihood of failure in the design, construction and operation of engineering systems and their components. The responsibility of engineers is to reduce the impact of failure to acceptable level.

Technical risk is becoming more complex as there are few technical staff to cope with the work. Number of workers has been reduced to look after and operate increasingly sophisticated equipments. Engineers may have difficulty in keeping

abreast of the technical literature in their speciality, and managers must be aware of developments over an even wider field. The technical risks will be realised in practice depends upon various human factors, accuracy of specification, quality of fabrication, care of installation, maintenance and operation, etc.

A better understanding of engineering fundamentals with enhanced and more precise design methods have enhanced engineers to work within ever closer tolerance. Failures are than more likely to be happened.

Computer-related Risks:

Computer-related risks produce particular kinds of technical risk. Engineers rely on computer software to undertake their works, such as design, forecasting, inventory control, etc. Computer aided systems for control and monitoring are almost universal. Such system may involve complex network arrangement and remote sensing of equipment status. Errors can arise if the software does not fully understand the plant or process, or the practising engineer is unfamiliar with the problem and its diagnostic tools because of their complexity. In house-programmes can often suffer from inadequate documentation for others to follow, with attendant risk of misinterpretation of the designer's intent.

System and Management-related Risks:

Often in inquiries set up to determine the technical reason for an accident, the underlying cause of the incident in some management or system breakdown.

Management related risks are seldom obvious to managers. Over the last decade, there have been significant changes in management structure, with smaller in-house engineering teams. No longer are there large Government departments within which there is retained significant engineering experience built up over a long period. The changes have brought about a corporate memory loss that has not been entirely replaced by external consulting service or through computerised records (Keey, 2000).

Kletz (1999) suggests that memory of organisation may be improved by using formal information systems to remind operating staff of potential hazard in their work and to record the past history of equipment operability for the benefit of maintenance crews. To warn operators the problems, the loss of organisational memory means that people must now depend more heavily on adequate formal records and the reliability of automatic monitoring and surveillance systems. Stricter planning and safety controls insist on minimal risk to the environment and to people.

Environmental and Ecological Risk:

Environmental risk refers to threat to the world surrounding a particular activity or facility. Ecological risk refers to threats to particular ecosystems. When developments were small, ill effects were only local in impact. There was always an escape to an unsullied environment. There are now worries that increasing worldwide industrial activity may even causing significant climate changes with far reaching consequence for life itself on earth.

Since environmental impacts may be wide-ranging and long lasting, some authorities prefer to speak of ecological risk in which the effects on whole ecosystems are considered, rather than the impact on aspects of the built environment or particular parts of the nature world that are prized by people.

Modern concepts of inherently safe plants and cleaner processes imply that the environmental risk is much diminished if these principles are embodied in actual facilities. Loss prevention and waste management require corporate commitment, but this policy can bring rewards in greater profitability and easier acceptance of development plans by consent authorities.

Environmental risk is sometimes used in the narrower sense of the risks to management of legal sanctions from failure to meet and/or contraventions of statutory requirements under environmental legislation.

Commercial and Business Risk:

Engineering services meet human needs. These services are undertaken within a commercial framework. Some project is a technical success but it can be a commercial failure, such as Concorde, it is highly successful in technical aspect, but it is a great failure for airlines since the operating costs is very high and low demands of super-sonic journey.

Multipurpose facilities can respond more easily than single-stream production units to changing market requirements. However, the multipurpose production unit have lower business risks but the capital costs will be higher the plant designed for one product.

Most business risk eventually results in financial gain as there is a concept of high expected return, high risk. In this sense, financial risks differ from technical risks that are sought to be eliminated, reduced or mitigated.

2.1.5. Classification of Risks

The table 2.1 highlights one important aspect of the way in which risks are assessed.

Table 2.1: Consideration affecting safety judgements

More Tolerated	Less Tolerated
Risk assumed voluntarily	Risk imposed involuntarily
Risk assumed at work	Risk caused by work
Effect delayed	Effect immediate
Effect temporary and reversible	Effect long-lasting and irreversible
Effect known and minor	Effect uncertain and life-threatening
Exposure deemed necessary	Exposure unnecessary
Common hazard	Dread uncommon hazard
Affects all people	Affects sensitive people
Likely to be used as intended	Likely to be misused

Source: Keey (2000); Lowrance (1976)

This difference of regard has led many observers to comment that risks involuntarily thrust upon us should be treated as being more serious than those of our own choosing. This line of reasoning can support the view that pursuing one's trade will almost invariably bring a peculiar set of risks and that such risks may be allowably greater than those outside the workplace. This is a dangerous argument.

2.1.6. Sources of Risks

Different definitions and classifications can be used in managerial practice. A general classification may use physical, social and economic sources. But an in-depth investigation of the problem of risk identification may need classification that can cover all types of risk in more detail. Therefore the sources of risk can be represented depending on the environment in which they arise as follows (Tchankova, 2002):

Physical environment

The physical environment is an important source of risk. Natural disasters like earthquakes, storms, flooding, landslides, etc. lead to serious losses. The environmental influence on the people and people's influences on the environment are important aspects of this source of risk. The physical environment can be a source of profitable opportunities, for example real estate as an investment, or appropriate climate for the agriculture business or tourism.

Social environment

The changes in people's values, human behaviour and state of social structures are another source of risk. Civil unrest, social riots and strikes are events underlining the importance of the social environment as a source of risk. The level of worker skills and loyalty to the organisation determine to a large extent the success of the organisation. The difference in social values and culture, for example, the businessman from Europe, America and Asia, creates a high level of uncertainty. At the same time the changes of culture create opportunities. For example, in many countries the equal opportunities of minorities lead to faster development.

Political environment

The political environment is an important source of risk in all countries. The ruling party can affect organisations in different ways, for example by cutting aid to some industry branches or protecting some branch or region, by implementing strict rules about the environment, etc. The political environment is a more complex and important source of risk in an international aspect. The difference in the ruling system raises different attitudes and policies toward business. For example, foreign investment might be confiscated, or taxation systems might change significantly, which will hurt the investor's interests. The political environment can present opportunities as well, for example the change in the political system and transfer to the market economy in Bulgaria.

Operational environment

Operational activities of the organisation create risk and uncertainty. For example, damage in installation or production processes might result in physical injuries of workers. Unfavourable working conditions can threaten both the physical and mental health of the workers. The formal procedures of hiring or firing employees may generate a legal problem. The manufacturing processes may produce harm to the environment. In this case the organisation is a source of risk. The international business can suffer from risks in the transport system. The operational environment also provides opportunities, because the results of organisational activities improve the level of life and work of the people.

Economic environment

The economic environment usually is hardly influenced by the political environment in a single country, but the globalisation of the market creates a market that is greater than a single market and needs to be considered separately. Although a particular activity of the government can affect the international capital market, the control of the market is impossible for a single government. Examples of sources of risk generated from the economic environment are, in a global aspect, economic recession and depression, and at a local level, interest rate, credit policy, etc.

Legal environment

The legal environment creates risk and uncertainty in business. This opinion is valid for all countries, but is very important in Bulgaria during the last ten years. The legal system creates risk by disparity of current or new laws to the environment. In the international domain, complexity increases because of the variation of legal standards in different countries and can lead to conflict among the partners. The legal system creates opportunities also by stabilising the society and, due to that, organisations know the restrictions in their work. The legal system provides also a protection of rights, such as author's right, copy right, unemployment protection.

Cognitive environment

The risk managers' ability to reveal, understand and assess risk is not perfect. The difference between perception and reality for different people is an important source of risk for an organisation. The cognitive environment is a big challenge to the risk manager. The questions of how to assess the effect of the uncertainty on the organisation and how to understand whether the perception of risk is real are considered. The Chernobyl accident and a lot of production accidents caused by carelessness and human factors are clear examples of the risk arising from the cognitive environment.

2.2. MANAGEMENT OF ENGINEERING RISKS*

*based on original text by Keey (2000)

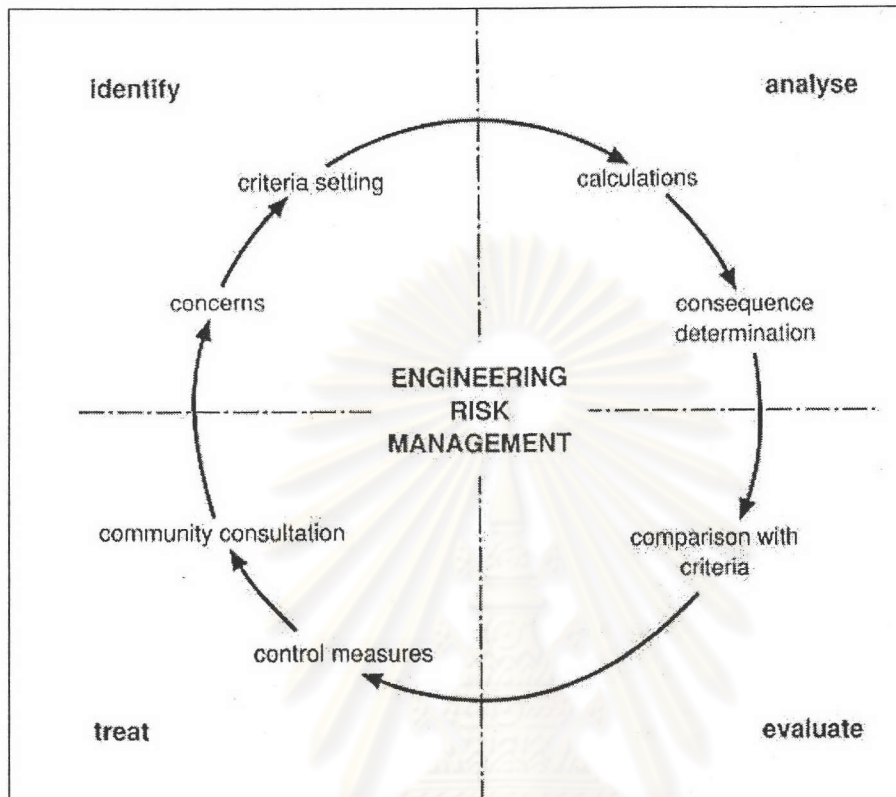


Figure 2.1: Engineering Risk Management

Source: Keey (2000)

Engineering risks arise from uncertainty. This may be due to incomplete knowledge or understanding, to appearance of unforeseen events that may be of commercial, political or social origin, or to an inability to control a developing situation. Such events, if they happen, may result in loss or harm to people, property and the environment. Even when risks are reduced, avoided or transferred, there is always some residual chance that things may go wrong, occasionally badly wrong.

Keey (2000) defines Engineering Risk as a practical likelihood of a specific hazard being realised through engineering activity given the actual workplace practices, management priorities, constraints and pressure. Taking risks may lead to gain, and this anticipated gain is normally the incentive for undertaking risky ventures.

Engineering risk management is concerned with mechanisms of recognising and facing threats to a technology-based organisation before they have a chance to inflict expensive and possibly irreparable damage. These threats may have a technical origin, but normally the prime cause is poor management of engineering processes and facilities.

Engineering activities involve uncertainties of various kinds. Risk management is concerned with coping with these future uncertainties by planning for the unintended

outcome, through avoidance or mitigation should it happen, thereby reducing future losses. 'Loss Prevention' is sometimes called risk management.

Keey (2000) distinguishes between management of risk and the management with risk. Management of risk is concerned with the reducing the risk faced by an organisation and maintaining them within acceptable limits. Engineering organisation must understand methods of risk reduction, risks may not need to be quantified, but ranked in priority for treatments. Management with risk is associated with business risks. For a company to grow, investment must be made, and there always is a risk associated with them. Proper management quantifies this risk as precisely as possible so that the venture can proceed with confidence. Engineering risks normally encompass both kinds of risk management.

There are many reasons that lead engineering organisations to adopt risk management. There is an increasing awareness of its benefits as means of reducing future losses while achieving a balance between the risk of failure and the reward of success. Managers are working in an increasingly complex and global environment under rapidly changing conditions and the risk of business activity is a central element of corporate governance.

All those in positions of management are making qualitative risk based judgment everyday. Without formal risk management training, most of these decisions will be skewed towards avoidance of incident of high consequence or those likely to be known or have been seen. The extent of risk-taking would depend upon a person's natural level of aversion and philosophy.

However, it is now possible to be systematic and consistent, thus improving the chance of identifying the unexpected. Being consistent allows rational decision-making over time and across an organisation's structure. It is very important to large organisations as many aspects of risks, such as technical, financial, insurance, and political issues, need to be considered.

Risk management is an ongoing aspect of good management and needs to be integrated into activities of the organisation. Effective risk management takes continual effort in developing a culture in which people are trained to think about risk in making decisions, risk analysis must be thorough, responses to events and crises need to be worked out and standard emergency and contingency plans need to be put in place. An organisation's risk profile will change over time, so risk management needs to be live, ongoing and aware of developments, often under guidance of a risk committee.

In western countries, 'Health and Safety in Employment Act' requires organisations to sure that there are effective methods of systematically identifying, assessing and reducing hazards in the workplace. Moreover 'Resource Management Act' requires that organisations put in place good environmental practices which demand the identification and treatment of risks.

2.3. RISK MANAGEMENT STANDARDS

Risk management is recognised by the Standard as an integral part of good management practice. It is an iterative process consisting of steps, which enable a continual improvement in decision-making to take place. Beer (1998) describes the whole process of risk management as risk identification, analysis, evaluation and treatment, as shown below:

There are a number of international standards and guides (Keey, 2000):

1. The British Standard BS8800 gives a guide to occupational health and safety management systems. It builds on the earlier standards such as BS5750:1987 on the principles of quality assurance and BS7750:1992 'Specification for Environmental Management System'.
2. The joint Australian standard has its counterpart in Canadian Standards Association's publication 'Risk Management: Guideline for Decision Makers' CAN/CSAQ850:1997.
3. International Standard ISO14971 deals with the application of risk analysis in the management of medical devices.
4. Australian/New Zealand Standard AS/NZ4360 'Risk Analysis of technological systems' which attempts to provide guidelines for selecting and implementing risk analysis techniques.

According to the Australian and New Zealand Standard on Risk Management AS/NZS 4360:1999, the main elements of the risk management process are:

Establish the context:

Establish the strategic, organisational and risk management context in which the rest of the process will take place. Criteria against which risk will be evaluated should be established and the structure of the analysis defined.

Identify risks:

Identify what, why and how things can arise as the basis for further analysis.

Analyse risks:

Determine the existing controls and analyse risks in terms of consequence and likelihood in the context of those controls. The analysis should consider the range of potential consequences and how likely those consequences are to occur. Consequence and likelihood may be combined to produce an estimated level of risk.

Evaluate risks:

Compare estimated levels of risk against the pre-established criteria. These enables risk elements to be ranked so as to identify management priorities. If the levels of risk established are low, then risks may fall into an acceptable category and treatment may not be required.

Treat risks:

Accept and monitor low-priority risks. For other risks, develop and implement a specific management plan, which includes consideration of funding.

Monitor and review:

Monitor and review the performance of the risk management system and changes, which might affect it.

Communicate and consult:

Communicate and consult with internal and external stakeholders as appropriate at each stage of the risk management process and concerning the process as a whole.

2.4. FAILURE MODE AND EFFECTS ANALYSIS (FMEA)

The failure mode and effect analysis is an engineering techniques used to define, identify and eliminate known and/or potential failures, problems, errors from system, design process, and/or service before they reach the customer (Omdahl, 1988).

Failure Mode and Effect Analysis is normally subdivided into four types.

Table 2.2: Types of Failure Mode and Effects Analysis

FMEA Types	Function of Analysis	Cause of Failure
System	Analyse systems and subsystems in early concept and design stage	System deficiencies
Design	Analyse products before releasing to manufacturing.	Design deficiencies
Process	<i>Analyse manufacturing and assembly process</i>	<i>Process or assembly deficiencies</i>
Service	Analyse services before reach the customers	System or process deficiencies

The failure mode and effect analysis is a team function and cannot be done on individual basis. The team must be defined as appropriate for a specific project and cannot serve as the company FMEA team. The knowledge that is required for a specific problem is unique to that problem. Therefore, the makeup of them must be cross-functional and multidiscipline of each FMEA (Stamatis, 1991).

A Process FMEA can be used as an assessment/analytical technique utilised by an engineering team as a mean to assure that potential failure modes and their associated causes have been considered and addressed. (Chrysler; Ford and GM, 1995). The Process FMEA is a summary of the team's thoughts, including an analysis of items that could go wrong based on experience and past concerns, as a process developed. This systematic approach parallels and formalised the mental discipline that an engineer normally goes through in any engineering activities.

The Process potential FMEA:

- Identifies potential product related process failure modes;
- Assess the potential customer effects of failures;

- Identifies the potential manufacturing/assembly/maintenance process causes and identifies process reduction variables on which to focus controls for occurrence reduction or detection of the failure conditions;
- Develops a ranked list of potential failure modes, thus establishing a priority system for corrective action considerations;
- Documents the results of the manufacturing/assembly/maintenance process.

The definition of 'customer' for a Process potential FMEA should normally be seen as the end user. However customer can also be a subsequence or downstream operation.

During the initial Process FMEA the responsible manager is expected to directly and actively involve representatives from all affected areas. The FMEA should be a catalyst to stimulate the interchange of ideas between the functions affected and thus promote a team approach.

The Process FMEA is a living document and should be initiated before or at the feasibility stage and take into account all maintenance operations, from individual components to assembly. Early review and analysis of new or revised processes is promoted to anticipate, resolve or monitor potential process concerns during the maintenance planning stage of a new model or component programme.

A Process FMEA should begin with a flowchart/risk assessment of the general process. This flowchart should identify the maintenance process characteristics associated with each operation.

2.5. GROUP DECISION MAKING

The Australian/New Zealand Standard emphasises that risk management is an ongoing aspect of an organisation's operations. Appropriate risk management is concerned with preventing future loss. Lack of such management can lead to failure.

Risk management is not an established discipline. It requires education and training in techniques. Risk Management is exercised at all levels in an organisation. All managers inherently manage risk in their day-to-day work, so all are responsible at their own level. Every decision whether made by committee or individual carries risks. Consideration of risk to be a natural part of the decision making process. It should become instinctive.

Hence the management of risks needs to be planned, proactive and permanent, whether there exists a specific committee with particular responsibility or these are incorporated in other management grouping.

The integration of risk management into the decision making process can generate more informed decisions. Risk management provides a greater understanding of the decision's inputs/outputs likelihood and consequences and if utilised effectively a more advantageous decision will be made.

Understanding how to control decision making to ensure it is best utilised in accordance with the business objectives and risk boundaries is a key component of risk management. Effective risk management will lower risk management costs such as insurance cover and budget over runs. A risk management system identifies and mitigates situations before they arise to ensure a more beneficial outcome is achieved. Physical risks of safety and site conditions are improved. Financial risks are reduced because more sound decisions are made regarding future market changes.

Effective implementation of a risk management system can also add value to a publicly listed company and increase the market's confidence of the company. In the eyes of the market companies with high shareholder values can be considered high trust implying the market trusts the management team of these companies. Risk management can transform a company into a high trust company because installation can improve and provide control of the decision making process and act as a safeguard. The mitigation of risks produces safeguards for businesses that utilise risk management and by identifying a future situation and strategies can be put in place and alternatives considered before the situation arises. Risks are not only negative but also represent positive opportunities as well. Traditional approaches to risk focus on the negative such as financial loss, fraud, lawsuits, environmental contamination and injury and death but approaching risk as also positive businesses can focus on the need to increase the business value. This new perspective acknowledges what is perceived as a hazard in one business could be an opportunity in another.

Group decision making is any decision making process that is performed by several individuals is group decision making. Using groups to make decisions has been both strongly endorsed and seriously questioned by behavioural scientist and managers. From early studies of group dynamics the implication appears to be that people are more likely to accept new ideas from their colleagues and leader in the course of discussion than from leader telling them what to do. It is believed that the individual sees a clearer picture of the situation and, as a consequence, feels involved in the decisions, and finds it easy to bow to the will of the group.

The involvement is considered effective when the focus is on overcoming resistant to change. It is claimed that group discussion makes better use of the available talent or abilities of members. It promotes acceptability of decisions because people have had the opportunity to raise their anxieties or concerns in connection with the problems under discussion. Also, it is considered a democratic way of going about things, although this could be somewhat invalidated chosen selectively. Several specific group decision making techniques can be employed by organisations.

2.5.1. Interacting group technique

An interacting group is a decision making group in which members openly and freely discuss, argue about, or agree on the best alternative. It is the least structured of the group techniques. These groups are widely used and involve members interacting in the process of generating ideas about ways of tackling a problem,

leading eventually to a group decision majority voting if necessary. These group suffer from the deficiencies associated with group functioning discussed elsewhere in this chapter.

2.5.2. Nominal group technique

More structured than the interacting group is the nominal group. Group members do not talk freely with one another. A group leader facilitates the decision process by describing the decision situation and asking for input from the participants. Alternatives are ranked, and a decision is chosen. The procedure adopted after presenting the problem to the group is as follows:

- Before discussion takes place, each member writes on paper his or her ideas about the problem under review.
- Then each member in turn presents an idea to the group, using a flipchart or blackboard. This is no discussion at this stage.
- Next, the group discusses the ideas presented, with emphasis on clarity and evaluation.
- Finally, each member reverts to silence and ranks independently the ideas already presented to the group. The idea with the highest aggregate ranking constitutes the final decision.

2.5.3. Role assigning technique

The role assignment approach lies between the extremes of the interacting and nominal group techniques. Two particularly important roles are the devil's advocate and the group facilitator. The responsibility of the group facilitator is to ensure that every group member feels free to express opinions, even controversial ones, and that no one person dominates the group.

2.5.4. Delphi group technique

This technique is sometimes used for developing a consensus of expert opinion. The Delphi procedure solicits input from a panel of experts who contribute individually. Their opinions are combined and "averaged." These results are fed back to the experts and the process continues until a solution is reached. This group bears a similarity to nominal groups, except for the fact that members do not meet face to face. The following procedures may be used:

- Member are told what the problem is and asked to provide a solution. This is done through a structured questionnaire approach.
- The questionnaire is completed independently by each member whose anonymity is maintained.
- The responses of all members are tabulated and each member receives a copy of the set of results covering all responses.
- After having an opportunity to see the range and types of answers, each member is asked again to provide an answer to the original problem. At this stage an individual could change his or her solution.
- The last two steps could be repeated until a consequence position is arrived at.

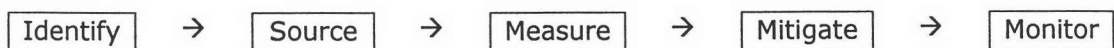
Advantages of group decision making is the amount of information and experience available can be increased by including more individuals in the decision making process. Group decision making tends to generate more alternatives, possibly allowing the organisation to optimise more. Communication and understanding are also increased when group decision making is used. This, in turn, increases the likelihood of the decision's being accepted and supported.

Disadvantages of group decision making are the amount of time needed for making a group decision is a big drawback. Group decision making can also force compromises when strong, decisive actions might be needed. Finally, group decision making can encourage groupthink, which is a phenomenon that emerges in a group when the group members' desire for consensus and cohesion outweighs their desire to make the best possible decision.

2.6. LITERATURES REVIEWS

Smallman (1996) defines a theoretical framework that is used to investigate a part of the relationship and the link between risk management strategy and organisational behaviour. Organisations are identified with either a proactive or a reactive approach to risk management. The critical factor of risk perception in managers and its impact on implementation strategy is considered. The types of risk strategy an organisation follows and its structure are defined using various measures of distinct factors. By establishing the nature and cause of relationships between the measures and factors, the relationship between organisational approaches to risk and organisation structure may be identified. The organisations should acknowledge their leaders in the field of risk management, and how they can achieve pre-eminent positions. Acknowledges risk-based auditing is still in its formative stages and so identification of best practice is an inexact science but there are three important trends from control-based to risk-based auditing, use of scenario planning and understanding that risks apply to soft assets (Kippenberger, 1999).

Carey (2000) provides guidance to companies in the UK to help them improve their internal controls and identify risks that are significant to the fulfilment of corporate business objectives and to implement a sound internal control system to management these risks effectively. The typical five stage model is shown below:



The above five stages include the following activities

1. Identity: application of various tools, potentially including scenario analyses, internal audit reviews, business process analyses, independent reviews, interviews round table risk debates/workshops, checklist/questionnaires, brainstorm.
2. Source: Analysis of underlying root-causes of identified top level risks to facilitate measurement and mitigation activities.
3. Measure: evaluation of likelihood and impact of identified risks.

4. Mitigate: development of plans to reduce or eliminate risk, based on the organisation's risk appetite/ability to cope with risk, and cost benefit analysis of mitigation, implementation of these plans.
5. Monitor: review of plan implementation and effectiveness of control processes, continued identification of changes to risk profile and implementation of new actions to address.

Over the last several years, many countries have seen significant changes to regulators' expectations of what constitutes effective corporate governance, including raising pressure for improved risk reporting and for better integrated and more comprehensive risk management practices. From the Simon (1995) encourages managers to establish effective controls to manage implementation of strategy as well as the inherent risks associated with strategic choices. Moreover Simon (2000) describes 'strategic risks' as an unintended event or set of conditions that significantly reduces the ability of managers to implement their intended business strategy. He therefore argues that all strategic choices made by a management team may impact on the strategic risk profile of the organisation, this providing a logical argument for the value of risk management and strategic control/performance measurement. This argument is supported by the results of a recent survey identifying the failure to manage major projects as the highest operational risk facing organisations (McCraig, 1999).

Despite the similarities, a major difference between risk management and corporate performance management is the degree to which analysis is applied. The development of risk management tools has been led by the financial services industry, to allow better management of the major risk types facing this industry: credit and market risk (Lawrie et al., 2003).

Hoffman (2002) suggests that the designer of risk management systems for assessing the impact of uncontrollable events or asset price movements tend to have a strong statically driven, predictive orientation, though these risk types may be special cases arising from the mechanical characteristics of financial market transactions. Bielski (2002) states that risk management requires ongoing identification, evaluation and projection based on internal and external data and that it necessitates preservative action. Management also implies total organisational involvement, versus gathering and creating numbers in some back room that are only seen by a few in the organisation and not acted upon in a timely manner at the line of business level.

Similarities between the 'top level risks' that related to operational management issues and the actively objectives on the corporate balanced scorecard were discussed by Lawrie et al. (2003). To evaluate this, cross check between the two independently developed lists was carried out. The linkages between objectives and risks are illustrated below, which the grey dell indicating Strategic Objective for which a comparable entry in the risk register was identified.

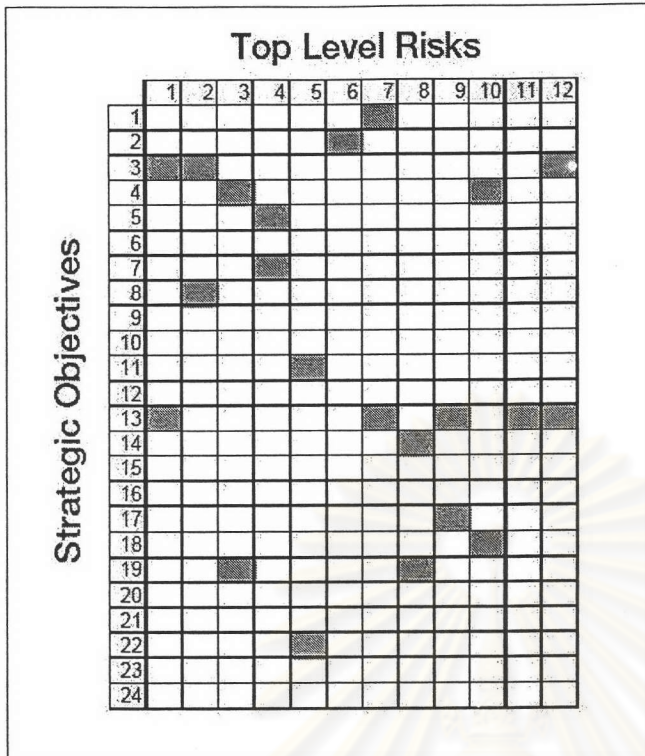


Figure 2.2: Strategic objective and identified top-level risks

Source: Lawrie et al. (2003)

All Strategic Objectives were matched to risk register entries. In fact this mapping suggests that some 40% of the objectives identified by the management as being critical to the achievement of its strategy were not recognised as being critical by those preparing the risk register.

The review of risk management methodologies reveals that they are designed to help manager identify the actions to require maximising the likelihood of organisational objectives being achieved. It is an integral part of their approach to strategic control and corporate performance management since well before the phase 'risk management' enter the business. As a result, risk management systems that are being implemented across the organisations today have much common with systems designed to manage organisational strategic performance.

One company in Australia uses strategic objectives and goals, an input of its strategic control process, as the starting points for risk management. Recommendations outlining risk mitigation activities and initiatives evaluated against existing business plans are reported back to the management team for evaluation and prioritisations. The result of this prioritisation process feeds back into the strategic control process in the form of 1) additional activities included in business plans and 2) as additional performance indicators used to monitor development in residual.

Cobbold (2002) propose the 3rd generation Balanced Scorecard which provides a good example of a proven framework for strategic control into which risk management sub-process can readily be incorporated. The components of the 3rd

generation Balanced Scorecard design process match components 1 - 3 of the Strategic Control process as show below:

- Destination Statement: long-term goals describing in some degree of detail what the organisation should look at some point of time in the future.
- Strategic Objective: activities and their expected outcomes defining what needs to happen to ensure achievement of the long-term goals and intermediate goals on the way to the long-term destination.
- Balanced Scorecard Performance Measures and Targets: measures for each strategic objective are chosen to inform management of progress in achieving the strategic objectives, targets are set for each measure to enable performance evaluation.

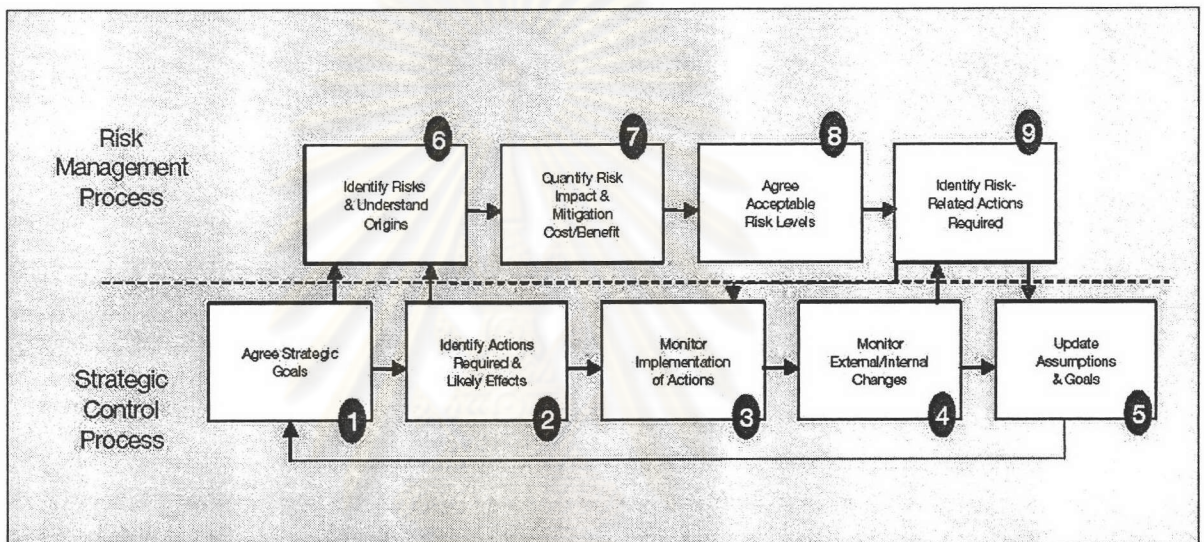


Figure 2.3: Risk Management Process vs. Strategic Control Process

Source: Lawrie et al. (2003)

Galloway and Funston (2000) look at the benefits of embedding a risk management capability across a whole enterprise. They give particular consideration to the creation of such a culture, outlining four factors characterising this environment which covers three key risk areas, and provides a model of the governance structure and infrastructure elements required.

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