DSA 8304
Risk Management Analytics

INTRODUCTION TO FINANCIAL RISK MANAGEMENT CONCEPTS

DSA 8304

Risk Management Analytics

- **Credit Hours:** 3
- **Pre-requisite(s):** NONE
- **Purpose of the course**
- To enable the learner understand the role and practice of risk management in investments and organizations. And The course is focused on key applications of predictive analytics in the area of risk analytics.
- **Expected Learning Outcomes**
- At the end of this course, the student should be able to:

1. Understand and understand the different sources of risk faced by financial institutions, how they manage risk internally and the related regulation requirement;
2. Measure and apply techniques for quantitative modelling of financial risk factors and managing financial risk; and
3. Apply techniques for dealing with data science techniques for financial risk management.

Course Content

- ***Risk Identification***
  - Introduction, Risk Classification, Risk Governance, Introduction to the concept of risk management: Definition of risk, Static and dynamic risks, Operational and strategic risk, market risk, credit risk, Economic and social cost of risk, Sources of risk. Economic Theory of Risk: Expected Utility Hypothesis, Risk preferences, Risk premium, Measurement of risk attitudes and Risk aversion coefficient.

Course Content

- ***Risk Modelling and Measurement***
  - Market Risk Definition, Definition of a coherent risk measure, Estimating VaR, lognormal VaR, Expected Shortfall, Back Testing VaR, importance of back-testing, Basel rules for back-testing, managing market risk, duration estimation, convexity estimation, portfolio immunization
  - Credit Risk Definition, Sources of Credit Risk, Default risk, recovery risk, exposure risk, spread risk, concentration risk, credit diversification, Bank failures and insolvency, Components of Credit Risk Evaluation, credit scoring, Credit Risk Mitigants, Quantitative and Qualitative techniques for Credit risk evaluation, probability of default, loss given default, exposure at default, expected loss, unexpected loss, VaR, annualized default rate, risk-adjusted pricing, stress testing, ratings in credit risk management, key features of good rating, introduction to credit derivatives – CDO, CDS, counter party credit risk, counter party risk intermediation.

Course Content

- Operation Risk – principles of operational risk management by Basel committee, governance of operational risk, tools and process to assess operational risk, model risk, scenario analysis, liquidity and leverage, monte carlo simulation, enterprise risk management (ERM), risk aggregation, implementation of ERM systems and challenges, information risk and data quality management, operational data governance and technologies, scorecards

- ***Risk financing***
  - Regulatory capital, economic capital, liquidity risk, funding risk, risk capital attribution

- ***Risk Monitoring/ Reporting***
  - Risk Governance, Risk Committee, Basel Accords, Solvency II, CBK Act, Basel I, Basell II, Basel III, Solvency II,

- **Issues in Risk Analytics** - Risk Analytics on Cloud Infrastructure, Effective use in risk analysis Big Data techniques, Aggregation-based Big Data approaches to the risk analytics, Hardware and software architectures to support Big Data risk analytics, Data warehouse structure for implementation of Big Data based risk analytics.
- **Model risk and issues** – Modelling dependence, Model performance, model validation, stability and calibration. Producing model reports.

- **Mode of Delivery**
- Classes will consist of lectures, group facilitation, discussion of text materials, case studies, written assignments and presentations.
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- **Instructional Materials and/or Equipment**
- Audio Visual Equipment, Chalkboard, Computer Simulation Software, Computer Programming Environment. tutorial and practical classes.

Course Content

Mode of Delivery

Lectures, class discussions, group discussions and group presentations. eLearning.

Instructional materials and/or Equipment

Powerpoint slides, flipchart, whiteboard

Course Assessment

Type	**Weightings (%)**
Examination	60
Continuous Assessment Tests	40
Total	**100**

Course Content

- **Core Reading Materials for the course:**
- **Textbooks**

1. McNeil, A. J., Frey, R., & Embrechts, P. (2015). *Quantitative Risk Management: Concepts, Techniques, and Tools: Concepts, Techniques, and Tools*. Princeton University Press. ISBN: 978-0691166278, 0691166277
2. David Vose. Risk Analysis: A Quantitative Guide. John Wiley & Sons, 2008
3. Allen, S. (2013). *Financial Risk Management: A Practitioner's Guide to Managing Market and Credit Risk (2nd ed.)*. John Wiley & Sons. ISBN: 9781118175453, 111817545X
4. Jorion, P., & Professionals, G. G. A. of R. (2011). *Financial Risk Manager Handbook*. John Wiley & Sons. ISBN: 978-0470904015, 0470904011
5. *Servigny, A. de, & Renault, O. (2004). *Measuring and Managing Credit Risk*. McGraw Hill Professional. ISBN: 0071417559

- Culp, C. L. (2002). *The ART of Risk Management: Alternative Risk Transfer, Capital Structure, and the Convergence of Insurance and Capital Markets*. John Wiley & Sons. ISBN: 978-0471124955

- **Core Reading Materials**
- **Recommended Reference Materials**

1. Bart Baesens and Veronique Van Vlasselaer (2015), Fraud Analytics Using Descriptive, Predictive, and Social Network Techniques: A Guide to Data Science for Fraud Detection (Wiley and SAS Business Series)
2. Bart Baesens (2015) Fraud Analytics Using Descriptive, Predictive, and Social Network Techniques: A Guide to Data Science for Fraud Detection…
3. Bart Baesens, (2014) Analytics in a Big Data World: The Essential Guide to Data Science and its Applications (Wiley and SAS Business Series)

Course Content

- **Textbooks**

1. McDonald, R. L. (2013). Derivatives Markets. Pearson. ISBN: 0321543084
2. Chance, D., & Brooks, R. (2015). Introduction to Derivatives and Risk Management. South-Western College Pub. ISBN: 130510496X
3. Tapiero, C. S. (2010). Risk Finance and Asset Pricing: Value, Measurements, and Markets. John Wiley & Sons. ISBN: 0470892382
4. *Culp, C. L. (2002). The Risk Management Process: Business Strategy and Tactics. Wiley. ISBN: 0471263699

End.

Nature and Scope of Risk Management

- The future cannot be predicted. It is uncertain, and no one has ever been successful in consistently forecasting the stock market, interest rates, exchange rates, or commodity prices—or credit, operational, and systemic events with major financial implications.
- One of the most important aspects of modern risk management is the ability, in many instances, to price risks and ensure that risks undertaken in business activities are correctly rewarded

Nature and Scope of Risk Management

- Risk management is really about how firms actively select the type and level of risk that it is appropriate for them.
- More formally risk management is the reaction by individuals or businesses as they attempt to ensure that the risks to which they are exposed are the risks to which they think they are exposed and want to be exposed.

Nature and Scope of Risk Management

- Risk management is not the process of controlling and reducing expected losses (which is essentially a budgeting, pricing, and business efficiency concern), but the process of understanding, costing, and efficiently managing unexpected levels of variability in the financial outcomes for a business

Nature and Scope of Risk Management

- Under this paradigm, even a conservative business can take on a significant amount of risk quite rationally, in light of
  - Its confidence in the way it assesses and measures the unexpected loss levels associated with its various activities
  - The accumulation of sufficient capital or the deployment of other risk management techniques to protect against potential unexpected loss levels
  - Appropriate returns from the risky activities, once the costs of risk capital and risk management are taken into account
  - Clear communication with stakeholders about the company's target risk profile (i.e., its solvency standard once risk-taking and risk mitigation are accounted for)

Nature and Scope of Risk Management

“Some risk are so bad that they must be eliminated at all costs - risk is always bad”

Nature and Scope of Risk Management

- Common fallacies about risk include; *that some risk are so bad that they must be eliminated at all costs*. There is no risk so great that it must be eliminated at all cost i.e the issue is not whether or not bad risks should sometimes be reduced but whether reduced means completely eradicated and whether the cost of that risk reduction comes into play.

Nature and Scope of Risk Management

- Risk must be evaluated in a probabilistic context and not merely in terms on consequences. The management of risk should try to equate the benefit of risk reduction to the cost of risk reduction at the margin.
- Risk cannot be completely eliminated a reasonable cost. Risk must thus be managed. Frequently also, is that *risk is always bad*. Risk can represent either a threat or an opportunity.

Risk Preferences

- **Risk neutral preferences** are preferences that are neither risk averse nor risk seeking. A risk neutral party's decisions are not affected by the degree of uncertainty in a set of outcomes, so a risk neutral party is indifferent between choices with equal expected payoffs even if one choice is riskier. For example, if offered either $50 or a 50% chance each of $100 and $0, a risk neutral person would have no preference.

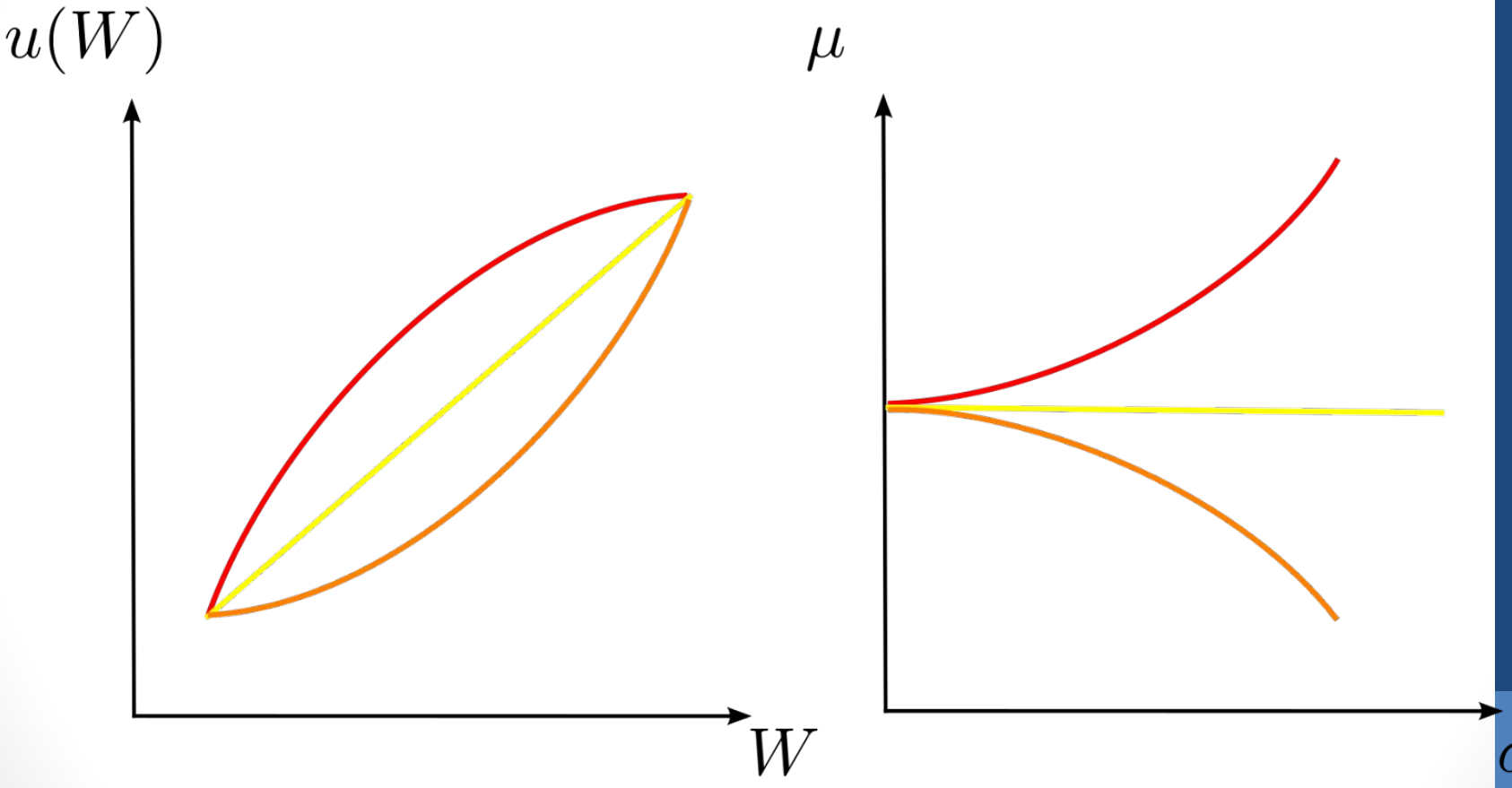
Risk Preferences

- **Risk aversion** is the behavior of humans (especially consumers and investors), who, when exposed to uncertainty, attempt to lower that uncertainty. It is the hesitation of a person to agree to a situation with an unknown payoff rather than another situation with a more predictable payoff but possibly lower expected payoff.
- For example, a risk-averse investor might choose to put their money into a bank account with a low but guaranteed interest rate, rather than into a stock that may have high expected returns, but also involves a chance of losing value

Risk Preferences

- **Risk-seeker** or **risk-lover** is a person who has a preference *for* risk. While most investors are considered risk *averse*, one could view casino-goers as risk-seeking
- **risk premium** is a measure of excess return that is required by an individual to compensate being subjected to an increased level of risk

Risk Preferences



Risk Preferences

- Show the conditions for risk aversion .
  - These inequalities are known as Jensen's inequality. They are equivalent to concavity of the utility function.
  - Strict concavity is equivalent to decreasing marginal utility

Risk Preferences

- The certainty equivalent is **a guaranteed return that someone would accept now, rather than taking a chance on a higher, but uncertain, return in the future**. Put another way, the certainty equivalent is the guaranteed amount of cash that a person would consider as having the same amount of desirability as a risky asset

Aspects of Risk Management

- The management of risk by and organization has three aspects:

1. Assessing the risks faced:
-identification
-measurement/ assessment/ impact

Aspects of Risk Management

- 2. Adoption of control measures and financing of risk (finding instruments and facilities to shift or trade risk). Here the risk we indicate how the risk has been dealt with:

Aspects of Risk Management

- **Avoided** –

Management Focus: Charting course of alternatives,
Investment of Capital: Cultivate alternatives, seek lower or different risk investments

- **Retained** (and how much capital is needed to support it) –

Management Focus:
Understanding exposures, risk events and factors,
Investment of Capital: Capitalreserves for risk events, Self –insurance, Invest in learning about risks

Aspects of Risk Management

- **Transferred** –

Management Focus: Finding counterparties or Insurance,
Investment of Capital: Insurance Premiums, Derivatives or Hedging

- **Mitigated** (and a revised assessment of the remaining risk) - Management Focus: Understanding risk drivers, reducing exposure and impact of exposure, Investment of Capital: Systems to track risk conditions, enterprise performance and Invest in learning about risks
- **diversified /aggregation** (and a revised assessment of the remaining combination of risks)

Aspects of Risk Management

3. Monitoring the risk of the portfolio or business segment

Aspects of Risk Management

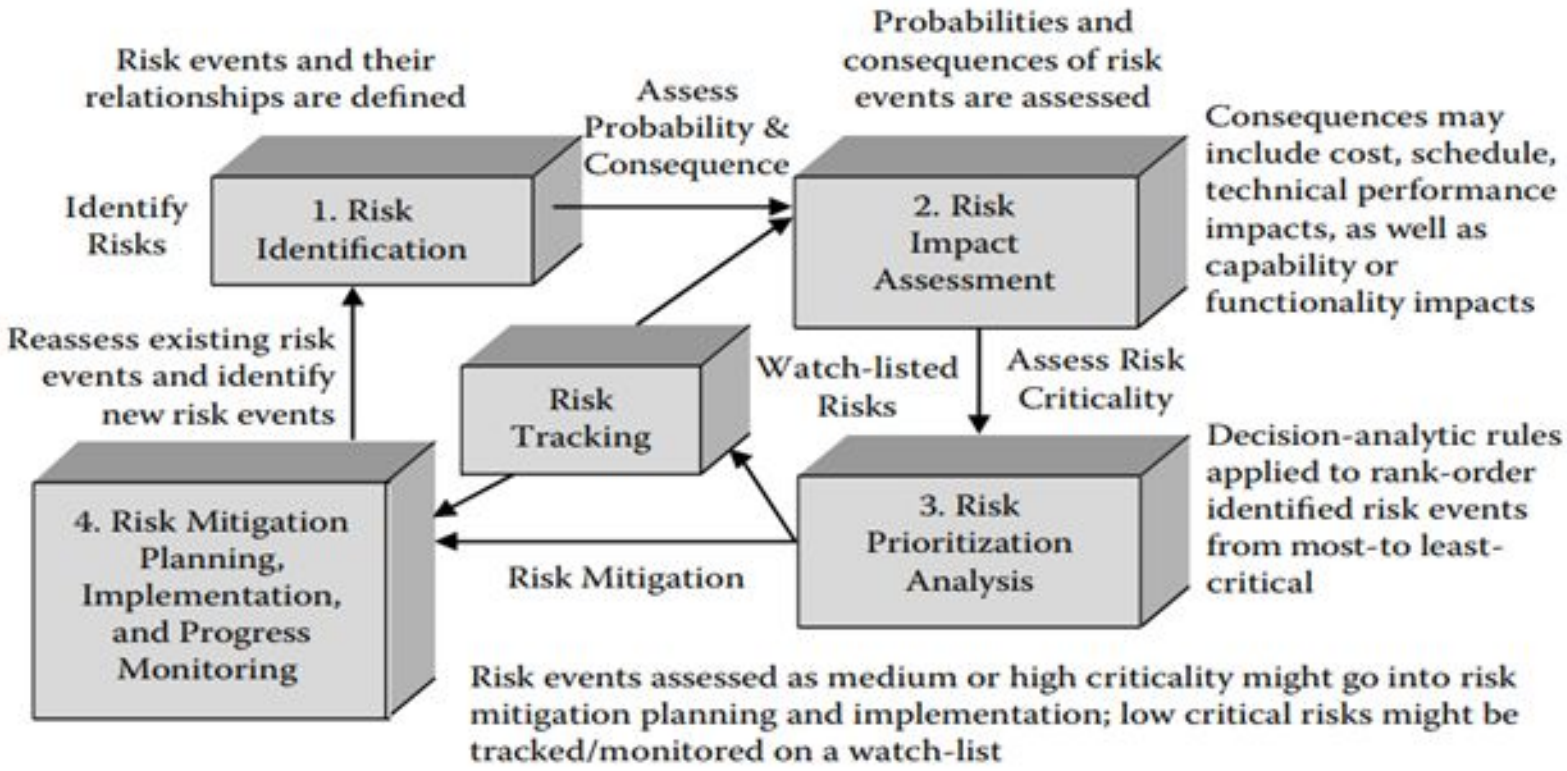


Figure 1.2: Steps common to a risk management process.

Types of Risk

- Static Vs Dynamic Risks
- Static Risk refers to damage or loss to a property or entity that is not caused by economic factors but by moral hazard, destructive human behavior or unexpected natural event. This risk can be typically covered by insurance.
- Static risks include damages such as theft, vandalism, burglary, thunder, earthquake, lightning.
- Dynamic Risk is risk brought about by changes in the economy. Changes in price levels, incomes, tastes of consumers or technology. Dynamic risks are mainly speculative risks, and are not easily predictable. It affects a large number of individuals.

Types of Risk

- Pure vs Speculative Risk
- Pure risk is beyond human control and can only result in a loss if it occurs, speculative risk is risk that is taken on voluntarily and can result in either a profit or loss. Speculative risks are thus considered controllable risks

Types of Risk

- Call risk: The variability of return caused by the repurchase of the security before its stated maturity
- Convertible risk: The variability of return caused when one type of security is converted into another type of security
- Default risk: The probability of a return of zero when the issuer of the security is unable to make interest and principal payments – or for equities, the probability that the market price of the stock will go to zero when the firm goes bankrupt
- Interest-rate risk: The variability of return caused by the movement of interest rates
- Management risk: The variability of return caused by bad management decisions; this is usually a part of the unsystematic risk of a stock, although it can affect the amount of systematic risk
- Marketability risk: The variability of return caused by the commissions and price concessions associated with selling an illiquid asset. Marketability is made up of two components: (1) the volume of securities that can bought or sold in a short period of time without adversely affecting the price, and (2) the amount of time necessary to complete the sale of a given number of securities.
- Political risk :The variability of return caused by changes in laws, taxes, or other government actions
- Purchasing-power risk: The variability of return caused by inflation, which erodes the real value of the return
- Systematic risk: The variability of a single security's return caused by the general rise or fall of the entire market
- Unsystematic risk: The variability of return caused by factors unique to the individual security

Types of Risk

- **More types of risk**

Activity: Discuss more types of risks and their mitigation methods. Eg. Political risk, currency risk, sovereign risk, concentration risk, idiosyncratic risk, systemic risk, basis risk, regulatory risk, translation risk, functional risk, strategy risk, security risk, organizational risk, Demographic risk, people risk, fraud risk, agency risk, model risk, process risk, data risk, residual risk, project risk, strategic risk,

Risk Contagion

- It is often said that risks are linked or correlated. Indeed, many economically driven risks happen simultaneously. That phenomena, although troublesome to the business, is called contagion. In operational risk especially, we see that risks, when manifested, give rise to new or additional risks. This is especially true when the risk in question is left unattended. In some ways the risk contagion might be expected .A shock to an enterprise might weaken its capital position and expose it to additional risks. This is a typical risk contagion.

Risk Contagion

- A dangerous feature of risk contagion is that it often gives rise to implicit and persistent risk. As with the example of a weakened firm experiencing new operating or funding risks, the impacts of such are most likely to exist over a prolonged period of time. The risks are implicit in that the firms did not specifically elect to accept them.
  Another unfortunate feature of risk contagion is that it often activates a risk that is driven by external forces.

Risk Contagion

- The danger of this contagion is that operational risk (to the extent that it is driven by internal processes and systems) is controlled largely by the actions of the enterprise. Once the risks give rise to another risk driven externally through contagion, the control mechanism is lost. The fate of the firm is, in some regard, driven by the actions of others, customers, regulators, investors, etc. Not only are business managers required to respond to risk but ensure that the risks do not give rise to additional risks. The ability to do so is a key advantage.

Risk Identification

- First in Risk management process is identification, but it is important to ensure that this is done using a consistent risk language and taxonomy.
- This involves not only defining all of the risks, but also grouping them in a coherent fashion. This is important because it ensures that risks have consistent meanings throughout the organization.
- Risk identification itself involves not only working out which risks an organization faces, but also a description of the broad nature of those risks. It also means recording them in a consistent and complete way to make reviewing them in future a much easier process.

Risk Identification

- The risk identification process needs to consider risks of all kinds. Typically, organizations can expect to encounter risks of the following types:
  - Strategic risk
  - Operations risk
  - Legal risk
  - Credit risk
  - Market risk

Risk Identification

- Having identified the risks, it is then time to assess them in the context of the risk appetite of an organization. In practice, the risk appetite should be agreed and given in clear terms before risks are actually measured. This includes specifying the risk measures to be used, as well as the values of those measures that are thought to be acceptable

Risk Identification

Concept	Elaboration
Mission, strategy, and objectives	What are the organization's mission, strategy, and objectives?
Risks	What are the significant risks?
Risk appetite	What is the organization willing to tolerate?
Likelihood	What is the likelihood of the risk occurring? (How can you measure?)
Impacts	What is the potential impact of the risk?
Risk mitigation	What are available defense strategies?
Residual risk	What is the risk remaining (beyond control)?
Risk response and effectiveness	How effectively does the organization manage its individual risks?
Risk maturity	How robust is the current ERM program?

Risk Identification

- In Enterprise Risk Management, SWOT Analysis can be used to identify risks, its scope is much broader, covering not just the negative aspects of the risks but the positive prospects for future strategies. Strengths and weaknesses are internal to the organisation, whilst opportunities and threats are external. In this way, SWOT analysis ensures that both the internal and external risk management contexts of an organization are considered.

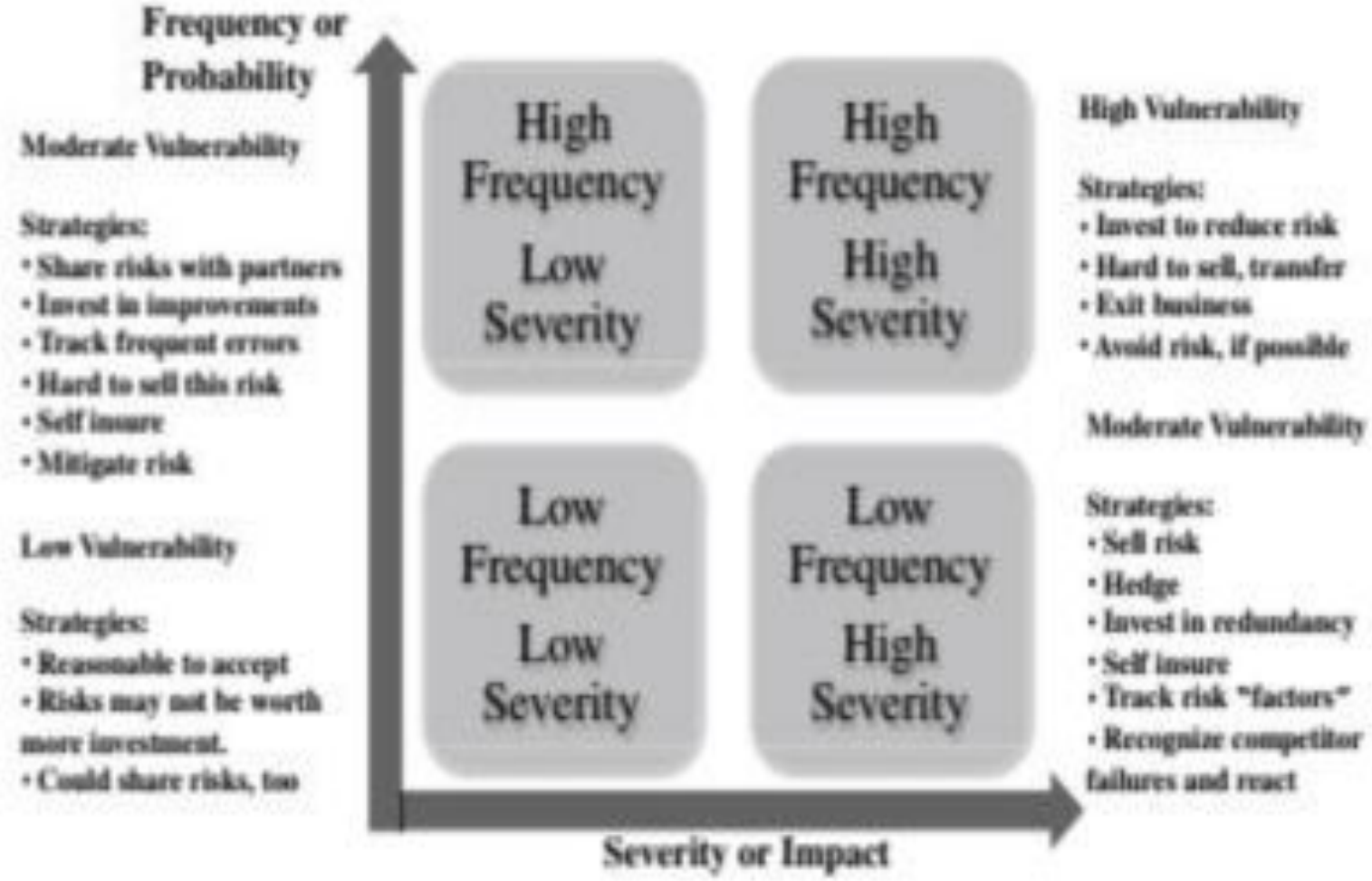
Risk Identification – SWOT ERM

Table 8.1. *Potential factors in SWOT analysis*

Strengths	Weaknesses
Market dominance	Low market share
Economies of scale	Extensive specialism
Low cost base	High cost base
Effective leadership	Lack of direction
Strong balance sheet	Financial weakness
Good product innovation	Reliance on contracting markets
Strong brand	Limited recognition
Differentiated products	Differentiation by price alone
Opportunities	**Threats**
Innovation	New entrants
Additional demand	Price pressure
Opportunities for diversification	Contraction of key markets
Positive demographic change	Damaging demographic change
Cheap funding	Falling liquidity
Economic liberalisation	Increased regulation

Source: Based on Chapman, R.J.: *Simple Tools and Techniques for Enterprise Risk Management* (2006).

Risk Identification – Vulnerability Chart



Risk Identification – Vulnerability Chart

Table 2.3 Product risk matrix

	Likelihood of risk low	Likelihood of risk medium	Likelihood of risk high
Level of risk high	Hedge	Avoid	Avoid
Level of risk medium	Control internally	Hedge	Hedge
Level of risk low	Accept	Control internally	Control internally

Risk Identification – Checklists

- Risk check lists are lists of risks that are used as a reference for identifying risks in a particular organization of situation. There are two main sources for such check lists: experiential knowledge is the collection of information that a person or group has obtained through their experiences, whilst documented knowledge is the collection of information or data that has been documented
about a particular subject by some external source. Caution must be used when using any knowledge-based information to ensure it is relevant and applicable to the current situation. It is also important to understand any caveats that may accompany the documented information.

Risk Identification – Prompt Lists

- Similar to check lists are prompt lists. However, rather than seeking to pre-identify every risk, prompt lists simply identify the various categories of risk that should be considered. These categories are then intended to prompt a broader and more specific range of risks for the institution being analysed.
- The classic prompt list categories where political, economic, social and technological, giving rise to PEST analysis. However, environmental, legal and industry risks are now also commonly cited, giving the acronym PESTELI.

Risk Identification – Trigger Qs

- Risk trigger questions are lists of situations or events in a particular area of an organization that can lead to risk for that organization. They are derived from situations or areas where risks have emerged previously

Risk Identification – Process Analysis

- This approach to risk identification involves constructing flow charts for every process used by an organization and analyzing the points at which risks can occur. Every broad process should be listed and described in detail, taking into account who and what is involved and, therefore, where failures can occur. Ideally, the links between different processes should also be considered.
- In order to establish what the processes are, it is important to have input from all key areas of an organization to establish how it does what it does. The areas for a financial services firm might include:
  - advertising products;
  - selling products;
  - collecting premiums;
  - investing assets;
  - making payments;
  - raising capital;
  - placing contracts (core and incidental);
  - hiring staff;
  - paying salaries

Risk Identification – Delphi survey

- This is another type of survey, where acknowledged experts are asked to comment on risks anonymously and independently. In order to make best use of expert knowledge, and time is taken to properly analyse the results rather than the answers simply being aggregated, the questionnaires used here generally allow much more flexibility than surveys otherwise might.
- The Delphi technique starts with an initial survey being sent out. This is followed up by subsequent surveys which are based the responses to the initial survey.
- This process continues until there is a consensus (or stalemate) on the nature and importance of the risks faced, meaning that the technique is used for assessment as well as identification

Risk Identification – more techniques

Other risk Identification Techniques include:

- Working groups,
- Surveys,
- Brainstorming,
- Gap Analysis which investigates the actual against the desired level of risk

Risk Identification –Risk Registers

- It is advisable for an individual or company exposed to risk to establish a risk portfolio or risk register.
- The risk portfolio categorises the various risks to which the business is exposed.
- Against each risk would be recorded a quantification of:
  – impact
  – probability.

Risk Identification –Risk Registers

- Once identified, risks should be put onto a risk register. This is a central document that details all of the risks faced by an organisation. It should be a living document which in constantly updated to reflect the changing nature of risks and the evolving environment in which an organisation operates.

Risk Identification –Risk Registers

- Each entry in a risk register should ideally include a number of factors:
  - a unique identifier;
  - the category within which the risk falls;
  - the date of assessment for the risk;
  - a clear description of the risk;
  - whether the risk is quantifiable;
  - information on likelihood of the risk;
  - information on the severity of the risk;
  - the period of exposure to the risk;
  - the current status of risk;
  - details of scenarios where the risk is likely to occur;
  - details of other risks to which this risk is linked;

Risk Identification –Risk Registers

- The risk portfolio can then be extended to indicate how the risk has been dealt with:
  - retained (and how much capital is needed to support it)
  - transferred
  - mitigated (and a revised assessment of the remaining risk)
  - diversified (and a revised assessment of the remaining combination of risks).

  The risk portfolio can also identify concentrations of risk and highlight the need for management action in these areas

Cost of Risk Management

- The costs of risk management include:

a) Financial distress costs – Financial distress leads to a decline in the value of a company. Therefore there would be increased difficulty in raising capital, the cost of capital would increase and the company's ability to follow capital intensive project would be limited.
In a decision to exit the business we would have to seek to maximize value to the shareholders in the sale, there a carefully designed exit strategy needs to be formulated and right buyers found.
b) Cost of assessment and monitoring

c) Cost of implementing risk management and ensuring a stable risk profile
d) Costs of issuing external financing

e) Cost of mitigating, transferring or hedging risk
f) Agency costs associated with reducing moral hazard

g) Implicit costs associated with risk management or failures eg. Enforcing culture, reputational aspects

Risk Culture and Risk Governance

- Culture is something that is present in all organizations; however, its impact is felt differently by different types of organization. For banks and insurance companies, culture is likely to be something felt from board level all the way down through the firm; in a pension scheme, foundation or endowment, it is likely to affect only the board of trustees.
- For banks and insurers, the board of directors influences the culture of the firm both directly and indirectly. It is important that this culture puts risk management at its core. At its most fundamental level, it includes the willingness of an organization to embrace ERM, and it is determined by the board of the organization. This is partly reflected in the structures that the board puts in place, as discussed later; however, culture is also reflected in more subtle ways.

Risk Culture and Risk Governance

- A board should make sure that risk is considered in all stages and at all levels of the organization; however, it is should also consider the way in which the members of an organization relate to one another. An overbearing chairman, or a culture in which the views of non-executives are not given as much weight as those of executive directors can lead to a form of blindness in relation to developing risks. There should be a culture of openness, encouraging dialogues not only between all members of the board, but also between all levels of the firm.
- This requires good internal communications, and can be characterised by the involvement of all levels when decisions on risk are made, and a willingness of board members and managers to encourage input from those that report to them. Good communication also means that the CRF becomes aware of the emergence of new risks promptly, as well as ideas for mitigating these risks and updating existing systems. In addition, it means the prompt transfer of knowledge from the CRF to the rest of the organization

Risk Culture and Risk Governance

- Openness also means an openness to new ideas and a commitment to learning and integrity. Boards should recognise the importance of relevant professional qualifications. This is important as the standards set by professional organisations and the requirements they place on their members can ensure that risk management is taken seriously. Both should be encouraged, and the lessons learned should be shared throughout the organization.
- It is also important that the culture is one that allows people to learn from their mistakes – there should be accountability for actions, but not blame. This too is important, as a culture of blame can encourage mistakes to be hidden and, possibly repeated, when instead lessons could be learned. These ideas reflect the features of a good risk management culture, but also possibly actively affect the culture of an organization.

Risk Culture and Risk Governance

- It is possible to go even further and to require employees to take these opportunities, or to engage in other risk management-related training.
- Statements on risk management can also be incorporated into job descriptions and performance management indicators, so that employees' remuneration and promotion prospects depend on working in the context of a sound risk management framework.
- For this to happen, it is important that specific risk management responsibilities are well defined. It is equally important that individuals know who to turn to with risks that are outside their area of expertise – and that they are commended for passing on information on such risks.
- One way of fostering a good risk management culture is to praise people who manage risk well. It is often the case that risk management is only heard about when there are failures, but it is important to recognize the importance of low-key actions that prevent the development of serious risks within an organization.

Risk Culture and Risk Governance

- Changing a firm's culture is difficult – if people with radically different outlooks are recruited, then they might become frustrated as existing employees grow resentful.
- However, recruiting people just because they fit in with the existing culture is not necessarily a good thing if the culture should change.
- Culture can usually change only incrementally, with the views of existing staff changing as the profile of new recruits also changes. However, it can also change only from the top of an organization. When changes are made to the management of risk in an organization, it
is important to assess the extent to which the culture is being changed. This can be done through surveys or as part of employees' appraisals on an ongoing basis.

Risk Culture and Risk Governance

- The *free flow of information*. Is information on positions and risks freely available to everyone who needs it, or is the process of finding out what the desk is doing like having teeth extracted?
- *Open discussion* of risk issues by all involved parties regardless of status. Can a junior risk manager (or finance professional or a deal lawyer or anyone else) point out that the emperor has no clothes?
- The *incentive structures* within the organization around risk data, valuation and deal commitment. If a limit violation, a serious data quality issue or a trader violating their mandate is escalated to the senior management, do they support the control function or the trader?
- *Skepticism* about risk and about the comprehensiveness of any risk aggregation process. Does the firm suffer from a single pervasive view of risk (sometimes known as *group think*) or does it embrace a diversity of views?

Risk Culture in a Corporation

- "What behaviors do you want people to use in relation to management of risk?"
- Appropriate risk management behaviors vary according to:
  1. The organization,
  2. The industry context,
  3. The location of operations both within and across national boundaries together with the resultant jurisdictional requirements

Risk Culture in a Corporation

- Behaviors are not likely to be conducive to good risk management are those that:
  - Allow responsibility for dealing with risk to be unclear,
  - Inspire a culture of fear and retribution,
  - Allow “shooting the messenger” or
  - Help “bad news to travel slowly

Risk Capabilities and Infrastructure

- Having risk-aware cultures and structures are high aims – but they will remain only aims if the organization does not have the capabilities to implement them.
  There are many different dimensions to the capabilities of an organization, but the most crucial are the people. These people should be sufficiently well qualified to fulfil their roles, with opportunities to develop and to change roles as they grow in skills and experience. Conversely, there is little point in implementing a structure that is the last word in risk management but cannot be implemented by the staff currently employed.

Risk Capabilities and Infrastructure

- Even if the staff are capable, they will be unable to perform to the best of their abilities if the infrastructure – in particular relating to information technology – is inadequate. Furthermore, all of this must sit within processes designed to provide a good risk management environment. This all means that sufficient monetary resources must be devoted to allow risk management to be properly implemented. However, money alone is not the answer, and good planning together with clear insight can be even more valuable.

Risk Governance

- Risk Governance is part of the overall corporate governance system and refers to the overall process of developing and putting a risk management system into use.
- The system must specify between centralized and decentralized approaches, reporting methods, methodologies to be used and infrastructure needs. High quality risk governance will be:
  1. Transparent
  2. Establish clear accountability
  3. Cost efficient in the use of resources
  4. Effective in achieving desired outcomes

Risk Governance

Characteristics of good corporate governance:

- discipline;
- transparency;
- independence;
- accountability;
- responsibility;
- fairness; and
- social responsibility

Risk Management and Role of Board

- The board has ultimate responsibility for the firms risk management framework. It is involved in:
  -approving the firm's overall risk management strategy and/or policy
  -overseeing the process of ensuring the firm's persons are responsible, fit and proper
  -setting the risk appetite of the firm
  -monitoring key risks by ensuring the implementation of a suitable risk management and internal controls framework

Risk Management and Role of Board

- A risk management committee for the board provides an appropriate forum for the committee to question and challenge management's assessment of key risks as well as the process put in place by the management to settle its assessment of key risk

Risk Management and Role of Board

- This committee is involved in:
  -Considering the appropriateness of the level and volume of reporting to the Risk Committee and keeping the quality of the reports tables and discussed under review to ensure the right information is being communicated.
  - Responsibility for keeping track of leading practices, trends and aiming to continually evolve and improve the organizations risk management process.
  - Risk committee should have an appropriate self-assessment program which includes Key Performance Indicators which are SMART I,e Specific, Measurable, Achievable, Realistic and Time bound

Risk Management and Role of Board

- Firms often use committees to ensure that decisions are taken by all relevant personnel with common information, for instance, The *risk committee* acts as a forum for the discussion of risk issues, the setting of the firm's risk appetite, high-level-limit definition, the approval of major changes in risk measurement methodology and (most importantly) is the final court of appeal in any decision on risk management decision.

Risk Management and Role of Board

- There may be additional risk subcommittees by product or risk class in larger firms.
  -*New product approval committee* ensures that new products are only traded with management cognizance and approval of issues from all functional areas.
  -*Audit and finance committee* deals with accounting policy issues, recognition of P/Reserving,
  and adverse audit reports on businesses or processes

Risk Management and Role of Board

- The key point is that the management must be managing (and be seen to be managing): a risk committee that simply reviews reports, rubber stamps limit increase requests and generally facilitates traders doing whatever they want is worse than useless.

Risk Management and Role of Board

- An effective risk committee has the following features:
  - It comprises of members of a diverse background with the appropriate qualities such as inquisitive/questioning minds, objectivity and relevant experience
  - May include external committee members to crate a broader band of experience on the committee. Knowledge of the organization is also important.
  - "Ask question" of the reports submitted and of management rather than applying the "tick the box" approach.

-Its directives have the support of the Board and the appropriate level of management "buy in"

Risk Management and Role of Board

- Generally the risk management process has the following requirements
  -the top level management involvement is setting policies and procedures for managing risk within regulatory guidelines
  -defining risk tolerance to various risk in terms of what the organization is willing and able to bear. For some risks tolerance would be high others would be low
  -measuring the current level and exposures to risk
  -adjusting the levels of risk-upwards where the firm has an advantage and seeks to generate return to exploit an advantage, downward in other cases

- END.