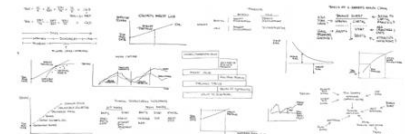


# Enterprise Risk Management

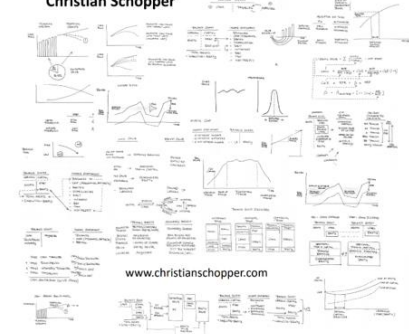
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For more concepts click on:



**Corporate Finance Concepts**

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# Introduction to Strategic Risk Management

## Basic Risk Types

- The number of possible **sources and combinations of sources of risk** is almost beyond classification
- The primary **classification typologies** revolve around the **origin** of the risk and around the nature of the effect

The most obvious initial classification of risk is to differentiate it in terms of the **risk level within the organisation** on which it impacts

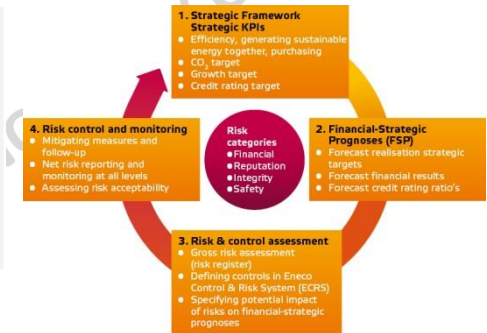
- Strategic risk
- Change or project risk
- Operational risk
- Unforeseeable risk

Over and above this basic classification, risk can also be classified in terms of the **specific nature of the risk**, its **origin** and characteristics, and the extent to which the risk is dependent upon or linked with other risks

- Financial and knowledge risk
- Internal and external risks
- Speculative and static risks
- Risk interdependency

# Basic Risk Types (cont'd)

Exhibit 1



## Risks & Opportunities



Figure 2 Risks to business



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## What Can Be Strategic Risk?

- Strategic risk relates to risk at the corporate level, and it affects the development and implementation of an organisation's strategy
  - Strategic risk includes risk relating to the **long-term performance of the organisation**

### Typical examples

- **The strategic plan might be incorrect**
  - Incorrect **assumptions** may have been made
  - The **environment** may have been incorrectly assessed
  - Sufficient **resources** may not be available
  - The plan might not actually represent where the organisation really wants to go

- **The original strategic plan may have been correct but internal changes may have compromised it**
  - Internal **re-organisations** may have led to a loss of efficiency
  - Required **changes** in operational **processes** may not have been introduced
  - Planned **changes** may **not** have **delivered** what was required

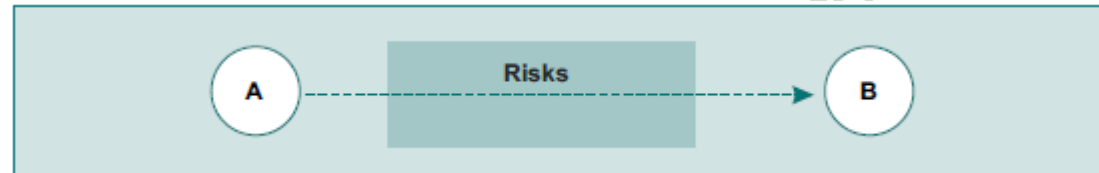
- **The original strategic plan may have been correct but external changes may have compromised it**
  - The external **environment** may have changed significantly
  - New **competitors** may have emerged
  - New **competing products** may have been released
  - **Statutory controls** may have changed

## Current and Desired Positions



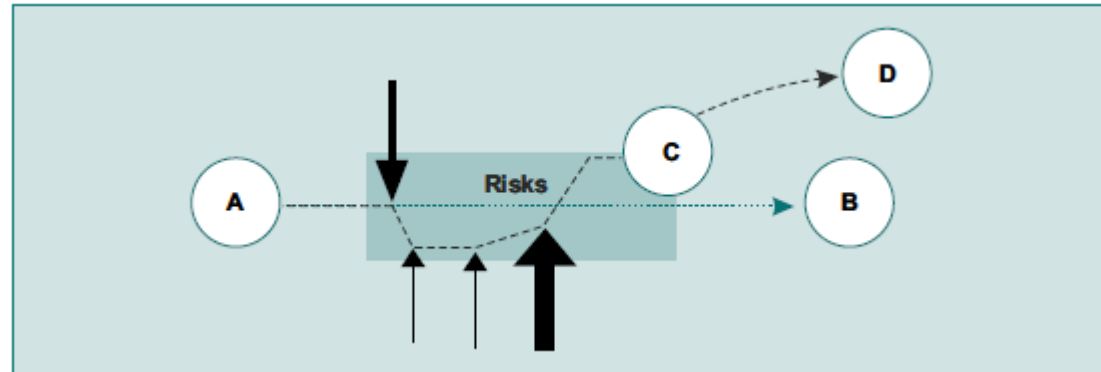
- *Point A: **Current** position.* This is where the company is now
  - The position is determined by a number of factors including market position, size, vulnerability, gearing, asset base and so on
- *Point B: **Desired** position.* This is where the company directors want to be in X years' time
  - Again, this position can be determined and described using a wide range of variables
- The direct route to B represents the course upon which the company wishes to progress ...

## Strategic Risk



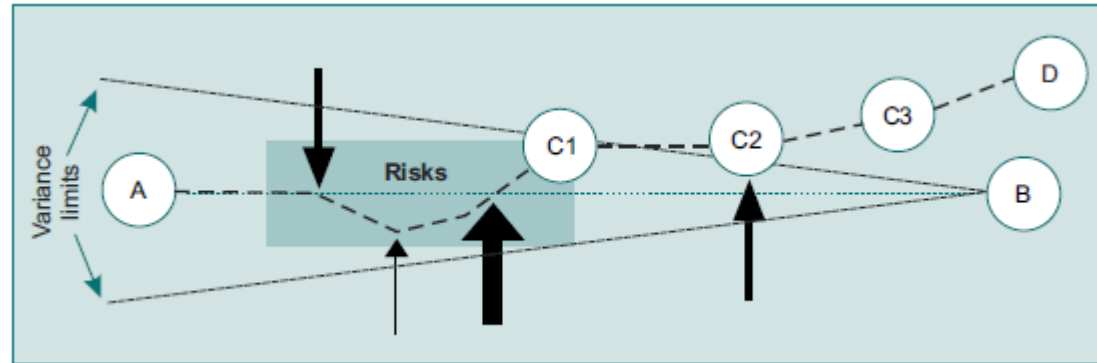
- In charting the direct route from A to B , there will be a range of both **foreseeable and unforeseeable risks** impinging upon this course
  - Some will be large risks; some will be small
  - Some may occur and some may not
  - Each one that does occur will affect the course of progression of the organisation from A to B.
- The organisation's strategy to get from A to B is really the **collective management of these numerous competing risks** ...

## Strategy Displacement



- The **risks** that stand between position A and position B **cannot be accurately determined**
  - They may **affect the achievement of the strategy** more in some areas than in others
  - Wholly **unforeseen events** might affect the viability of navigating between A and B
  - The **net result is** that the company evolution suffers **deflections** as it attempts to implement the strategy or stay on course
  - Some risks have a greater impact than the strategy foresaw, some lesser so ...
- The net result is a general **divergence** or 'set' from the **desired course** ...

## Strategy Implementation Variance Envelope



- The **effect** of those impacts is **that the strategy course A to B no longer applies**
  - The **evolution of the company has been driven off course** by risk occurrences that were greater, or less, than expected when the strategy was designed
  - They are **presumably also beyond the limits of correction** that are available through the use and application of management reserve or contingencies
- In addition, **new strategies may be formed** within the organisation
  - These may serve to reinforce or deflect the original strategy
- In order to take account of these variations, **most strategies allow a variance envelope**
  - This permits **divergence up to a certain limit**, after which a warning is sounded
  - The variance envelope typically contracts **as a function of time**
  - As the company **nears** desired **position B**, the **allowable margin of error must diminish ...**

## Strategic Risk Management

- Strategic risk management is concerned with ...
- ... the **identification and management of these foreseeable and unforeseeable risks** ...
- ... in order to **ensure** that the organisation finishes up within an **acceptable distance of the original goal** ...
- If the implementation process is resulting in a transgression from the required course, the **strategic risk management** system **should** be able to **detect this and** (at least to some extent) **predict the consequences**
  - This information then acts as the basis for justifying any necessary corrective actions
- The final stage is to ensure that any **corrective actions** are, in fact, succeeding so that an **eventual successful** or acceptable, or better, **outcome** will be achieved

## Management Perspective of Risk Management

## The Concept of Risk Management

*“A decision that does not involve risk,  
probably is not a decision ...”*

Peter Drucker

*“Risk is good.  
The point of risk management isn’t to  
eliminate it; ...  
... that would eliminate reward.  
The point is to manage it ...”*

Thomas Stewart

- Enterprise risk is the aggregate of all functional and process risks a business entity faces in the course of carrying out its business activities, among others:
  - Hazard risk
  - Financial risk
  - Operational risk
  - Strategic risk

- Management of strategic risk **isn't intended to identify every risk** facing the organization but to identify **those that are most significant** to its ability to achieve and realize its core business strategy and objectives



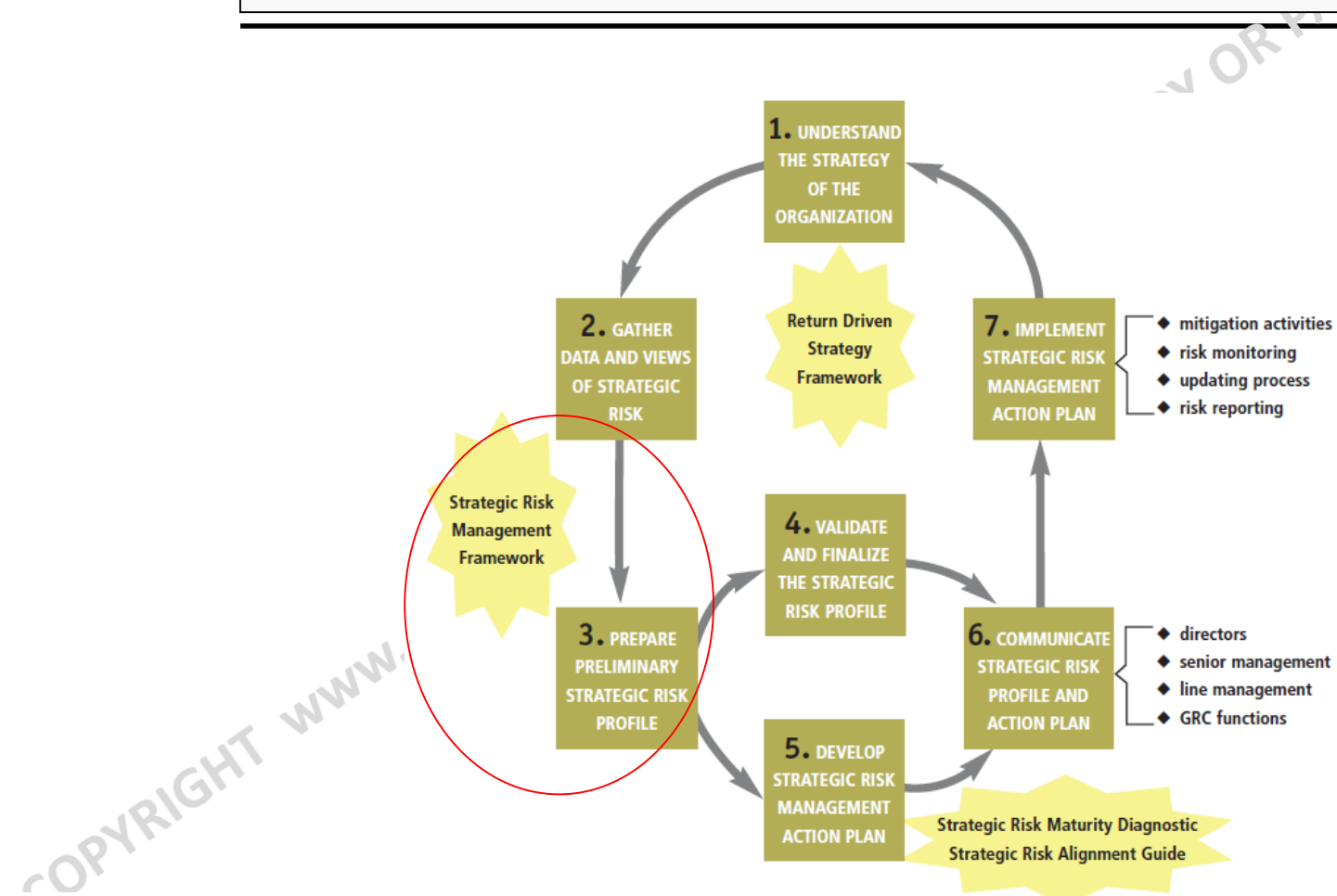
## The Chinese Symbol for “Crisis”

危机

The first symbol is the symbol for “danger,” ...  
... while the second is the symbol for “opportunity,” ...  
... making risk a mix of danger and opportunity

You cannot have one without the other

<b>Strategic Risk Assessment Process</b>



# Enterprise Risk Management

- The Society of Actuaries (SOA) describes the organisational objectives for pursuing ERM as:
  - Competitive advantage
  - Strategic goals
  - Shareholder value
  - Transparency of management
  - Decision making
  - Policy holder as a stakeholder

Enterprise risk management (ERM) is aimed at **dealing with uncertainty for the organisation**

- **Risk management**: Protection of the **assets and profits** of an organisation by either reducing the potential before it occurs ...
- **Financial risk management** is the mitigation process for **financial exposure**
- **“ERM** is the discipline, by which an organisation in any industry **assesses**, controls, exploits, finances, and monitors **risks from all sources** for the purpose of **increasing** the organisations short and long term **value to its stakeholders**”

- ERM is a **process**
- ERM is **affected** by **people** at every level of an organization.
- ERM is **applied** in **strategy** setting
- ERM is applied **across the enterprise**, at every level and every unit
- ERM is designed to **identify** potential **events** to manage risk within appetite
- ERM is able to **provide** reasonable **assurance** to the management and board of directors of an entity.
- ERM is general towards the achievement of objectives in one or more separate but **overlapping** categories

# Strategic Risk Management Framework



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## Limits to an ERM

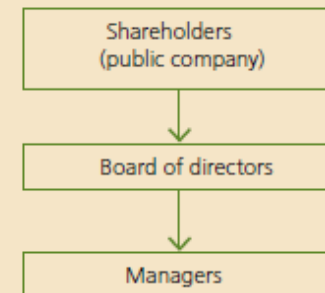
- **Judgement**
  - The existence of **human frailty** subject to the conditions at the time of decision making (available time, information presented, and business pressures)
- **Breakdowns**
  - Eg: **Misunderstood implementation of instructions by personnel** which may be due to judgement mistakes or errors committed as a result of **fatigue, distraction, or carelessness**
- **Collusion**
  - Individuals may **act together to cover the tracks** of an action they carried out, and may need to alter some financial data or management information; may not be detectable by the ERM
- **Cost versus Benefits**
  - Necessary to put cost against benefits of decisions **especially when it relates to response to risk of failure**, and control activities
- **Management Override**
  - There is the possibility of a manager deviating from prescribed policies or procedures of ERM
  - Reasons for this override **may include personal gain**, or to **present an enhanced financially condition of the entity**, or compliance status
  - Effective ERM will however improve the entity's prevention and detection of override activities capabilities

## Corporate Governance Perspectives

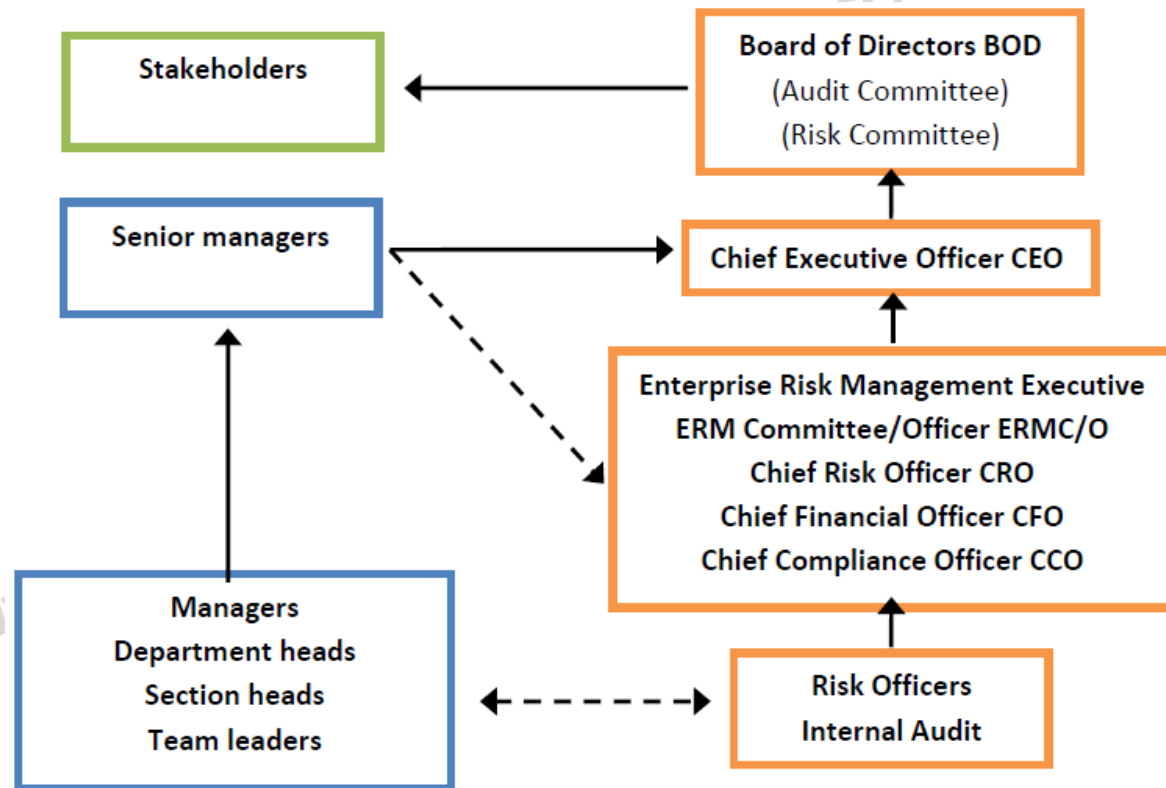
There are a number of predominant theoretical perspectives on corporate governance:

- **Agency theory**—align the interests of internal agents (executives/managers) who display strong self-interest with those of the shareholders (owners). In effect this represents a double agency dilemma (see figure)
- **Transaction cost theory**—reduce costs of transactional hazards through internal corporate governance mechanisms, which cannot be handled by external market mechanisms
- **Stewardship theory**—general human motives of achievement, altruism and meaningfulness should be managed and guided in the most opportune manner
- **Resource dependence theory**—highlights corporate dependence on external relations and sees governance as a vehicle to ensure continued access to essential resources

- **Stakeholder theory**—acknowledges agreements with multiple stakeholders that can create incremental value and/or lead to subsequent risk events if neglected or abused

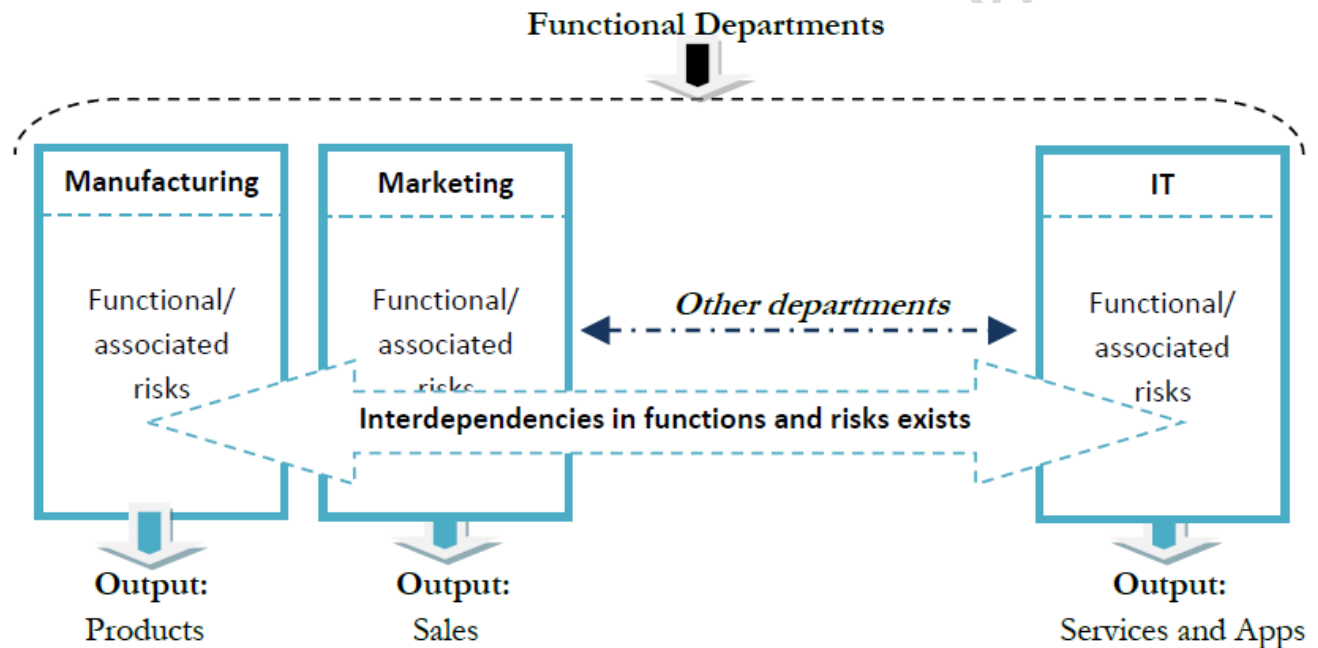


## Players in the ERM



## From the Silo Way ...

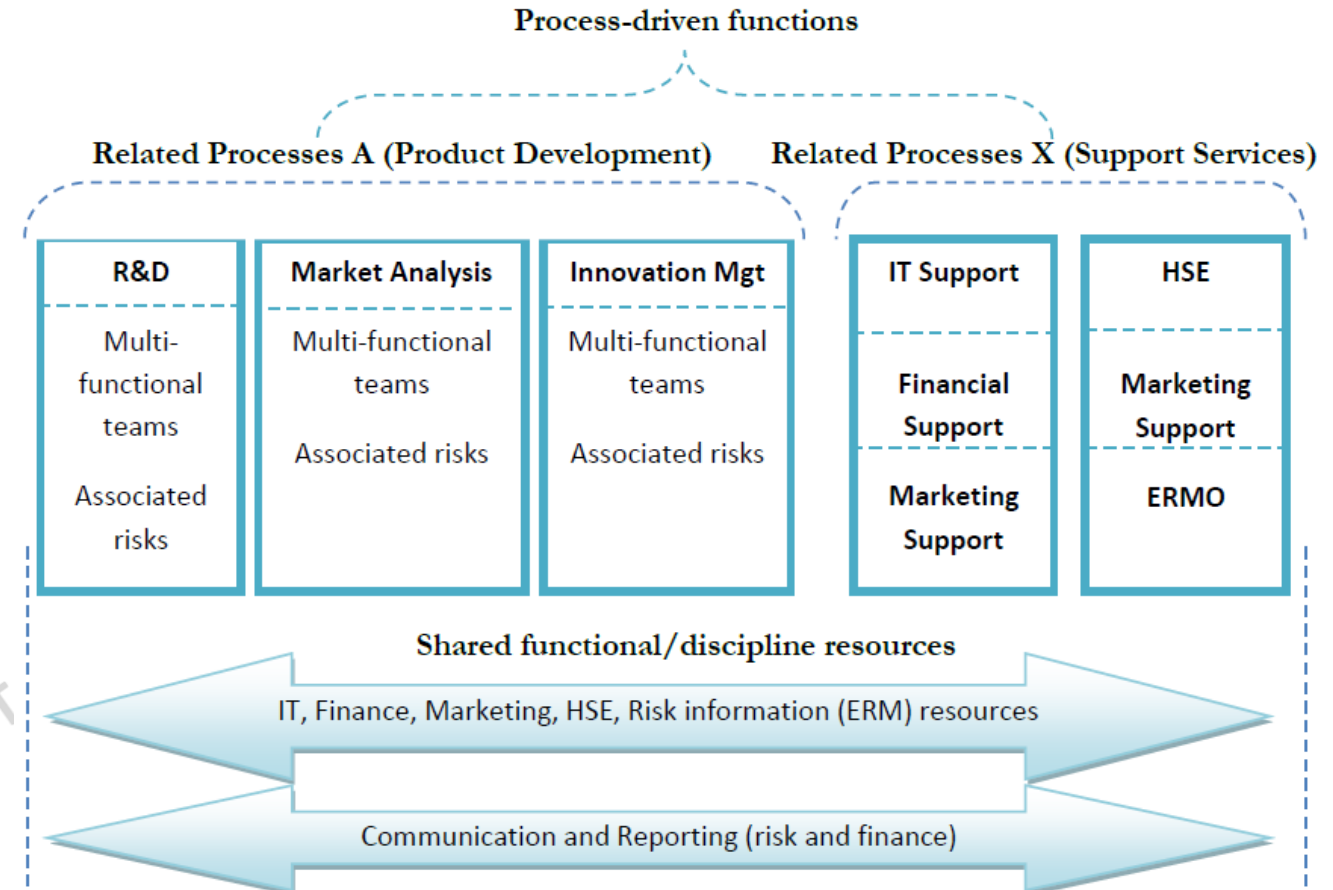
- In this hypothetical case of a manufacturing business, the first step taken to implement the ERM technology was the establishment of context; identifying core business processes
- This on the assumption the business is already implementing a process-centric business model as against the functional departments shown





## ... to the Process-Centric Way

- De-risking the strategic business goals provides outcome/solutions which are necessary for repositioning the entire business, therefore re-evaluating the core processes that are key to creating value for the business
- This will ultimately lead to the re-evaluation of supporting processes down to itemised tasks
- The process-driven organisation illustrated above describes a structure where functions related to achieving a specific objective through a defined process are co-ordinated within a section which is accountable and responsible for the outcome of such processes



## Classification of Risks

### Example 1

- Using the the **Basel II framework** and adapting the classifications to **non-financial firms**, this example divides organizational risks into three categories:
  - **1. Operating Risk**
    - Operating and verification (accuracy)
    - Business risk
  - **2. Financial Risk**
    - Internal risks
      - Insolvency
      - Counterparty
      - Financial structure planning
    - External risks
      - Interest rate
      - Currency exchange rate
      - Inflation
  - **3. Market-Based Risk**

### Example 2

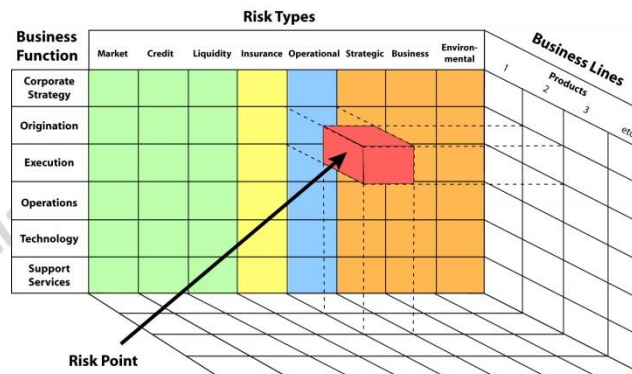
- **1. Financial Risk**
  - Credit (default, downgrade)
  - Price (commodity, interest rate, exchange rate)
  - Liquidity (cash flow)
- **2. Operational Risk**
  - Business operations (efficiency, supply chain, business cycles)
  - Information technology
- **3. Strategic Risk**
  - Reputational (i.e., bad publicity)
  - Demographic and social/cultural trends
  - Regulatory and political trends
- **4. Hazard Risk**
  - Fire and other property damage
  - Theft and other crime, personal injury
  - Diseases

## What is a Risk Profile?

- The standard structure allows for the impact of specific forms of risks, broken down by risk type and within risk type by specific risk categories (shown on the top axis of the adjacent diagram), onto the various business processes or functions (shown on the left-hand axis), as employed for a specific product or service type (shown as the right-hand dimension of the diagram)
- The impact is essentially measured at and referred to as a “risk point”

### Do most firms create risk profiles?

- Not necessarily
- In **many firms**, it is **taken for granted** that everyone in the firm (particularly those with experience) is already aware of the risks that the firm faces
- This can be a mistake ...



### Which types of risk should be ...

- ... **allowed** to pass through the firm to its owners, or ...
- ... **hedged**, or ...
- ... be **exploited**

## What is a Risk Profile? (cont'd)

		Process Risks				Conduct Risks							External Risks		
		Execution, Delivery and Process Management		Business Disruption		Clients, Products and Business Practices		Internal Fraud and Theft		Employment Practice and Workplace Safety			Damage to Assets	External Fraud	
		Transaction Management	Data Management	Reporting and Disclosure	Infrastructure and Systems	Fiduciary	Improper Practices	Unauthorised Market Activity	Internal Fraud and Theft	Diversity and Discrimination	Employee Relations	Safe Environment		Hacking and Disruption	External Fraud and Theft
Origination	Product or Service Development and Suitability	16	27	13	27	31	21	12	25	8	8	8	8	10	12
	Relationship Management	17	31	28	24	21	21	9	23	11	10	8	10	14	14
	Credit Review and Approval	17	28	13	21	18	27	12	24	8	8	8	8	12	10
	Models and Methodologies	13	24	13	27	8	26	13	27	8	8	8	8	12	10
	Research	10	24	16	17	25	31	9	16	8	8	8	8	9	11
Execution	Advisory Services	14	20	15	13	38	34	12	13	8	8	8	8	9	11
	Custom or Structured Transaction Requirements	17	21	19	24	26	29	13	16	8	8	8	8	8	12
	Pricing and Quotations	14	20	16	30	22	30	19	29	8	8	8	8	9	14
	Limits and Facility Checking	12	28	15	28	15	28	15	21	8	8	8	8	9	11
	Instruction or Order Management	24	24	33	44	35	37	44	45	8	8	8	11	10	21
Processing and Operations	Reference Data Creation and Maintenance	15	30	11	27	17	12	10	20	8	8	8	8	12	10
	Transaction/Fees Capture and Record Update	53	42	22	30	19	26	32	37	8	8	8	11	11	14
	Confirm/Affirm/Matching and Documentation	41	30	27	31	22	25	26	29	8	8	8	24	13	13
	Transaction Maintenance and Administration	55	37	16	24	17	28	23	24	8	8	8	13	12	11
	Interest Calculation and Application	27	44	15	25	13	23	10	20	8	8	8	8	10	8
	Client/Customer Valuation and Reporting	20	32	21	30	32	31	10	16	8	8	8	10	9	12
	Internal Valuation	20	33	14	28	5	21	12	25	8	8	8	10	9	10
	Trust and Fiduciary Administration	21	23	24	20	25	33	10	31	8	8	8	10	8	10
	Collateral/Margins/Netting	24	32	24	25	22	30	10	27	8	8	8	16	9	13
	Payment/Settlement/Collection (cash/securities)	53	46	31	48	26	26	10	44	8	9	12	30	23	22
	Custody and Actions (including assets)	46	39	31	32	41	32	14	27	8	8	13	25	17	13
	Asset Maturity and Disposals	20	17	9	10	13	22	9	20	8	8	8	16	15	9
	Reconciliation and Resolution	17	25	11	24	12	25	9	22	8	8	8	9	8	11
	Workouts and Credit Recoveries	28	28	15	16	15	33	13	24	8	8	8	8	17	10
	Cash Management	32	28	13	35	12	21	12	20	8	8	8	12	8	10
	Transaction Accounting	34	34	20	27	11	18	9	19	8	8	8	9	12	10
Business Continuity	Planning, Training, Testing, Execution	16	21	12	30	18	20	10	10	14	14	22	18	17	12
	Development, Implementation & Project Mgmt	24	20	8	24	12	25	8	17	8	8	12	14	25	15
Technology	Infrastructure, Networks & Maintenance	16	17	10	33	9	20	9	26	10	11	19	26	32	24
	IT Security	13	18	11	38	19	23	8	15	10	10	9	21	32	10
	Disaster Recovery	17	23	10	35	13	20	8	14	11	9	11	20	18	21
Finance	Financial Reporting	9	26	18	23	12	28	8	16	8	8	8	9	8	9
	Taxation	15	29	14	20	22	34	8	21	8	8	8	8	8	13
	Regulatory Reporting	12	33	45	28	11	32	8	10	8	8	8	9	12	11
Oversight	Policy, Surveillance and Monitoring	12	13	18	17	17	24	8	12	16	17	8	8	8	10
	Legal Advisory	11	13	9	3	14	18	10	9	9	10	8	8	8	8
	Litigation Management	11	19	17	8	12	17	8	9	11	12	8	8	10	12
	Audit and Investigation	9	18	16	15	8	18	8	10	16	17	8	8	8	10
Human Resources	Recruitment and Training	9	14	17	9	14	22	8	11	29	19	9	9	12	8
	Appraisal and Termination	9	16	9	9	10	24	8	11	34	30	9	8	8	10
	Remuneration, Expenses and Payroll	9	25	15	19	10	22	8	27	29	32	8	12	9	14
Corporate Services	Physical Security	8	10	8	21	14	14	8	13	18	15	22	13	24	9
	Property and Facilities Management	8	13	8	16	17	17	8	33	17	16	30	30	32	8
	Insurance and Recoveries	8	18	12	11	9	15	9	16	8	8	9	9	12	8
	3rd Party/Vendor Management	12	17	11	16	15	26	10	17	8	11	12	10	9	15

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## Risk Aversion, Risk Policy, Risk Tolerance and Risk Appetite

- Risk **appetite**
  - The amount of risk an organization is **willing to seek or accept** in pursuit of its long term objectives
- Risk **tolerance**
  - The **boundaries** of risk taking outside of which the organization is not prepared to venture in the pursuit of long-term objectives
  - Risk tolerance can be stated in absolutes
    - Eg: "We will not deal with a certain type of customer"
    - Eg: "We **will not expose more than X percent of our capital to losses** in a certain line of business."
- Risk **universe**
  - The **full range of risks** that could **impact** either positively or negatively on the ability of the organization to achieve its long term **objectives**

## Towards an Enterprise Risk Management

- Enterprise Risk Management (ERM) emphasizes a **comprehensive**, holistic approach to managing risk, shifting **away from** a “**silo-ed**” **approach** of separately handling each organizational risk
- ERM also views risk management as a **value-creating activity**, and not just a mitigation activity

## Approaches for Adjusting Value for Risk

### Risk-Adjusted Value

Definition: The value of a risky asset can be estimated by discounting the expected cash flows on the asset over its life at a risk-adjusted discount rate:

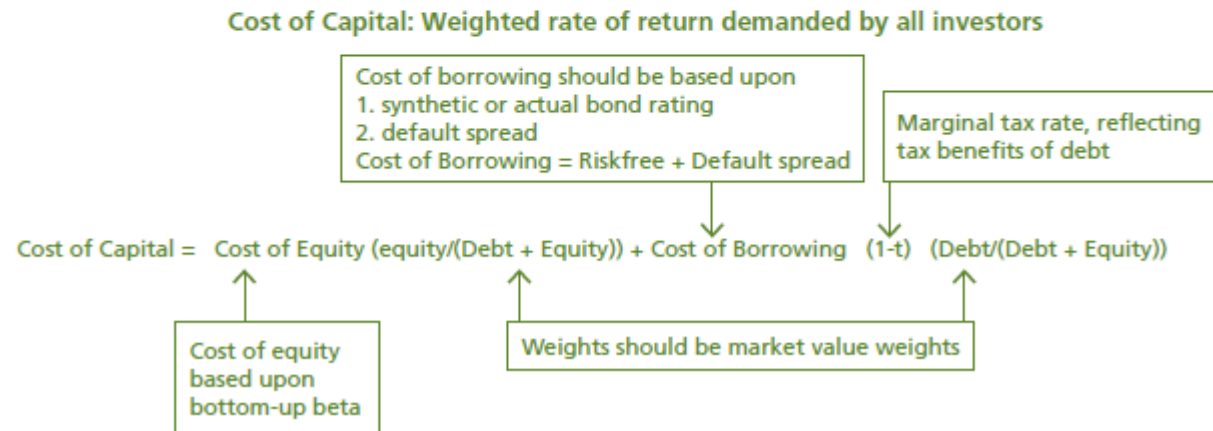
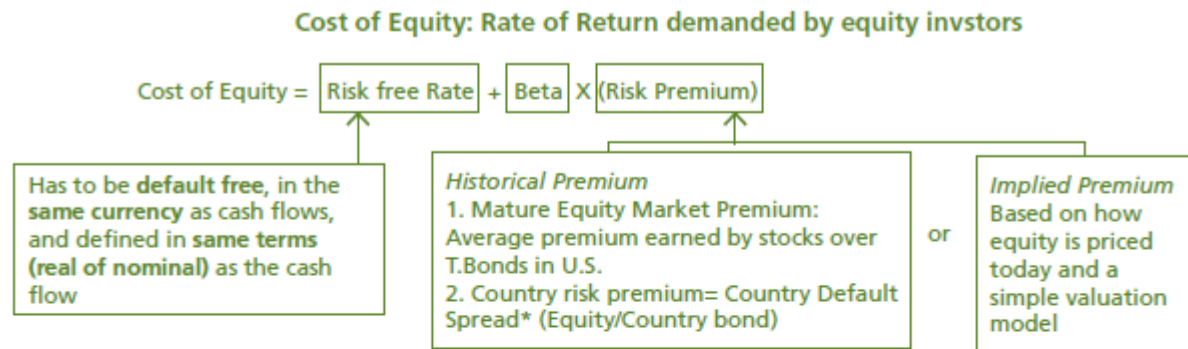
$$\text{Value of asset} = \sum_{t=0}^T \frac{E(CF_t)}{(1+r)^t}$$

where the asset has a n-year life,  $E(CF_t)$  is the expected cash flow in period t and r is a discount rate that reflects the risk of the cash flows.

#### PROCESS TO ESTIMATE RaV

- Step 1: Estimate the expected cash flows from a project/asset/business.** For a risky asset, consider/estimate cash flows under different scenarios, attach probabilities to these scenarios and estimate an expected value across scenarios.
- Step 2: Estimate a risk-adjusted discount rate**, comprised of two components, the risk-free rate and the risk premium.  
**Risk-adjusted rate = Risk-free rate + Risk premium =  $R_f + \text{Beta} (R_m - R_f)$**
- Step 3: Take the present value of the cash flows at the risk-adjusted discount rate.**

## Cost of Equity: Rate of Return Demanded by Equity Investors





## Risk Management and Enterprise Value

- ERM is a **strategic support** activity
  - It creates business value through an integrated process of identification, estimation, assessment, handling, and controlling of risk
- **Classical finance assumes market efficiency** when assessing the value of the firm
  - It only focuses on the “beta” to estimate the risk embedded in the company
- **In contrast, ERM recognizes the imperfection of markets, imperfect diversification of the investment portfolio, and bankruptcy costs**
  - ERM takes a much broader perspective on risk. It introduces a way to think about the enterprise processes that involves a proactive approach to management

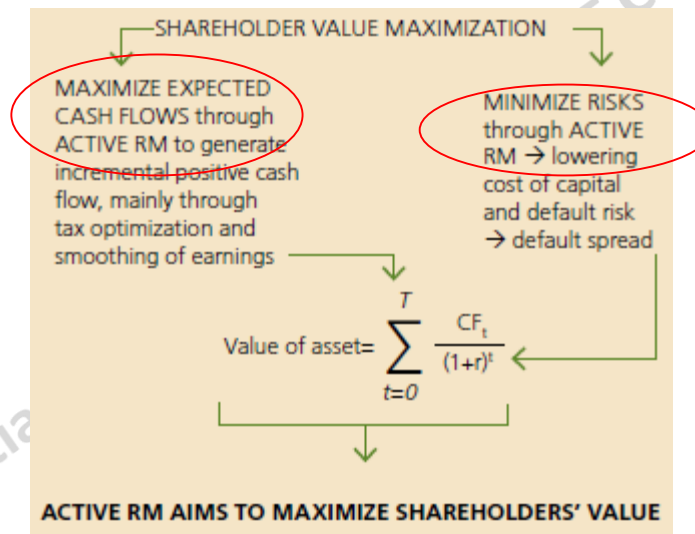
“A comprehensive and integrated framework for managing credit risk, market risk, operational risk and economic capital and risk transfer in order to **maximize firm value**” (Lam 2003)

“Dealing with uncertainty for the organization.” (Monahan 2008)

“RM is the identification, assessment, and handling of risks enacted through (coordinated) corporate actions to monitor, control, and minimize the adverse effect of unfortunate events or **maximize the realization of opportunities**.” (Andersen 2010)

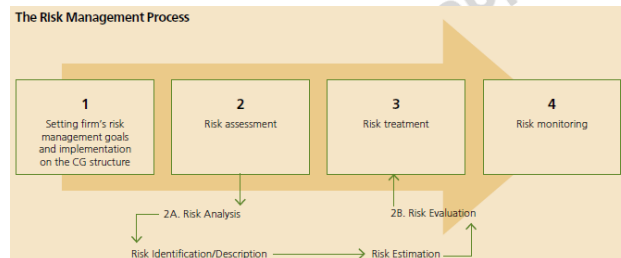
“Risk management is a central part of any organization’s strategic management. It is the process whereby organizations methodically address the risks attaching to their activities with the goal of achieving sustained benefit within each activity and across the portfolio of all activities.” AIRMIC 2010 (Risk Management Standard)

## Corporate Finance and ERM Objectives Converge



# Risk Management Process

- As with the definition of risk there is **no universal agreement on the process** to be followed in the implementation of ERM



## Risk Identification: Definition and Tools

Risk identification sets out to identify an organization's exposure to uncertainty.

Risk identification requires intimate knowledge of the firm, the market in which it operates, the legal, social, political, and cultural environment, and sound understanding of its strategic and operational objectives, including factors critical to its success and the threats and opportunities related to achieving of its objectives.

### AVAILABLE TECHNIQUES INCLUDE:

- Brainstorming
- Questionnaires
- Business studies on business processes describing both the internal processes and external factor determinants
- Industry benchmarking
- Scenario analysis
- Risk assessment workshops
- Incident investigation
- Auditing and inspection
- HAZOP (Hazard & Operability Studies)

## Risk Assessment

- The risk analysis consists of risk **identification and estimation**
  - In the identification of enterprise risks potential sources of negative **events** are identified ...
  - ... that are **capable of compromising achievement of strategic and operational objectives**
- **Once the risks are identified, they need to be described**
  - The ERM team creates **risk maps** in which the **failure events are described**
    - Name
    - Qualitative description of risk
    - Principal up/downside **scenarios**
    - **Probability** of occurrence
    - Identity of **person in charge** of managing identified risks
    - **Measurement techniques** to monitor identified risks
    - **Preliminary evaluation** of the economic impact of the scenarios presented

### Emerging Market Participants Example: Major Risks (Risk identification contributed by workshop participants)

<b>Nigeria</b> Government policy changes Physical security Exchange rate fluctuations IT breakdown Electrical power fluctuations Customer receivables Receivables from state Theft	<b>Vietnam</b> Inflation Foreign exchange changes Regulatory changes Flooding Operational disruptions	<b>India</b> Regulatory changes Tax rates Project failure Unions Environmental issues Access to resources Corruption
<b>Nepal</b> Rebel insurgency Political instability Electrical power fluctuations Skilled labor	<b>Zambia</b> Electrical power fluctuations Copper price changes IT Failures Flooding Regulatory changes Competition Reputation	<b>Uzbekistan</b> Earthquakes Regional political instability Regulatory changes Cotton price changes Gold prices Political restrictions

## Risk Estimation

Risk estimation can be quantitative, semi-quantitative or qualitative in terms of the probability of occurrence and the possible consequence.

- **Qualitative methods:** Probabilities and consequences of events (catastrophic to insignificant) are estimated according to qualitative scaling (analysts' bias).
- **Semi-quantitative methods:** Qualitative scaling is weighed and transformed into a quantitative scale and a P-I risk synthetic score is computed.
- **Quantitative methods:** Risk is estimated through quantitative methods as such Scenario Analysis, Decision Tree, Monte Carlo Simulation or according to the Value-at-Risk Models. These methods rely on causal distribution estimation (subjective and/or objective methods).

- **Qualitative methods** use descriptive words or **scales of value** to illustrate the impact and the probabilities of an event
  - Among the various methods used for qualitative estimates, the **Probability-Impact Matrix** is among the most common

Probability	Impact				
	Insignificant	Low	Moderate	Severe	Catastrophic
Almost certain (>50%)	High	High	Extreme	Extreme	Extreme
Very frequent (20%–50%)	Moderate	High	High	Extreme	Extreme
Moderate (5%–20%)	Low	Moderate	High	Extreme	Extreme
Improbable (1%–5%)	Low	Low	Moderate	High	Extreme
Rare (<1%)	Low	Low	Moderate	High	High

### Legend:

**Insignificant:** Very low impact events of marginal consequence

**Low:** Management of event risks using routine procedures and controls

**Moderate:** Requires the identification of an individual responsible for its management and monitoring

**Severe:** Careful risk evaluation by the officer at the highest hierarchical level

**Extreme:** Requires a maximum level of attention and an immediate intervention for risk treatment

## P(robability) I(mpact) Matrix

- Probability and Impact Matrix uses the combination of probability and impact scores of individual risks and ranks/ **prioritizes** them for easy handling of the risks
- It helps to **determine** which risks need detailed **risk response plans**
- It is vital to understand the priority for each risk as it allows the project team to **appreciate the relative importance of each risk**

		Impact				
		Trivial	Minor	Moderate	Major	Extreme
Probability	Rare	Low	Low	Low	Medium	Medium
	Unlikely	Low	Low	Medium	Medium	Medium
	Moderate	Low	Medium	Medium	Medium	High
	Likely	Medium	Medium	Medium	High	High
	Very likely	Medium	Medium	High	High	High

## Risk Estimation (cont'd)

- **Semi-quantitative estimate** method **transforms** a series of **qualitative judgments into quantitative variables**, using numerical scoring systems to arrive at a **risk score** — a numerical synthetic risk judgment

Probability	Score
Almost certain	100
Probable	50
Moderate	25
Improbable	5
Rare	1

Impact	Score
Catastrophic	1000
Severe	200
Moderate	50
Low	10
Insignificant	1

Risk Score	
Extreme	>5000
High	5000__500
Moderate	500__50
Low	<50

- **Quantitative estimation process** involves estimating the potential losses from a particular risk
- There are four steps required to perform this analysis.
  - 1. **Build a causal model** on event probability
  - 2. **Estimate individual input distributions** using historical data or simulations
  - 3. **Estimate the outcome distribution** according to the inputs
  - 4. **Validate** the model



## Risk Evaluation and Enterprise Value: The Value-Based Model

- In this managerial phase, the analyst **compares the output from the previous risk estimation phase to the risk policy limits** that the board establishes
- The objective is to determine **whether the hedging decisions generate or destroy enterprise value** based on the assumption that only decisions that affect cash flows or cost of capital are relevant
- Active risk management can **increase the firm value if the costs generated in hedging a risk are lower than the loss suffered by the company in case of an incident**

- Managerial risk management phase
- Compares estimated risks against risk criteria identified by the organization upon completion of risk analysis phase
- Risk criteria include associated costs and benefits, legal requirements, socioeconomic and environmental factors, stakeholders' concerns among others
- Evaluation used to make decisions about the significance of risks to the organization, whether to accept each risk, or whether to treat according to DCF model

### The Individual Hedging Decision Value

The DCF framework is useful to rank preferences and to select risks to avoid, mitigate, or retain.

$$\text{Hedging decision value} = \sum_{t=0}^T \frac{E(IHCF_t^+) - HC^-}{(1+r)^t} + \Delta MI$$

Where:

- $E(IHCF_t^+)$  are the expected incremental positive cash flows generated by the hedging decision (i.e., tax advantage, greater efficiency in investing)
- $R_j$  is the cost of equity = risk free +  $B \cdot$  equity premium (if Beta = 1,  $R_j = R_m$ )
- $HC^-$  are the negative cash flows associated with the hedging decision (i.e., cost of insurance)
- $\pm \Delta MI$  market imperfections (i.e., asymmetry of information, regulation, risk specific assets)

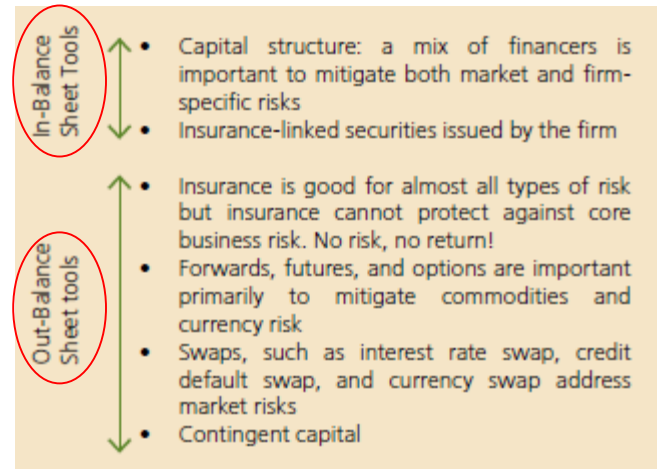
## Risk Treatment: Principal Strategies and Methods

- All risks that are identified, estimated, and evaluated are subject to a **risk treatment decision**. There are four potential outcomes of the decision:

1. Risk **avoidance**
2. Risk **transfer**
3. Risk **reduction**
4. Risk **retention**

- The **risks** are alternatively **avoided** or **accepted**
- **If accepted**, they can be **retained** by the firm, **reduced through diversification** (risk reduction) or **transferred** to third parties (risk transfer)
- The risk treatment decision should be consistent with the guidance criteria of value maximization

### Tools for Risk Retention and Risk Transfer



## Monitoring Incurred Risks

- The final phase of the integrated risk management process is monitoring
- This phase is both **technical and managerial**
- **Senior decision makers**, including board members, must **identify the risks to be monitored** and **middle managers** need to ensure that these risks are **reported**

Risk monitoring and control includes the following:

- Identify, analyze, and plan for new risks
- Track identified risks and monitor trigger conditions
- Review project performance information such as progress/status reports, issues, and corrective actions
- Re-analyze existing risks to see if the probability, impact, or proper response plan has changed
- Review the execution of risk responses and analyze their effectiveness
- Ensure proper risk management policies and procedures are being utilized

## Probabilistic Approaches

- One problem with risk-adjusted value approaches is that analysts are required to condense their uncertainty about future outcomes into a set of expected cash flows
- Probabilistic approaches take a richer and more data-intensive view of uncertainty, allowing for extreme outcomes, both good and bad
- In the process, a better sense of how risk can affect a venture is developed, and enables consideration of appropriate ways to manage this risk

- **Sensitivity Analysis**

- “What if?” questions about **key inputs** and look at the **impact on value**
- Examine extreme outcomes and evaluate the sensitivity of the outcome to changes in individual assumptions

- **Scenario Analysis**

- Estimate the outcomes and value under **viable scenarios** in the future (from very good to very bad ones) and **attaching probabilities**
- Best employed when the outcomes of a project are a function of the macroeconomic environment and/or competitive responses

- **Decision Trees**

- Some firms face **sequential risks**, a situation in which it is necessary to move through one stage successfully before proceeding to the next stage

- **Simulations**

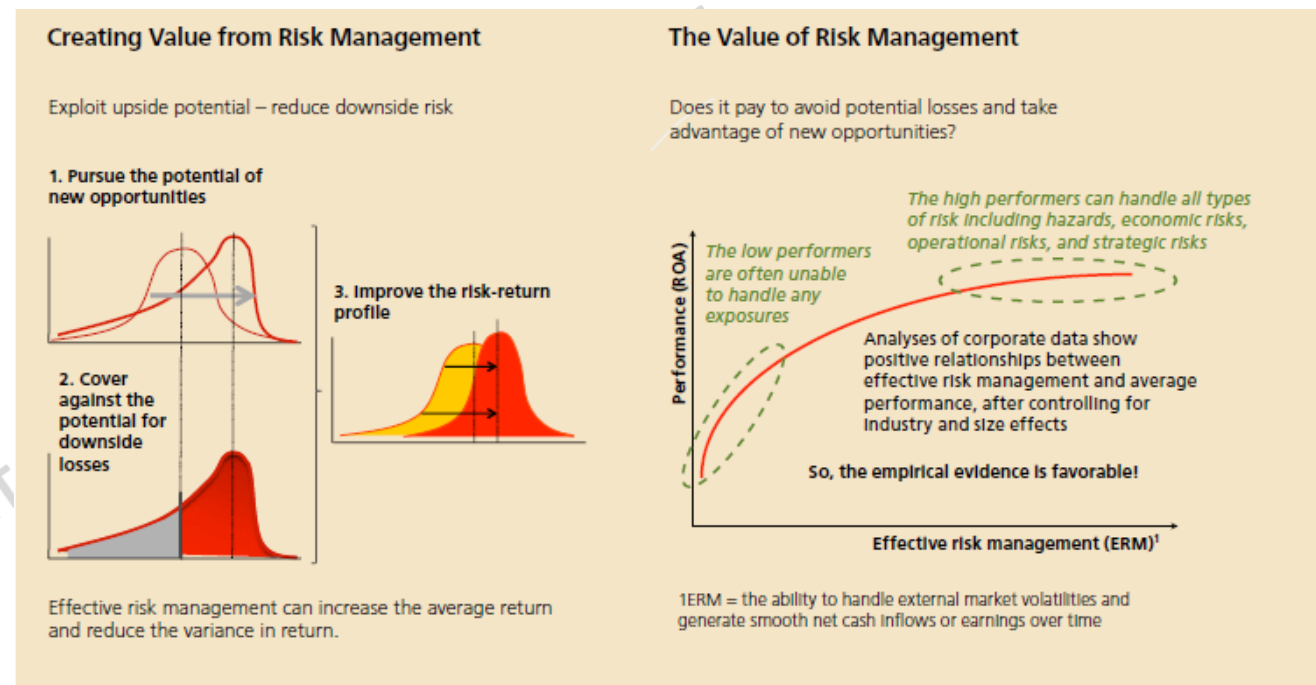
- Allows for the deepest assessment of uncertainty because it lets analysts **specify probability distributions of values** - rather than a single expected value for each input - about which they feel uncertain

- **Value at Risk (VAR)**

- Value at Risk, or VaR, measures the **potential loss in value** of a risky asset or portfolio over a **defined period** for a **given confidence interval**

## How Risk Management Affects Value

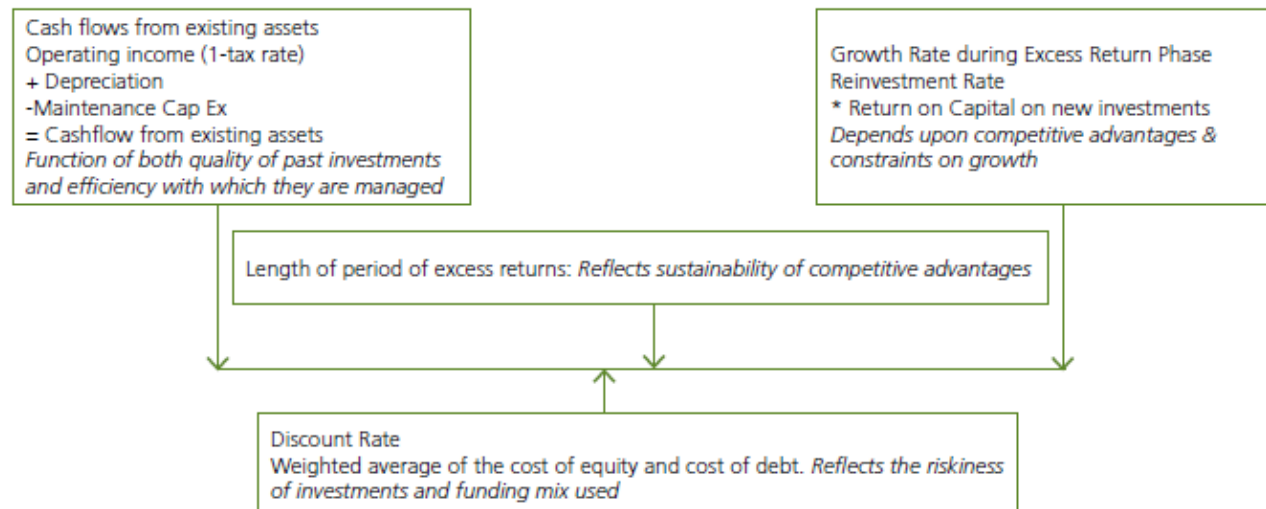
- When managing a firm's risk, the ultimate objective is to **make the firm more valuable**
  - Thus, it is important to consider how risk management affects the value of a firm
  - The most straightforward way to do this is to **start with the conventional drivers of firm value and look at how individual risk management actions affect these drivers**



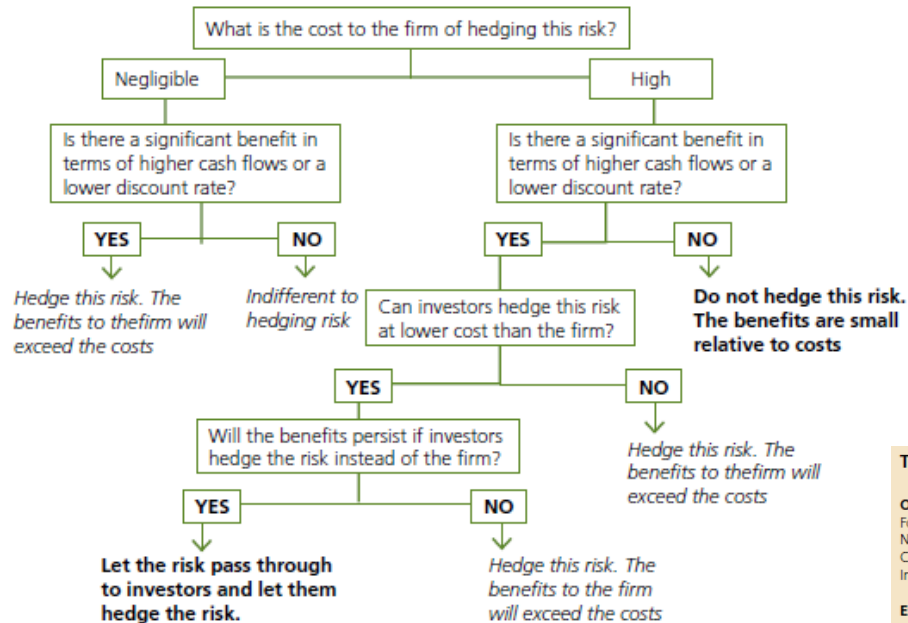
Source: Andersen, T. J., 2008, The Performance Relationship of Effective Risk Management: Exploring the Firm-Specific Investment Rationale, Long Range Planning, 41(2).

## Factors Influencing the Value of a Business

- Four sets of inputs determine the value of a business
  - **Cash flow** generation from assets in place and investments already made
  - **Expected growth** rate in the cash flows during periods of high growth and excess returns, when the firm earns more than its cost of capital on its investments
  - **Time period** elapsing before the firm becomes a stable growth firm
  - **Discount rate** that reflects the risk of the investments made by the firm and the financing mix used to fund them



## When Is It Appropriate to Hedge Risk?



### TYPES OF DERIVATIVES

#### Over-the-Counter (OTC) Derivatives

Forward foreign exchange  
Non-deliverable forwards  
Currency swaps  
Interest rate swaps

#### Exchange-Traded Derivatives

Currency options  
Interest rate futures  
Commodity futures  
Options on futures

#### Securitizations

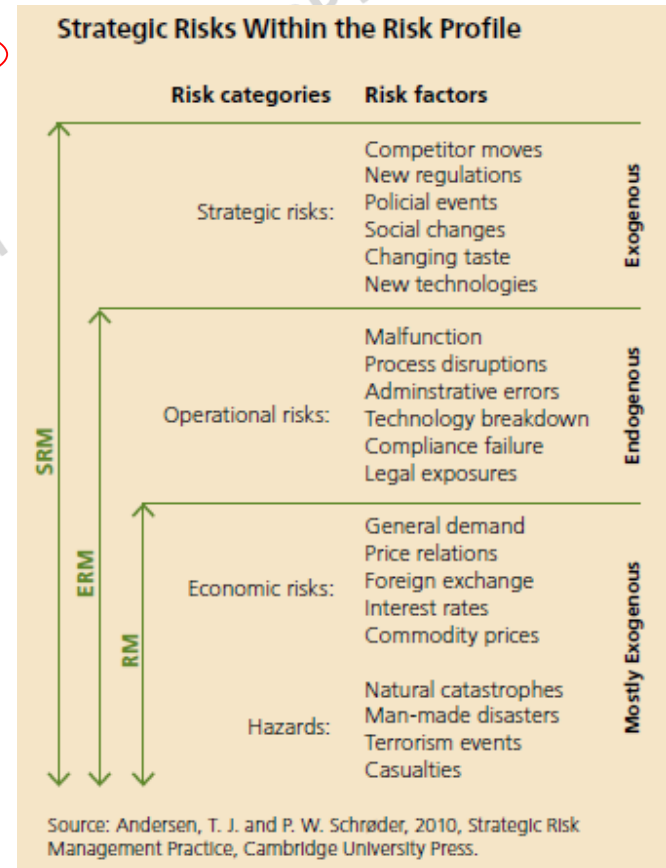
Collateralized debt obligations  
Mortgage-backed securities

#### Exotic Options, Structured Products and Non-Traditional Derivatives

Weather, oil, natural gas and electricity derivatives  
Asian options, barrier options, basket options, compound options, look back options, binary options

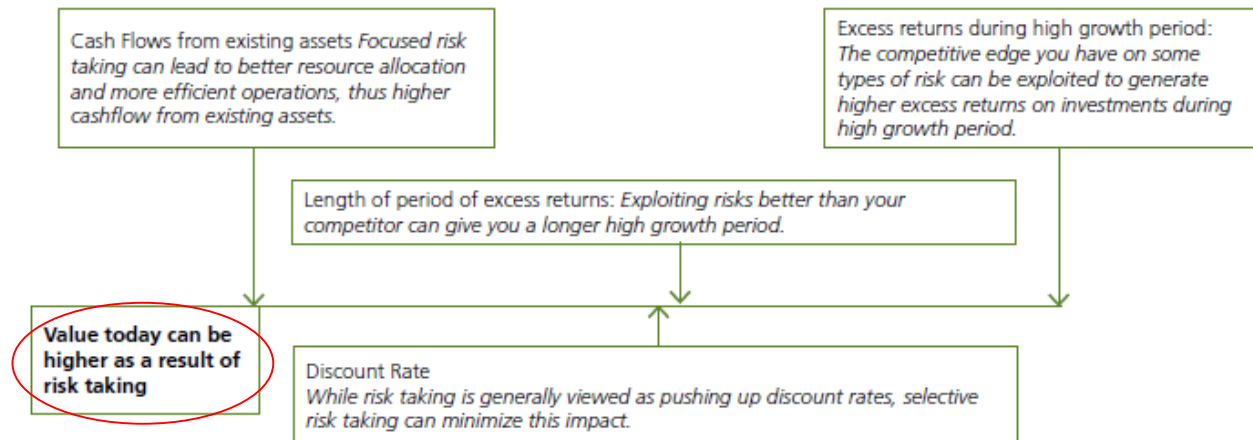
## Strategic Risk Taking and Value

- Risk management is **more than** just risk **hedging**
- In fact, **successful firms**, over time, can attribute their successes not to avoiding risk but to seeking out and **taking the “right risks.”**
- Success in risk taking is as much a result of **design** as of **luck**
- A key choice for firms is the design of the organization to optimize the benefits from risk taking
- Risk taking occurs within a context that includes the firm’s leadership and **culture**, systems, and capabilities

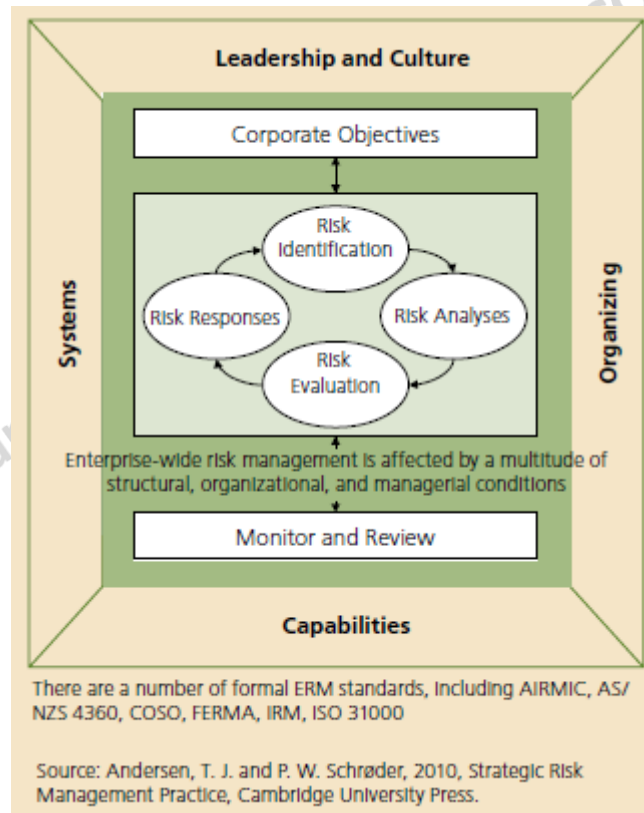




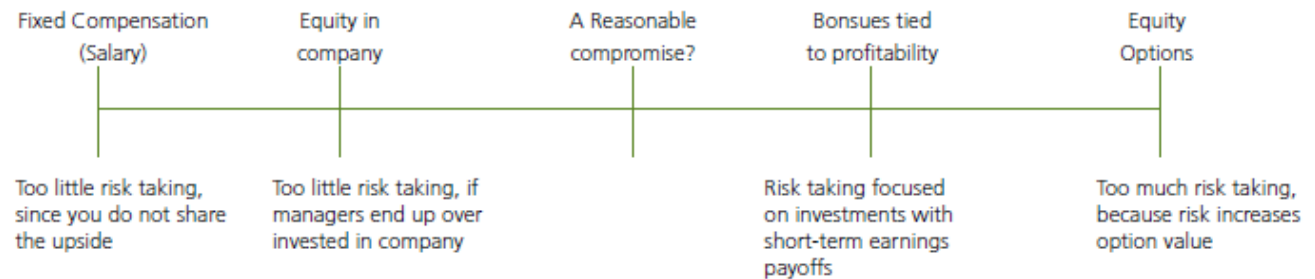
## Impact of Risk Taking on Valuation Inputs



## Enterprise Risk Management Framework



## Finding the Balance: Rewarding Risk Takers



## Understanding the Decision-Making Context

- **Directors** often are required to make **high-stakes decisions under less than ideal conditions**
  - Inadequate **information**
  - **Time** to engage in exhaustive analysis
  - **Cost** of collecting information
  - **Cognitive limitations**, including bounded rationality
- Not only do directors have to face individual constraints, they **act in a group** and are **subject to the dysfunction** inherent in group decision making
- An average **decision process** can be divided into several steps, including:
  - Setting objectives
  - Searching for alternatives
  - Evaluating alternatives
  - Choosing alternatives
  - Implementing decisions

### Cognitive Biases

Decision makers may repress uncertainty and act on simplified models they construct.

#### 1. Formulate goals and identify problems

**Prior hypothesis:** problem identification is affected by erroneous beliefs  
**Adjustment and anchoring:** influence of previous judgments and values  
**Reasoning by analogy:** impose simpler analogies to complex situations  
**Escalating commitment:** increase commitment when a project is failing

#### 2. Generate alternatives

**Single outcome:** focus on a single goal or preferred alternative  
**Impossibility:** discard non-preferred alternatives by inferring that it is impossible to implement  
**Denying value trade offs:** over-valuation of a preferred alternative  
**Problem sets:** imposing an often-used problem solution

#### 3. Evaluate alternatives and choice

**Insensitivity to predictability:** ignoring the reliability of information  
**Illusion of validity:** observations may reflect a different concept or data can be confounded  
**Insensitivity to sample size:** generalizing from a small data sample or a limited set of examples  
**Devaluation of partial description:** discounting alternatives that are only partially described

**Cognitive biases can arise at all stages of the decision-making process**  
They can all lead to bad decision outcomes!

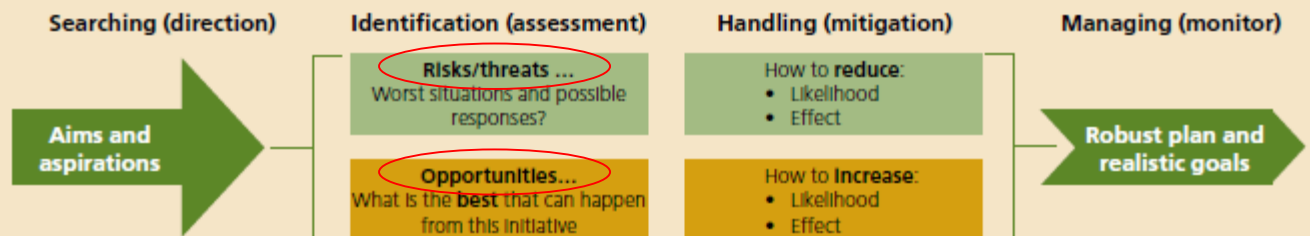
Source: Charles Schwenk, *Cognitive Simplifications Processes in Strategic Decision-Making*, 1984.

## Integrating Risk Analysis with the Strategy Process

### Example: LEGO Group

#### Active Risk and Opportunity Planning (AROP)

The process applies to all new corporate projects



Source: LEGO Systems A/S

## Preliminary Conclusions

### Main Propositions About Risk

1. Risk is everywhere.
2. Risk is threat and opportunity.
3. People are ambivalent about risk and not always rational in the way they deal with it.
4. Not all risk is created equal: small/large, symmetric/asymmetric, continuous/discrete, macro/micro.
5. Risk can be measured.
6. Risk measurement and assessment should lead to better decisions.
7. The key to risk management is deciding which risks to hedge, which risks to pass through and which risks to take.

GOOD RISK MANAGEMENT = GOOD MANAGEMENT

### The most Important Ingredient in risk management is luck!

There is so much noise in this process that the dominant variable explaining success in any given period is luck and not skill.

**Proposition 1:** Today's hero will be tomorrow's goat. The opposite is true as well. There are no experts. Let your common sense guide you.

**Proposition 2:** Don't mistake luck for skill. Do not over react either to success or to failure.

**Proposition 3:** Life is not fair. You can do everything right and go bankrupt. You can do everything wrong and make millions.

## Reflections for Corporations

## How Do You Define Risk?

1. How would you define risk?
2. Given your definition of risk, how would you measure risk?
3. Given your definition and measure of risk, what do you see as the objective of risk management?
  - ☐ Reduce exposure to all risk
  - ☐ Reduce exposure to “bad” risk
  - ☐ Increase exposure to “good” risk
  - ☐ Reduce exposure to bad risk and increase exposure to good risk
4. In your firm, how is risk management defined and organized? Does it match up to the objective you chose in the last question?



## Relative Risk Aversion

Based on your assessment of how risk averse you are and how risk averse your co-workers are, which of the following do you think describes your relative risk aversion?

- a. I am more risk averse than my colleagues
- b. I am about as risk averse as my colleagues
- c. I am less risk averse than my colleagues

If you are more or less risk averse than your colleagues, how does this difference manifest itself in your decision-making and discussions?

- a. It does not affect either decisions or discussions
- b. I am usually the cautious one, pushing every one else to slow down or to stop risky actions.
- c. I am usually the aggressive one, trying to get every one else to move quicker and take more risky actions.

## Risk Measures for Your Firm

If your firm is publicly traded:

1. Is your equity (stock) viewed as a safe, average or risky stock? (Find some measures of risk on your stock that are publicly accessible, such as beta and standard deviation).
2. Is your debt (bonds) viewed as safe, average or risky? (Again, see if you can find a measure of bond risk; this can take the form of a bond rating if you are a larger, multinational firm but it can be also extracted by looking at interest rates that banks charge you for lending you money)
3. Is this consistent with how you view your firm's risk? If not, why do you think there is a difference?
4. Has the riskiness of your firm changed over time? Do you think that the market measures of risk reflect these changes?

If your organization is not publicly traded:

1. Is your firm a safe, average or risky firm? What measure of risk are you using to come this conclusion?
  - Subjective
  - Objective (Earnings volatility etc.)

Has the riskiness of your firm changed over time?

2. Do you think your firm is less or more exposed to risk because it is not publicly traded (as opposed to publicly traded firms in the same business)?

## Risk-Adjusted Value

### Risk Adjusted Discount Rates

1. Does your firm have a hurdle rate that it uses when assessing investments? If so, do you know (roughly) what it is right now?
2. Has this hurdle rate changed over time? Why
3. Is there only one hurdle rate for all investments or do you have different hurdle rates for different investments? If the latter, why do you use different hurdle rates for different investments?

### Risk Adjusted Cash Flows

Do you risk adjust your cash flows?

If yes, how do cash flows get risk adjusted?

- ☐ Hair cut cash flows on risky investments
- ☐ No established approach but it gets done by individual decision makers
- ☐ It happens and I have no idea how it happens
- ☐ Other (Please describe):

## Probabilistic Approaches

1. Do you use probabilistic approaches in your firm?
2. If yes, which approach do you use?
  - a. What if analysis
  - b. Scenario Analysis
  - c. Decision Trees
  - d. Simulation
3. If no, do you think that there is potential for a probabilistic approach? If you think there is, which one would best fit, given the type of risks you are exposed to (discrete or continuous, sequential or contemporaneous...)?

## Value at Risk

1. Do you use Value at Risk (VaR) in your firm?
2. How is it used?
3. If it is used, do you know how often it is computed?
4. How is it computed?
  - a. Variance Covariance Matrix
  - b. Historical simulation
  - c. Monte Carlo simulation
5. If your firm uses VaR, does it also use other risk measures? Which ones?

## Real Options

1. Does your firm own any patents or proprietary technologies that are not viable right now?
  - a. If yes, are they valued? If so, how are they valued? If not, why not?
  - b. If no, are there processes or products that can be patented (and protected from competition)?
2. If you are a natural resource company, do you have undeveloped reserves of the resource? If yes, how are they valued?
3. Do you make investments that you know will not pass financial hurdles but that you feel offer your strategic opportunities (to enter new markets or acquire new customers)? What justification do you offer when you make these investments?
4. Do you invest in long term project with significant outlays? If yes, do you try to build in escape hatches, in case the project does not work out? If so, what form do these “escape hatches” take?

## Value and Risk

- Do you have a risk manager or someone responsible for risk management at your firm?
  - If yes, what is their job description? (Is it to measure risk and report to top management, monitor risk taking, hedge risks or something else?)
  - If no, how is risk managed in your organization?
- What is the objective of risk management in your firm?
  - If the objective is to increase value, is there a conscious effort made to see how risk management actions affect value?
  - If the objective is something else, what is it? How is “it” linked up to value (if at all)? Can you see potential conflicts between this objective and value creation?

## Developing a Risk Profile

1. List the risks you are exposed to as a business. Try to include all risks, small and large, internal or external on this list.
2. Categorize the risks that you face into broad groups, based upon whether it is Macro risk or micro risk: Macro risks related to risks coming from macro economic factors such as interest rates, inflation or overall economic growth and micro risks refer to risks that come from within the firm.  
Discrete risk or continuous risk: Discrete risks are risks that occur at points in time whereas continuous risks are those that you are exposed to all of the time.  
Catastrophic risk or small risk: Catastrophic risks are risk that have large consequences for a firm. In effect, they can put a firm's future in doubt, if they come to fruition.



## Risk Hedging Checklist

Do you hedge risks at your firm?

- a. Yes
- b. No
- c. Not sure

Who makes these risk hedging decisions?

- a. Managers on individual investments
- b. Corporate treasury
- c. Ad hoc

If you hedge risk, what types of risks do you hedge?

- a. Input cost risk (Cost of raw materials that you use for operations)
- b. Output price risk (Price of products that you sell)
- c. Exchange Rate risk
- d. Political risk
- e. Other

Why do you hedge risk?

- a. To increase earnings stability
- b. To ensure survival
- c. To increase value
- d. Because every one else does it

If you hedge risk, how do you hedge risk

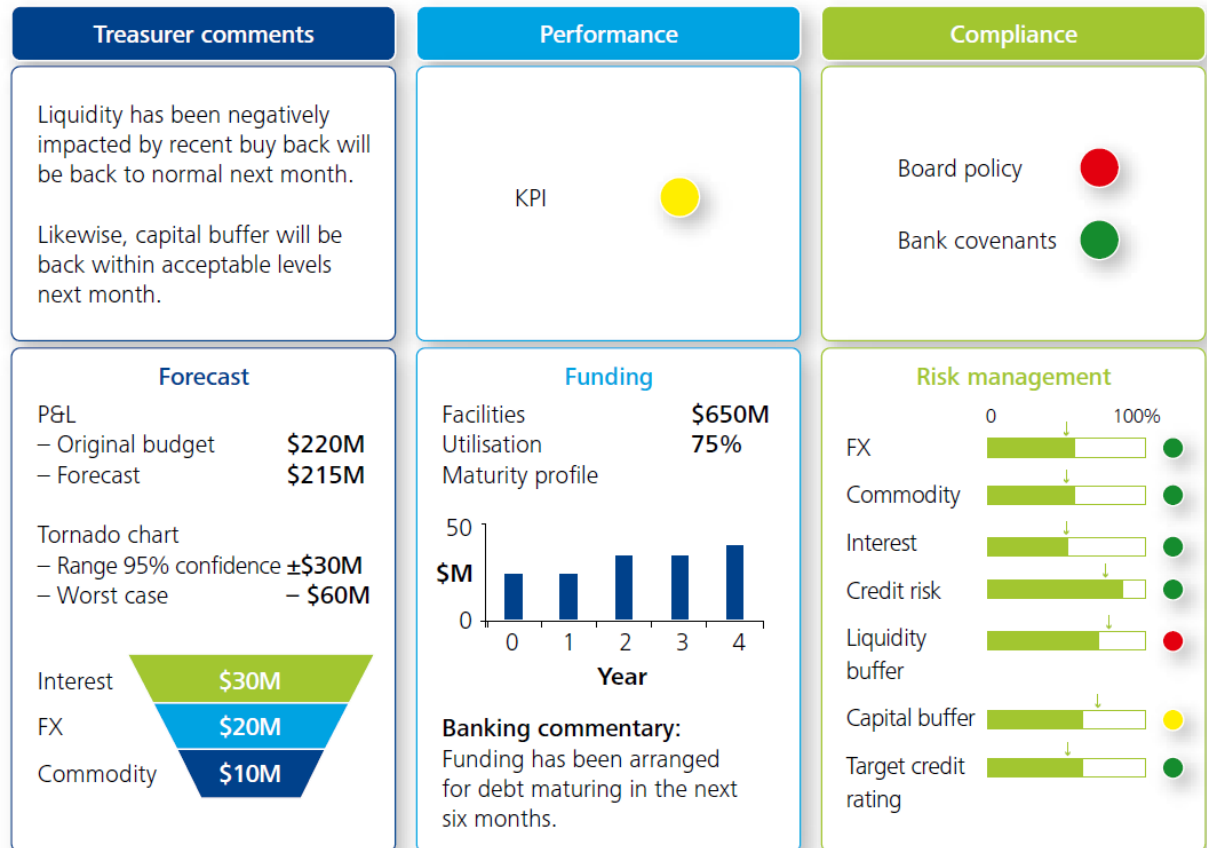
- a. Internal investment decisions
- b. Financing decisions
- c. Insurance
- d. Options
- e. Futures and forwards

## Assessing Risk Taking Capabilities

Dimension	Your organization's standing
1. Are the interests of managers aligned with the interests of capital providers?	<input type="checkbox"/> Aligned with stockholders <input type="checkbox"/> Aligned with bondholders <input type="checkbox"/> Aligned with their own interests
2. Do you have the right people in place to deal with risk?	<input type="checkbox"/> Too many risk takers <input type="checkbox"/> Too many risk avoiders <input type="checkbox"/> Right balance
3. Is the incentive process designed to encourage good risk taking?	<input type="checkbox"/> Discourages all risk taking <input type="checkbox"/> Encourages too much risk taking <input type="checkbox"/> Right balance
4. What is the risk culture in your organization?	<input type="checkbox"/> Risk seeking <input type="checkbox"/> Risk avoiding <input type="checkbox"/> No risk culture
5. Have much flexibility is there in terms of exploiting upside risk and protecting against downside risk?	<input type="checkbox"/> Good on exploiting upside risk <input type="checkbox"/> Good in protecting against downside <input type="checkbox"/> Good on both

## Appendix -- A Treasurer's Risk Cockpit

## Example: Treasury Reporting



● Above target   
 ● Within 10% of target   
 ● Outside target by over 10%   
 ↓ Benchmark   
  Actual position

## Checklist

1. Is it clear what the strategy is for using derivatives? ☐
2. In assessing the hedge strategy is it clear as to the trade off between the risks and benefits? ☐
3. Has the board been given the forecast hedge results under different scenarios and is the board comfortable with these results? ☐
4. Have the hedge results been considered in the context of the liquidity, funding and capital structure of the organisation? ☐
5. Are the assumptions upon which the strategy is based clearly defined & articulated? ☐
6. Is the board comfortable with critical assumptions? ☐
7. Are there appropriate controls in place to manage the risks of using derivatives? ☐
8. Has the strategy been back tested against historical results? ☐
9. Has the strategy been assessed over a long period of time so as not to be biased by recent events? ☐
10. Has a specialist reviewed the policy to ensure appropriate controls are actually in place? ☐

## Appendix -- Disney - Developing a Risk Profile

## Developing a Risk Profile

To manage risk, you first have to understand the risks that you are exposed to

- Develop a risk profile
    - e.g. risks from competition
    - e.g. risks from product market changes (incl. macro economic forces)
  - What to do about these risks
    - Do **nothing** and let the risk pass through to investors in the business
    - **Protect** ourselves against the risk
    - **Intentionally increase** our **exposure** to some of the risks
- 
1. List risks
  2. Categorize risks
    - Market vs firm-specific risk
    - Operating vs financial risk
    - Continuous Risks vs event risk
    - Catastrophic risk vs smaller risks
  3. Measure exposure to each risk
    - Earnings versus value risk exposure

## The Walt Disney Example

Period	Operating Income	Firm value	T.Bond Rate	Change in rate	GDP (Deflated)	% Chg in GDP	CPI	Change in CPI	Weighted Dollar	% Change in \$
2003	\$2,713	\$68,239	4.29%	0.40%	10493	3.60%	2.04%	0.01%	88.82	-14.51%
2002	\$2,384	\$53,708	3.87%	-0.82%	10128	2.98%	2.03%	-0.10%	103.9	-3.47%
2001	\$2,832	\$45,030	4.73%	-1.20%	9835	-0.02%	2.13%	-1.27%	107.64	1.85%
2000	\$2,525	\$47,717	6.00%	0.30%	9837	3.53%	3.44%	0.86%	105.68	11.51%
1999	\$3,580	\$88,558	5.68%	-0.21%	9502	4.43%	2.56%	1.05%	94.77	-0.59%
1998	\$3,843	\$65,487	5.90%	-0.19%	9099	3.70%	1.49%	-0.65%	95.33	0.95%
1997	\$3,945	\$64,236	6.10%	-0.56%	8774	4.79%	2.15%	-0.82%	94.43	7.54%
1996	\$3,024	\$65,489	6.70%	0.49%	8373	3.97%	2.99%	0.18%	87.81	4.36%
1995	\$2,262	\$54,972	6.18%	-1.32%	8053	2.46%	2.81%	0.19%	84.14	-1.07%
1994	\$1,804	\$33,071	7.60%	2.11%	7860	4.30%	2.61%	-0.14%	85.05	-5.38%
1993	\$1,560	\$22,694	5.38%	-0.91%	7536	2.25%	2.75%	-0.44%	89.89	4.26%
1992	\$1,287	\$25,048	6.35%	-1.01%	7370	3.50%	3.20%	0.27%	86.22	-2.31%
1991	\$1,004	\$17,122	7.44%	-1.24%	7121	-0.14%	2.92%	-3.17%	88.26	4.55%
1990	\$1,287	\$14,963	8.79%	0.47%	7131	1.68%	6.29%	1.72%	84.42	-11.23%
1989	\$1,109	\$16,015	8.28%	-0.60%	7013	3.76%	4.49%	0.23%	95.10	4.17%
1988	\$789	\$9,195	8.93%	-0.60%	6759	4.10%	4.25%	-0.36%	91.29	-5.34%
1987	\$707	\$8,371	9.59%	2.02%	6493	3.19%	4.63%	3.11%	96.44	-8.59%
1986	\$281	\$5,631	7.42%	-2.58%	6292	3.11%	1.47%	-1.70%	105.50	-15.30%
1985	\$206	\$3,655	10.27%	-1.11%	6102	3.39%	3.23%	-0.64%	124.56	-10.36%
1984	\$143	\$2,024	11.51%	-0.26%	5902	4.18%	3.90%	-0.05%	138.96	8.01%
1983	\$134	\$1,817	11.80%	1.20%	5665	6.72%	3.95%	-0.05%	128.65	4.47%
1982	\$141	\$2,108	10.47%	-3.08%	5308	-1.61%	4%	-4.50%	123.14	6.48%

Firm Value = Market Value of Equity + Book Value of Debt



## The Walt Disney Example (cont'd)

$$g(x, X) = \frac{x - \bar{X}}{s}$$

- **T-statistic** is a ratio of the departure of an estimated parameter from its notional value and its standard error
- It is used in hypothesis testing, for example in the Student's *t*-test

Regressing changes over a period yields the following result for Disney Corp

(t statistics in brackets)

Change in Firm Value = 0.2081	- 4.16 (Change in Interest Rates)
(2.91)	(0.75)
Change in Firm Value = 0.2165	+ 0.26 (GDP Growth)
(1.56)	(0.07)
Change in Firm Value = 0.2262	+ 0.57 (Change in Inflation Rate)
(3.22)	(0.13)
Change in Firm Value = 0.2060	-2.04 (Change in Dollar)
(3.40)	(2.52)
Change in Operating Income = 0.2189	+ 6.59 (Change in Interest Rates)
(2.74)	(1.06)
Change in Operating Income = 0.1725	+ 0.66 (GDP Growth)
(1.10)	(0.15)
Change in Operating Income = 0.1768	-1.76 (Change in Dollar)
(2.42)	(1.81)
Change in Operating Income = 0.2192	+9.27 (Change in Inflation Rate)
(3.01)	(1.95)

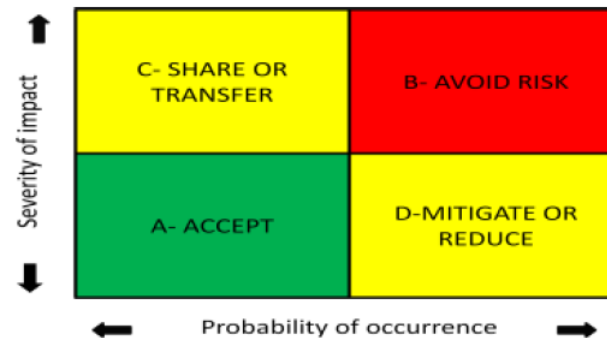
What to do when operating income and firm value have different results

- **Operating Income** provides a measure of **earnings risk exposure** and is thus narrow
- Whereas the **firm value** captures the effect not only on current earnings but **also on future earnings**
- It is possible, therefore, that a firm is exposed to earnings risk from a source but that the value risk is muted, ...
- ... as is the alternative where the risk to current earnings is low but the value risk is high

## Appendix -- Risk Assessment and Positioning

## Qualitative Risk Assessment Legend

LEVEL	COLOUR DESCRIPTION	LIKELIHOOD OF OCCURENCE	DESCRIPTOR	RELATIVE IMPACT
1		Very low	Rare	Insignificant
2		Low	Unlikely	Minor
3		Moderate	Possible	Moderate
4		High	Likely	Major
5		Very high	Almost certain	Catastrophic



## Example 1

RISK CATEGORY	RISK ID	TOPIC	RISK ASSESSMENT	
			LIKELIHOOD	IMPACT
Concentration Risks	a	Service concentration		
	b	e-business	Moderate	Moderate
	c	Client concentration	High	Major
	d	Geographical concentration	Moderate	Major
	e	Vertical domain concentration	High	Major
	f	Platform concentration	Very high	Major
Legal and statutory Risks	g	Contractual liabilities	Moderate	Major
	h	Statutory compliance	Moderate	Major
	i	Intellectual property	High	Moderate
Human Resources Risk	j	Manpower development	High	Moderate
	k	Knowledge sharing	High	Moderate
Operational Risks	l	Project	Very low	Major
	m	Process	Very low	Major
	n	Disaster	Very low	Major
	o	Information system	Very low	Major
	p	Service	Very low	Major
	q	Communication	Very low	Major
	r	Technology	Very low	Major
	s	Category 1 Desktop environment (PCs and associated software)	Very low	Major
	t	Category 2 Proprietary System	Very low	Major
	u	Category 3 Tools for software development	Very low	Major
Financial Risks	v	Internal control	Very low	Major
	w	Foreign currency rate	Very low	Insignificant
	x	Liquidity		
	y	Leverage	Very low	insignificant

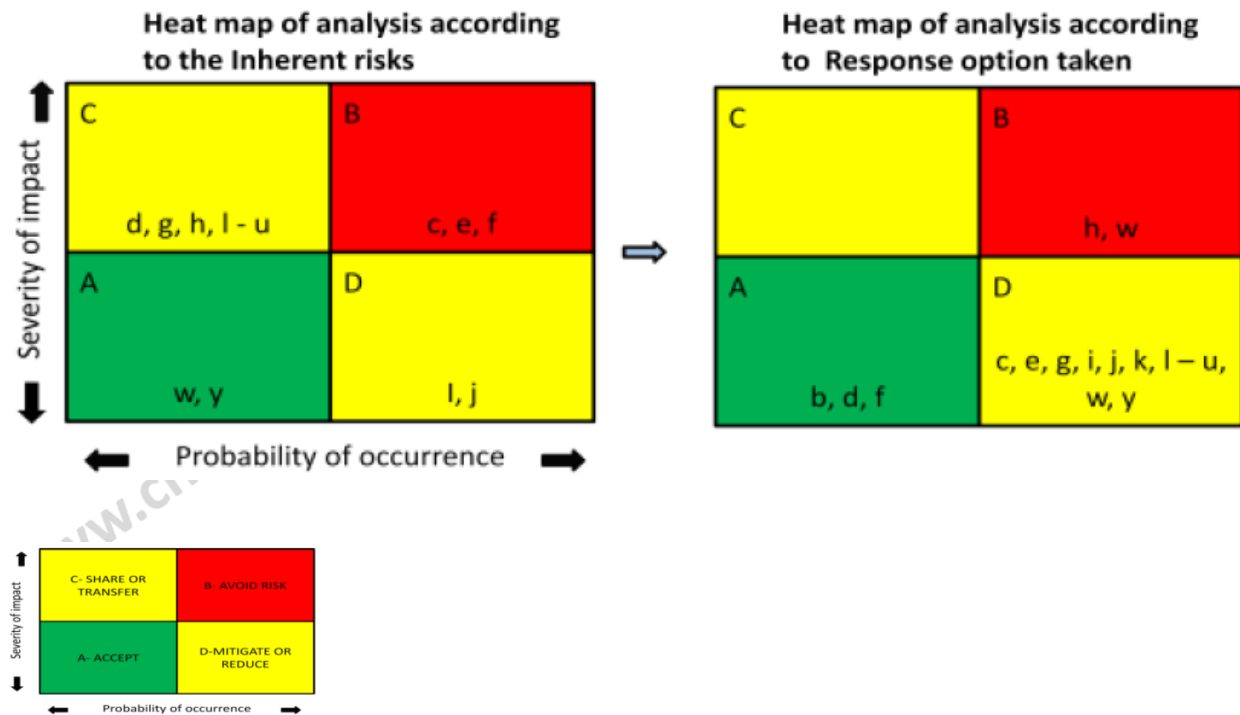
## Example 1 (cont'd)

RISK CATEGORY	RISK ID	TOPIC	RISK ASSESSMENT	
			LIKELIHOOD	IMPACT
Concentration Risks	a	Service concentration	Moderate	Moderate
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	c	Client concentration	High	Major
	d	Geographical concentration	Moderate	Major
	e	Vertical domain concentration	High	Major
	f	Platform concentration	Very high	Major
Legal and statutory Risks	g	Contractual liabilities	Moderate	Major
	h	Statutory compliance	Moderate	Major
	i	Intellectual property	High	Moderate
Human Resources Risk	j	Manpower development	High	Moderate
	k	Knowledge sharing	High	Moderate
	l	Project	Very low	Major
Operational Risks	m	Process	Very low	Major
	n	Disaster	Very low	Major
	o	Information system	Very low	Major
	p	Service	Very low	Major
	q	Communication	Very low	Major
	r	Technology	Very low	Major
	s	Category 1: Desktop environment (PCs and associated software)	Very low	Major
	t	Category 2: Proprietary System	Very low	Major
	u	Category 3: Tools for software development	Very low	Major
	v	Internal control	Very low	Major
Financial Risks	w	Foreign currency rate	Very low	Insignificant
	x	Leverage	Very low	Insignificant

(Green) 1 – 8 Low priority  
(Yellow) 9 – 15 Medium priority  
(Red) 16 – 25 High priority

RISK ID	TOPIC	LIKELIHOOD	IMPACT	WEIGHTED
a	Service concentration			
b	e-business	3	3	9
c	Client concentration	4	4	16
d	Geographical concentration	3	4	12
e	Vertical domain concentration	4	4	16
f	Platform concentration	5	4	20
g	Contractual liabilities	3	4	12
h	Statutory compliance	3	4	12
i	Intellectual property	4	3	12
j	Manpower development	4	3	12
k	Knowledge sharing	4	3	0
l	Project	1	4	4
m	Process	1	4	4
n	Disaster	1	4	4
o	Information system	1	4	4
p	Service	1	4	4
q	Communication	1	4	4
r	Technology	1	4	4
s	Category 1: Desktop environment (PCs and associated software)	1	4	4
t	Category 2: Proprietary System	1	4	4
u	Category 3: Tools for software development	1	4	4
v	Internal control			0
w	Foreign currency rate	1	1	1
x	Liquidity			0
y	Leverage	1	1	1

## Example 1 (cont'd)



## Example 2

RISK CATEGORY	RISK ID	TOPIC		RISK ASSESSMENT	
				LIKELIHOOD OF OCCURENCE	RELATIVE IMPACT
Product development Risks	a	Research and Development		Moderate	Major
Marketing Risks	b	New engine Sales		High	Major
	c	Engine parts sales			
Financial Risks	d	Foreign Exchange	Translational Risk	Very high	Insignificant
	e		Transaction Risk	Very high	Major
	f	Interest Rate Risk	Fixed rate bond		
	g		Floating rate debt		
	h	Commodity Risk		high	
Credit Risk	i	Sales finance		Moderate	Moderate

## Example 2 (cont'd)

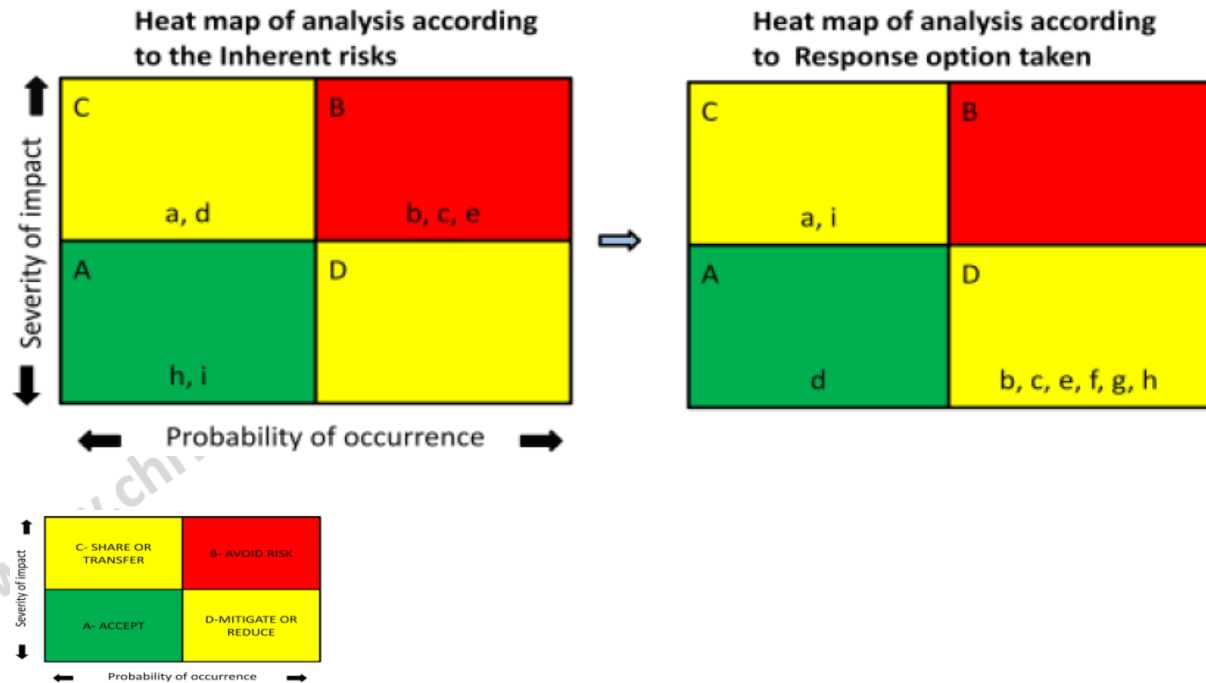
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Financial Risks	d	Translational Risk	Very high	Insignificant
	e	Foreign Exchange Transaction Risk	Very high	Major
	f	Interest Rate Risk		
	g	Fixed rate bond Floating rate debt		
	h	Commodity Risk	High	
Credit Risk	i	Sales finance	Moderate	Moderate

(Green) 1 – 8 Low priority  
 (Yellow) 9 – 15 Medium priority  
 (Red) 16 – 25 High priority

RISK ID	TOPIC	LIKELIHOOD	IMPACT	WEIGHTED
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l	Project	1	4	4
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s	Category1: Desktop environment (PCs and associated software)	1	4	4
t	Category 2: Proprietary System	1	4	4
u	Category 3: Tools for software development	1	4	4
v	Internal control			0
w	Foreign currency rate	1	1	1
x	Liquidity			0
y	Leverage	1	1	1



## Example 2 (cont'd)



## Preliminary Thoughts

### For Organisations

- Cultivate a risk culture that supports objectives
- Cost of acquiring an ERM expert for specialist support, guidance, and training
- Building a risk management culture complemented with a risk-reward system to encourage staff
- ERM processes are to be fully integrated into all daily activities

### In regards to ERM

- There is no “one-size-fits all” framework or process for ERM
- Cost effective and less complex framework for SMEs

## Appendix -- The LEGO Case Study

## The LEGO Group Strategy

### Growth Strategy

- Increase the **market share** in the **US**
  - Germans buy 3 times as much ...
- Increase market share in **Eastern Europe**
  - Toy market growing very rapidly
- **Invest** in emerging markets
  - ... but cautiously
  - Appropriate levels and be ready for when those markets do move
- **Expand direct-to-consumer activities** (sales through LEGO-owned retail stores), online sales, and online activities (such as online games for children)

### Innovation Strategy

- Creating **innovative new products** from concepts developed under the title “Obviously LEGO, never seen before”
- Come up with such concepts every two to three years
  - The latest example is LEGO Games System, which is family board games (a new way of playing with LEGO bricks) with a LEGO attitude of changeability (obviously LEGO)
- Expand **LEGO Education**
  - Works with schools and kindergartens.
- Develop its **digital** business

# LEGO Strategic Risk Management

## 1. Enterprise Risk Management

- Was **traditional ERM** in which financial, operational, hazard, and other risks were later supplemented by explicit handling of strategic risks

## 2. Monte Carlo Simulations

- Were **added** to understand the **financial performance volatility** (which proved to be significant) and the **drivers** behind it to integrate risk management into the budgeting and reporting processes
- Those two steps were seen mostly as “**damage control**”

## 3. Active Risk and Opportunity Planning (AROP)

- Business projects go through a **systematic risk and opportunity process** as part of preparing the business case before final decisions about the projects have been made

## 4. Preparing for Uncertainty

- Management tries to **ensure** that **long-term strategies** are relevant for and **resilient to future changes** that may very well differ from those planned for
- Scenarios help them envision a set of different yet plausible futures to test the strategy for resilience and relevance

# 1. Enterprise Risk Management

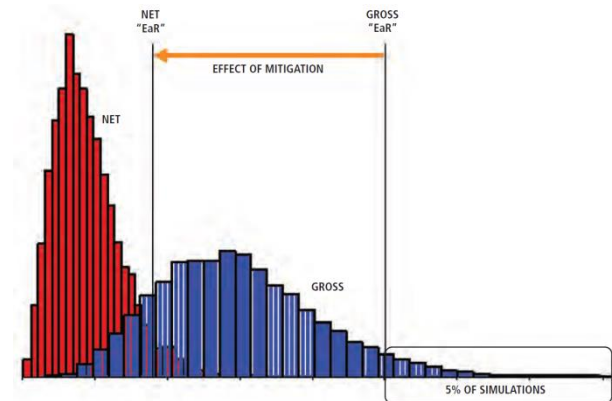
- Companies like the LEGO Group achieve sustainable high performance and create stakeholder value by consistently executing the strategic activities in the Return Driven Strategy framework
- Strategic risk management processes incorporate distinct elements of co-creation by engaging its employees (internal stakeholders) throughout the strategic decisionmaking, planning, and execution processes, as well as engaging external stakeholders

- Initiative leader requires
  - Broad knowledge of the business and its core strategies
  - Strong relationships with directors and executive management
  - Strong communication and facilitation skills
  - Knowledge of the organization's risks
  - Broad acceptance and credibility across the organization
- The **risk-owner concept** at LEGO provides a good example of the importance of understanding who owns the risks
  - ... as well as defining the role of risk management in the organization
  - The idea of “risk owners” was important to ensure action and accountability



## 2. Monte Carlo Simulation

- **Budget Simulation**
  - Business controllers are asked for their input about **volatility**, combined with analyses based on past performance of budget accuracy
- **Credit Risk Portfolio**
  - Similar approach to have a more professional “conversation” with a **credit risk insurance** partner
- **Consolidation of Risk Exposure**
  - With a Monte Carlo simulation, you can “calculate” the **5% worst-case loss compared to budget** and use that **to define risk appetite** and risk report exposure vis à vis this risk appetite
- A **privately held** company, the LEGO Group ~~can't look at stock values~~, so it looks at the **amount of earnings** the company is **likely to lose compared to budget** if the worst-case combined scenarios happen



### 3. AROP: Risk Assessment of Business Projects

- When the LEGO organization implements business projects of a defined minimum size or level of complexity, it's mandatory that the business case includes an explicit definition and method of handling both risks and opportunities
- LEGO Group has created a supporting tool (a spreadsheet) with which to do this, and it differs from the former approach to project risk management in several areas

- **Identification**
  - Call upon **stakeholders**
  - Look at **opportunities** as well as **risks**
  - Look at risks both **to** the project and **from** the project (i.e., potential project impact on the entire business system)"
- **Assessment**
  - Define explicit **scales** and agree what 'high' means to avoid different people agreeing on an impact being high without having a shared understanding of the exposure"
- **Handling**
  - Systematically assign **risk owners** to ensure action and accountability
- **Re-assessment**
  - Define the net-risk **exposure** to ensure to have an exposure deemed as acceptable
- **Follow-up**
  - Keep the risk portfolio of the project **updated** for gate and milestone sessions
- **Reporting**
  - Done automatically and fully standardized based on the data



## 4. Preparing for Uncertainty: Defining and Testing Strategies

- “We are going one step further upstream in the decision process with what we call **‘Prepare for Uncertainty.’**
  - This is a strategy process, and we’re looking at the **trends** of the world
  - The **industry is moving**; the world is moving quite rapidly
  - I just saw a presentation that indicated that the changes the world will see between 2010 and 2020 will be somewhere between 10 and 80 times the changes the world saw in the 20th Century, compressed into a decade.”

## Four Strategic Scenarios Based on Megatrends

### • Illustrative Example Based on Corporate Social Responsibility

SCENARIO DESCRIPTION	IDENTIFIED ISSUES	HANDLING/RESILIENCE
<b>1. More of the Same</b> Some growth in consumer spending, driven by RDE markets. Technologies emerge, but impact on toy industry is limited/fragmented. E-tailing is growing, and traditional retailers are pressured—but no major changes.	<ul style="list-style-type: none"> <li>• Legal compliance is sufficient control</li> <li>• Some efforts needed to remain part of the “good guys team,” e.g. “cradle to cradle” documentation</li> <li>• Transparency is enhanced</li> </ul>	<ul style="list-style-type: none"> <li>• Adhering to and systematic third-party auditing on “Global Compact”</li> <li>• Documented adherence to the disclosed “Planet Promise”</li> <li>• ...</li> </ul>
<b>2. Brave New World</b> Significant growth, driven by Asian markets. Educational overhaul of/into peer-learning where learning content is mandatory. Distributed and collaborative product development by “prosumers.”	<ul style="list-style-type: none"> <li>• NGOs and consumer groups multiply and get stronger and global—fast</li> <li>• Complying with legal requirements is not good enough—added benefit is needed</li> <li>• Globalization is almost exploding</li> </ul>	<ul style="list-style-type: none"> <li>• Liaise with key NGOs</li> <li>• Scan blogs/Internet for expectation on “good performance” on governance</li> <li>• Proactively use social media to communicate with our constituents and stakeholders</li> <li>• ...</li> </ul>
<b>3. Cut-Throat Competition</b> Networking is the norm in a highly diversified society. Customization and flexibility are essential. Halted expansion of global middle classes. Legislative override and aggressive pricing/marketing with very short lifecycles.	<ul style="list-style-type: none"> <li>• No major issue among consumers—they are more occupied with other things</li> <li>• Legislative override on compliance—to some extent driven by protectionism</li> </ul>	<ul style="list-style-type: none"> <li>• Increased monitoring of key legislative processes (especially U.S.)</li> <li>• Close(r) liaison with partners to reduce likelihood of “unbearable” legislation</li> <li>• Focus on extremely close compliance with defined legislation</li> <li>• ...</li> </ul>
<b>4. Murphy's Surprise</b> Networking permeates everything. Trade protectionism and lack of resources hamper growth and globalization. IPs dominate, and new crazes permeate the globe in hours. Powerful retailers drive market polarization into private label and branded products.	<ul style="list-style-type: none"> <li>• Full-steam legislative override and restrictions driven by “other motives” of protectionism</li> <li>• Globalization is effectively halted</li> <li>• High demands for openness—but no severe demands for “high performance”</li> <li>• Be extremely focused on compliance with legal demands</li> </ul>	<ul style="list-style-type: none"> <li>• Monitoring of and lobbying on legislation—also on minor country/state level</li> <li>• Local representation everywhere relevant</li> <li>• Enable openness on governance practices and results</li> <li>• Outperform the competition</li> <li>• ...</li> </ul>

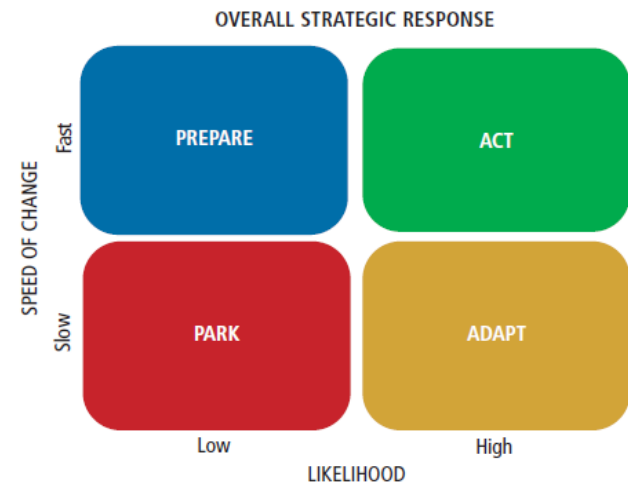


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## The PAPA Model

- **Park**
  - The **slow** things that have a **low probability** of happening, we *park*
  - We **do not forget** about them
- **Adapt**
  - The **slow** things that we know will happen or are **highly likely** to happen—we adapt to those trends
  - In our case, this is a lot around **demographics**
- **Prepare**
  - The things that have a **low probability** of happening, but, if they do, they **materialize fast**—we need to be prepared for
- **Act**
  - Finally, we have the **high probability and fast-moving** things that we need to act on now in order to make sure the strategy will be relevant
  - In our case, anything that has to do with the concept of **connectivity**—i.e., mobile phones, Internet ...



## Strategic Risk Management Return on Investment

Lego has explicitly **embedded risk management** in most of the **key planning processes** used to “run” the company:

- The Strategic and Financial Management Process— Monte Carlo and Scenarios
- The LEGO Development Process—AROP in projects
- The Customer Business Planning Process—AROP in collaboration
- The Sales & Operations Planning Process—Tactical scenarios
- The Performance Management Process—Bonus based on results, not efforts

## Conclusion

***“We have been prepared to make bigger supply chain investments than we otherwise would have done and have been able to achieve a bigger growth than we ever imagined we could have.”***

- Based on actual data, we have had a 20% average growth from the period between 2006 and 2010 in a market that grows between 2% and 3% a year
- Beyond that, our profitability has developed quite significantly as well
- We’ve grown from a 17% return on sales to a 31% return on sales in 2010
- And it goes beyond that. If you go back a couple more years, in 2004 we were in dire straits and had a negative return on sales of 15%. We changed a number of strategies
- “”We want to emphasize that **risk management is *not* about risk aversion**. If, or rather when, you want/need to take bigger chances than your competitors—and get away with it (succeed)—you need to be **better prepared**. The fastest race cars in the world have the best brakes and the best steering to enable them to be driven faster, not slower.
- “”Risk management should enable organizations to take the risks necessary to grow and create value. To quote racing legend Mario Andretti: “If everything’s under control, you’re going too slow.” ““


## Appendix -- Real vs Financial Options

## Illustrative Example – The Issue

- **US-American** equipment manufacturer ...
- ... earns **half of its revenues abroad** (primarily in Europe), ...
- ... but currently **produces** exclusively **in the U.S.**
- As the **Dollar strengthens** relative to the Euro and other currencies, profit margins on foreign sales decrease
  - Assuming prices remain unchanged
- Furthermore, **competitors** whose production facilities are located **abroad** are **able to lower the prices** they charge for their products in the U.S. while still maintaining their margins, and may even be able to boost their market share
  - As a result, even the domestic component of the American firm's business suffers as a result of the stronger Dollar

What to Do?

## Illustrative Example – The Alternatives

- Hedge the transaction and competitive risks by using **financial contracts**
    - Taking short positions in Euro forwards or ...
    - ... long positions in Euro put options
  - Building **production facilities** abroad
    - Locating a production facility in Europe could ensure that the currency denomination of its operating expenses matches more closely that of its revenues
- 
- If the exchange rate is volatile and the firm's plants have excess capacity, it will have a valuable option to switch production between its domestic and foreign plants
    - This will provide the American firm with an important competitive advantage over rivals that lack a global production network



## Illustrative Example – The Costs

- Creating the real option to switch production locations will require an **initial investment**, and there likely will be subsequent **costs associated with switching locations**, i.e. exercising the option
- A **foreign exchange option** or derivatives strategy may provide a similar cash flow as the real option at **lower cost (??)**
- ... or: Conversely, the **real option** may be **less expensive (??)** for high levels of exchange rate volatility, since the cost of building the production facilities will be much less sensitive to the level of volatility than would be the cost of the financial options
- This cost difference will also increase as the **time horizon** lengthens

## Illustrative Example – The Preliminary Conclusions

- What **real options** does the firm **currently** have
  - ... and is it exercising these options in such a way as to both manage its exposure and exploit uncertainty in an optimal fashion?
- What opportunities does the firm have to **invest in new real options** or in enhancing the value of its existing options?
- Do these real options provide a cost efficient **alternative to using financial options or insurance**?
- Do they **protect against risks not covered by financial and insurance** contracts?
- Will firms ever **combine** investments in both real options and financial derivatives, and if so how do these investments interact?
- Would using financial derivatives remove the very source of real option value, namely the underlying exposure to uncertainty?
- Might a firm's investment in **real options** actually **introduce risk** that must then be hedged by other means?

## Classification of Risks

Risk Category	Examples
Technological	R&D outcome risk Production breakdown Implementing new technology Defective products Force majeure risks
Economic	Material and labor costs Output price risk Product demand uncertainty Market share risk
Financial	Interest rate risk Currency rate risk Commodity price risk Security holdings risk
Performance	Subcontractor performance Judicial risk Credit risk of contract counterparties
Legal/Regulatory	Tax law changes Environmental regulation changes Political regime switches or insurrection Expropriation

## Why Manage Risk?

- Decrease probability of incurring bankruptcy or reorganization costs
- Enter into contracts with better terms (with suppliers, customers, employees)
- Reduce incidence of value-decreasing investment decisions
- Increase debt capacity and maximize value of debt tax shields
- Avoid costly external financing, or underinvesting due to financial constraints
- Lower cost of performance-based compensation to risk-averse employees
- Hedge owners' risk if they are not sufficiently well diversified
- Decrease incidence of falling short of earnings targets
- Mimic industry peers to avoid underperforming benchmark

## Different Contractual Mechanisms for Managing Risk

Purpose of Contract	Examples
Exploit differences in risk-bearing capacity	Financial derivatives Contracts for delivery of products Insurance contracts
Transfer risk to party that is best able to control it	Subcontractor performance contracts Employee compensation contracts
Both risk control and risk bearing are considerations in contract design	Maturity structure of debt Convertible bonds Joint ventures Warranties

## Conventional and Real Option Risk Management Solutions

Type of Risk	Risk Management Solution
Technological	Invest in prevention (maintenance)
Product liability	Quality control to prevent defective products
Profit margins	Decrease operating leverage and volume exposure
R&D outcome	Stage R&D investment
Obsolescence	Delay investment until some of the uncertainty is resolved
Input price	Flexible production system: switch between inputs; hold inventories
Output price	Delay investment; output mix flexibility; close or abandon plant
Competition	Shorten lead times to get product to market
Product demand	Option to expand or contract; diversify product lines or services
Currency	Locate plants abroad with ability to switch production location
Legal/Tax	Plant location flexibility; option to exit

## Using Real vs Financial Options for Hedging

- Like financial options, real options provide the firm with an opportunity to limit its downside risks while allowing for profit on the upside
  - But, at what cost to the firm?
- Are real options ever free?
  - **In some cases, “yes”**. Firms usually have the ability to **delay** projects as they wish and also have options to walk away from failing projects
- And, previous investments in **R&D / marketing** / flexible **production** facilities may be valuable real options that the firm can now capitalize on
- **Financial options** or derivatives strategies can in theory be designed to yield the **same contingent payoff** structure as a real option ...
  - ... **assuming there are derivatives traded** on the corresponding underlying variables
- Real options may not only provide the most inexpensive opportunity to manage risk, they may in fact be the only available means to hedge certain types of risk
  - ... including technical risks, competitive risks, demand level risks, and regulatory risks
- A **key difference** between real and financial options is that **financial options** are **much more liquid** than real options
  - Real options take time to develop or acquire, and are difficult to sell off, whereas financial derivatives can be easily traded and positions can be quickly reversed

## But do Mind ...

- Hedging does not reduce the volatility of the underlying uncertainty, but rather reduces the volatility of the firm's cash flows
  - In the plant location example, the forward contracts will certainly not affect the volatility of the underlying exchange rates
  - They will simply help the firm reduce cash flow volatility in the future, and by so doing will add to, rather than detract from, the value of the firm's real options
- Real options should be optimally exercised regardless of the firm's financial derivatives position
  - Consider a firm that is planning on launching a project in one year's time based on a valuation today that uses the current level of interest rates
  - The firm decides to lock in this project value by entering into short positions on T-Bond futures contracts, thus hedging against an increase in interest rates
  - During the next year, interest rates in fact do increase. Should the firm still go ahead and invest in the project given that it has locked in the borrowing rate?
  - Not necessarily: The firm should redo its valuation analysis based on the prevailing level of interest rates
  - If this valuation indicates that the project is not viable, the firm should not proceed, and should simply walk away with the profits from its derivatives position



## The Derivative Dilemma: Yes, No & Maybe!

### How do we protect ourselves?

- A common sense approach is to adopt the **KISS** principle: **Keep it Short and Simple**
  - If a transaction requires the use of complex formulas, stay away from it.
  - The complex maths is there only to confuse the buyer. The best solutions can be explained in the simplest of words
- Invest in tools to price structured products if you buy them
- Invest in training the board members and the finance team in understanding derivatives.
- When in doubt – either call for reinforcements – use the experts
- And still not clear: Walk away

And finally investors (and directors too!) need to ask a few questions:

- Do these transactions help the firm reach its return goals?
- Do these transactions add to the total portfolio risk?
- Is the firm using derivatives to help create a better portfolio, or to concentrate risks because of institutional constraints?
- Does the manager using these techniques, have respect for their power?
- Does the manager use derivatives prudently?

## Appendix -- Hedging

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## Search for Effective Hedges – The Term

- The *Oxford Popular Dictionary and Thesaurus* defines a *hedge* as ...
- ... a fence of bushes or shrubs ...
- ... and, alternatively, as avoiding giving a direct answer or making a commitment
- In banking, finance, and treasury operations, the objective of *true hedging* is:  
**The reduction of risk that has been assumed through trading and investment**
- But while a hedge may reduce the *price risk* in the physical commodity market, ...
- ... it also becomes subject to *basis risk* and other exposures
- A given hedge tends to be regarded as *effective* if, at inception and throughout its life, the holder entity or investor can expect that the changes in the fair value or cash flows of a hedged item will be almost fully offset by changes in the fair value or cash flows of a hedging instrument
  - This is very rarely, if ever, the case
  - Banks tend to regard a hedge as “more or less effective” if the actual outcomes are within a range of 80-125% from targeted fair value or cash flow

## Search for Effective Hedges – Price Risk and Basis Risk

### Price Risk

- The risk of a decline in the value of a security or a portfolio
- Price risk is the biggest risk faced by all investors
  - Although price risk specific to a stock can be minimized through diversification, market risk cannot be diversified away
  - Price risk, while unavoidable, can be mitigated through the use of hedging techniques.

### Basis Risk

Difference between

- The spot price of the commodity being hedged, ...
- ... and the futures price provided by the hedge.
- The magnitude of basis risk should decline toward zero as the futures delivery day approaches
- But, basis risk is the risk associated with imperfect hedging
  - Difference between the asset whose price is to be hedged and the asset underlying the derivative
  - Mismatch between the expiration date of the futures and the actual selling date of the asset

## Search for Effective Hedges – Principle Types of Hedges

- *Cash flow hedges*
  - Interest rate swaps designed to protect against changes in cash flows of certain variable-rate debt issues
- *Fair value hedges*
  - Interest rate swaps used to protect against changes in the fair value of fixed-rate medium- to longer-term debt, due to changes in market interest rates

## Search for Effective Hedges – Legal Risk

### Examples

- Definition of a credit event
- Definition of the validity of a price discovery process
- Claims of misrepresentations or of unfair sales practices
- Amount of assumed exposure by protection writers - because of market value changes and potential changes — is provided by credit default swaps (CDSs)
  - Protection seller to lose the entire notional value of a CDS *if* the reference entity defaults and there is *no recovery* value to its obligations
  - By contrast, with other derivatives the amount of the loss is only the amount of the price move and it will likely represent only a portion of the notional amount

## Search for Effective Hedges – Counterparty Risk

- The risk to each party of a contract that the counterparty will not live up to its contractual obligations
- Counterparty risk as a risk to both parties and should be considered when evaluating a contract

### Mitigating Counterparty Risk

- Enter into collateral posting agreements with the counterparty
  - When your portfolio of transactions is an asset to you, your counterparty must post you cash (or cash equivalents) based upon a negotiated Credit Support Annex
- Purchase insurance related to the hedge provider
  - Ideally from a stable entity with a very high credit rating
  - CDS

## Search for Effective Hedges – Default Risk

- The current cost of replacing derivative contracts in a gain position.
- Varies by type of derivative instrument, depending on whether these products are over the counter or exchange traded, as well as some other criteria
- Futures contracts are exchange traded, and usually require daily cash settlement
- Swap agreements and forward contracts are OTC transacted, hence exposed to default risks to the extent of their replacement cost
- To reduce default risk, companies require collateral, principally securities of the U.S. government and its agencies or other gilts
  - From an economic standpoint, they evaluate default risk exposure net of related collateral
- Master netting agreements could provide protection in bankruptcy, in certain circumstances
  - In some cases, they may also enable receivables and payables with the same counterparty to be offset on the consolidated balance sheet



## Hedging Practices – Speculators and Investors

- Usually an investor – opposite form a speculators - risks own capital with the hope of making profits from volatility in market prices
  - By hedging, potential losses are sought to be off-set
- Speculators typically use capital of others — often borrowed or trusted money — and assume the risk that investors seek to avoid

Originally, it has been derived from the Latin *speculari*, which means to watch and observe, which is precisely what wise investors are – also – doing

- Watch price movements
- Observe market trends
- Take notice of supply and demand
- Monitor commercial deals
- Evaluate factors affecting prices
- Make their buy or sell decisions

Because they are using their own money, investors are more usually cautious. They act on their caution

- Scenario analysis
- Simulation
- Stress testing

## Types of Hedging Instruments – Price Discovery

### *Price discovery*

- Futures and options markets provide a competitive price setting mechanism for financial instruments and commodities
- Moreover, through derivatives, market players add liquidity to the market
- But every financial instrument and every commodity has its own characteristic ways in which products are timed, valued, inventoried, and traded:
  - The lifespan of futures and options contracts is relatively short
  - Unlike stocks or bonds, it is not possible to buy a commodity futures contract and put it away for years

## Types of Hedging Instruments – The Choice

### *Basis swaps*

- Variety of interest rate swap agreements by which variable rates are received and paid, but they are based on different index rates

### *Leveraged swaps*

- Another type of interest rate instrument whereby changes in the variable interest rate are multiplied by a contractual leverage factor
  - Such as four times the three-month London Interbank Offered Rate (LIBOR).

### *Currency forwards*

- Commonly employed to manage currency risk

### *Currency swaps*

- Preferred in situations in which
  - A long-dated forward market is not available, or
  - The client needs a customized instrument to hedge a foreign currency cash flow stream

### *Equity options,*

- Hedge equity price risk
- May require the writer to purchase or sell a specified stock or to make a cash payment based on changes in the market price of that stock, basket of stocks, or stock index

### *Credit spread risk*

- Hedge the possibility of changes of a given credit quality

## Right and Wrong Hedges

- Among others, Financial Accounting Standards Board (FASB) has established a rule requiring companies to show whether they are
  - Using derivatives to hedge risks connected to their business or
  - If they are just taking a risky bet in the hope of making extra profits
- A Bank had calculated its potential exposure to an IT Company not only in terms of loans but also in terms of hard- and software
- Estimated exposure stood at
  - Some \$300 million in loans
  - Roughly \$1 billion in software
  - About \$300 million in worth of equipment
- At a cost of 1% per year, the Bank bought insurance on the IT Company as a counterparty for 50% of the sum of its loans, hardware, and software exposure
- Airline took out forward currency contracts to buy dollars for yen, to hedge the future purchase of aircraft
- Contrary to projections, the dollar weakened against the yen, resulting in a \$1.7bn loss
- Losses were being ignored until aircraft were purchased, when (most irrationally) the extra cost was spread over the life of the assets through higher depreciation
- Nobody admitted that lost as a result of wrong hedging until an accounting change brought the torrent of red ink to light

## From Management Intent to Hedge Accounting

According to USGAAP and IFRS a quoted company should recognize and categorize derivatives financial instruments as either

- *Trading transactions*, including all customer and proprietary deals whether for profits or hedging, and/or
  - *Nontrading transactions*, held for *strictly hedging* purposes as part of the bank's risk management policy against assets, liabilities, or cash flows
- 
- Behaviors of the hedged and hedging instruments are most often asymmetric
  - *If* different accounting valuation methods are used for the different instruments, such as historical cost and accruals for the hedged item and marking-to-market for the hedging, ...
  - ... this will result in profit and loss account volatility
  - Hence accounting standards bodies have developed a specific accounting treatment, known as *hedge accounting*—a process subject to well-established rules

## Hedge Accounting

- An effective hedging relationship is one in which the entity achieves offsetting changes in fair value or cash flows for the risk being hedged,
- Therefore, the hedge's effectiveness or ineffectiveness must be recorded in accounting terms that are the same for all parties

For financial reporting purposes,

- The gain or loss on hedge transactions must be included in the profit and loss account, and
- Whether an asset or liability, the offsetting loss or gain on a firm hedge contract must be recognized and included in earnings

Gain or loss from the hedged instrument is recognized at the same time as the offsetting gain or loss from the hedging instrument

- For a derivative instrument designated as a *fair value hedge*, the gain or loss is recognized in earnings in the period of change together with the offsetting loss or gain on the hedged item attributed to the risk being hedged
- For a derivative designated as a *cash flow hedge*, the effective portion of the derivative's gain or loss is recognized in earnings when the hedged exposure affects earnings
  - The ineffective portion of gain or loss is also recognized in earnings

## Full-Fair-Value Accounting

*Full-fair-value* accounting avoids situations in which hedging relationships are identified ex post to deliberately massage profits and losses

The International Accounting Standards Board (IASB) laid down a number of specific requirements to qualify for hedge accounting

- Hedging relationship must be clearly identified and documented at inception
- Such relationships must be effective in their deliverables
- *If* this was a forecasted transaction, *then* the hedge's aftermath must be highly probable
- The message conveyed by these three requirements is that a hedge can qualify for hedge accounting only if it passes an *effectiveness test*
- A basic principle is that over the entire life of an effective hedging instrument, change(s) in fair value or cash flows of the hedged item can be expected to be almost fully offset by changes in the fair value or cash flows of the hedging instrument
  - When this is the case, the net impact on profit and loss over time is relatively small. As already noted, however, this is an ideal case (IAS 39)

## Full-Fair-Value Accounting (cont'd)

### The Fair Value Hedge

Measurement of Derivative Instrument

Change in Fair Value

— + / - —→

Measurement of Hedged Item

Change in Fair Value  
attributable to  
risk hedged

— + / - —→

Income  
Statement

### The Cash Flow Hedge

Measurement of Derivative

Change in  
Fair Value

Effective  
portion

Ineffective  
portion

Recognition

OCI  
(Shareholders'  
Equity)

↓ \*

Income  
Statement

\* Amounts are subsequently transferred out of OCI based on the same timing as the hedged item impacts income (interest income, interest expense, etc.)

### The Net Investment Hedge

Measurement of Derivative

Change in  
Fair Value

Effective  
Portion

Ineffective  
Portion

Recognition

Shareholders'  
Equity

↓ \*

Income  
Statement

Net Investment in Foreign Operation

Foreign Currency  
Gain / Loss

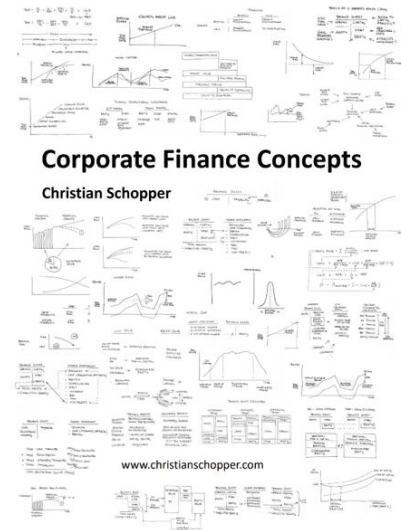
\* Amounts are subsequently transferred out of Shareholders' Equity in the same period during which corresponding exchange gains or losses arising from the translation of the financial statements of the foreign operation are recognized in net income.



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