

# Measuring and Managing Operational Risk

John Thirlwell

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- **What is operational risk?**
- The operational risk framework
- Management practice and regulatory expectations
- The challenge of quantification and reporting
- Can capital effectively be allocated for operational risk?

# Basel II definition of operational risk

“The risk of loss resulting from inadequate or failed internal processes, people and systems or from external events. This definition includes legal risk, but excludes strategic and reputational risk” (Basel II, para 644)

Originated from the BBA/ISDA/RMA 1999 Survey

- Attempt to be positive, i.e. not to say “everything except credit and market risk”
- Not intended as a bounded definition but to indicate the **scope** of OR
- A definition for regulatory capital rather than risk management purposes.

- Strategic (or business) risk – should they be included within operational risk?
- Where does reputation risk fit in?
- Where does reputation risk fit in to

CAUSE → EVENT → EFFECT ?

# The FSA view: CP 06/3 para 4.11

<b>ELEMENT 1 (Pillar 1)</b>	<b>ELEMENT 3 (not covered by Pillar 1)</b>	<b>ELEMENT 4 (External factors)</b>
Credit risk	Interest rate risk (banking book)	Business risk (earnings and costs)
Market risk	Concentration risk	Strategy
Operational risk	Liquidity risk	Economic and regulatory environment
	Settlement risk	
	Reputation risk	
<b>ELEMENT 2 (not fully covered by Pillar 1)</b>	Strategic risk	
Residual risk	Underwriting risk	
Securitisation risk	Pension risk	
Underestimation of credit risk (model risk)	Underestimation of credit risk (using standardised approach)	

Credit risk	Market risk	Liquidity risk	Insurance risk	Group risk	Operational risk
Operational controls					

# Is operational risk different from other risks?

	Credit risk/ Market risk	Operational risk
Is the risk transaction-based?		
Is the risk assumed proactively ?		
Can it be identified from accounting information eg the P&L?		
Can occurrence of the risk (all risk events) be audited?		
Can its financial impact be bounded or limited?		
Can you hold a position in the risk, i.e. can you close out or sell the risk?		

# Another way of looking at it – What keeps you awake at night?

Loss of reputation

Physical damage

Failure to change/adapt

Business interruption

Employee retention

Political risk

Product liability

General liability

Terrorism

Failure of key  
strategic alliance

Computer crime

... 75% not transferable – but  
manageable

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# ORM Framework

## Governance

### Key indicators

Identify risk and control indicators	Specify risk appetite
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Action plans

### Risk & Control Assessment

Identify risk and owner Assess likelihood and impact	Identify control and owner Assess design and performance
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Action plans

### Losses

Identify and capture internal and external losses	Analyse loss causes
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Action plans

## Modelling

## Reporting

Loss event data

# Attributes of loss event data

- **Loss category**
- **Amount – the basis of severity**
- **Date – the basis of frequency**
- Business activity, business unit
- Geographical location
- **Cause - narrative**
- **Effect/impact**

# Issues and decisions concerning loss data

- **Reporting threshold**
- **Near misses**
- **Indirect costs and costs to fix**
- Business interruption
- Foregone income
- Offsets and gains
- **“Boundary” losses**

# Uses of internal loss event data

- Focus management attention on areas of activity that are giving rise to losses
- Validate risk self-assessments, scenario analysis, key risk indicators and capital allocation.
- It is therefore extremely useful as *information*.

# External loss data

- Pooled, e.g. BBA GOLD, ORX, ABI and national data pools
  - All the concerns of internal data
  - As with internal data, its construction and nature will depend on the purpose for which it is gathered (e.g. benchmarking; raw data; causal; modelling; informing scenario analysis)
  - Different risk, control and reporting cultures
  - Exclusions (e.g. legal, insurance settlements)
  - Scaling
- Public data (e.g. FitchRisk, Aon (insurance claims), Willis)
- The use of external data
  - provide *information*
  - enhance OR management rather than measure “severe” losses
  - “External data is in the realm of *scenario analysis*” - Roger Cole, Chairman Basel Risk Management Group.

# Risk self-assessment

# Risk self-assessment

- Essentially a matrix to assess the frequency/probability and severity/impact of the risks which have been identified.
- Involves some degree of scoring - from traffic lights (red, amber, green) or H,M,L to larger number of grades and mathematical extrapolation. Ideally, should be minimum of 4 grades.

Assuming some metrics are used, these will be “logarithmic” . . .

# Matrix parameters - example 1

<b>Frequency</b>	
<i>Definition</i>	<i>Expected frequency</i>
Almost impossible	< 1 x 10 years
Rare	Between 1 x 1 yr and 1 x 10 years
Very unlikely	Between 1 x 1 month and 1 x 1
Unlikely	year Between 1- 5 x 1 month
Likely	Between 5 – 9 x 1 month
Very likely	> 9 x 1 month
<b>Severity</b>	
<i>Definition</i>	<i>Loss range</i>
Very severe	> 1000k
Severe	100k – 1000k
Moderate	10k – 100k
Small	1k – 10k

# What should impact relate to?

- assets?
- income?
- sales?
- capital?

But there's a missing ingredient . . .

# Control risk self-assessment

- Two assessments are required
  - Assuming controls work (net)
  - Assuming controls fail (gross)
- The final result will provide
  - A league table of risk exposures, which will drive management action and provide the basis for cost-benefit evaluations of new controls
  - A risk map for senior management
  - Feeds to internal and external auditors regarding the effectiveness or weaknesses in controls
  - The basis for Sarbanes-Oxley sign-off

# Frequency and severity – Traditional ORM

High (3)	3	6	9
Med (2)	2	4	6
Low (1)	1	2	3
	Low (1)	Med (2)	High (3)

# Frequency and severity - modern ORM

High (3)		n/a	n/a
Med (2)			n/a
Low (1)			
	Low (1)	Med (2)	High (3)

# Practical challenges

	<b>Losses</b>	<b>RCSA</b>
Objective (past)	Y	N?
Subjective (forward looking)	N	Y
Quality analysis by:	Finance	Management
Quantity available	Low?	Tailored
Collection time	Long	Short
Source	Accounts, but . . .	Management

# Key risk indicators

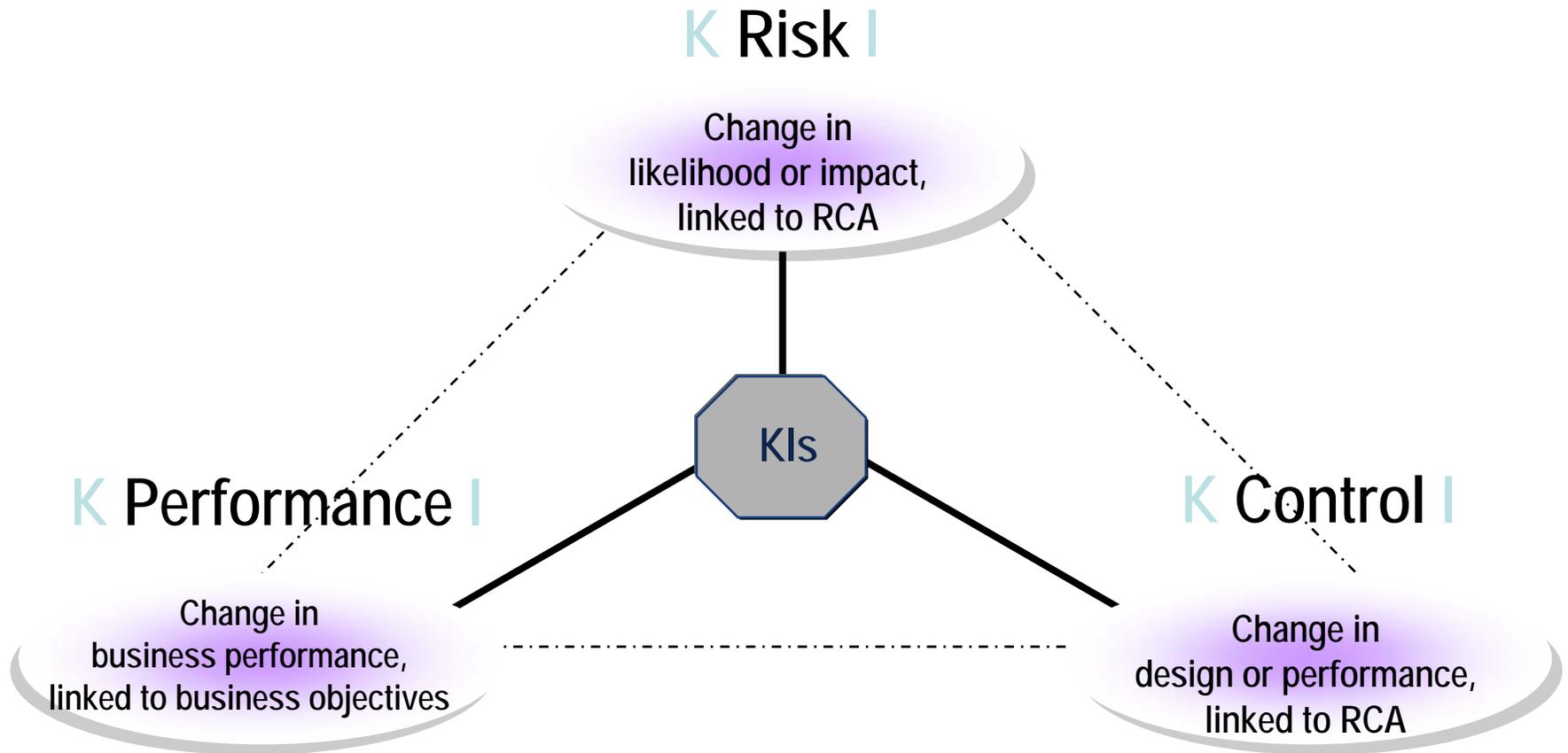
# What is (and is not) a KRI

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- Observed or calculated values used to show the state of a risk which is considered key
- A warning light of future risk exposure.
- Identifies factors which have not yet become events.
- Enables early detection and management of unacceptable risk in each function or process against predefined tolerance levels.
- Should be a meaningful driver of risk (ie related to *causal* factors)
- NOT:
  - A predictor of future risk severity or frequency
  - An indicator of control or control failure
  - An indicator of business performance

# Indicators

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# Working with the business

- Talk to the business about its risks and its current indicators
- Find out what indicators are significant
- Separate risk, control and performance indicators
- 60% to 70% of indicators for key risks are in the businesses already

# Examples of indicators

**Risk:**  
Client default on loan

**Control:**  
Credit Scoring

**RI:**  
Number of defaults

**CI:**  
Number of clients with high credit scores

**KPI:**  
Number of defaults by clients with high credit scores

**Risk:**  
Loss of staff

**Control:**  
Suite of training courses for staff to choose from

**RI:**  
Number of staff leaving

**CI:**  
No. of staff not attended a training course within last 6 months

**KPI:**  
Number of staff leaving without attending a training course within last 6 months

# Risk indicators - an Audit Committee perspective

## NB almost all Y/N

*[Audit Committee Institute (KPMG) – Shaping the Audit Committee agenda, May 2004]*

Inappropriate tone at the top	Unusually rapid growth
Frequent organisational changes	Unusual results or trends
High turnover of senior mgt	Industry softness or downturns
Lack of succession plans	Interest rate or currency exposures
Inexperienced management	Exposure to rapid technological changes
Lack of management oversight	Late surprises
Management over-ride	Autocratic management
Overly complex organisational structures or transactions	Ongoing or prior investigations by regulators or others
Untimely reporting and responses to audit committee enquiries	Excessive or inappropriate performance-based compensation
Unrealistic earnings expectations (by firm or financial community)	Lack of transparency in business model and purposes of transactions

# What does risk appetite mean in the context of operational risk?

- Can a limit be put on OR?
- Is zero reasonable – or meaningful?
- Must an “appetite” be capable of measurement, ie be a metric?
- If or where the answer is NO to the above, what do we mean by risk appetite? How do we manage it?
- Risk indicators can form the basis for a practical expression of risk appetite.

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# Regulatory expectations of banks (Standardised and AMA) (Basel II)

- *Board and senior management* involvement
- OR system *conceptually sound* and an integral part of the bank's management process
- *OR management function*
- Sufficient *resources* in major business lines, control and audit areas
- Policies *documented* (i.e. transparency, disclosure, audit trails)
- *Internal loss data*
- *Validation and independent review*

# Management involvement

FSA CP 06/3 clearly expects:

- CEO sign-off of ICAAP
- Senior management understanding
- ‘Use test’ – i.e. use as part of risk management, not as a capital calculation project.

NB The operational risk of merely calculating the operational risk capital requirement

# Stress and scenario tests

- Degree of stress equivalent to the recession of the early 1990's.
- Scenario tests can be the basis of assessing operational risk capital requirements.

# Pillar 2

- The ARROW process
- Risks to the FSA's objectives
- Gaps between expectation and practice
- Gaps between ICAAP and regulatory assessment (including diversification, correlation estimates)
- Always additive. Pillar 2 can never be less than zero.

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# Advanced Measurement Approach – quantitative standards (CRD)

- Capital required for *expected (EL) and unexpected loss*, **unless** they can demonstrate their EL is adequately captured in internal business practices ie pricing.
- “a soundness standard comparable to a 99.9% *confidence interval over a one year period.*”
- Methodology to include *internal and external loss data, scenario analysis* and factors reflecting the *business environment and internal control systems.*
- *Avoid double counting.*

# Advanced Measurement Approach - quantitative criteria (Basel II)

Basel II is the same as the CRD with two differences:

- “. . . There may be cases where estimates of the 99.9<sup>th</sup> percentile confidence interval . . . would be unreliable for business lines with a heavy-tailed loss distribution and a small number of observed losses. In such cases scenario analysis and business environment and control factors may play a more dominant role in the risk measurement system.” [para 669(f)]
- Prior to implementation, “the Committee will review evolving industry practices regarding credible and consistent estimates of potential operational losses . . . *and may refine its proposals if appropriate.*” [para 668]

# Quantification and reporting

- Losses
  - incomplete
  - many high frequency, but low impact
  - few low frequency, high impact
  - not forward looking
- Risk self-assessment
  - subjective assessments
  - forward looking over capital time horizon and can assume confidence interval
  - Allowing for correlations (subjectively assessed) can form the basis of a capital assessment
- Indicators
  - forward looking but don't predict severity or frequency of risk exposure

# Achieving the soundness standard – possible approaches

- Scaling
- Stress testing
- Scenario analysis
- Back testing
- Boot-strapping

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# Capital assessment and capital allocation for operational risk

- What do ***you*** mean by OR?
- Is OR the same as other risks?
- How much of operational risk data is relevant to a forward-looking capital assessment?
- How much data do we have?
- Are current actuarial methodologies relevant?
- Are they capable of reaching the required soundness standard?
- We won't achieve what's required until we at least work out . . .

“It is the cause, it is the cause, my  
soul.”

[Othello, Act V, scene 2]

**John Thirlwell**

**Tel: 020 8386 8019**

**E-mail: [info@johnthirlwell.co.uk](mailto:info@johnthirlwell.co.uk)**