



Basel II and Lean Six Sigma Approach to Operational Risk

Risk Practice | Dec 10



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Appendix A

Basel II Operational Risk Framework

Pillar 1 – Minimum Capital Requirements

Appendix B

Lean Six Sigma methodology and models

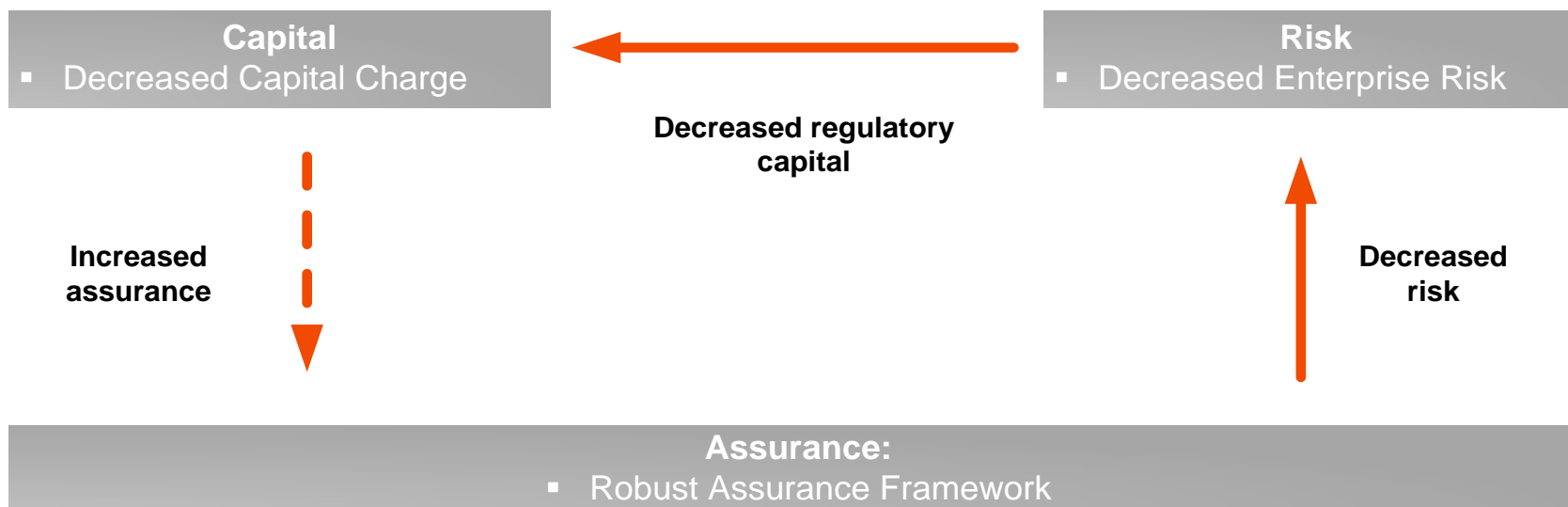
Scorecard



Enterprise Risk | Regulatory Cycle

- A **robust** and **integrated** enterprise risk assurance framework leads to a **decrease** in enterprise risk
- With a lower enterprise risk value, **the regulatory capital charge** should decrease
- An accurate regulatory capital holding gives the board and shareholders a greater **assurance** that the firm can withstand future instability

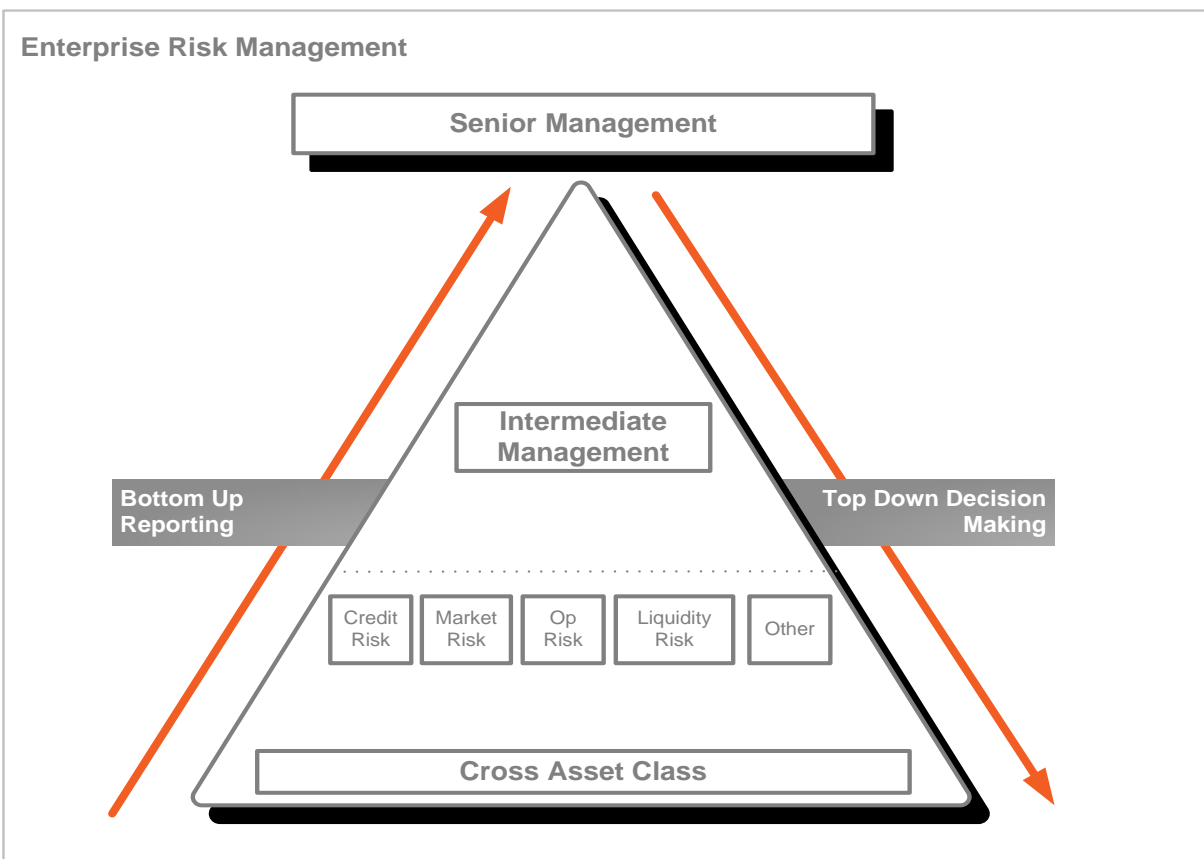
The Regulatory Cycle





Enterprise Risk | Reporting

- Risk is captured across asset class and risk disciplines at a **transaction level**
- Risk reporting is **aggregated** and **reviewed** by intermediated management
- High level **dashboards** and **exceptions** are presented to senior management
- Senior management make **informed** decisions





What is Risk under Basel II (plus ref Solvency II) ?

- Basel II looks to quantify the following three risks and are broadly defined as

Market Risk	<ul style="list-style-type: none">▪ Exposure to movements in risk factors▪ On positions which we can choose to close out▪ Risk factors in trading positions
Credit Risk	<ul style="list-style-type: none">▪ Exposure to failure to perform▪ Cannot choose to close out underlying transaction▪ Although we may be able to distribute risk▪ Issuer risk and concentration risk
Operational Risk	<ul style="list-style-type: none">▪ Exposure to failure of people, processes and systems▪ Both internal and external – do not choose to take on▪ Harder to measure▪ Concentration on identifying / mitigating

From a regulatory point of view, all market, credit and operational risk consists of three components:

- **Pillar I – Minimum Capital Requirements**
- **Pillar II – Supervisory Review Process**
- **Pillar III – Market Discipline / Disclosure**

This works equally for Basel II as well as Solvency II, which can be considered at a high level the insurance equivalent to Basel II



Operational Risk under Basel II (plus ref Solvency II) ?

BIS Committee has adopted a common industry definition of operational risk, namely:

“the risk of direct or indirect loss resulting from inadequate or failed internal processes, people and systems or from external events”.

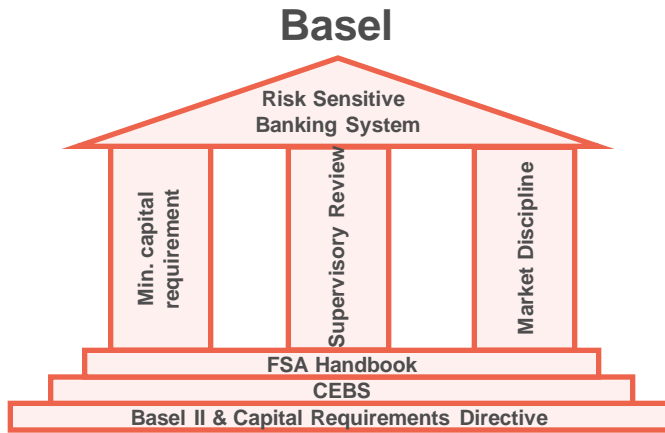
However, the Basel Committee recognizes that operational risk is a term that has a variety of meanings and therefore, for internal purposes, banks are permitted to adopt their own definitions of operational risk, provided the minimum elements in the Committee's definition are included.

Specifically, operational risk is part of regulatory risk manifested in Basel II/III and Solvency II implementation and their enforcement through UK and EU law

The upside is that by complying, it could save regulatory capital for the Banks/Insurance firms as well.



Regulatory reasons (Basel II mapped to Solvency II)



➤ Minimum capital requirement

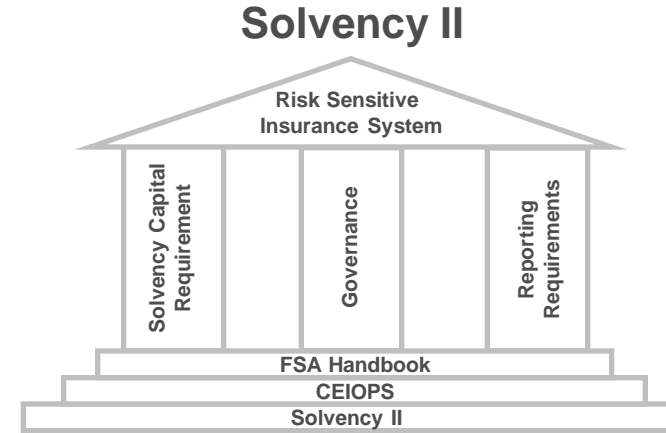
- For Credit, Market and Operational Risk different levels of sophistication are possible. As the degree of sophistication becomes apparent, the capital requirement declines which is a major incentive to move to the more sophisticated approaches.

➤ Supervisory review

- Senior management sponsorship, risk strategy and policy setting, organisational structure, risk categorisation, qualitative and/or quantitative risk assessment methodologies and tools, management and risk reporting, training and education programmes.
- Ensuring compliance with the Sound Practice document.
- Links to existing initiatives.

➤ Market discipline

- Qualitative disclosures of the operational risk approach adopted and quantitative disclosures for the more advanced approaches



➤ Solvency Capital Requirement

- Requires that minimum solvency capital requirements be set and that a firm should be familiar with the structure and application of the Solvency Capital Requirement (SCR) as articulated in QIS4, the fourth of a series of Quantitative Impact Studies published by CEIOPS. Alternatively firms may calculate their SCR using an internal model. This may represent a more efficient use of capital - but it will be subject to initial and ongoing supervisory approval.

➤ Governance

- Requires regulated firms to assess and manage the risks to which they are exposed and to assess their own capital needs and maintain that capital. The firm's assessment of its capital needs and of its risks is subject to supervisory review.

➤ Reporting Requirements

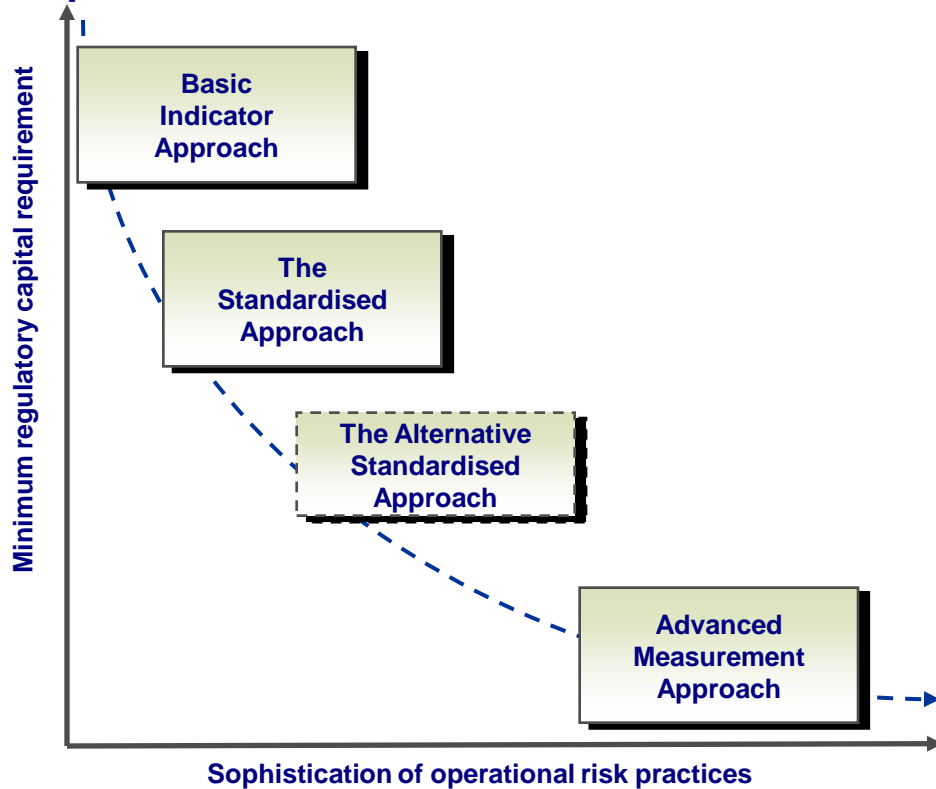
- Requires regulated firms to disclose publicly, key information that is relevant to market participants. Its purpose is to enhance market discipline on the regulated firm.



Operational Risk Under Basel Pillar 1 (see detail in Appendix A)

Pillar I approaches:

“The risk of loss resulting from inadequate or failed internal processes, people and systems or from external events.” Includes legal risk, but excludes strategic and reputational risk.



Basic Indicator Approach:

All business types - Gross Income x 15%

The Standardised Approach:

Corporate Finance - Gross Income x 18%

Trading & Sales - Gross Income x 18%

Retail Banking - Gross Income x 12%

Commercial Banking - Gross Income x 15%

Payment & Settlement - Gross Income x 18%

Agency Services - Gross Income x 15%

Retail Brokerage - Gross Income x 12%

Asset Management - Gross Income x 12%

The Alternative Standardised Approach:

Retail Banking – Loans & Advances x 0.035 x 12%

Commercial Banking - Loans & Advances x 0.035 x 15%

All other businesses – as per the Standardised Approach

Advanced Measurement Approach:

Based on output from internal operational risk measurement / modelling approach

Subject to combined regulatory capital ‘floor’ for operational, credit & market risks - 90% of current minimum capital requirements for 1st year & 80% for 2nd year 1

3 Year Average of Gross Income is employed in the capital estimate

Adoption of each approach is subject to compliance with defined ‘qualifying criteria’
FSA expects the sophistication of banks to evolve



Key questions re Operational risk modeling evolution

Key topics that will need to be addressed to mitigate operational risk in financial services:

- Operational risk is decomposed into a number of sub risks using business lines and risk categories defined by banks and insurance companies.
- Supervisors will need to develop standards to ensure that banks internal measurement methodologies capture all material elements of its operational risk.
- In each sub risk, data will need to be collected and robust estimation techniques (for event impact, frequency and aggregate operational loss) will need to be developed.
- The assumptions on the distribution types and estimations of the parameters are made and validated by the bank.
- Supervisors will need to design guidance to ensure appropriate validation has been applied.

The industry is therefore encouraged to continue its work on developing such approaches.



What is Lean Six Sigma ? (more detail refer to Appendix B)

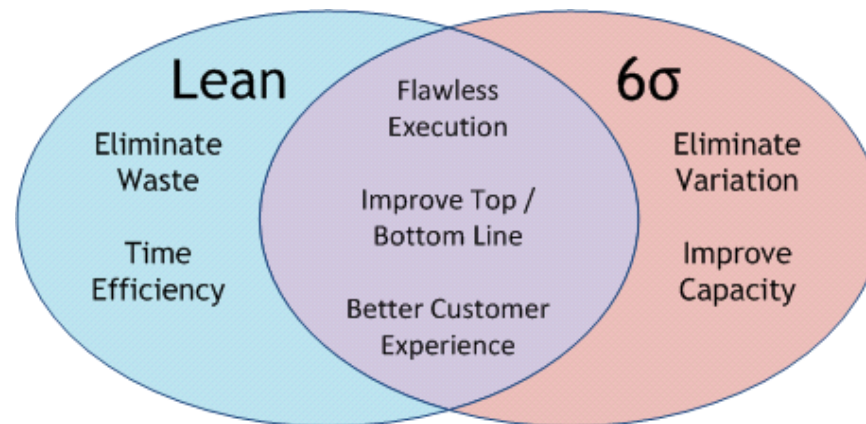
The combination of two separate methodologies established in manufacturing

- Lean is an approach to reducing waste in:

- Design
- Implementation
- Activity

- 6 Sigma is a statistical approach to reducing variation in:

- Processes
- Quality





Operational Risk and Lean Six Sigma ?

- Helps Causal analysis
- Minimized burden of implementing if already used
- Reduced duplication of effort within a business
- Shorter implementation programs if approach already used
- Flexible and scalable
- Integration of diverse risk, compliance and audit functions
- Simplified reporting and data analysis



Appendix A

Basel II Operational Risk Framework Pillar 1 – Minimum Capital Requirements

1) Basic Indicator Approach

- Uses a revenue-based proxy for scale and therefore risk at a institutional/corporate level.
- Uses an industry-wide calibrated rate, alpha factor for the institution.
 - Capital for operational risk equal to the average over the previous three years of positive annual gross income* X alpha (a fixed percentage).
 - Alpha is currently set to 15%.
 - Calibration at this level is supposed to equate to 12% of minimum regulatory capital **for the industry**.

Appendix A

Basel II Operational Risk Framework Pillar 1 – Minimum Capital Requirements



2) Standardized Approach

- Uses a revenue-based proxy for scale and therefore risk at a business line level.
- Uses industry-wide calibrated rates, beta factors for each business line.
- Capital is the summation (over 3 years) of positive annual gross income in a given year for each business line X the business line beta factor.

Standardized Approach Beta Factors	
Business Lines	Beta Factors
Corporate Finance	18%
Trading & Sales	18%
Retail Banking	12%
Commercial Banking	15%
Payments & Settlements	18%
Agency Services	15%
Asset Management	12%
Retail Brokerage	12%

Mapping of Business Lines	
Level 1	Level 2
Corporate Finance	Corporate Finance Municipal/Government Finance Merchant Banking Advisory Services
Trading & Sales	Sales Market Making Proprietary Positions Treasury
Retail Banking	Retail Banking Private Banking Card Services
Commerical Banking	Commercial Banking
Payments & Settlements	External Clients
Agency Services	Custody Corporate Actions Corporate Trust
Asset Management	Discretionary Funds Management Non Discretionary Funds Management
Retail Brokerage	Retail Brokerage

Appendix A

Basel II Operational Risk Framework

Pillar 1 – Minimum Capital Requirements



▪ **Advanced Measurement Approaches (AMA)**

AMA allows significant flexibility in using an internal risk measure as the basis for regulatory capital. It must be based on **Internal loss history**

Adjustments to the above for:

- Material changes in the measured control environment, or business mix
- de minimis gross loss threshold allowed to vary between and/or within banks, but must be broadly consistent with a bank's peers.
- Insurance coverage, partial use exception

Since the soundness required is a high quantile (99.9%, 1 year) it may be necessary to corroborate the measure above by reference to:

- Industry-wide loss experience
- Scenario analysis

AMA Qualifying Criteria

- Governance requires independent operational risk function.
- Board of Directors actively involved in oversight.
- Operational risk measurement is integrated into dynamic risk management process, including proper incentives.
- The framework is audited and validated.

AMA Soundness Standards:

- Expected Losses and Unexpected Losses
- Sufficiently granular risk measurement system
- Correlations
- Quality of internal loss data
- Business environment or risk factors
- Use of external data and scenario analysis where necessary
- Factors reflecting the business environment and internal control systems
- Inclusion of risk transfer products (e.g. insurance)

Appendix B

Lean Six Sigma methodology and models Scorecard Illustration



- Specific to CRSA or process, questions may include

- Size of loss
- Frequency of loss
- Benchmark to external data
- Timeliness of Reporting
- Control Override
- Significant change to last reported position

- Closed Form Answers

- Frequency / Severity Bandings
- Yes / No
- Timeliness Bandings
- Answers weighted according to behaviour

Attributes	Controls	Loss Events	Questionnaires	Linked Processes	Linked Risks	Score Card
Strategic Score Card			Risk Specific Score Card			
Has the bank suffered a single operational risk loss greater than £1,000,000 in the last 12 months?			Does this risk have any new controls?			
<input type="text" value="No"/>			<input type="text" value="No"/>			
Other than for test purposes has the bank activated its business continuity plan in the last 12 months?			Have any controls been manually over-riden in the last 12 months?			
<input type="text" value="No"/>			<input type="text" value="No"/>			
Has the bank acquired or merged with other entities in the last 12 months?			When were all linked controls last reviewed?			
<input type="text" value="No"/>			<input type="text" value="1 Month"/>			
Has the bank been subject to additional regulatory scrutiny over the last 12 months?			When was internal data relating a failure of any linked control last reported?			
<input type="text" value="Yes"/>			<input type="text" value="2 Month"/>			
Has the external rating of the bank moved by more than 2 notches over the last 12 months?			How long did it take to report the control failure?			
<input type="text" value="Yes"/>			<input type="text" value="Within 1 day"/>			
Total: 2			Total: 4			
/ Weighting: 5			/ Weighting: 25			
= Score: 0.40			= Score: 0.16			
			Final VET Score: 0.56			

- Result yields Sigma Shift Value (Qualitative Adjustment)
- Sigma value is area under the curve

Appendix B

Lean Six Sigma methodology and models Aggregation via Simulation

