



2008 Enterprise Risk Management Symposium

Operational Risk Management Workshop Session 3

Where Are the Gaps Between Where the Practice is Now to Where It Needs to Go and What Are the Steps to Close Those Gaps?

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Chicago

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2008 Enterprise Risk Management Symposium

Agenda

Characteristics of ORM Solutions

Policies

Methodologies

Infrastructure

ORM Vision

Failures of ORM Solutions

ORM of Trading Portfolio

Model Risk Management

Case Study 1: Canadian ABCP

Mitigation of OpRisk of Trading Portfolio

Case Study 2: Trading Losses at Société Générale

Assessment of OpRisk



Characteristics which are at the Core of Superior Operational Risk Management (ORM) Solutions

- *The ability to efficiently integrate all the components of operational risk on a *portfolio basis as well as to effectively operate in complex *markets*
- *while serving *customers as well as satisfying *regulators is a direct function of the quality of the operational risk policies, methodologies and infrastructure*

*** Regulators
Rating
Agencies
Equity Analysts**





A key challenge internally and externally (e.g. rating agencies) is to benchmark the quality of operational risk management

Effective Ops Risk Management

Policy

Increasing ORM Sophistication

Methodology

+ Performance Measurement
+ Pricing Ops Risk } Risk Adjusted Profitability (RAROC)

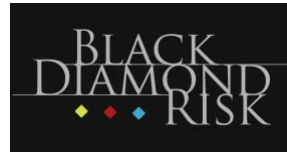
+ Accounting Capital
+ Economic (Risk) Capital
+ Basel II & Solvency II } Manage Ops Risk Capital

+ Value at Risk (OpVAR)
+ Stress Test & Scenario Analysis } Ops Risk Analysis

+ Monitor, Identify & Avoid } Limit Management

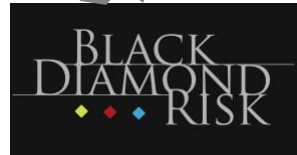
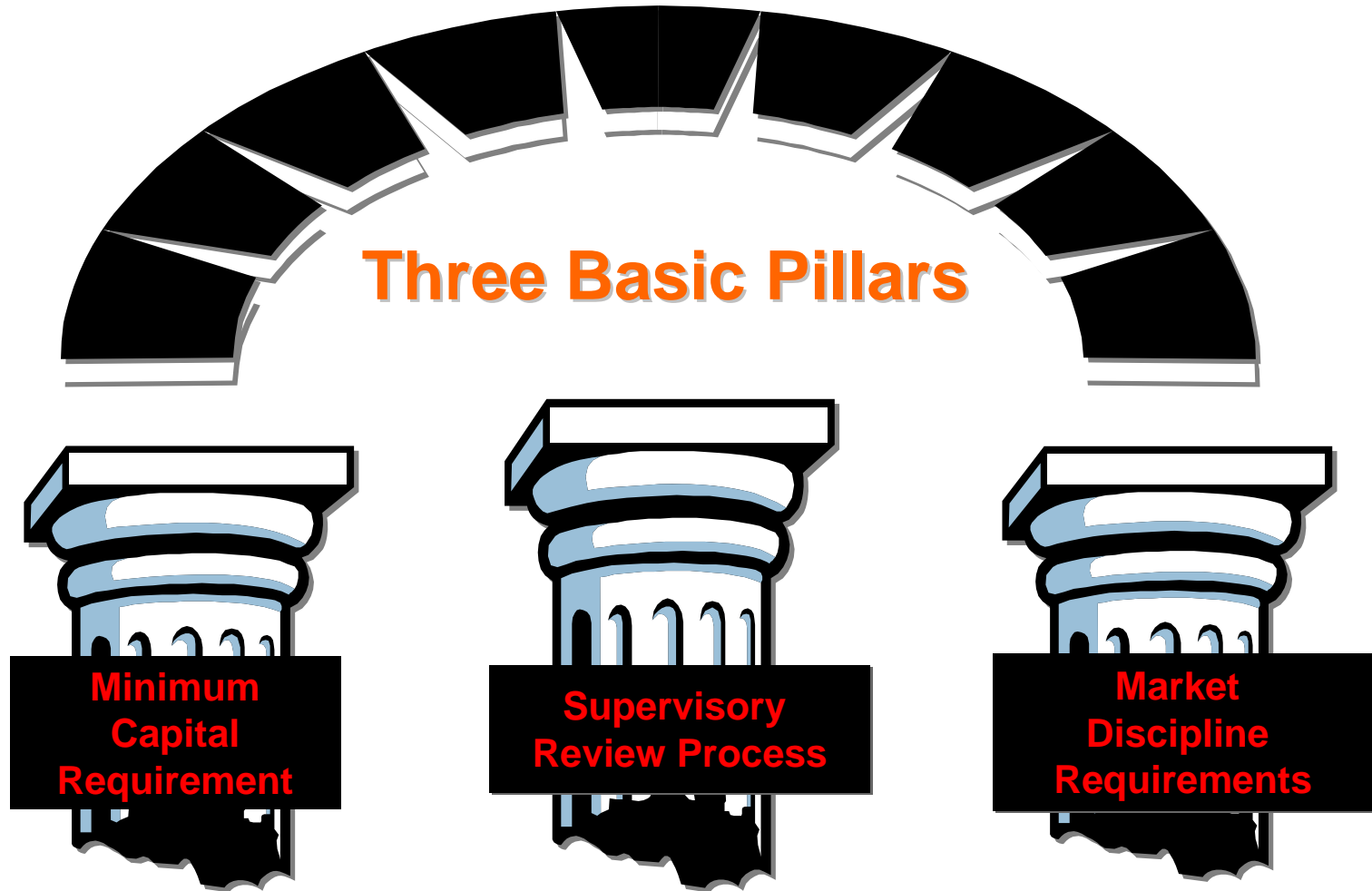
Effective Ops Risk Management

Infrastructure



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The spend on Operational Risk has become increasingly driven by integrated demands (e.g. Basel II , Solvency II , **Rating Agencies** , SOX, AML, etc)



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Characteristics of Policies at the Core of Superior ORM Solutions

- *The tolerance for operational risk is integrated and consistent with the Business Strategies (and visa versa)*
- *Operational Risk measures are backtested, **authorities are expressed in meaningful terms** and reflect a desired tolerance for risk*
- *Operational Risk is **properly disclosed** (e.g. a hit parade of risks) internally and externally on a drill down and integrated portfolio management basis*



Operational Risk Culture – Starts with Accountability at the Top

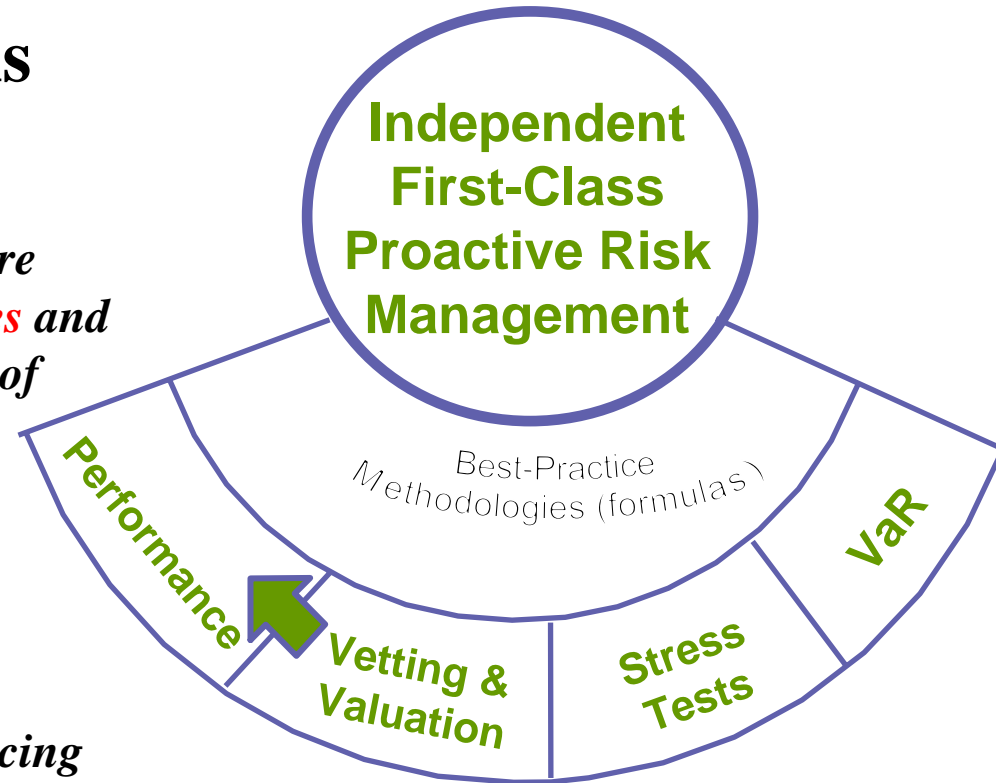


- “I was not aware”
- “I did not have any knowledge”

The Rating Agencies are placing steadily increasing pressure on the board and senior management to demonstrate that they are aware of the key risks

Characteristics of Methodologies at the Core of Superior ORM Solutions

- *OpVaR and Stress Test methodologies are **predictive of the actual operational losses** and integrated across all risks and all books of business*
- *Ops Risk models are properly vetted.*
- *Positions are properly valued*
- *Ops Risk methodologies are tied into pricing and performance measurement (and becomes a bigger deal with SOX).*



Example: Monte Carlo simulation

- Developing operational loss profiles...

$$\text{OpVaR} = f(\text{KRI}) = f(\text{SD}, \#E, \text{DQ}, \#T)$$

Major Stats Outputs		KRIs		Average
Expected Loss	\$100,000	Systems Down Time		4.98
Severe Loss*	\$23,305	# of Transactions		100002.87
Catastrophic Loss	\$13,823	Data Quality		94.97
Average loss per day	\$100,136	# of Employees		19.99

Severe Loss +
Catastrophic Loss =
Unexpected Loss

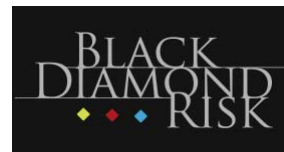
Minor Stats Outputs			
0.1 percentale	\$69,715	Maximum	\$137,128
1 percentile	\$75,804	Minimum	\$68,839
5 percentale	\$84,583		
10 percentile	\$87,645		
90 percentile	\$112,568		
95 percentile	\$117,093		
99 percentile*	\$123,305		
99.9 percentile	\$135,182		

Calculation of Catastrophic Loss:

$$\begin{array}{r} \$137,128 \\ -) \$123,305 \\ \hline \$13,823 \end{array}$$

Calculation of capital requirement
(expected loss + severe loss) =
99 percentile loss amount

Note: 1) Correlation among each of
KRIs is "0"

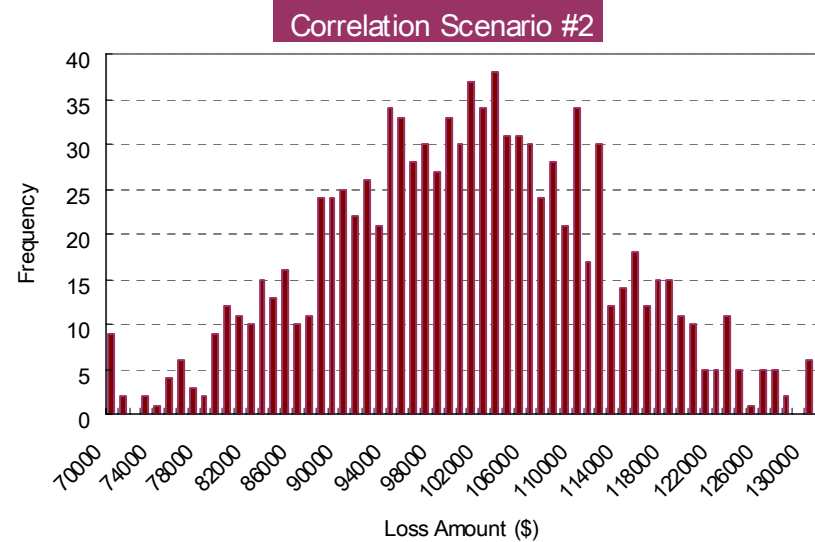
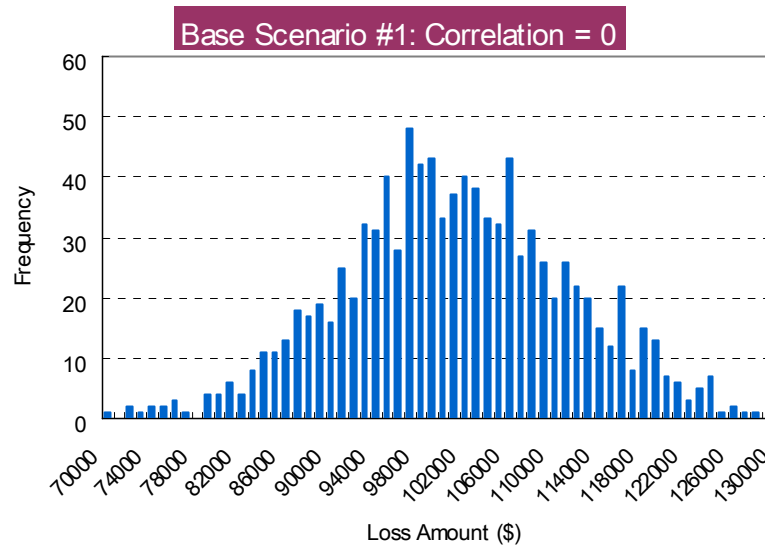


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Measuring impact of Correlation (between KRIs)

- Assuming that the Systems Downtime (minutes) is more negatively correlated with Data Quality (percentage), catastrophic loss will become larger...

Major Stats Outputs	KRIs	Major Outputs	KRIs	Major Outputs	KRIs
Expected Loss	Systems Down Time	\$100,000	4.98	\$100,000	4.98
Severe Loss	# of Transactions	\$23,305	100,002.87	\$28,188	100,002.87
Catastrophic Loss	Data Quality	\$13,823	94.97	\$14,324	95.00
Average loss per day	# of Employees	\$100,136	19.99	\$100,136	19.99



Note*: Severe Loss is based 99% confidence interval level.



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Model Risk Example:

Correlation models failed in sub prime crises

Factor model for asset return correlations

First level:

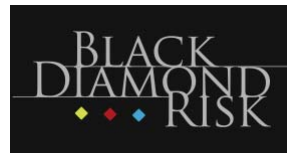
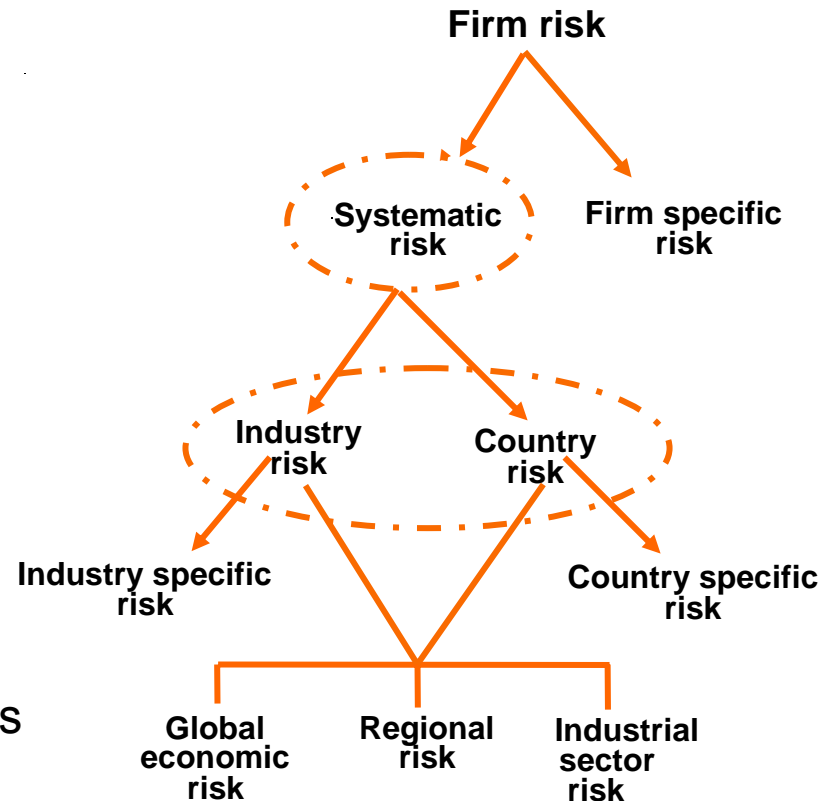
- Composite factor

Second level:

- Country and industry factors

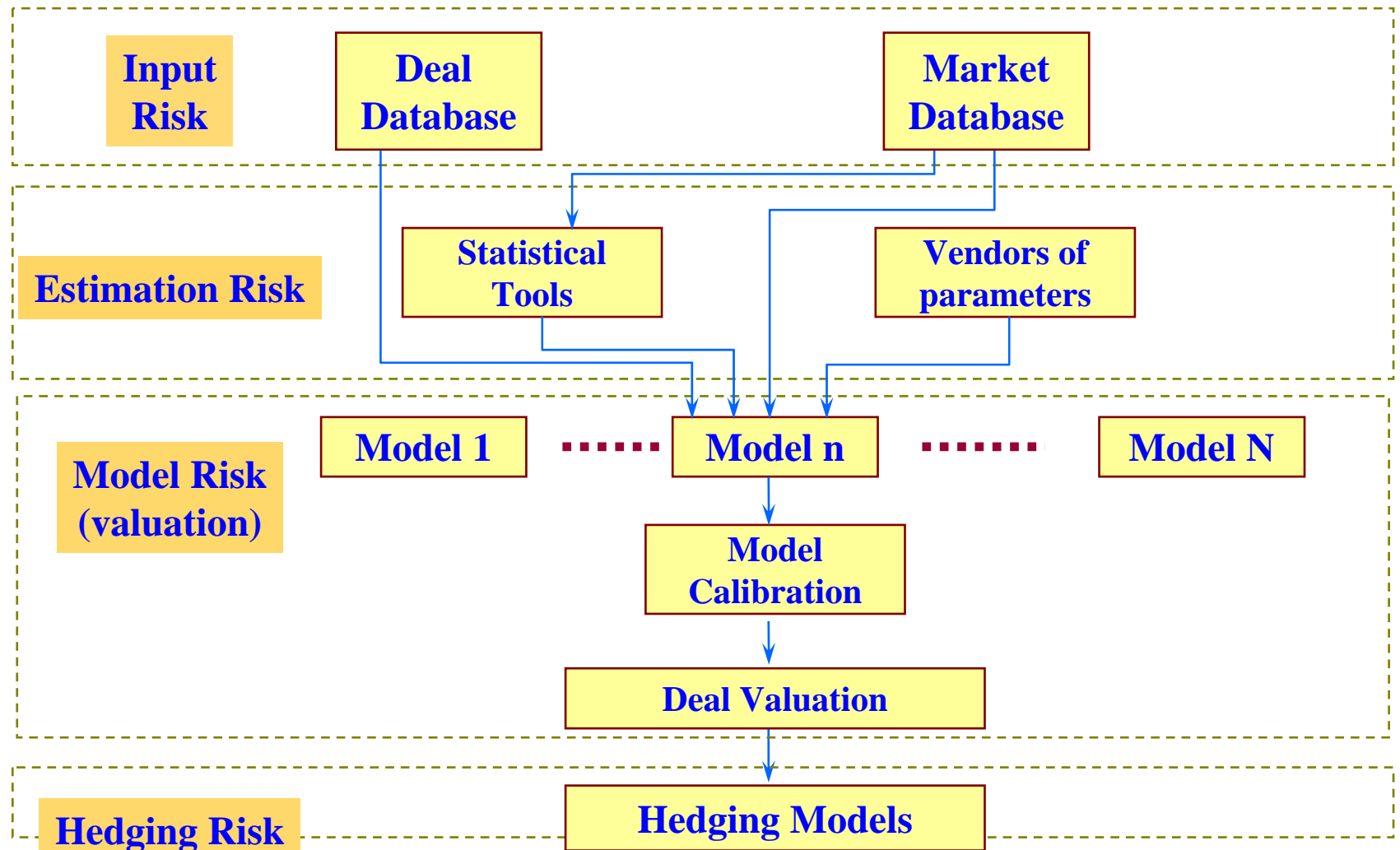
Third level:

- Global, regional and sector factors

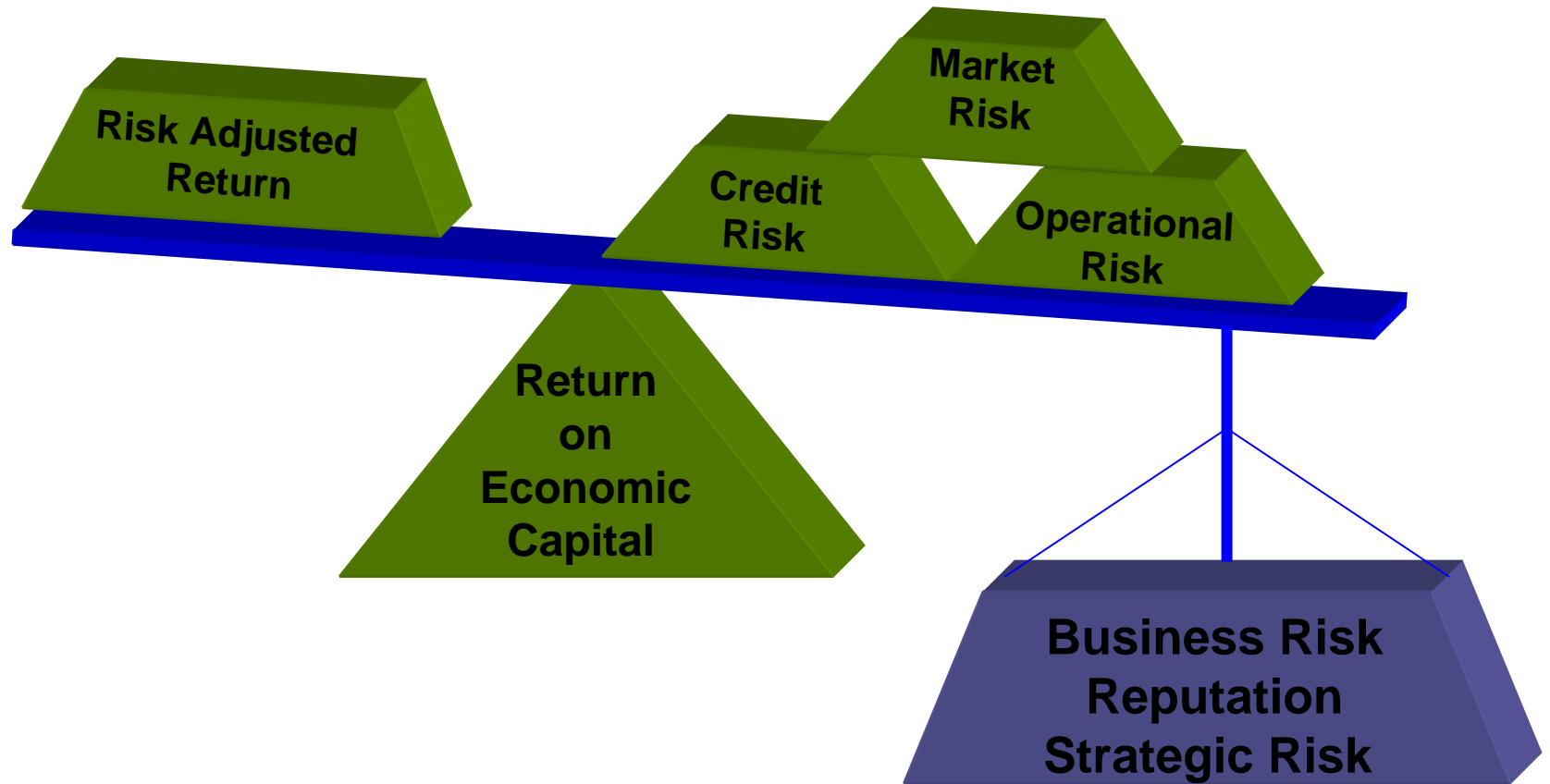


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Model Risk Mitigation : Model vetting Example



Example: A key characteristic of *superior risk methodologies* is that they are able to captures the portfolio effects across all the appropriate RAROC factors





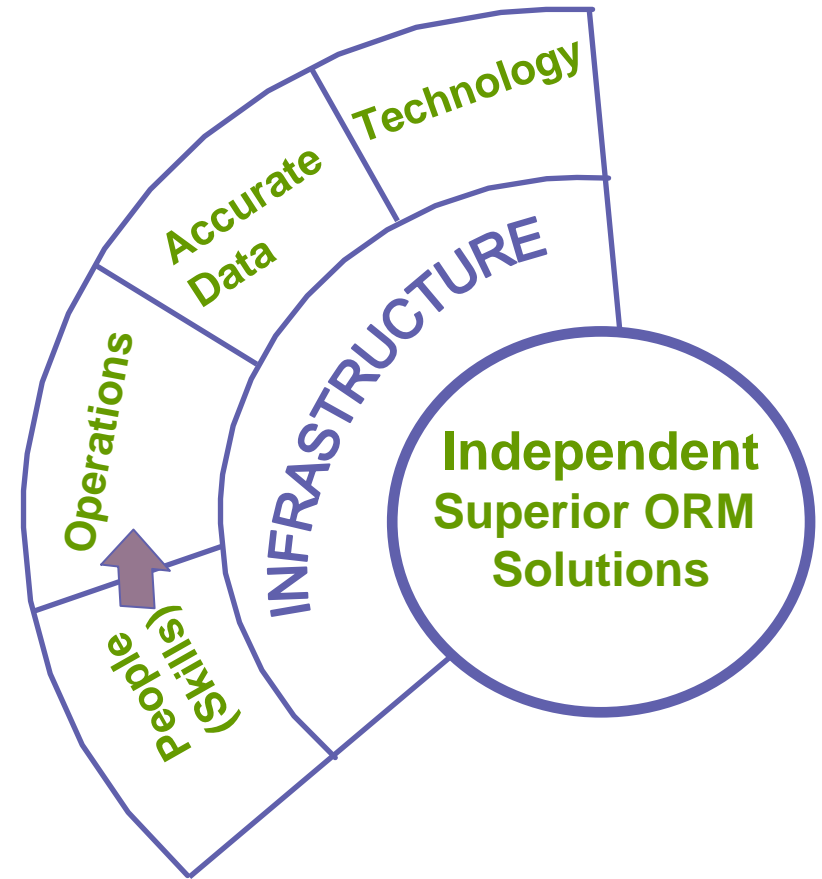
Significant progress has been made in measuring market risk ,
credit risk , hazard risk but



***having a a highly reliable unified measure of operational risk inside of a
common risk framework is at the core of superior ERM solutions***

Characteristics of Infrastructure at the Core of Superior Operational Risk Solutions

- *The appropriate people in place with the right operational risk skills*
- *An integrated operational risk infrastructure*
- *An integrated operational risk data infrastructure*
- *Timely access to operational risk data (e.g. transaction data, legal data ,etc)*

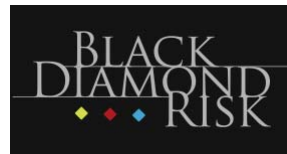
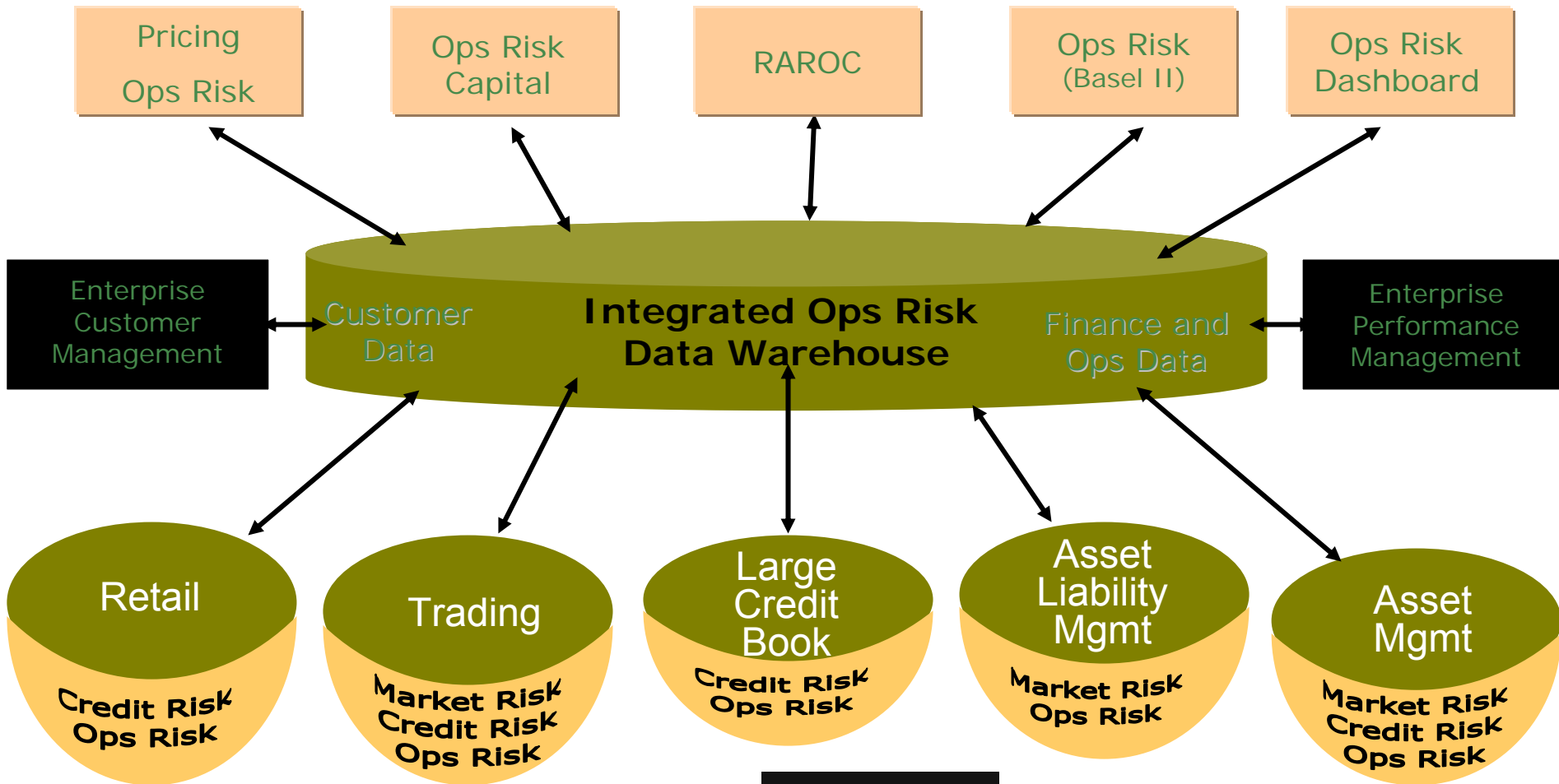




The right set of questions with respect to having the appropriate ops risk people in place include asking:

- Do they permit hiring and retention of qualified ops risk staff with the right **compensation, stature** and **career paths** ?
- Are resources and budget provided to ops risk management sufficient?
- What is the size of the overall ops risk management function's budget?
- What is the process of how the cost of the ops risk management function's budget is allocated to the various business units?
- What is the level of education in ops risk management (bachelors, masters, Ph.D.)?
- Does the ops risk function include experienced former business persons?
- How many years of experience does the ops risk management function have?

ORM Vision: Add Economic and Strategic Value at both the business (revenue generation) and risk management levels



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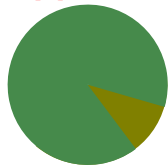


ORM Vision: A Single Integrated Ops Risk View enables Better, Faster Risk Decisions

- Ops Risk Query **complexity** grows
- Workload risk **mixture** grows
- Ops Risk data **volume** grows
- **Ops risk Schema** complexity grows
- Depth of ops risk **history** grows
- Number of **users** of the ops risk system grows
- **Expectations** grows

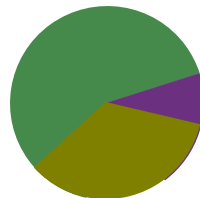
Ops Risk Workload Complexity

Ops Risk REPORTING
WHAT happened?



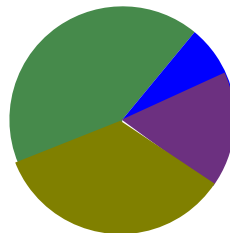
Primarily batch

ANALYZING
Ops Risk WHY
did it happen?



Increase in ad hoc ops risk analysis

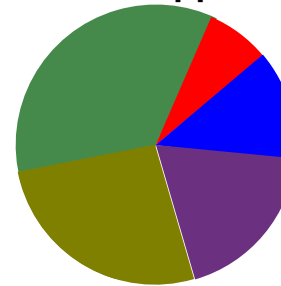
PREDICTING
WHAT WILL happen?



Sophisticated Ops Risk Analytical modeling

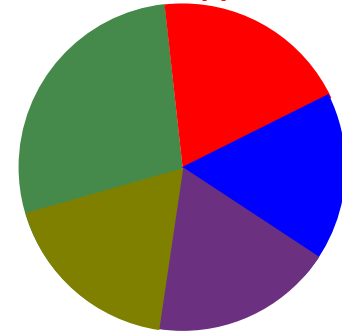
Ops Risk Data Sophistication

OPERATIONALIZING
WHAT IS happening?

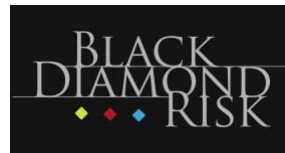
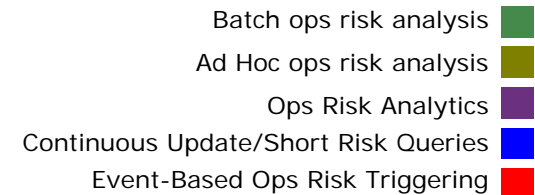


Continuous update and time-sensitive ops risk queries become important

ACTIVATING
MAKE it happen!

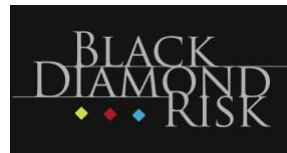


Event-based ops risk triggering takes hold (best)

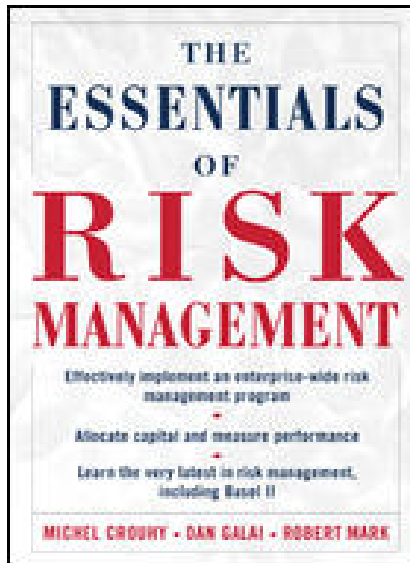




Basel II Level 2. Operational Risk Loss Event Classification to Level 3.				
Event Type, (7)	Definitions	Categories (Level 2)	Insurance Coverage Available	Activity (Some Examples Only - Not Comprehensive) (Level 3)
3. Employment Practices & Workplace Safety	Losses arising from acts inconsistent with employment, health or safety laws or agreements, from payment of personal injury claims, or from diversity/discrimination events	3.A. Employee Relations	No	3.A.1. Compensation 3.A.2. Benefit 3.A.3. Termination issues 3.A.4. Organized labor activity
		3.B. Safe Environment	Yes	3.B.1. General Liability 3.B.2. Employee health & safety rules events 3.B.3. Workers Compensation
		3.C. Diversity & Discrimination	Yes	3.C.1. All discrimination types
4. Clients, Products & Business Practices	Losses arising from an unintentional or negligent failure to meet a professional obligation to specific clients, (including fiduciary and suitability requirements), or from the nature or design of a product	4.A. Suitability, Disclosure & Fiduciary	Yes	4.A.1. Fiduciary breaches/guideline violations 4.A.2. Suitability/disclosure issues, (KYC, etc.) 4.A.3. Retail customer disclosure violations 4.A.4. Breach of privacy 4.A.5. Aggressive sales 4.A.6. Account churning 4.A.7. Misuse of confidential information
		4.B. Improper Business or Market Practices	No	4.B.1. Antitrust 4.B.2. Improper trade/market practices 4.B.3. Market manipulation 4.B.4. Insider trading on a firm's account 4.B.5. Unlicensed activity 4.B.6. Money Laundering
		4.C. Product Flaws	No	4.C.1. Product defects, (unauthorized, etc.) 4.C.2. Model Errors
		4.D. Selection, Sponsorship & Exposure	No	4.D.1. Failure to investigate client per guidelines 4.D.2. Exceeding client exposure limits
		4.E. Advisory Activities	No	4.E.1. Disputes over performance of advisory activities



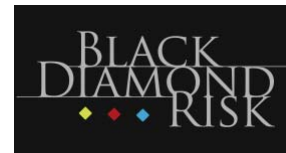
Recommended Value Added Unbiased References



- **Comprehensive user friendly description of Operational Risk Management**
- **No Math**



- **Detailed technical description of Operational Risk Management**
- **Analytical focus**



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Operational Risk Management Failures...

Institutions with significant trading portfolios are exposed to specific types of operational risk

- | | | |
|---|--|--|
| <ul style="list-style-type: none"> ❑ LTCM Hedge Fund <ul style="list-style-type: none"> – “Market neutral” arbitrage strategy | | <p>Breakdown of Vols & Corr pattern</p> <p>↑ Vols, ↑ Corr, ↓ Liquidity</p> |
| <ul style="list-style-type: none"> ❑ Enron Energy Trading <ul style="list-style-type: none"> – Valuation of long-dated Gas contracts | | <p>Extrapolation of forward price curve</p> |
| <ul style="list-style-type: none"> ❑ Bank of Montreal, U.S. <ul style="list-style-type: none"> – Valuation of commodity derivatives | | <p>Unique source of MTM</p> |
| <ul style="list-style-type: none"> ❑ Bank of England survey <ul style="list-style-type: none"> – Valuation of exotic Over-The-Counter (OTC) derivatives in 40 institutions | | <p>Differences up to 60% in MTM of exotic IR and FX derivatives</p> |
| <ul style="list-style-type: none"> ❑ Bank Société Générale <ul style="list-style-type: none"> – Derivatives trading (\$7.2bn loss) | | <p>Weak controls; Rogue trading</p> |
| <ul style="list-style-type: none"> ❑ U.S. Subprime Mortgages <ul style="list-style-type: none"> – Underwriting; Structuring (\$1tn); Rating; CDO | | <p>Erosion of market discipline, weak risk management</p> |



What is Operational Risk of a Trading Portfolio?

Anything that could keep an institution from timely, complete and accurate reporting of the fair value and exposure of its trading portfolio

Model Risk

- Unobservable market inputs
- Nonstandard models
- Faulty assumptions
- Lack of model vetting

Reporting Risk

- Limited disclosure
- Misclassification of assets
- Hedge Accounting requirements

Pricing Risk

- Off-market prices
- Stalled marks
- Lack of IPV
- Inadequate valuation adjustments



Business Risk

- Ineffective business planning
- Non-alignment between business goals and operational delivery
- Poor market knowledge
- Reputational damage
- Management failure

Process Risk

- Poorly controlled processes
- Inefficiency
- Errors and omissions
- Supplier failure
- Inability to cope with customer demand

Event Risk

- Computer systems breakdown
- Catastrophic events – fire, flood
- Regulatory clampdown



What is Model Risk?

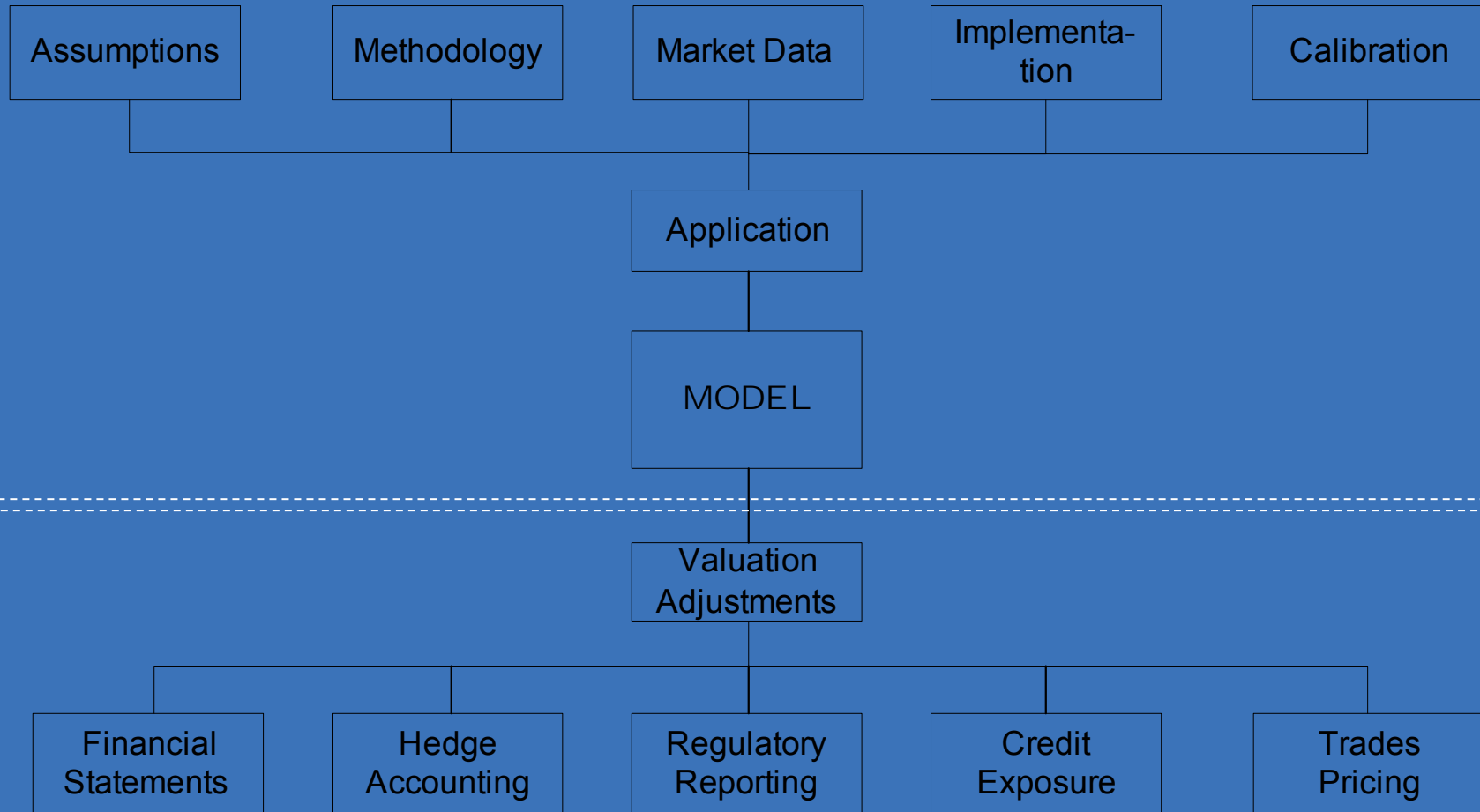
- Model Risk is a general term referring to the risk of financial loss or incorrect strategic decision resulting from the use of a mathematical model for
 - Valuation (Mark-to-Model, ALM behavioral models)
 - Risk Measurement (VaR, Stress Testing)
 - Performance Management (Economic Capital, RAROC)
 - Decision making (retail credit scoring, product management)

- The difference between the Mark-to-Model value of a complex and/or illiquid instrument, and the price at which the same instrument is revealed to have traded in the market is referred to as having been caused by Valuation Model Risk

- How could Model Risk be assessed?
 - Model Risk = Model Complexity x Impact

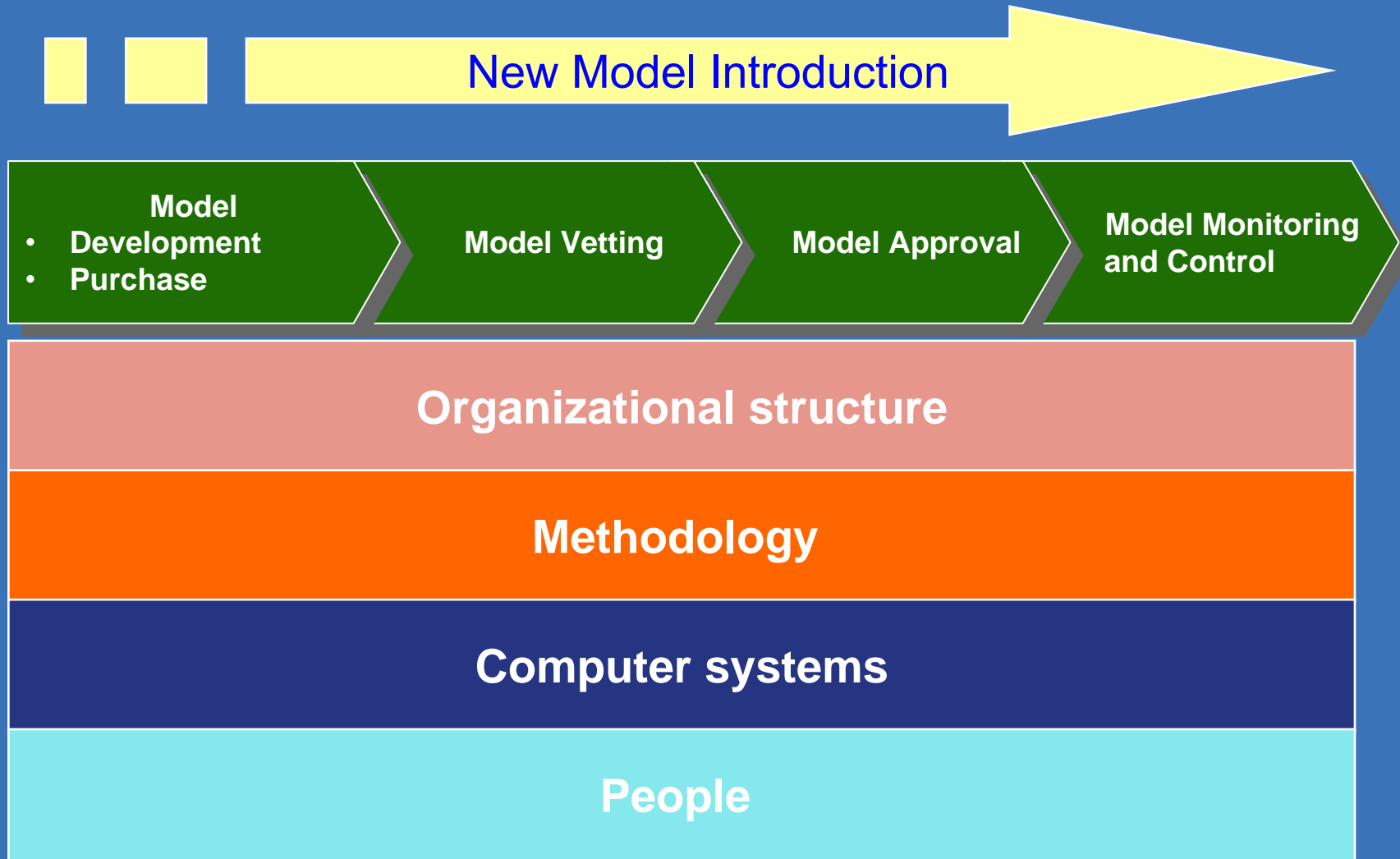


Drivers of Model and Pricing Risks



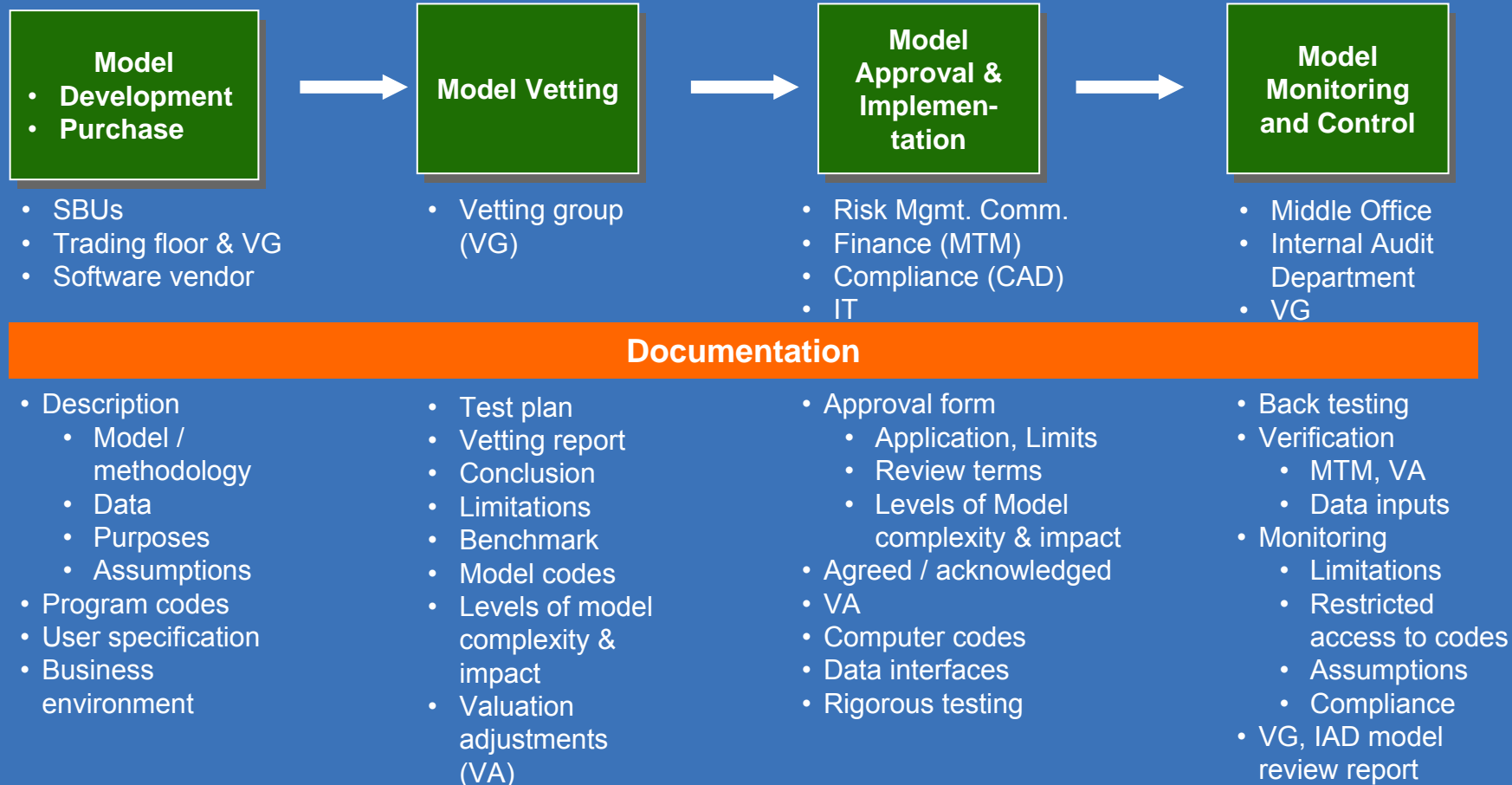


ORM Framework of Model Management





Introduction of New Model



Model Risk Policy

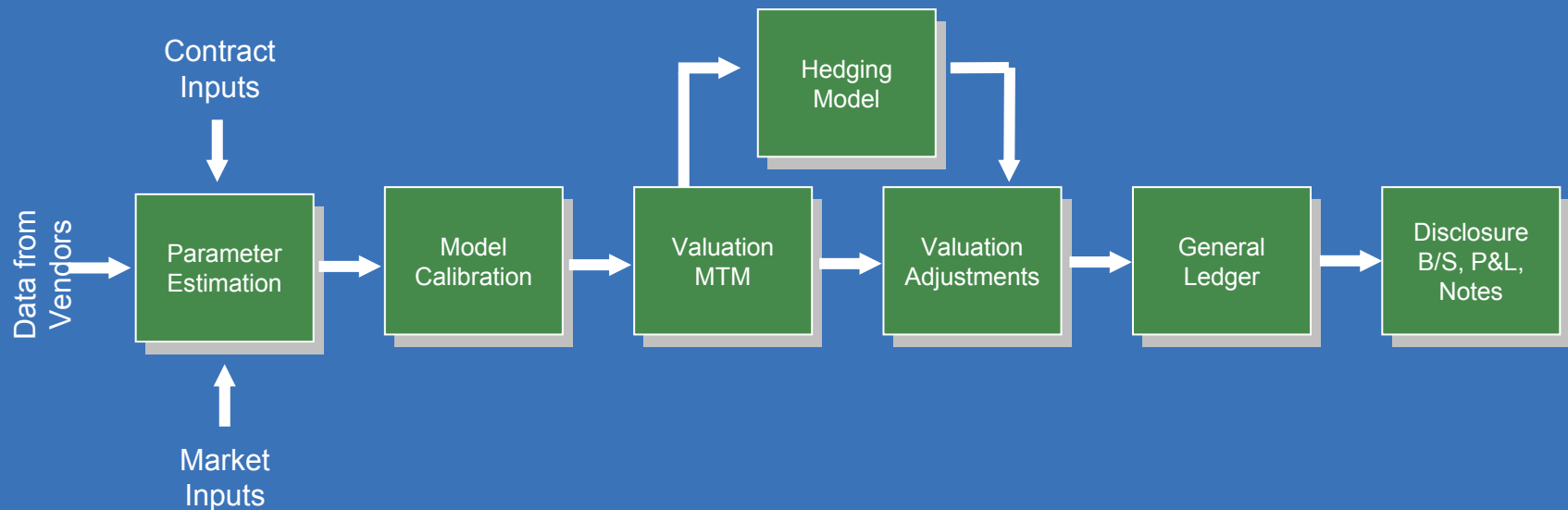


Regulatory Framework for Model & Pricing Risks

- The office of the Comptroller of the Currency (OCC) Bulletin: 2000-16 “Risk Modeling”
- OSFI Mini-Benchmarking Study on Model Risk and Vetting (for Trading Activities), May 2003
- FAS 157 “Fair Value Measurements”
- FAS 159 “The Fair Value Option for Financial Assets and Financial Liabilities”
- FAS133 / FAS 149 (amendments), “Accounting for Derivative Instruments and Hedging Activities”
- IAS39 “Financial Instruments: Recognition and Measurement”
- CICA: S3855 “Financial Instruments”, S3865 “Hedges”
- New Basle Accord (BIS II)
- FASB Concept Statement No. 7 (February 2000): “Using Cash Flow Information and Present Value in Accounting Measurement.



Effectiveness of Fair Valuation Process Can Be Compromised By Many Issues



Associated Issues

- Validity of the Inputs
- Availability of observable market data
- Vols. & corr.
- Data vendors transparency
- Manual / automatic data import
- Validity of the model
- Assumptions
- Scarce data points
- Interpolation/ extrapolation
- "One error point"
- Validity
- Assumptions
- Within limits
- Black box – vs – spreadsheet
- Misrepresentation of economic reality / behavior
- Bugs
- Subjective
- Portfolio based
- Simplifications
- General VA
- Specific VA
- Hedge accounting
- FAS133/IAS39/ CICA 3855/65
- FAS 157, FAS 159
- VA release
- Accounting abuse
- Misstatements
- Accounting abuse
- Regulatory / GAAP compliance



Case Study 1: Canadian ABCP

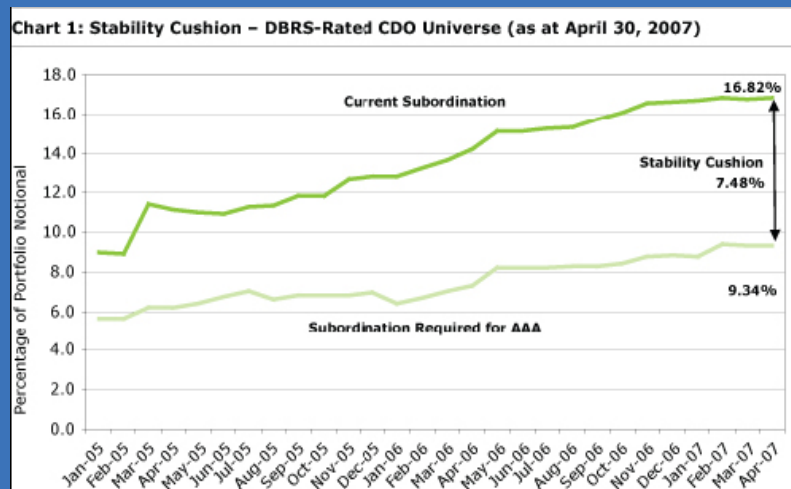
Canadian ABCP Market is Divided on Bank-sponsored and Third-party ABCPs

Bank-sponsored Conduits

- 29 Trusts, Total notional of @80bn
 - BMO - Largest sponsor \$22.5bn
- Lack of public information
- 6% or \$4.8bn do not have global-style liquidity backup
- Spreads went up significantly in January 2008
- Mark-to-Market triggers for margin/collateral calls

Non Bank-sponsored Conduits

- 21 Trusts, Total notional of @32bn
 - Traditional securitized assets \$3bn
 - Synthetic assets \$26bn
 - U.S. sup-prime assets \$3bn
 - Six boutique financial services firms
- Spreads went up significantly in July-August 2007
- Market is frozen since August 2007
- Canadian-style (DBRS) liquidity agreements
- Montreal Accord to restructure ABCP transactions:
 - Extending maturity of ABCP
 - Pooling together certain series of ABCP
 - Replace Mark-to-Market triggers for margin/collateral calls with Loss only or Spread and Loss triggers
 - Support liquidity needs of ABCP holders
 - Banks committed up to \$14bn of a backup credit line.





Case Study 1: Canadian ABCP (cont.)

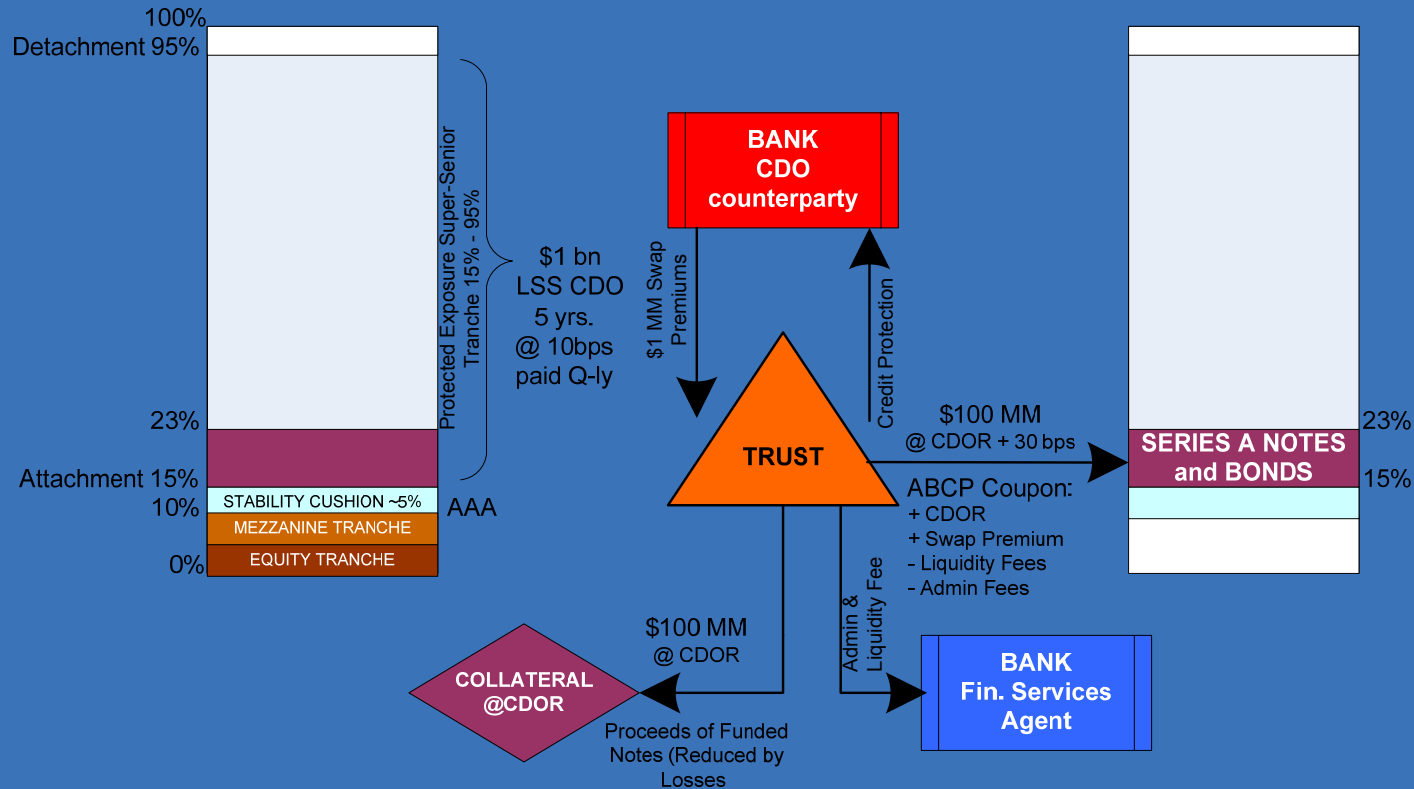
Leveraged Super-Senior CDO

REFERENCE ENTITIES:

- 125 Entities @ \$10 MM per Entity or CDS
- Total Exposure \$1.25 bn
- Super-Senior Tranche Exposure \$1.00 bn
- Spread on Super-Senior Tranche \$1 MM or 10 bps.

ABCP INVESTORS:

- Initial Funding \$100 MM (leverage 10.0x)
- Implied Return on Funded Portion = CDOR + 30 bps = CDOR + 100bps - Fees
- "AAA" Series A Notes (protections from 15% to 23%)
- Senior and Subordinated Notes with maturity from 1 to 6 or 12 months



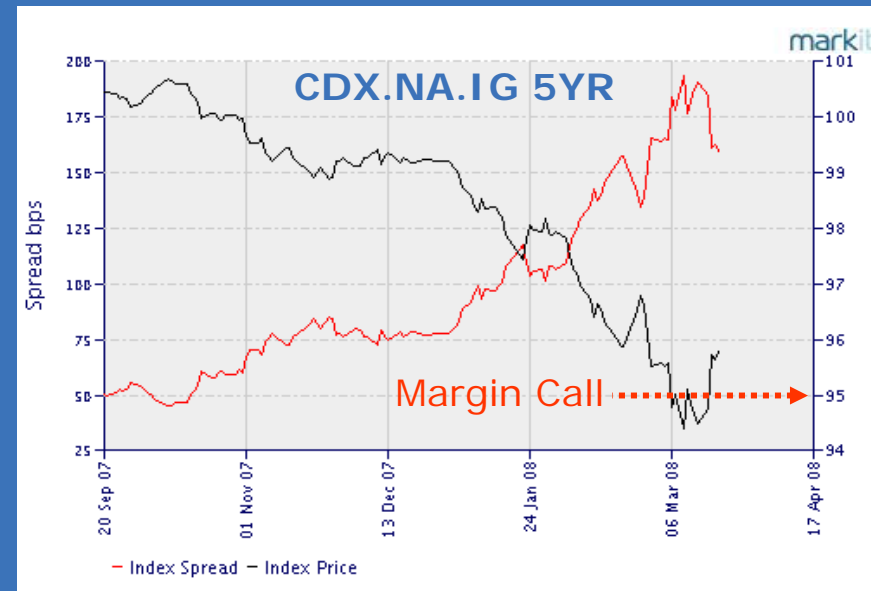


Case Study 1: Canadian ABCP (cont.)

Increasing Corporate Credit Spreads Require the ABCP Trusts to Post Additional Collateral

Issues

- Lack of transparency of the ABCP market spooked the investors who left the market and caused a significant decrease of its liquidity
- High CDS spreads and decreased mark-to-market of LSS CDOs triggered margin calls under the Mark-to-Market collateral regime*
- LSS transactions exhibit the funding risk
 - a) Short-term funding of long-term CDOs with ABCP
 - b) Collateral calls



* - Canadian ABCP conduits are structured with the following collateral regimes: MTM ~ 92%, Loss Only ~1.6%, Spread & Loss ~6.5%.



How to Mitigate OpRisk of Trading Portfolio?

Here are some of the key elements of how to generate accurate FV and transparent P&L:

- Clearly defined roles and responsibilities among all stakeholders in the fair valuation and reporting processes;
- Policies and procedures in place;
- Selection and development of appropriate models;
- Model validation performed by an independent from the developer group;
- Validation of data inputs and parameters used by the model;
- Maintenance of complex models and their limitations database;
- Review of model usage by internal audit and revalidation by the vetting group;
- Reporting of the existing model risk levels / impacts / exposures;
- Establishing of model risk valuation adjustments (model reserve);
- Independent revaluation of positions;
- Reconciliation of trading accounts vs. deferred accounts;
- P&L decomposition and reconciliation.



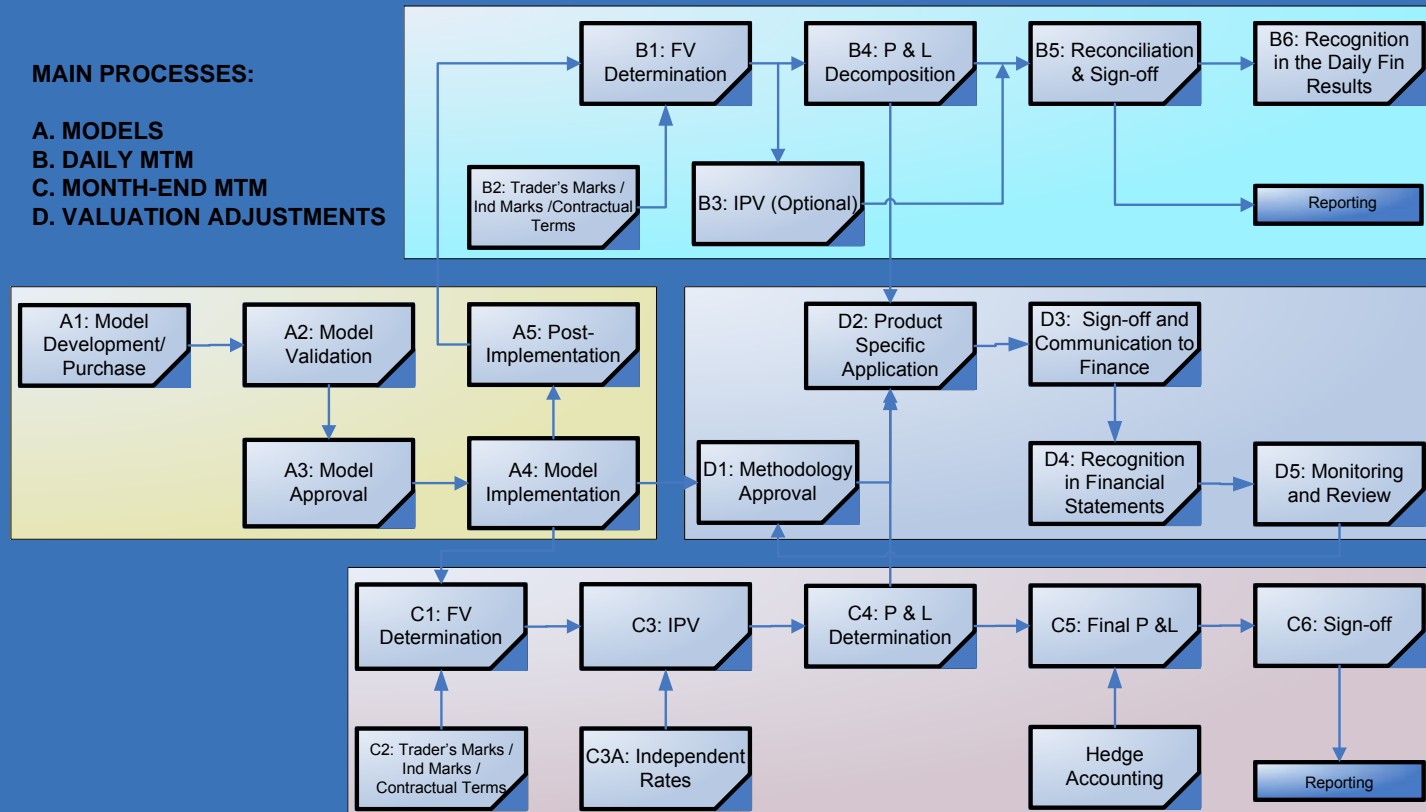
Mapping of Business Process is the First Step in Building Effective OpRisk Management Function

Overall, the OpRisk of Trading Portfolio is managed through the following activities:

- Model Vetting,
- Reliable Independent Price Verification,
- Sound Marking-to-Market,
- Detailed P&L Decomposition

MAIN PROCESSES:

- A. MODELS
- B. DAILY MTM
- C. MONTH-END MTM
- D. VALUATION ADJUSTMENTS





IPV is a Critical Element of Effective Operational Risk Management Function

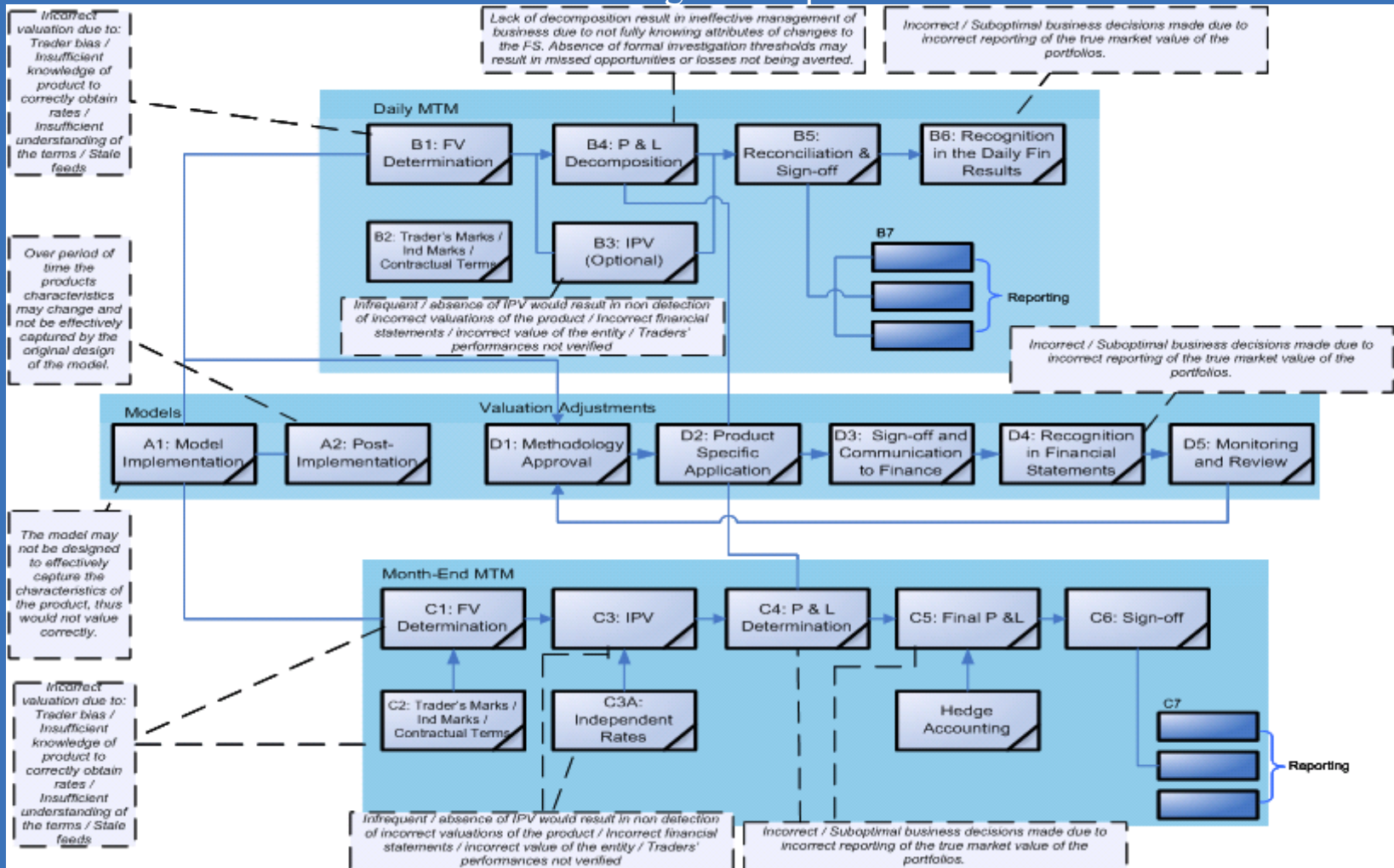
The IPV process is widely used by reputable financial institutions, making the assessment of the quality of the process a key business requirement

- The IPV process provides assurance on the pricing of financial instruments and their resultant market value as reported in the Financial Statements. The IPV process is also used to independently verify the performance of the traders to determine incentive compensation and firm performance.
- The IPV process should establish a standardized methodology and approach to ensure that IPV results are consistently and accurately prepared.
- A standardized methodology of measuring the qualitative elements of the IPV processes while adhering to best practice/good governance is critical to an effective IPV process. Standardization would also make inter-geography and cross-desk comparisons easier as each location would have to adhere to the same evaluation criteria.
- Having good controls per se does not guarantee a good IPV process. The qualitative elements also impact the overall quality of the IPV process.
- Standardization can be achieved by applying a consistent methodology, which quantifies the qualitative elements of the IPV process.



Shortcomings/Risks Introduced by Weaknesses in the IPV Process

The process flow below charts the areas of the IPV process and some of the possible risks introduced as a result of shortcomings in the process.





Case Study 2: Trading Losses at Société Générale

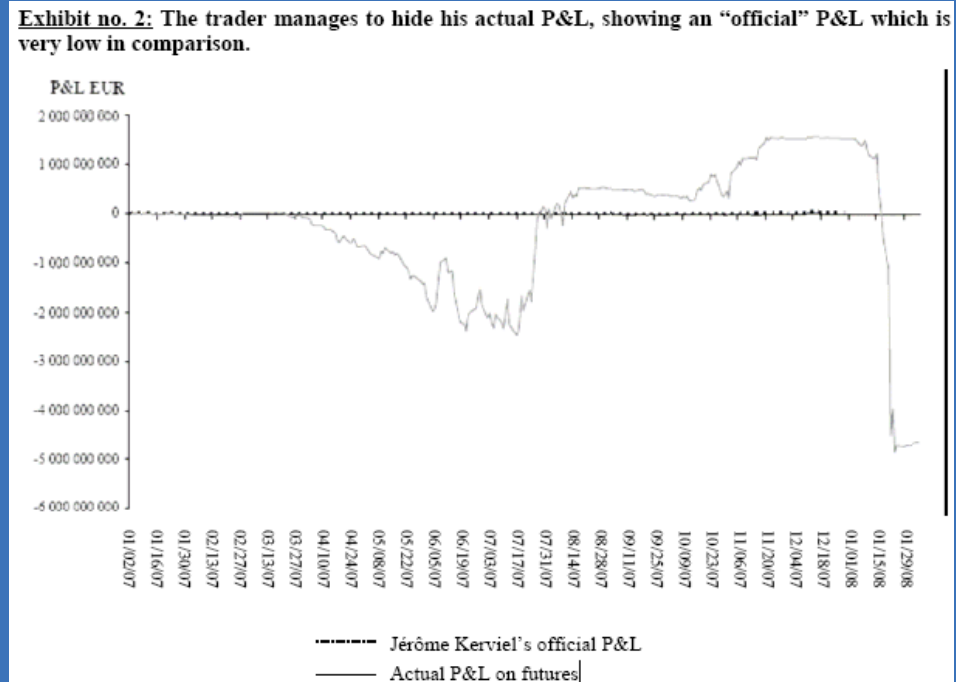
Unauthorized trading losses are endemic to the trading floors

Firm Name	Loss Amount (USD)	Date
Société Générale	7,200,000,000	18-Jan-08
Sumitomo Corp.	2,856,999,936	13-June-96
Showa Shell Sekiyu KK	1,476,906,536	31-Dec-93
Resona Bank (formerly Daiwa Bank)	1,440,060,032	17-July-95
Barings PLC	1,300,000,000	27-Feb-95

Chart A: Five Largest Unauthorized Trading Events from Algo FIRST

Patterns of Rogue Trading

- Relatively young or star traders
- Warning signs are not heeded
- Management inaction
- Seemingly profitable business unit
- Internal pressure to bring in high returns
- Gambling persona
- Risk-taking environment
- Far-flung branch office
- Matrix reporting





Case Study 2: Trading Losses at Société Générale

Clusters of the failed controls cause abnormal trading losses

1. Lack of management escalation process
2. Undertaking excessive risks
3. Failure to question above-market returns
4. Failure to reconcile daily cash flows
5. Failure to enforce proper limits
6. General corporate governance issues
7. Lack of dual control/lack of segregation of duties
8. Organizational gaps/unclear organizational structure/unclear reporting structure
9. Failure to supervise
10. Failure to comply with internal policies and procedures/insufficient compliance measures

Public sources of additional information about rogue trading:

Algo FIRST Newsletter, March 2008

[http://www.sp.socgen.com/sdp/sdp.nsf/V3ID/6D44E7AEF3D68993C12573F700567904/\\$file/comiteSpecialFevrier08gb.pdf](http://www.sp.socgen.com/sdp/sdp.nsf/V3ID/6D44E7AEF3D68993C12573F700567904/$file/comiteSpecialFevrier08gb.pdf)

http://www.fsa.gov.uk/pubs/newsletters/mw_newsletter25.pdf

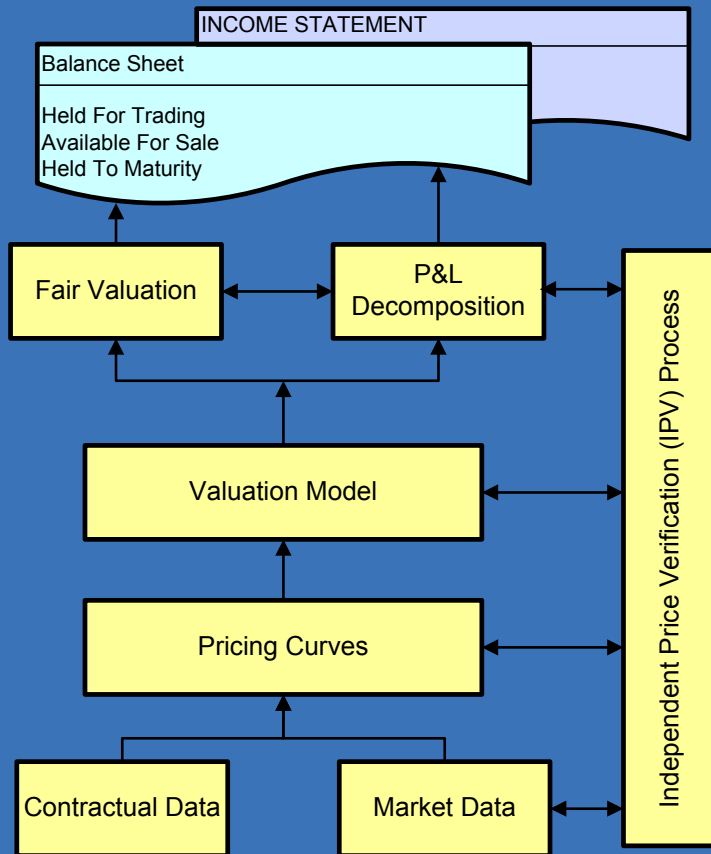
<http://www.algorithmics.com/EN/publications/whitepapers/registration.cfm?code=wp18>

Report Into Irregular Currency Options Trading at the National Australia Bank, APRA, March 2004

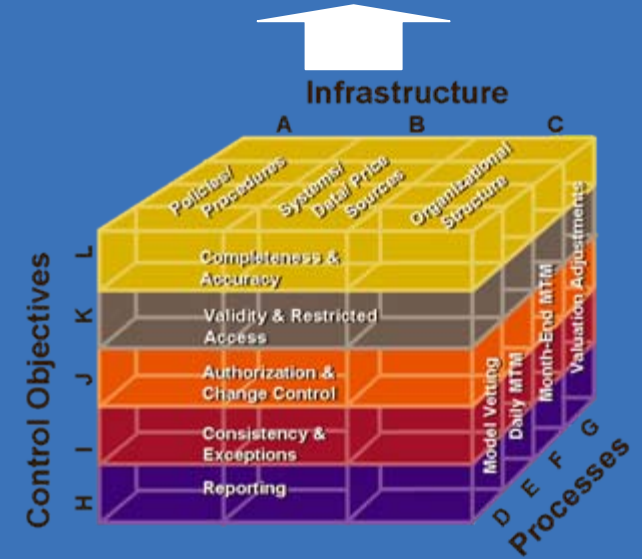


Assessment of Operational Risk of Trading Portfolio

OpRisk Assessment is performed to verify the completeness, consistency and appropriateness in market data inputs, valuation curves, methodologies and control environment



M&FV Risk ScoreCards



Bill 198 / SOX Results



Fair Valuation Process Review: Approach

The approach begins with a top-down review directed by the COSO based framework which is then augmented with a bottom-up review guided by the initial top-down observations

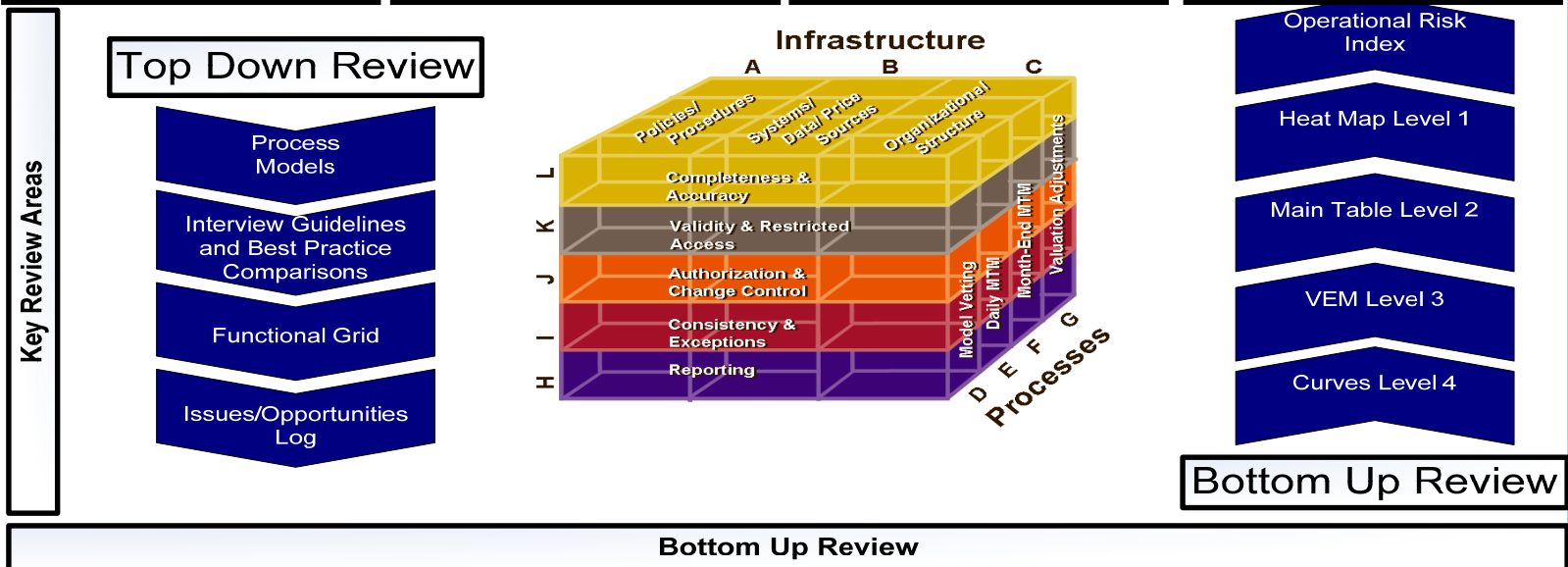
The cube below decomposes the complexity of the IPV processes, representing the infrastructure that supports the IPV processes which follow good governance / best practices

Process Models: The IPV Process model is used to gain an understanding of the existing IPV process used by the business and the related risks/controls.

Conducted Interviews: A set of normative interview questions are created for each area of the IPV process that target areas of good governance/best practice which would be expected in any mature financial institution.

Functional Grid: A functional grid is designed to highlight areas of overlapping responsibilities or areas where roles are not clearly defined.

Issues/Opportunity Log: An issues / opportunities log is compiled from the interview question responses, and, where applicable, evaluated against best practice.



Risk Index Tables
The information gathered is used to construct the Risk Index Tables giving a 'quality' score to the IPV process for each product. The results are refined and confirmed in collaboration with the business.

Detailed Interviews
Detailed interviews are conducted to validate risk index table results. The responses are added to the Issues/Opportunities Log.

Best Practice Companies
A Best Practice benchmarking survey through the firm's network to position the recommendations.

OP Risk Index
An IPV OpRisk index allocates a risk score to each product/book/portfolio for each area of the IPV process.



2008 Enterprise Risk Management Symposium

Operational Risk Management Workshop Session 3

Thank you . Questions?

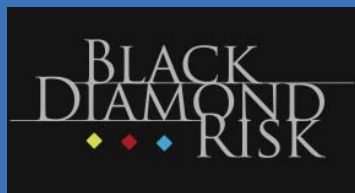
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Appendix

Basel Linked Operational Risk Matrix



Basel II Level 2. Operational Risk Loss Event Classification to Level 3.

Event Type, (7)	Definitions	Categories (Level 2)	Insurance Coverage Available	Activity (Some Examples Only - Not Comprehensive) (Level 3)
1. Internal Fraud	Losses due to acts of a type intended to defraud, misappropriate property or circumvent relations, the law or company policy , excluding diversity/discrimination events, which involves at least one internal party	1. A. Unauthorized Activity	Yes	1.A.1. Transactions not reported, (intentional), 1.A.2. Transaction type unauthorized, (w/\$ loss) 1.A.3. Mismarking of position, (intentional) 1.A.4. Frontrunning,
		1.B. Theft & Fraud	Yes	1.B.1. Fraud 1.B.2. Credit fraud 1.B.3. Worthless deposits 1.B.4. Theft 1.B.5. Extortion 1.B.6. Embezzlement 1.B.7. Robbery 1.B.8. Misappropriation of assets 1.B.9. Malicious destruction of assets 1.B.10. Forgery 1.B.11. Check kiting 1.B.12. Smuggling 1.B.13. Account take over/impersonation 1.B.14. Tax non-compliance/willful evasion 1.B.15. Bribes 1.B.16. Kickbacks 1.B.17. Insider Trading
2. External Fraud	Losses due to acts of a type intended to defraud, misappropriate property or circumvent the law, by a third party	2.A. Theft & Fraud	Yes	2.A.1. Theft/Robbery 2.A.2. Forgery 2.A.3. Check Kiting
		2.B. Systems Security	Yes	2.B.1. Hacking Damage 2.B.2. Theft of Information, (w/& loss)



Basel II Level 2. Operational Risk Loss Event Classification to Level 3.

Event Type, (7)	Definitions	Categories (Level 2)	Insurance Coverage Available	Activity (Some Examples Only - Not Comprehensive) (Level 3)
5. Damage to Physical Assets	Losses arising from loss or damage to physical assets from natural disaster or other events	5.A. Disasters & other events	Yes	5.A.1. Natural disaster losses 5.A.2. Human losses from external sources, (terrorism, vandalism)
6. Business disruption & System Failures	Losses arising from disruption of business or system failures	6.A. Systems	Yes	6.A.1. Hardware 6.A.2. Software 6.A.3. Telecommunications 6.A.4. Utility outage/disruptions
7. Execution, Delivery & Process Management	Losses from failed transaction processing or process management, from relations with trade Counterparties and vendors	7.A. Transaction Capture, Execution & Maintenance	No	7.A.1. Miscommunication 7.A.2. Data Entry - maintenance or loading error 7.A.3. Missed deadline or responsibility 7.A.4. Model/system misoperation 7.A.5. Accounting Error/entity attribution error 7.A.6. Other task misperformance 7.A.7. Delivery failure 7.A.8. Collateral management failure 7.A.9. Reference Data Maintenance
		7.B. Monitoring & Reporting	No	7.B.1. Failed mandatory reporting obligation 7.B.2. Inaccurate external report, (loss incurred)
		7.C. Customer Intake & Documentation	No	7.C.1. Client permissions/disclaimers missing 7.C.2. Legal documents missing/incomplete
		7.D. Customer/client Account Management	Yes	7.D.1. Unapproved access given to accounts 7.D.2. Incorrect client records, (loss incurred) 7.D.3. Negligent loss or damage of client assets
		7.E. Trade Counterparties	No	7.E.1. Non-client counterparty misperformance 7.E.2. Misc. non-client counterparty disputes
		7.F. Vendors & Suppliers	No	7.F.1. Outsourcing 7.F.2. Vendor disputes



Bio of Dr. Robert M. Mark

- Dr. Robert M. Mark is the Chief Executive Officer of Black Diamond which provides corporate governance, risk management consulting, software tools, and transaction services. He serves on several Boards. He also serves on Checkpoint's Investment Committee. He was awarded the Financial Risk Manager of the Year by the Global Association of Risk Professionals (GARP). He is on the board and is the Vice Chairperson of The Professional Risk Managers' International Association (PRMIA)
- Prior to his current position, he was the Senior Executive Vice-President and Chief Risk Officer (CRO) at the Canadian Imperial Bank of Commerce (CIBC). Dr. Mark was a member of the Management Committee. Dr. Mark's global responsibility covered all credit, market and operating risks for all of CIBC as well as for its subsidiaries.
- Prior to his CRO position, he was the Corporate Treasurer at CIBC. Prior to CIBC, he was the partner in charge of the Financial Risk Management Consulting practice at Coopers & Lybrand (C&L). The Risk Management Practice and C&L advised clients on risk management issues and was directed toward financial institutions and multi-national corporations. This specialty area also coordinated the delivery of the firm's accounting, tax, control, and litigation services to provide clients with integrated and comprehensive risk management solutions and opportunities.
- Prior to his position at C&L, he was a managing director in the Asia, Europe, and Capital Markets Group (AECM) at Chemical Bank. His responsibilities within AECM encompassed risk management, asset/liability management, research (quantitative analysis), strategic planning and analytical systems. He served on the Senior Credit Committee of the Bank. Before he joined Chemical Bank, he was a senior officer at Marine Midland Bank/Hong Kong Shanghai Bank (HKSB) where he headed the technical analysis trading group within the Capital Markets Sector.
- He earned his Ph.D., with a dissertation in options pricing, from New York University's Graduate School of Engineering and Science, graduating first in his class. Subsequently, he received an Advanced Professional Certificate (APC) in accounting from NYU's Stern Graduate School of Business, and is a graduate of the Harvard Business School Advanced Management Program. He is an Adjunct Professor and co-author of "Risk Management" (McGraw-Hill), published in October 2000 and the "Essentials of Risk Management" in December 2005 (McGraw-Hill). He also served on the board of ISDA as well as the Chairperson of the National Asset/Liability Management Association (NALMA).



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Bio of Dr. Alexander Shipilov

Dr. Alexander Shipilov, Associate Vice President, Audit Division, TD Bank Financial Group

Dr. Alexander Shipilov leads Quantitative Audit Team at TD Bank Financial Group. The Team performs audit procedures with respect to the development, vetting, usage and validation of mark-to-market and risk measurement models used across all business lines at the Bank.

Prior to joining TDBFG, Alexander worked as a Director with Risk & Regulatory Advisory Practice at PricewaterhouseCoopers. He consulted financial institutions and corporate treasuries on valuation and risk management issues, working in Canada, the U.S., Great Britain, Spain and Russia. His specific area of expertise included implementation and vetting of valuation and risk measurement models and control procedures used in financial institutions and treasuries dealing with valuation/risk measurement models, structured products and complex derivative instruments.

Dr. Shipilov serves as Treasurer on the Board of Directors for The Professional Risk Managers' International Association (www.prmia.org)

Alexander is a co-author of "Resonant Robotic Systems (Foundations of Engineering Mechanics)", Springer, 2003

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