

Workshop 2
Wednesday, March 28th
Banks and Insurers (2007)
Separate paths but a Common Destination
ERM Basics for Banks and Insurers

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“Characteristics” which are at the “Core of Superior ERM Solutions”

- *The ability to efficiently integrate all the components of 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 policies, methodologies and infrastructure*

*Customers
Investors



Regulators

* Rating
Agencies

Equity Analysts


*Markets

ERM

2007 ENTERPRISE RISK MANAGEMENT SYMPOSIUM

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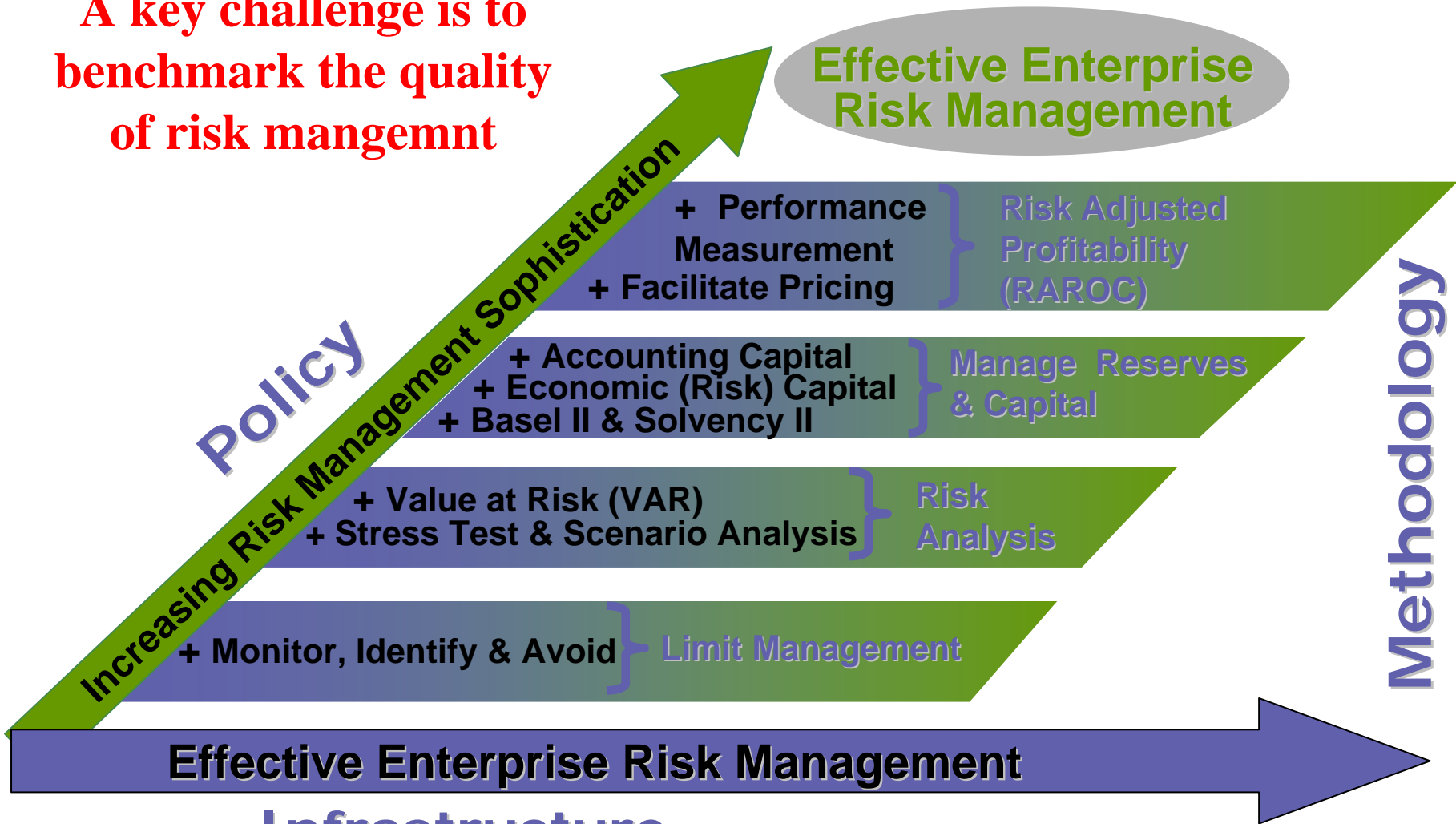


The value added nature of risk programs needs to be made transparent






A key challenge is to benchmark the quality of risk management

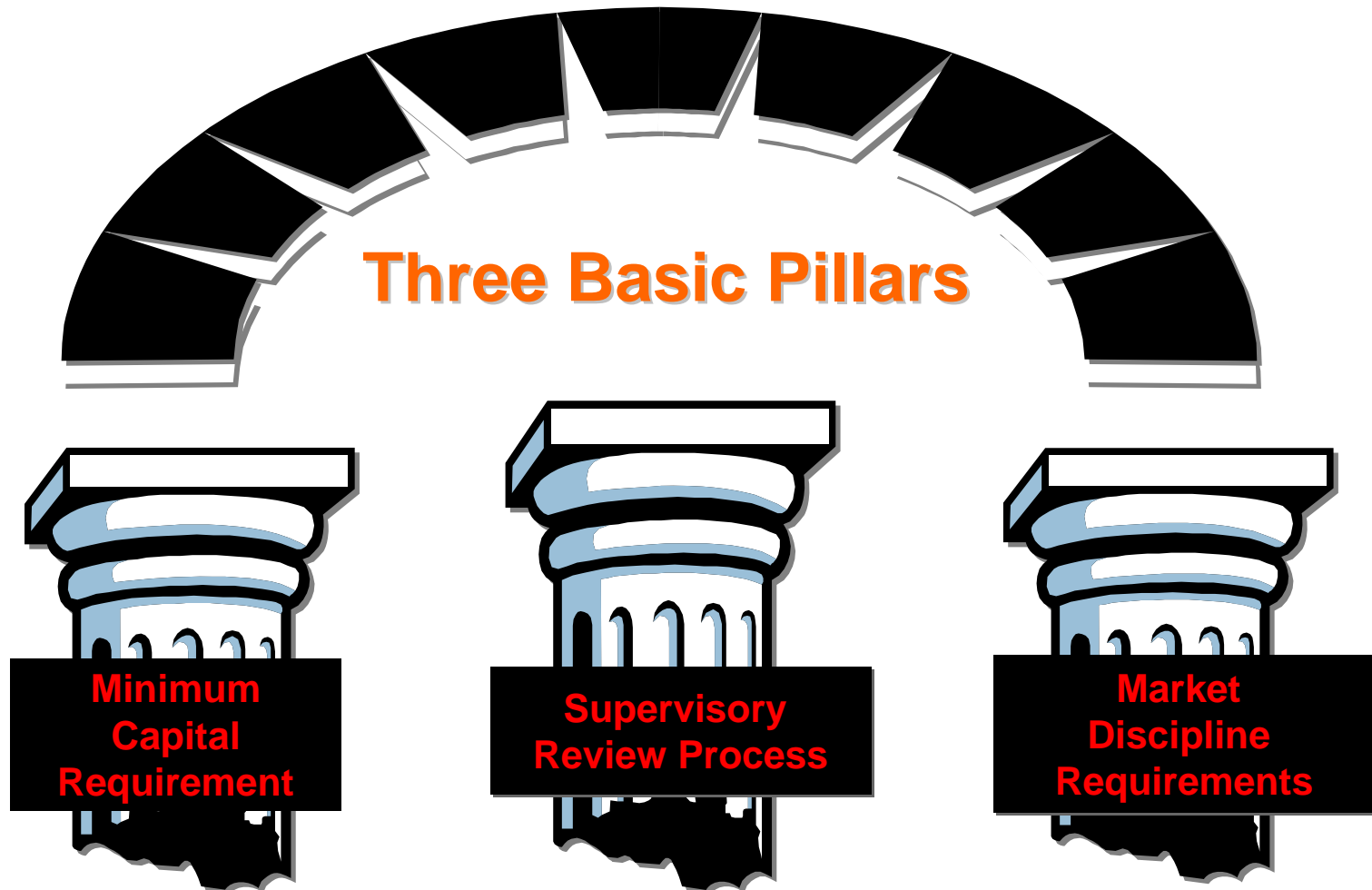


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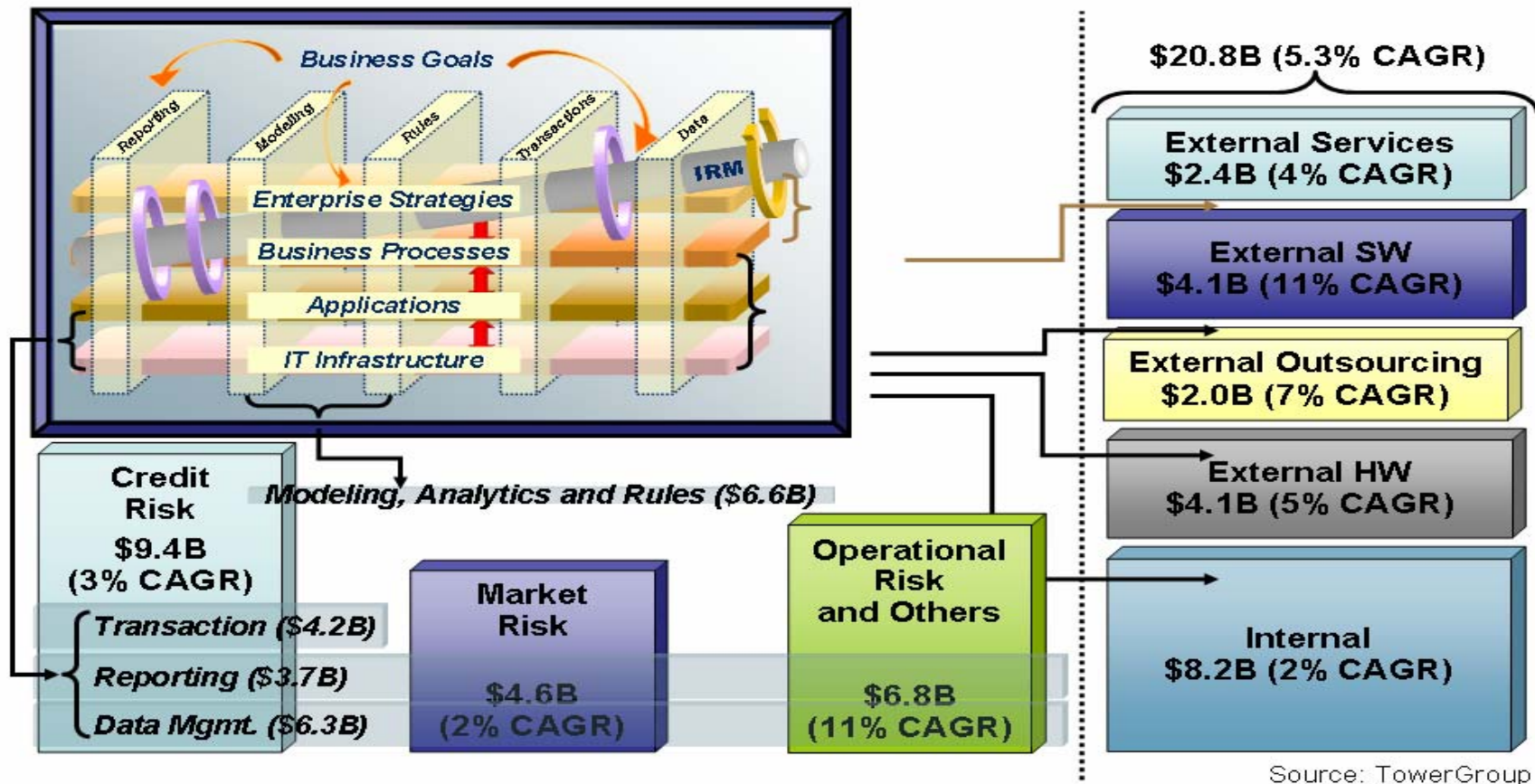




ERM has become increasingly driven by integrated demands
(e.g. Basel II & Solvency II & Rating Agencies & SOX)



FSIs 2006 Investment Global Risk Management
 \$20.8B (5.3% CAGR) in Risk Management Technologies
 (Source: Guillermo Kopp -Tower Group)



Source: TowerGroup



Risk Culture – Starts with Accountability at the Top

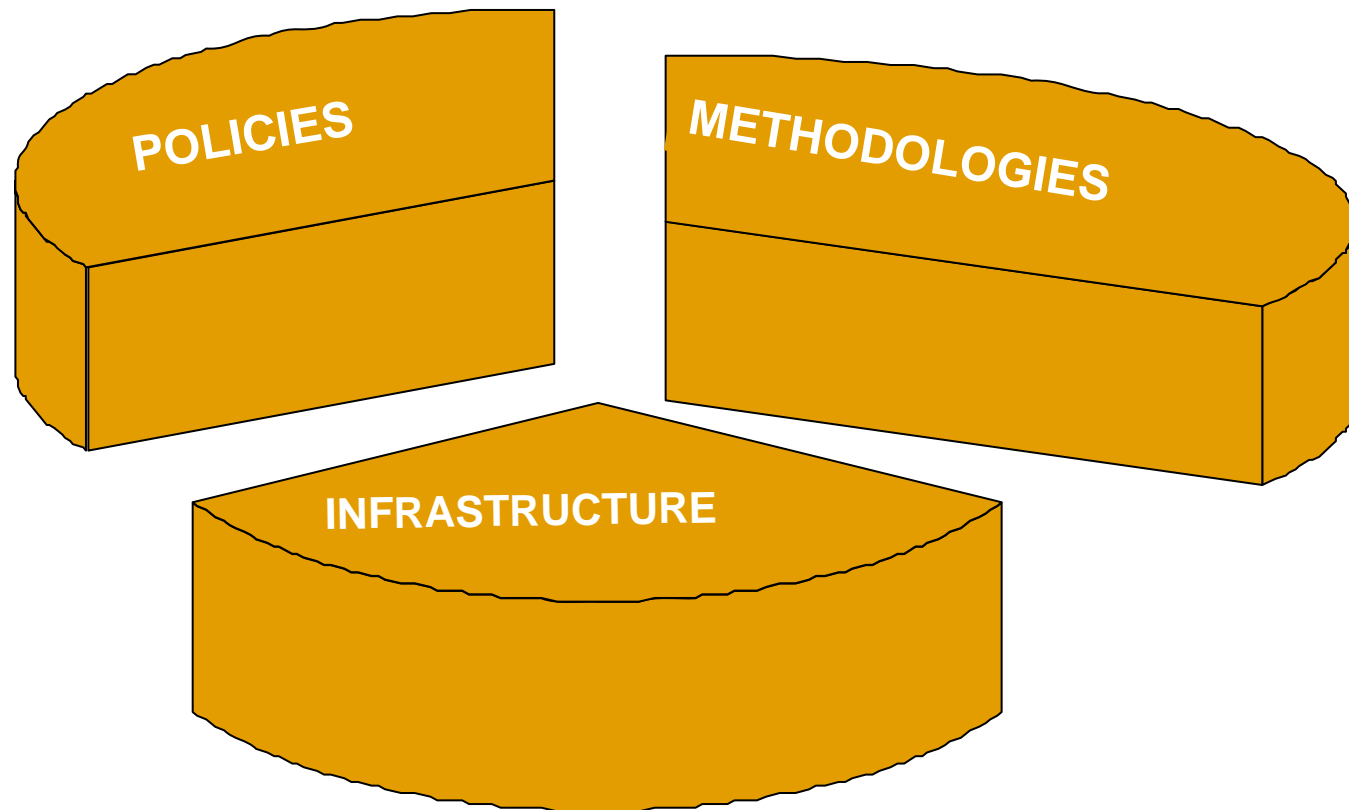


- “I was not aware”
- “I did not have any knowledge”

**The board and senior management are well aware
that they can not claim they knew too little about risk**



A significant challenge is to build a “Superior ERM Solution” whose “Characteristics” can be benchmarked in terms of:





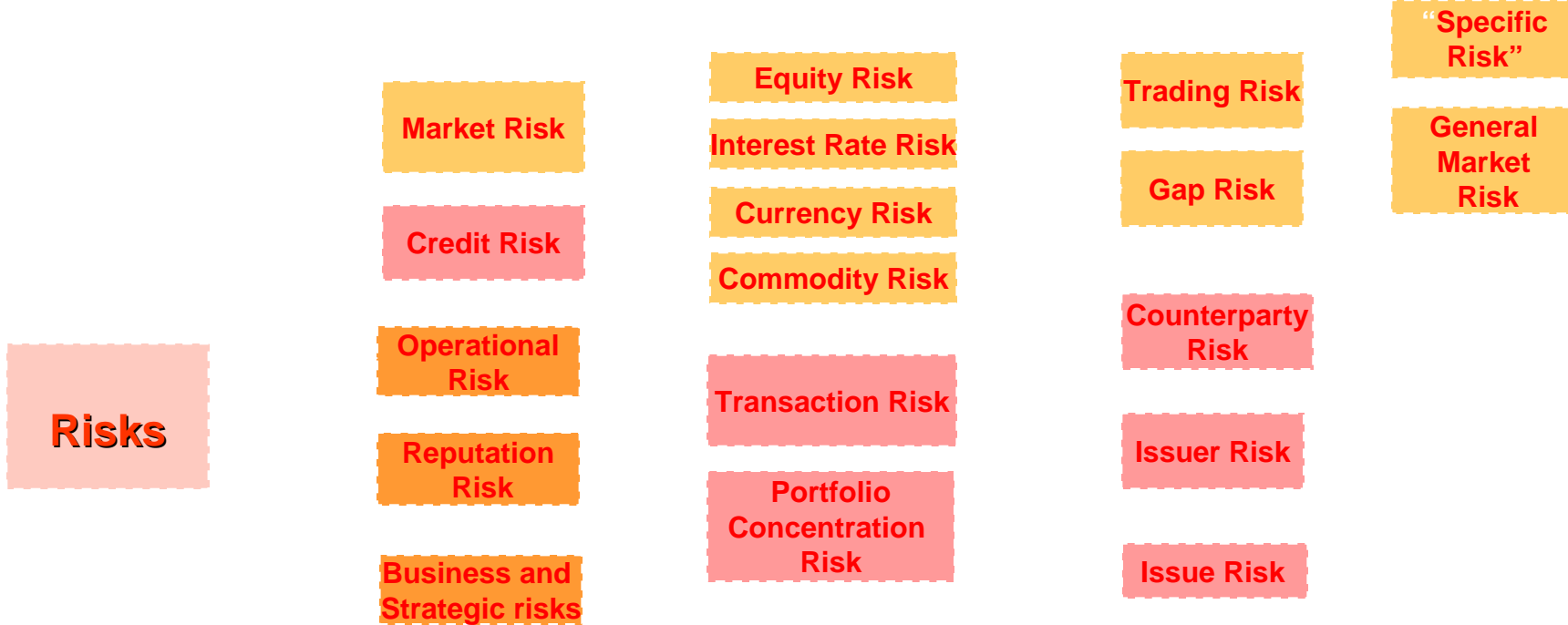
Characteristics of Policies at the Core of Superior ERM Solutions

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





- One should be able to “slice and dice” the multiple dimensions of risk into *authorities that are expressed in meaningful terms*





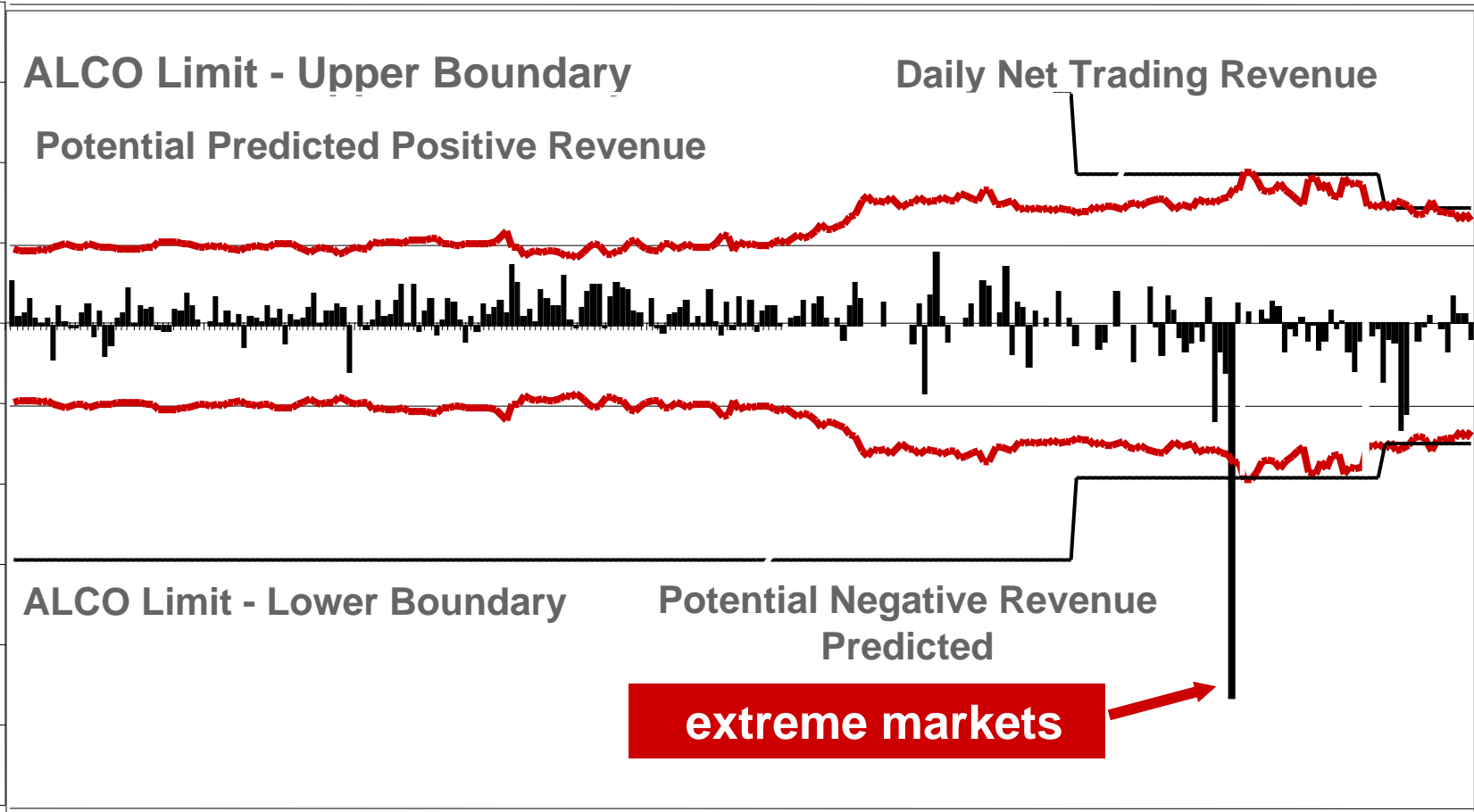
Disclosing the main drivers of financial and non financial risk would include answering such questions as :

- What are the top risks in the trading book and banking book (i.e. a literal hit parade of risks)
- Where are the concentrations of risk (e.g. hot spots)
- How often the list of main risks change
- Have the forecasts of the top financial and operational risks (e.g. stress tests) been predictive?
- Have any of the top risks listed caused management to take action to alter them in any way? If so, how?



Certain types of backtesting **disclosure** have become standard

Similar **disclosure** will become standard across all risk types



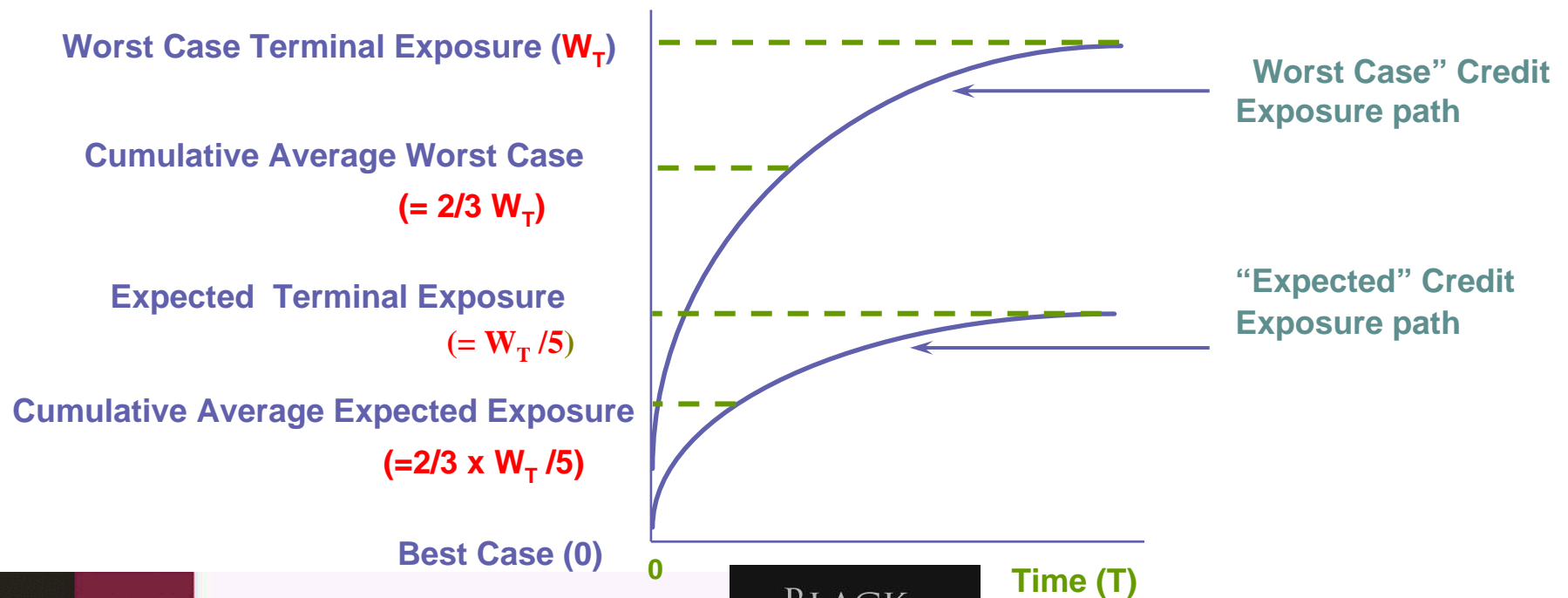
Characteristics of Methodologies at the Core of Superior ERM Solutions

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



Example: A key challenge is to integrate trading credit risk exposure with credit risk banking book exposure

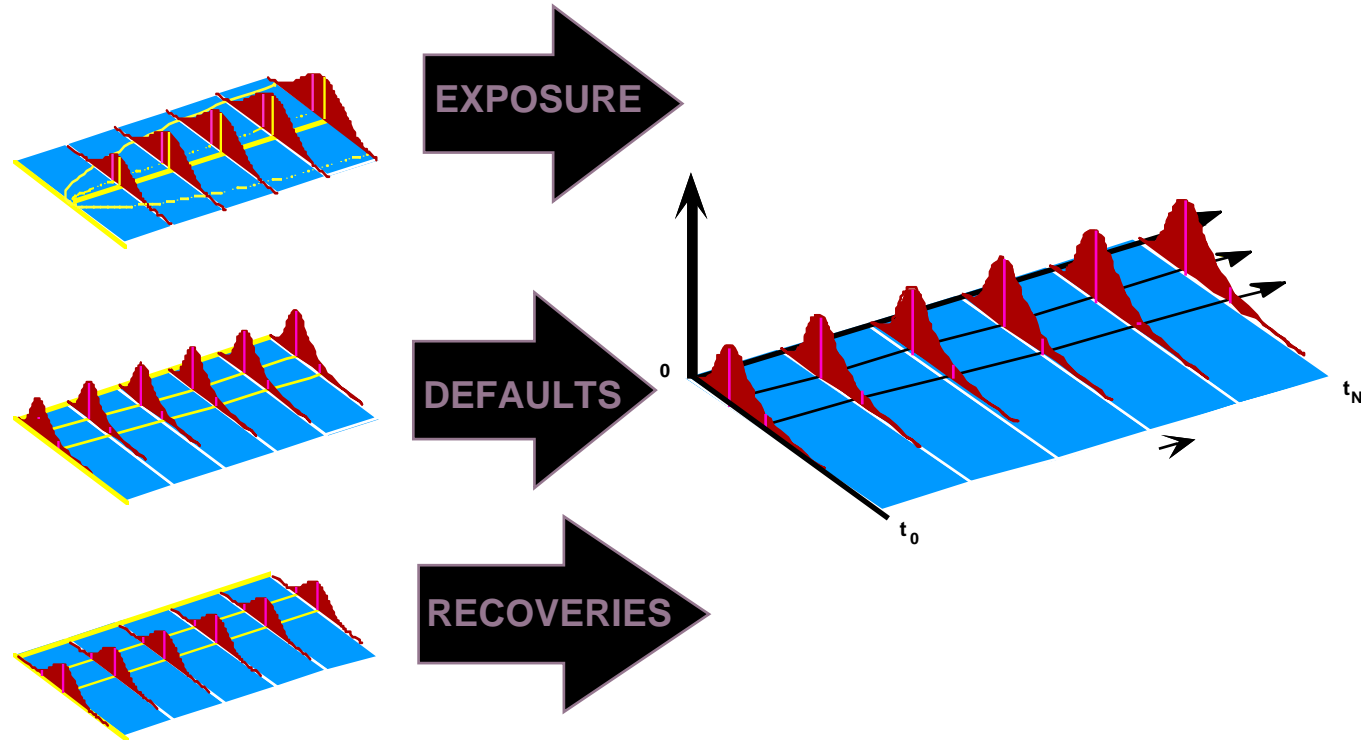
- **Note:** The expected credit risk exposure for derivatives is typically used as the loan equivalent whereas worst case credit exposure is typically used to set limits





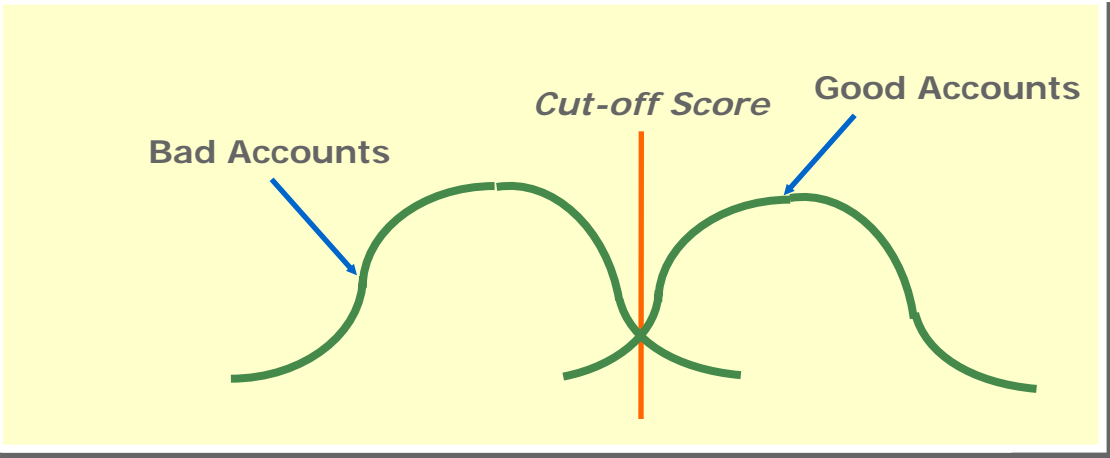
Example: A key challenge is to translate the credit risk exposure calculation into a credit loss calculation

$f(E, PD, LGD)$





Example: A key characteristic of superior retail methodologies is that credit scoring analytics can be supplemented with sophisticated analytics.....

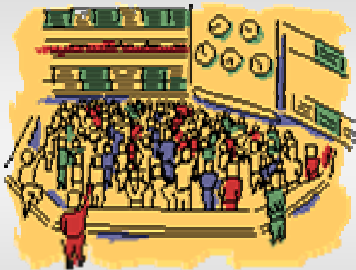


The presumption underlying credit scoring models is that there exists a metric that can divide good credits and bad credits into distinct distributions



Example: A key challenge is to design and implement Risk Based Customer Value Management Methodologies which integrates marketing and risk based techniques

Observe



Observe behavior



Probability of Take

Predict



Analyze Risk



Cross Sell

Decide



Significant progress has been made in measuring market risk and credit risk with some early success at measuring operational risk but



having a a highly reliable unified measure of risk inside of a common risk architecture across both the banking and trading books is at the core of superior ERM solutions



A key challenge is to price and mitigate operational risk

- 1. Internal Fraud**
- 2. External Fraud**
- 3. Employment Practices and Workplace Safety**
- 4. Clients, Products & Business Practices**
- 5. Damage to Physical Assets**
- 6. Business Disruption and System Failures**
- 7. Execution, Delivery & Process Management**



Case Study Example:

Insuring versus Self Insuring Operational Risk (OR)

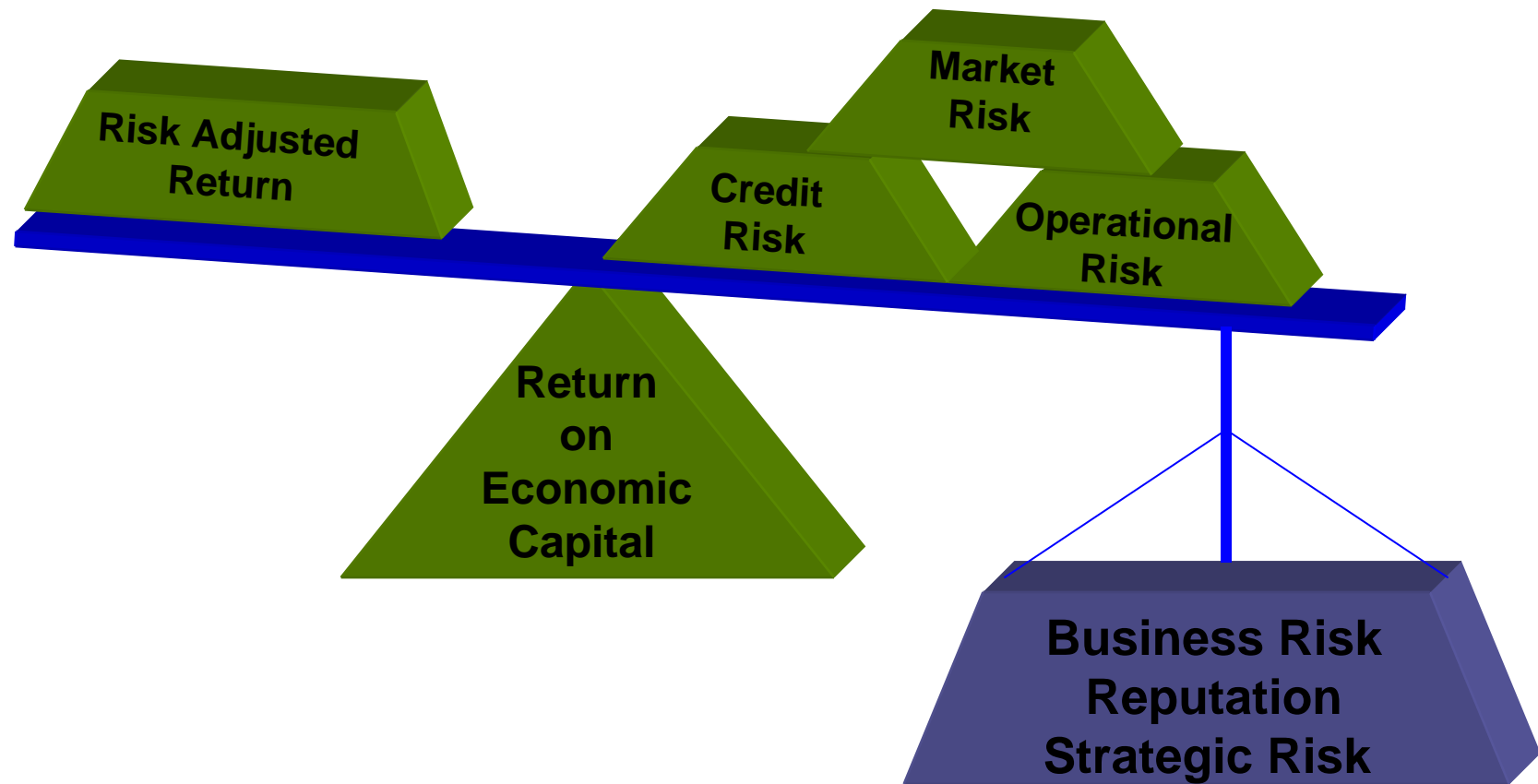
- A bank's asset (A) equals \$100 mm (i.e. $A_0 = \$100$ mm).
- If there is no OR event (ORE) such as a massive computer failure then the asset is expected to grow with certainty by 6% at the end of the year (i.e. $A_1 = \$106$ mm and $R=6\%$).
- The bank faces a 1% chance of an OR event that will cause these assets to be worth only \$56 mm at the end of the year (i.e. $A_1 = \$56$ mm and $L=\$50$)
- What price would you recommend for the purchase of OR insurance? \$1mm?



Pricing Solution for Insuring against Operational Risk

- The fair price of the insurance (I) can be shown to be such that:
 $I=L(1-Q)/(1+R)$ where
- L=potential loss to the bank on the Asset
- Q=the risk neutral probability of no ORE
- R=expected growth of the asset


A key challenge is ensure that the RAROC calculation includes all the appropriate factors



Characteristics of Infrastructure at the Core of Superior Risk Solutions

- *The appropriate people in place with the right skills*
- *An integrated risk operational infrastructure which incorporates and replaces many of the mid office functions (e.g. valuing deals)*
- *An integrated risk data infrastructure*
- *Near real time access to data (e.g. market data, transaction data, legal data ,etc)*





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

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



Example: A complete internal and external data infrastructure needs to be created and collected to drive operational risk measurement

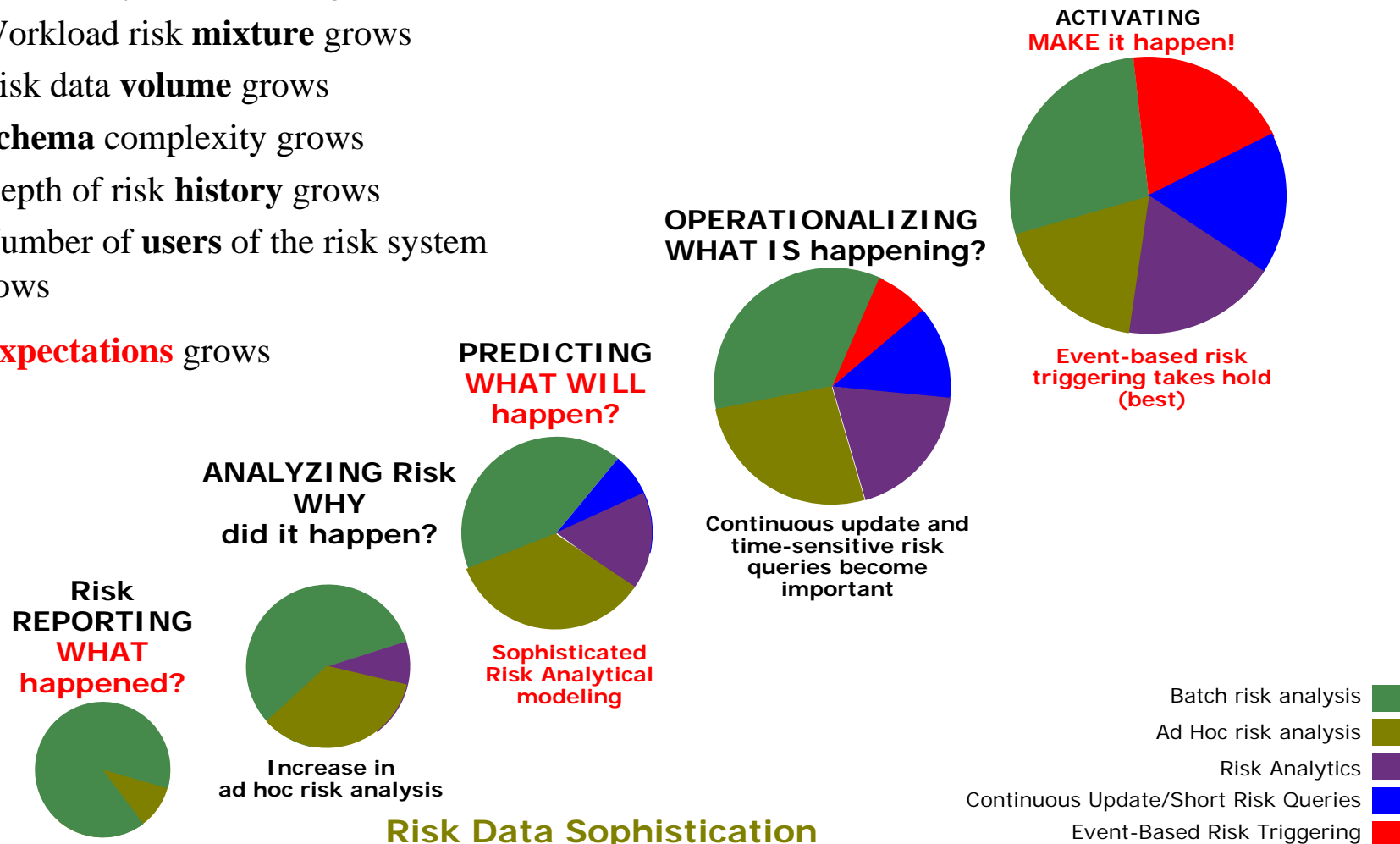
- 1. Internal Fraud**
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A Single Integrated View :Better, Faster Risk Decisions (Source :Teradata)

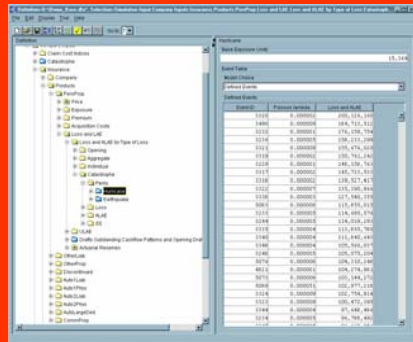
- Risk Query **complexity** grows
- Workload risk **mixture** grows
- Risk data **volume** grows
- **Schema** complexity grows
- Depth of risk **history** grows
- Number of **users** of the risk system grows
- **Expectations** grows

Risk Workload Complexity



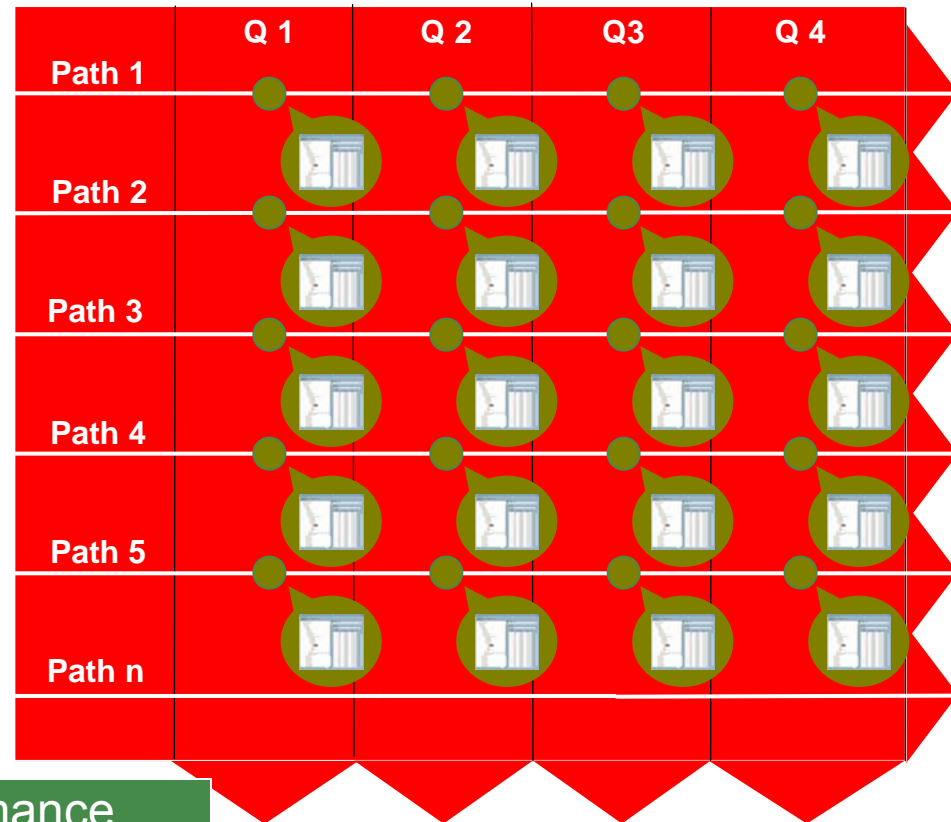
Example: Simulation Modeling Approach (Source: DFA)

Current State



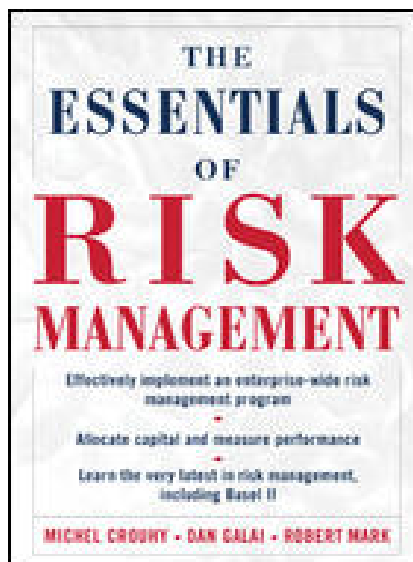
• Current financials, business plan, actuarial models

• High performance, distributed computing



• Large output data – storage, query/reporting

Recommended Value Added Unbiased References



- **Comprehensive user friendly description of Risk Management**
- **No Math**
- **Detailed technical description of Risk Management**
- **Deeply analytical**



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)
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



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 and 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).**