



The Actuarial Profession

making financial sense of the future

The Actuarial Profession, Risk and Investment conference

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Operational risk management workshop

Agenda

- Operational risk
 - What is it?
 - Is it different from other risks?
- A governance framework
- Qualitative analysis
 - What's the difference?
 - Wish list
 - What data are needed?
 - What will it look like?



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Operational risk: what is it?





‘The world has never been so full of risk’

(Thomas Aquinas, 1245)



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National security strategy (Oct 2010)

TIER 1	TIER 2
International terrorism	Chemical, biological, nuclear, radioactive (CBNR) weapons
Cyber attacks and large scale cyber crime	Overseas insurgency creating environment for terrorism
Major accident or natural hazard, e.g. extensive coastal flooding, pandemic	Organised crime
International military crisis	Satellite communications disrupted

Year	Event
1988	Piper Alpha oil rig (North Sea)
1993	Metallgesellschaft
1995	Barings Bank (+ Daiwa (1995), Sumitomo (1995), Allfirst/Allied Irish (2002), National Australia Bank (2004), Société Générale (2008))
1998	Long Term Capital Management
2000	Millennium Bug
2001	World Trade Center (9/11)
2001	Enron/Arthur Andersen
2003	SARS near-pandemic
2005	Hurricane Katrina (+ Dennis, Emily, Rita, Wilma)
2010	BP/Deepwater Horizon oil spill (+ Texas City (2005), Alaska pipeline (2006, 2011))
2010	Eyjafjallajökull (Iceland) volcano
2011	Japanese earthquake/ tsunami

Defining operational risk

‘The risk of direct or indirect losses resulting from inadequate or failed processes, people or systems, or from external events.’ [*Operational risk: the next frontier.* RMA/PriceWaterhouseCoopers, 1999]

‘The risk of **loss** resulting from inadequate or failed **internal** processes, people or systems or from external events’ [Basel II]

- includes legal risk
- excludes strategic and reputational risk
- ignores regulatory risk

‘The risk of loss **arising** from inadequate or failed internal processes, **or from personnel and** systems, or from external events.’ [Solvency 2]

An attempt to frame the unframeable, to assuage fears about the uncontrollable 'rogue others' and to tame the man-made monsters [of the financial system].

Prof Michael Power, *Organized uncertainty : designing a world of risk management* (OUP, 2007)

Operational risk - Is it different from other risks?

Is operational risk different from other risks?

	Credit, market, commodity, liquidity	Operational
Is the risk transaction-based?		
Is the risk assumed proactively ?		
Can it be identified from accounting information e.g. the P&L?		
Can audit confirm that every occurrence of the risk has been captured?		
Can its financial impact be capped or limited?		
Can you trade the risk?		
Is everybody in the firm responsible for the risk?		
Does the risk affect every activity?		





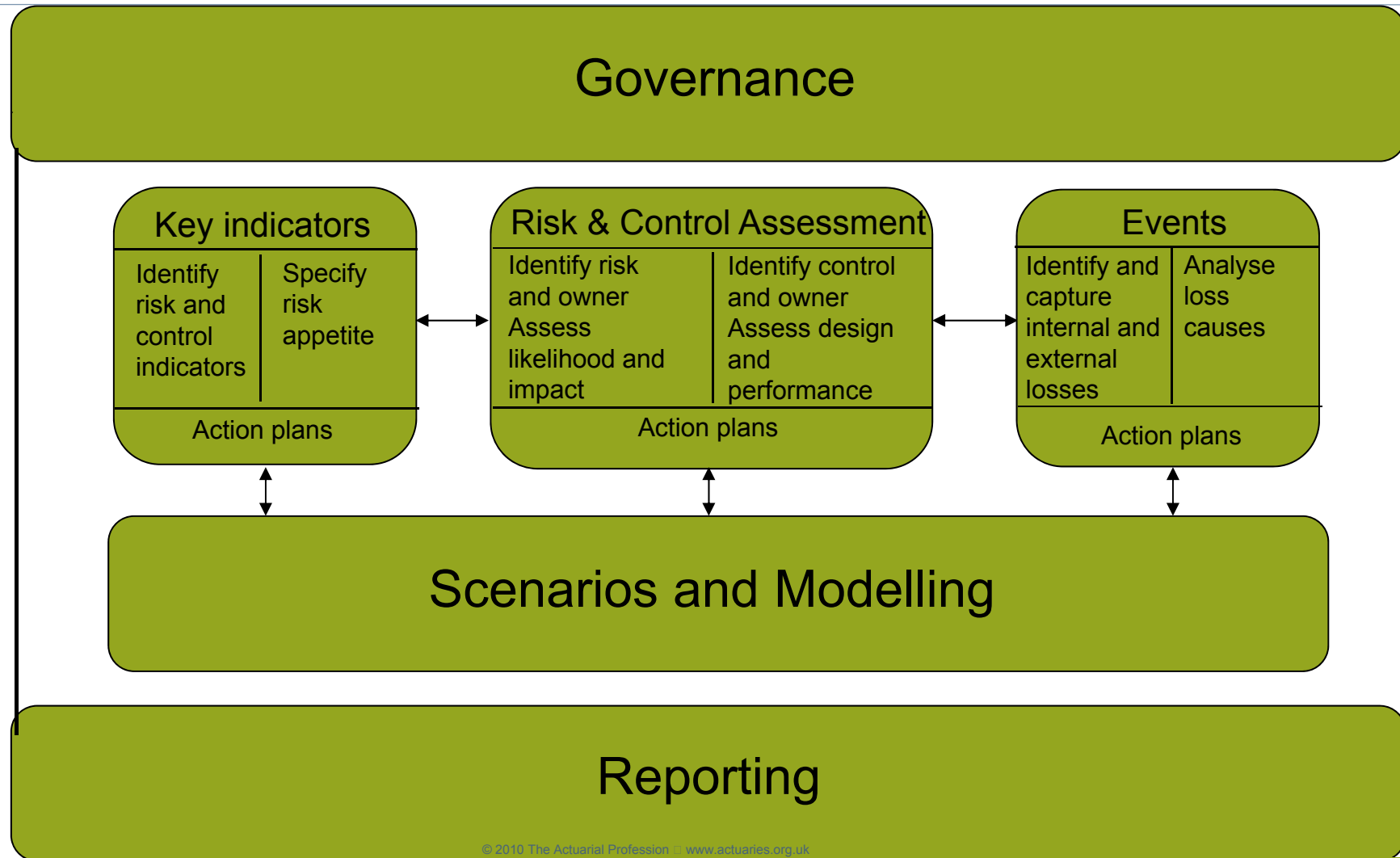
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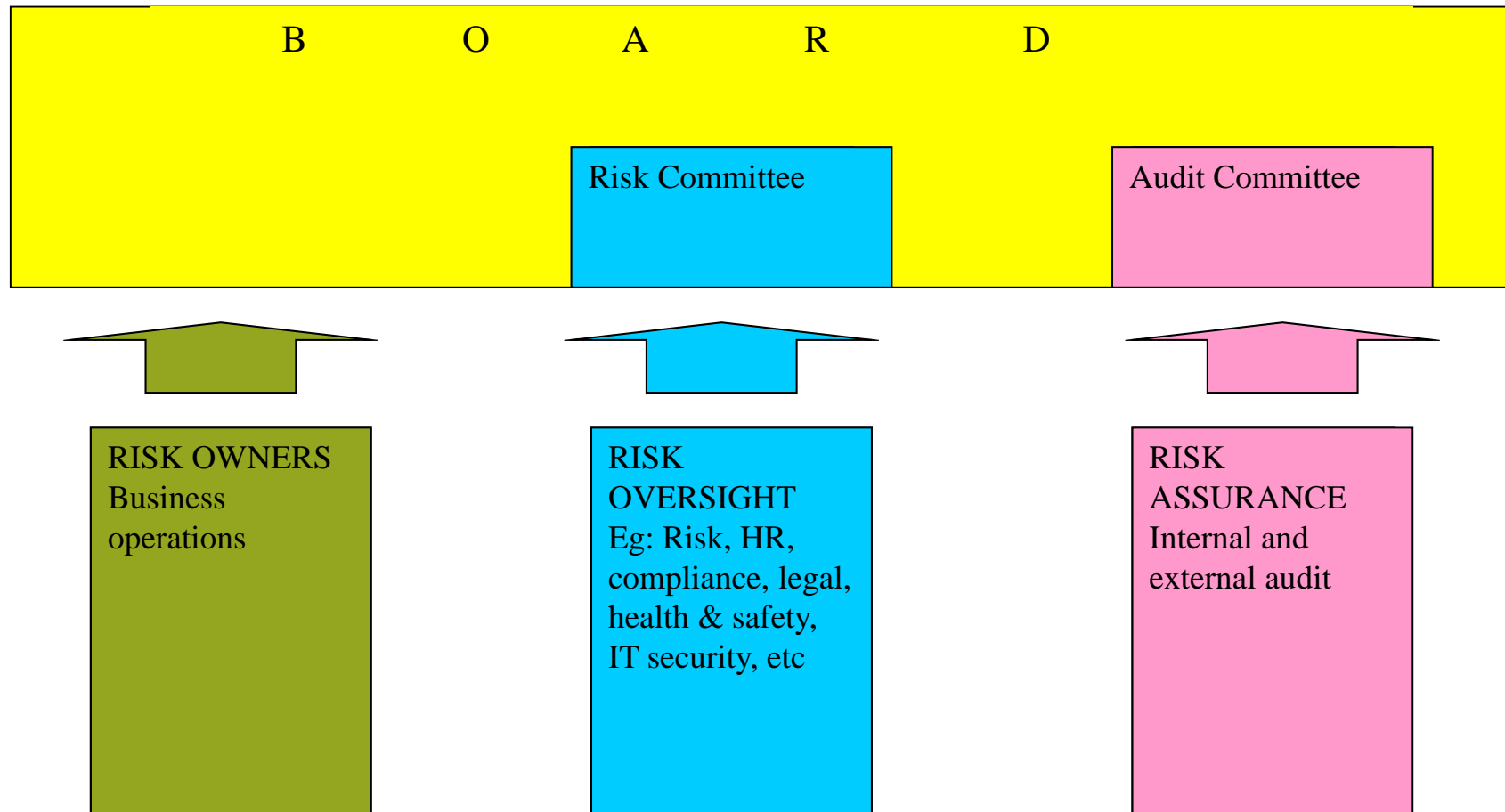
A governance framework for operational risk management



Operational Risk Management Framework



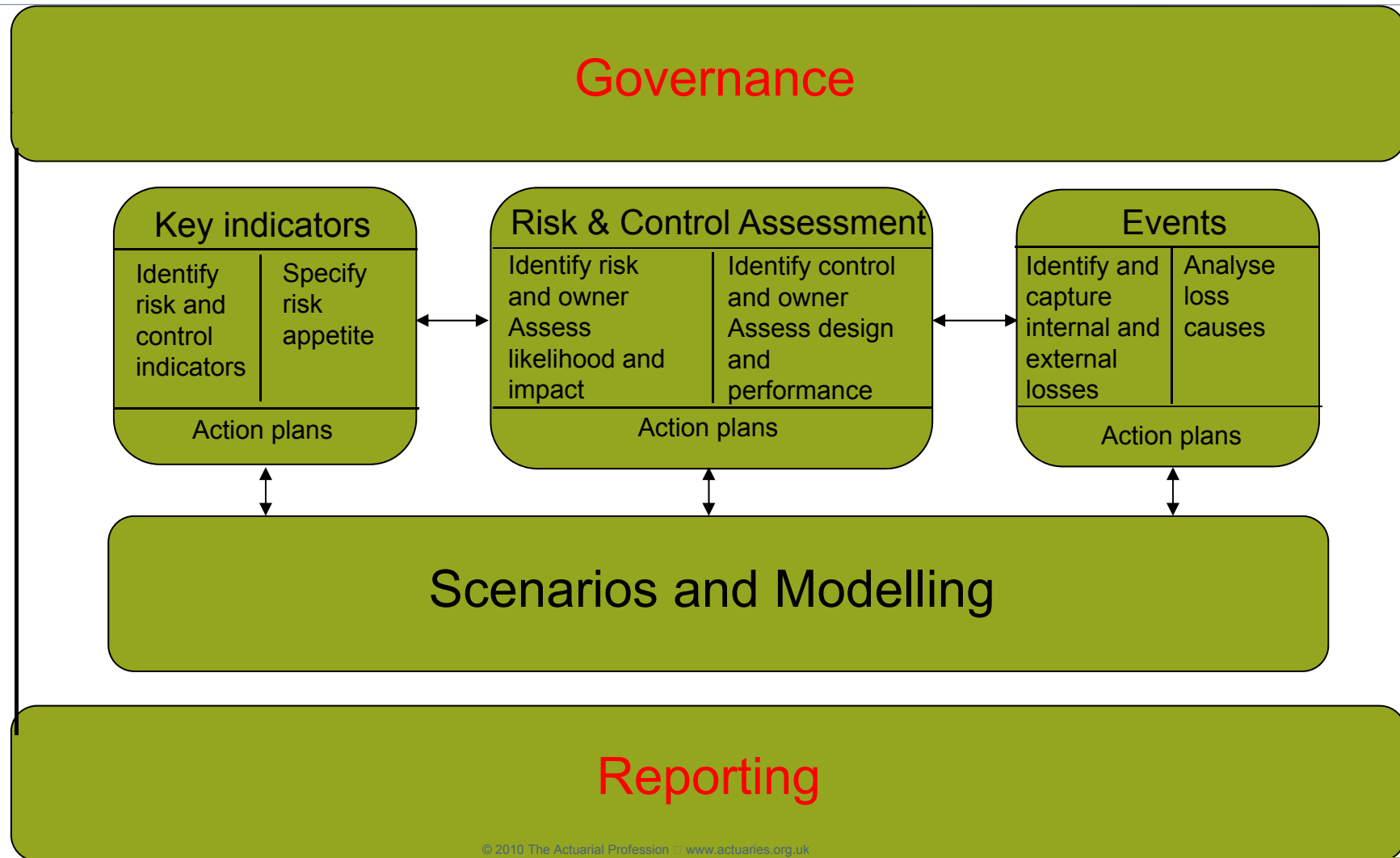
The 3 lines of defence



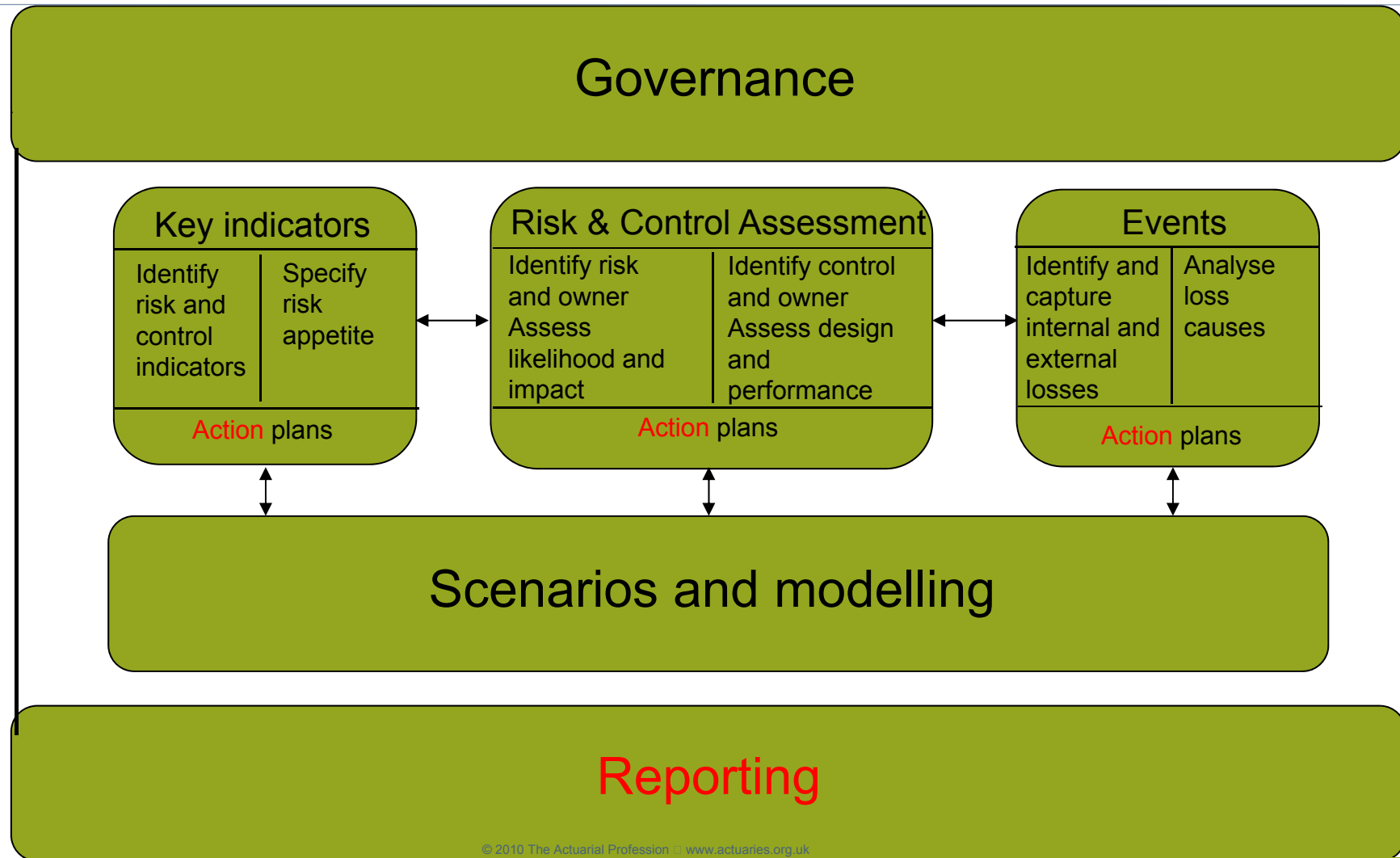
Board

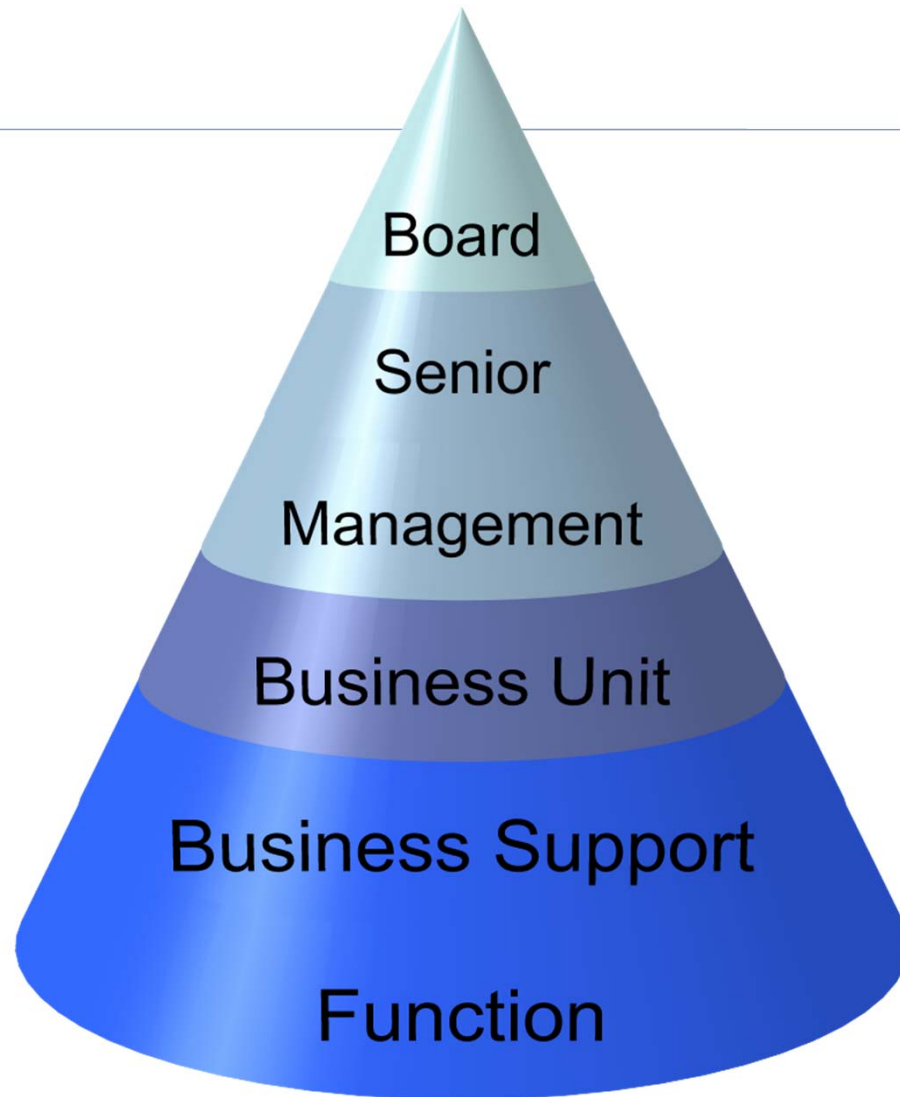
- Leadership
 - Culture
 - The tune in the middle
- Strategy and objectives
 - Risk appetite (= risk/reward)
- Reporting and communication

Operational Risk Management Framework



Operational Risk Management Framework

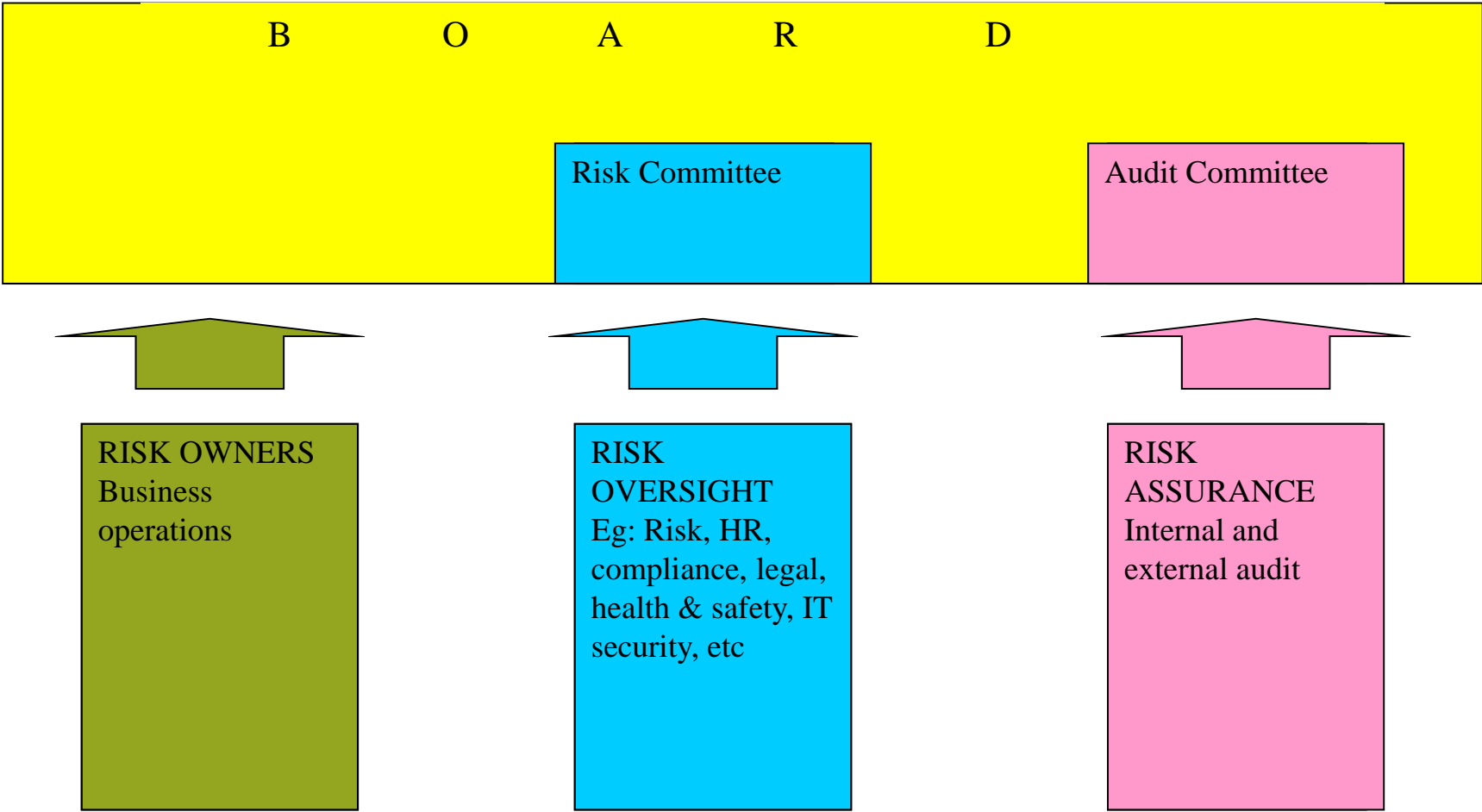




The board and risk

- Corporate governance (Turnbull 1999, Walker 2010)
- Strategy; new acquisitions, new products, new ventures
- Board Risk Committee
- Risk function and the CRO

Where does the (operational) risk function sit?



Risk assurance

- Independent
- Internal audit
 - Clear objectives
 - Status and position in the firm
 - Audit Committee
- External audit – financial reporting
- Internal audit as executive management
- Internal audit as consultant or investigator



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Qualitative analysis



What's the difference?

- Quantitative analysis
 - Uses actual losses, so backward looking?
Past is no indicator of the future?
 - Don't have to guess distributions – or do we?
 - Long time to collect data
 - Adding VaRs to get a capital figure
- Qualitative analysis
 - Uses 'soft' data, so forward looking?
 - Which curve to use?
 - Aligned with management's perceptions
Business judgement is good future indicator
 - Indirect use of external data

Ideally we will want to ...

- Use our existing data
- Mathematically fail controls, and link to risks
- Introduce practical risk management
 - Convert the qualitative risk scores to monetary values
 - See by how much (monetary amount) our controls reduce our risk profile
 - Prioritise actions by monetary risk impact
- Not wait until we have finished the loss collection exercise

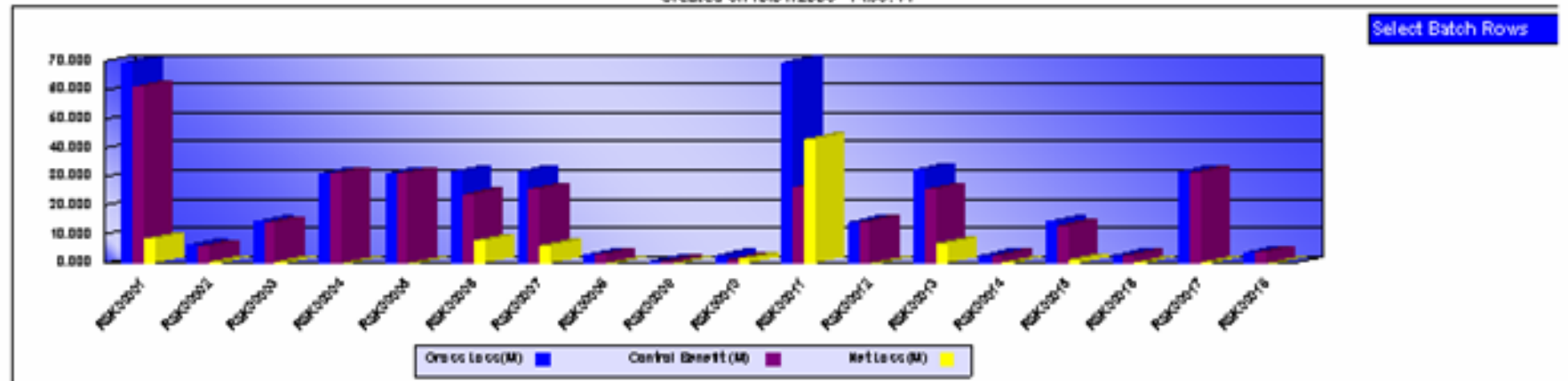
What data is needed for qualitative analysis?

Standard risk and control assessment data:

- Risk impact
- Risk likelihood
- Risk correlations
- Controls and their performance characteristics
 - Design, performance, key control, preventative, detective, mitigation effectiveness

Gross loss/Net loss comparison

Risk Results[Sim2 99.9 50000 seed1(76) - Session: 1 Asset Management Company(15) - Quantile: 99.90%]
 Time Frame Factor: 1 - Iterations: 50000 - Seed 1
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Risk	Risk Owner	Gross Loss GBP(M)	Control Benefit GBP(M)	Net Loss GBP(M)	
RSKD0001	Loss of key staff	TL	69.400	61.124	8.276
RSKD0002	Poor staff communication	DA	6.451	5.893	0.558
RSKD0003	Failure to understand the law and/or regulations	CK	14.570	14.112	0.458
RSKD0004	Over-dependency on outsourcing	DA	31.208	31.208	0.000
RSKD0005	Weakness in information security system	DA	31.188	31.151	0.037
RSKD0006	Inadequate or insufficient IT infrastructure to achieve busi	CK	31.845	23.874	7.971
RSKD0007	External fraud	JY	31.963	25.711	6.252
RSKD0008	Internal fraud	TL	2.934	2.934	0.000
RSKD0009	Inappropriate new products launched	DA	0.787	0.727	0.060
RSKD0010	Failure to recruit appropriate staff	DA	2.877	1.415	1.462
RSKD0011	Loss of key clients	CK	69.654	26.518	43.136
RSKD0012	Failure to accurately calculate performance fees	JY	14.339	14.339	0.000
RSKD0013	Failure to understand knowledge level of client	JY	32.608	25.631	6.977
RSKD0014	Failure to understand key client needs	DA	2.872	2.603	0.269
RSKD0015	Poor performance of outsourced administration	DA	14.408	13.150	1.258
RSKD0016	Poor distribution	JY	2.868	2.661	0.207
RSKD0017	Failure to update prices on daily basis	CK	31.782	31.436	0.346
RSKD0018	Dealing errors	CK	3.839	3.820	0.019
			395.593	318.307	77.286

Control cost benefit

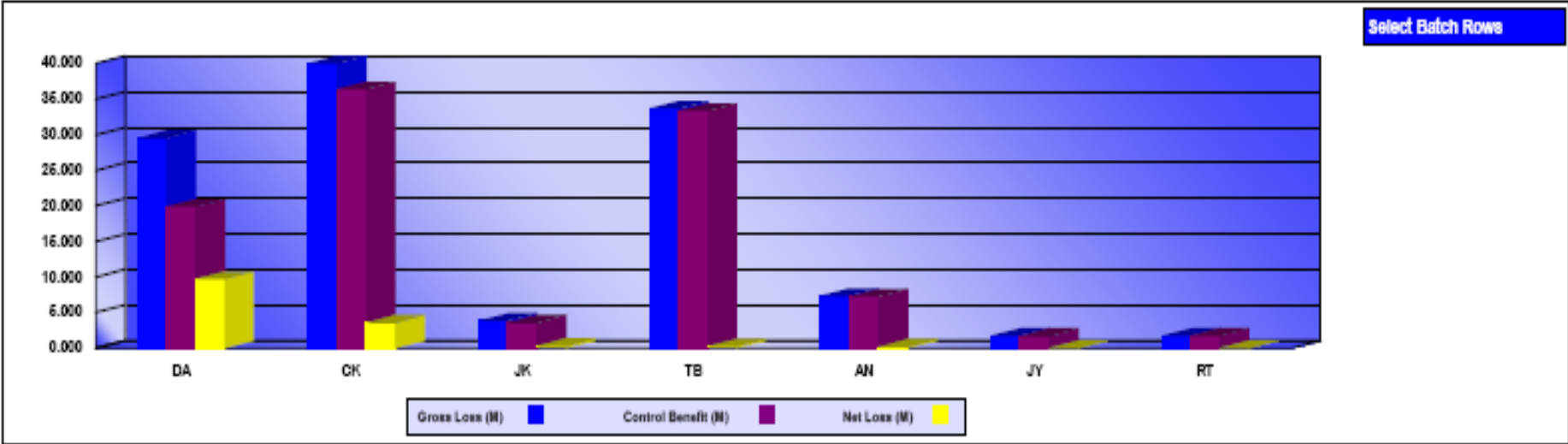
Results for All Controls [Sim2 99.9 50000 seed1(76) - Session: 1 Asset Management Company(15) - Quantile: 99.90%]

Time Frame Factor: 1 - Iterations: 50,000 - Seed 1
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Control	Control Owner	Cost of Control GBP(M)	Control Benefit GBP(M)	Control Benefit after Cost GBP(M)
CTR00002 Salary surveys	JK	0.200	27.080	26.880
CTR00001 Training and mentoring schemes	CH	0.400	12.380	11.980
CTR00003 Retention packages for key staff	DA	2.000	21.664	19.664
CTR00004 Defined communication channels	RT	0.200	2.188	1.988
CTR00005 Documented procedures and processes	NS	0.150	3.705	3.555
CTR00006 FSA registration	DA	2.500	9.114	6.614
CTR00007 Regular updates from various sources	TB	1.800	2.856	1.056
CTR00008 External training courses	JY	0.750	2.142	1.392
CTR00009 SLAs	RT	0.350	7.408	7.058
CTR00010 Outsourcing monitoring	RT	0.750	7.116	6.366
CTR00011 Due diligence	RT	3.100	8.342	5.242
CTR00012 Policy	AN	1.300	8.342	7.042
CTR00013 Record retention	JY	2.100	6.477	4.377
CTR00014 Information security policy procedure and monitoring	AN	2.100	8.456	6.356
CTR00015 Staff training and certification	DA	4.100	7.466	3.366
CTR00016 Client agreements/marketing	DA	3.700	8.752	5.052
CTR00017 Business/strategic planning	DA	2.100	14.921	12.821
CTR00018 IT system performance and capacity monitoring	CK	0.750	8.953	8.203
CTR00019 Physical security	CK	2.800	7.213	4.413
CTR00020 Systems security	DA	2.100	18.497	16.397
CTR00021 Criminal background check	DA	0.200	0.699	0.499
CTR00022 Segregation of duties	AN	0.300	0.675	0.375
CTR00023 Staff training	JY	0.800	34.633	33.833
CTR00024 Fraud monitoring	JY	0.900	0.596	-0.304
CTR00025 Whistle blowing	AN	0.100	0.699	0.599
CTR00026 New products employee training	TB	0.800	1.306	0.506
CTR00027 New products approval process	RT	1.600	0.386	-1.214
CTR00028 Recruitment of staff with appropriate skills	YH	1.000	1.416	0.416
CTR00029 Periodic review of performance fees	GJ	0.200	4.780	4.580
CTR00030 Formal exception process involving review by CFO	GJ	0.100	4.780	4.680
CTR00031 valuation reviewed prior to fee calculation	KR	0.850	4.780	3.930
CTR00032 Periodic client review report	LK	1.100	17.779	16.679
CTR00033 Regular client meetings	RT	0.550	1.128	0.578
CTR00034 New product development to meet client needs	TN	1.350	1.474	0.124
CTR00035 Adequate SLAs in place	TN	1.100	8.163	7.063
CTR00036 Regular performance review of all vendors/providers	RW	0.350	4.987	4.637
CTR00037 Breadth of distribution methods	DG	1.200	1.154	-0.046
CTR00038 Annual distributor reviews	LR	0.700	1.507	0.807

Results by risk owner

Results by Risk Owner [Sim1 99.9 50000 seed1(50) - Session: 1 Sample Retail Bank(14) - Quantile: 99.90%]
 Time Frame Factor: 1 - Iterations: 50,000 - Seed: 1
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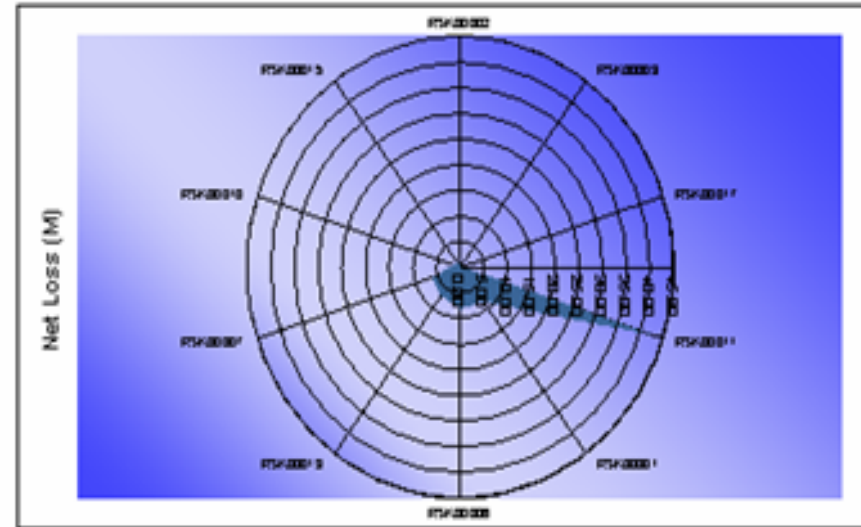
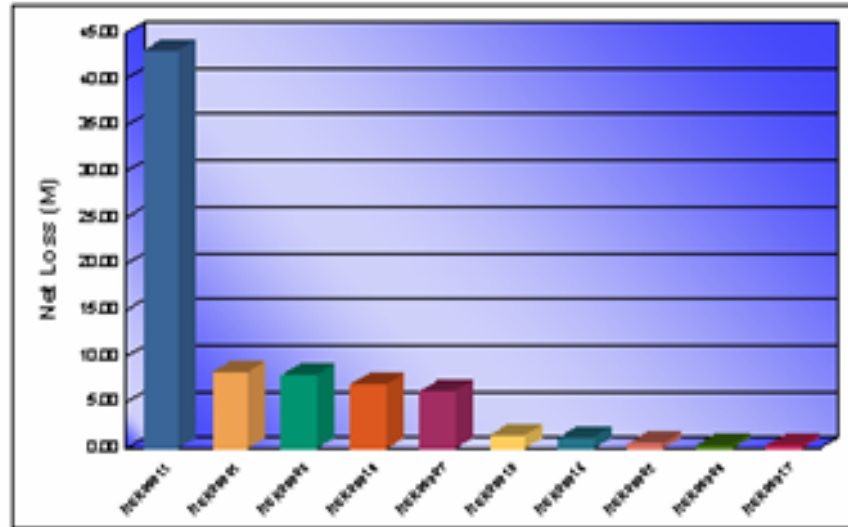


Risk Owner	Gross Loss GBP (M)	Control Benefit GBP (M)	Net Loss GBP (M)
DA	29.561	19.888	9.673
CK	39.997	36.427	3.570
JK	3.872	3.580	0.292
TB	33.668	33.399	0.269
AN	7.421	7.233	0.188
JY	1.722	1.695	0.027
RT	1.744	1.744	
	117.985	103.966	14.019

Ten highest residual risks

Ten Highest Net(Residual) Risks [Sim2 99.9 50000 seed1 (76) - Session 1 Asset Management Company(15) - Quantile: 99.90%]

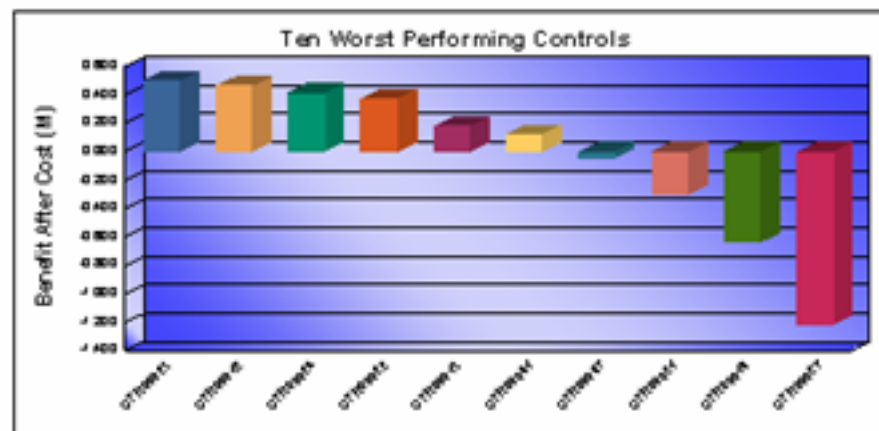
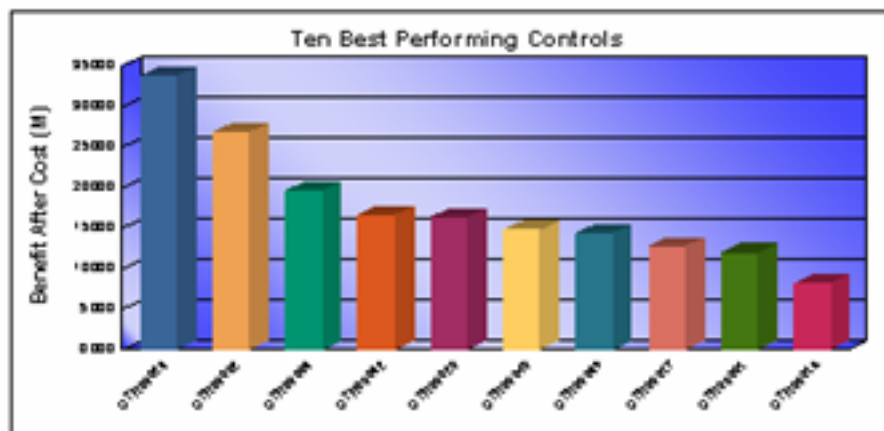
Time Frame Factor: 1 - Iterations: 50,000 - Seed 1
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Risk	Risk Owner	Gross Loss GBP(M)	Control Benefit GBP(M)	Net Loss GBP(M)
RSK00011 Loss of key clients	CK	69.654	26.517	43.136
RSK00001 Loss of key staff	TL	69.400	61.124	8.276
RSK00006 Inadequate or insufficient IT infrastructure to achieve busi	CK	31.845	23.874	7.971
RSK00013 Failure to understand knowledge level of client	JY	32.608	25.631	6.977
RSK00007 External fraud	JY	31.963	25.711	6.252
RSK00010 Failure to recruit appropriate staff	DA	2.877	1.416	1.462
RSK00015 Poor performance of outsourced administration	DA	14.408	13.150	1.258
RSK00002 Poor staff communication	DA	6.451	5.893	0.558
RSK00003 Failure to understand the law and/or regulations	CK	14.570	14.111	0.458
RSK00017 Failure to update prices on daily basis	CK	31.782	31.436	0.346
End of Ten Highest Net (Residual) Risks		305.56	228.86	76.70

Top best and worst controls

Control Benefit After Cost [Sim2 99.9 50000seed1 (76) - Session: 1 AssetManagementCompany(15) - Quantile: 99.90%]
 Time Frame Factor: 1 - Iterations: 50,000 - Seed: 1
 Created on 10/01/2008 14:38:44



Control	Control Owner	Cost of Control GBP(M)	Control Benefit GBP(M)	Control Benefit after Cost GBP(M)
Best Performing Controls				
CTR00023 Staff training	JY	0.800	34.633	33.833
CTR00002 Salary surveys	JK	0.200	27.080	26.880
CTR00003 Retention packages for key staff	DA	2.000	21.664	19.664
CTR00032 Periodic client review report	LK	1.100	17.779	16.679
CTR00020 Systems security	DA	2.100	18.497	16.397
CTR00040 Automated daily check with external source data	TN	0.900	15.718	14.818
CTR00039 Daily system price update report	TN	1.300	15.718	14.418
CTR00017 Business/strategic planning	DA	2.100	14.921	12.821
CTR00001 Training and mentoring schemes	CH	0.400	12.380	11.980
CTR00018 IT system performance and capacity monitoring	CK	0.750	8.953	8.203
Worst performing Controls				
CTR00021 Criminal background check	DA	0.200	0.699	0.499
CTR00042 Automated post-trade process in place	LR	0.850	1.312	0.462
CTR00028 Recruitment of staff with appropriate skillset	YH	1.000	1.416	0.416
CTR00022 Segregation of duties	AN	0.300	0.675	0.375

Support scenario analysis

Stress test risks and/or controls to see the impact of changes such as:

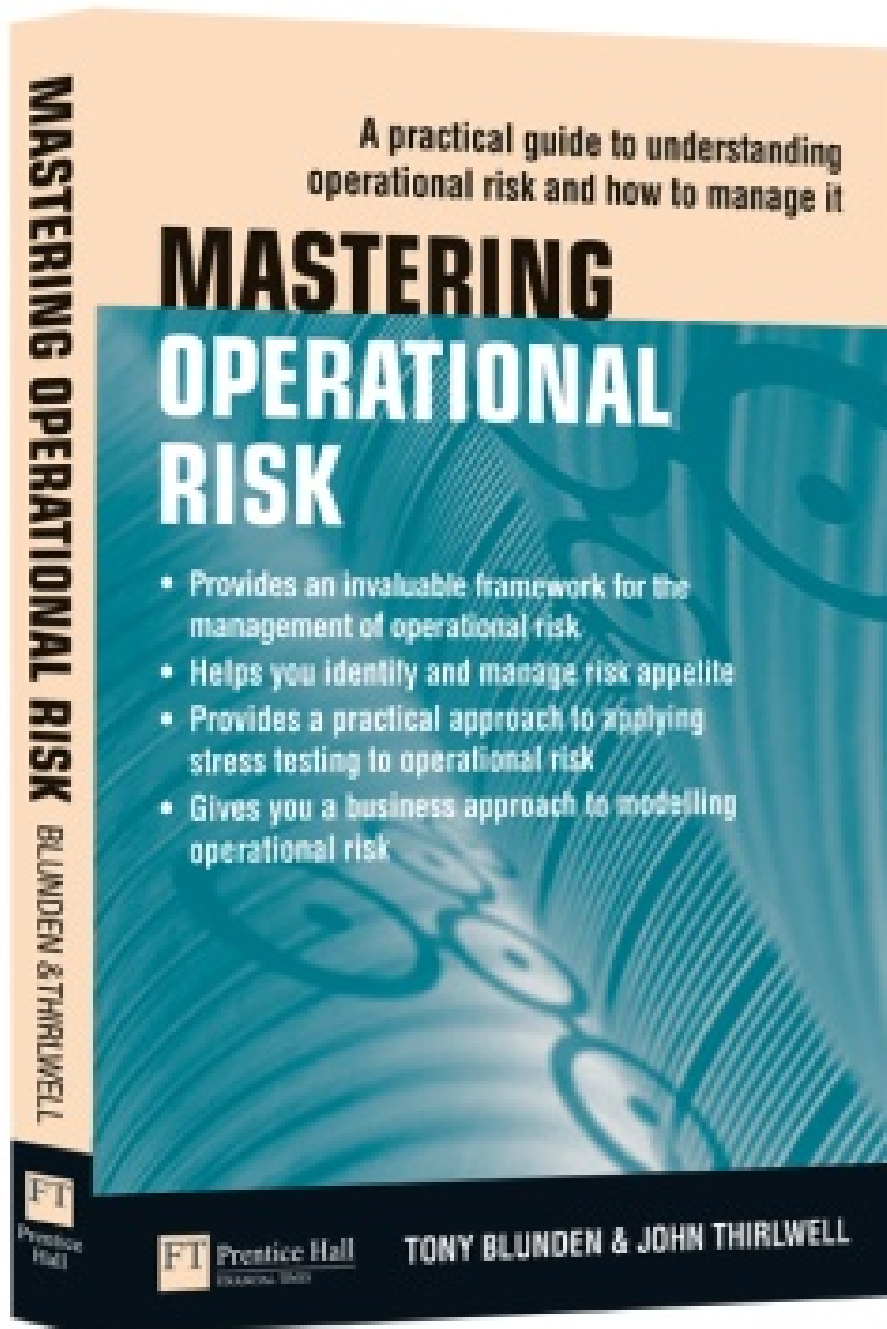
- All risks in a certain area (eg. payments) increasing in severity by 10%, combined with a reduction in control effectiveness by 15% for all controls relating to reconciliations
- Assess the impact of a new business that gives rise to new or different risks
- Assess the P/L benefit of introducing a new control
 - e.g. perhaps a new control is scheduled to be introduced next FY due to budget constraints. Modelling enables users to investigate the benefit of it being introduced earlier

Rapidly investigate changes in market knowledge

- New Risks / Losses
 - A new type of loss starts appearing; or
 - A risk that most people thought was benign hits headlines because another retail bank lost £50m; or
 - Another retail bank makes a loss because of some unforeseen risk severity
- Modelling enables a firm to investigate what these really mean ... a control we thought worked suddenly becomes doubtful. Well how doubtful must it become before it hurts?
10% 50%?

Business Benefits

- Utilises already available RCA data
- Focuses the business on risk and control challenge
- Clarifies order for control improvements
- Directs business managers to monetary gains for enhancing risk and control environment
- Enables firms to investigate the sensitivity of their risk and control profile to change; change that cannot be calculated or seen intuitively with a spreadsheet



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