

ENTERPRISE RISK MANAGEMENT AND INTERNAL MODELS

REGIONAL SEMINAR – SUPERVISORS IN
AFRICA ON RISK-BASED SOLVENCY AND
SUPERVISION

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OUTLINE OF TOPICS

- Introduction
- What is Enterprise Risk Management (“ERM”)?
- Relationship between ERM and Internal Models
 - Risks Facing Insurers
 - Quantification Process of Risk
 - Aggregation of Risk
 - Optimization of Risk
- Governance and ERM for Capital Adequacy and Solvency
 - Summary

INTRODUCTION



The world is interconnected making it very risky – it places various challenges on both the supervisory authority and the insurer.

- Any challenges in the environment that an insurer operate in can have positive or negative impact on the insurer's business;
- Financial assessment mechanisms are constantly changing (financial reporting, actuarial valuations, auditing). Regulatory requirements different from jurisdiction to jurisdiction;
- Competitors can influence the business success or failure of an insurer. Regulatory standards around financial and market conduct, fit and proper, ownership, etc; and
- Risk management an integral part of an insurer's business. Supervisors knowledge of setting effective risk management standards. Industry's understanding and ability to use different tools in assessing and managing its risks to mitigate adverse impact.

ENTERPRISE RISK MANAGEMENT (ERM)

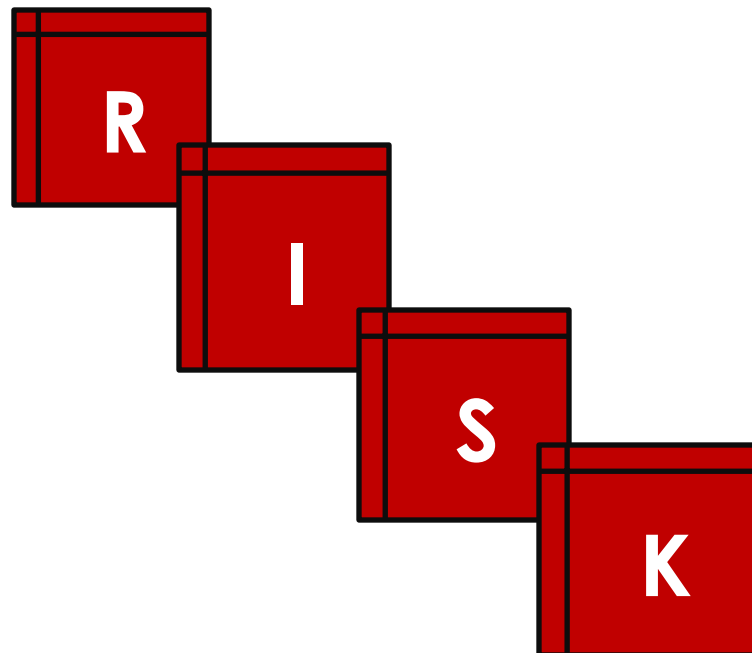


- Definition
 - Framework
 - Risk concepts
 - Process
- ERM Overview - IAIS Standards and Guidance

WHAT IS ERM?



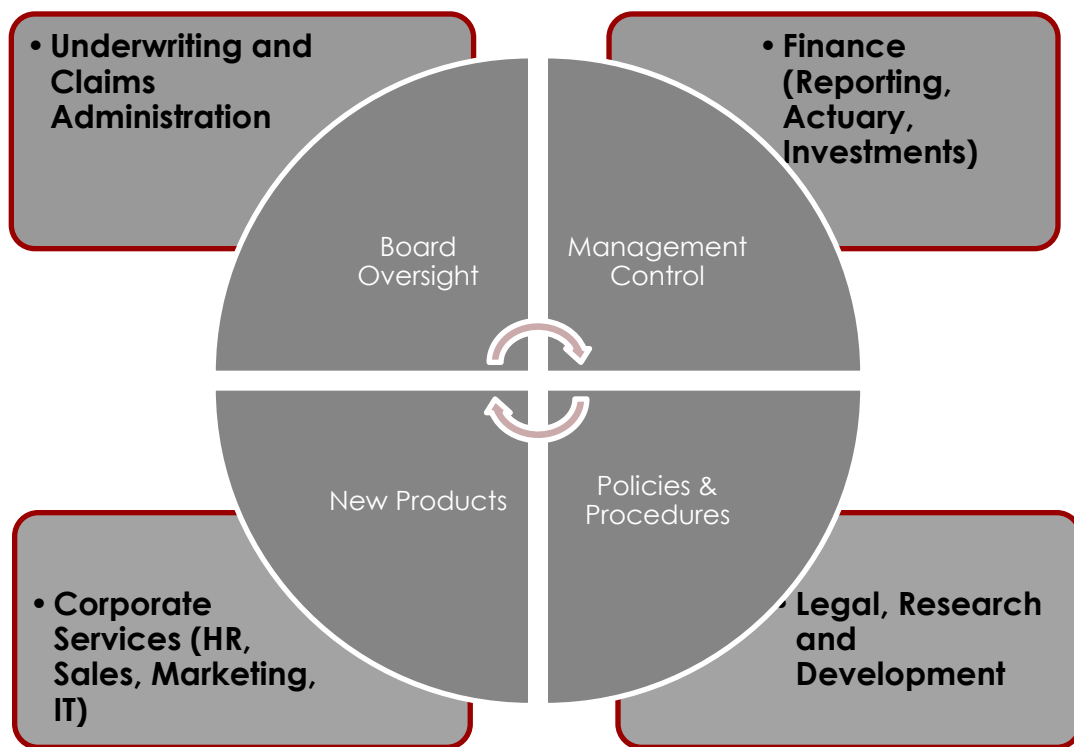
“ERM is the discipline by which an organization in any industry assess, controls, exploits, finances and monitors risks from all sources for the purpose of increasing the organization’s short- and long-term value to its stakeholders” (CAS 2003)



ERM FRAMEWORK

For any organization to make ERM part of its culture successfully – all functional departments will need to be coordinated and all employees should be educated while allowing for flexibility, initiative and autonomy within each department.

ERM – Breaking down Silos



RISK CONCEPTS



- Exposure – maximum amount of loss/damage in case event occurs
- Volatility – the variability in potential outcome (greater the volatility the greater the risk)
- Severity – amount of loss/damage that would occur if event happens
- Probability – possibility of the event occurring (the greater the possibility the greater the risk)
- Frequency – how often the event may occur (the more frequent the event occurs the higher the risk)
- Time horizon – once the event occurs – how long is the exposure to the risk (the longer the period of exposure the higher the risk)

ERM PROCESS



ERM is a process of managing complex risks faced by an insurer.

- Establish the context (SWOT analysis – internal, external and risk management)
- Identify the risks – document all conditions that represents material threats
- Quantify the risks – analyze each risk, create probability parameters
- Aggregate all risks – integrate all the material risks distributions
- Prioritize the risks – assess the risks to determine percentage contribution of each to the aggregate risk profile
- Treat the risks – set strategies to manage and control each risk
- Monitor and review – continuous assessment of risk environment and risk management strategies

ERM PROCESS...



A risk management framework and process is an essential part of an insurers business in order to meets its challenges

Risk Governance

- Establish a ERM system – developing, supporting and embedding risk strategy and accountabilities

Risk Assessment

- Identify, assess and categorize all the risks for the whole business

Risk Quantification

- Measure, analyze and consolidate all the risks

Risk Monitoring & Reporting

- Monitor, report and conduct activities to provide insights into risk management strengths and weakness

Risk Control & Optimization

- Use risk and control information to improve performance

ERM OVERVIEW– IAIS STANDARDS & GUIDANCE



- Nature of insurance is the assumption, pooling and spreading of risks – mitigate the risk adverse financial consequences to policyholders
- ERM process – identifying, assessing, measuring, monitoring, controlling and mitigating risks
- ERM involves the self-assessment of all reasonable foreseeable and relevant material risks an insurer faces and their interrelationships
- ERM now an acknowledge practice in many insurer's everyday business practices
- ERM provides link between the ongoing operations management of risks and long-term business goals and strategies
- IAIS standard on asset-liability management (ALM) identifies ALM as a vital element in ERM framework

RELATIONSHIP BETWEEN ERM & INTERNAL MODELS



- Definition of Internal Models
 - Purpose of Internal Models
- Relationship of ERM to Internal Models

WHAT IS AN INTERNAL MODEL?



- Is a method by which an insurer determines its own economic capital needs; and
- Is a means to determine an insurer's regulatory capital requirements where appropriate in the context of the solvency regime.
- “The term “Internal Model” refers to a risk measurement system developed by an insurer to analyze its overall risk position, to quantify risks and to determine the economic capital to meet those risks.” (IAIS 2008)

PURPOSE OF INTERNAL MODELS



- To assist the insurer in better integration of its risks and capital management processes and practices.
- Can also be used by an insurer in:
 - ✓ Price setting – appropriate premium levels, etc.
 - ✓ Part of ALM function
 - ✓ Analyzing reinsurance programs
 - ✓ Investment assessments
 - ✓ Underwriting framework
 - ✓ Claims assessment
- Internal models should form part of an insurer' strategic, operational, governance and risk management processes.

RELATIONSHIP OF ERM TO INTERNAL MODELS



- Internal models is the fundamental mechanism through which the ERM process can be managed by an insurer to create great value;
- Internal models ensures transparency and accountability for the management of the material risks faced by an insurer; and
- Therefore, internal models is more than a tool – it should be embedded into an insurers ERM framework.

RISKS FACING INSURERS



- Risk a Key Business Issue for Insurers
 - Type of Risks Faced by Insurers
- Relationship between Risk and Insurer's Business

RISK A KEY BUSINESS ISSUE FOR INSURERS

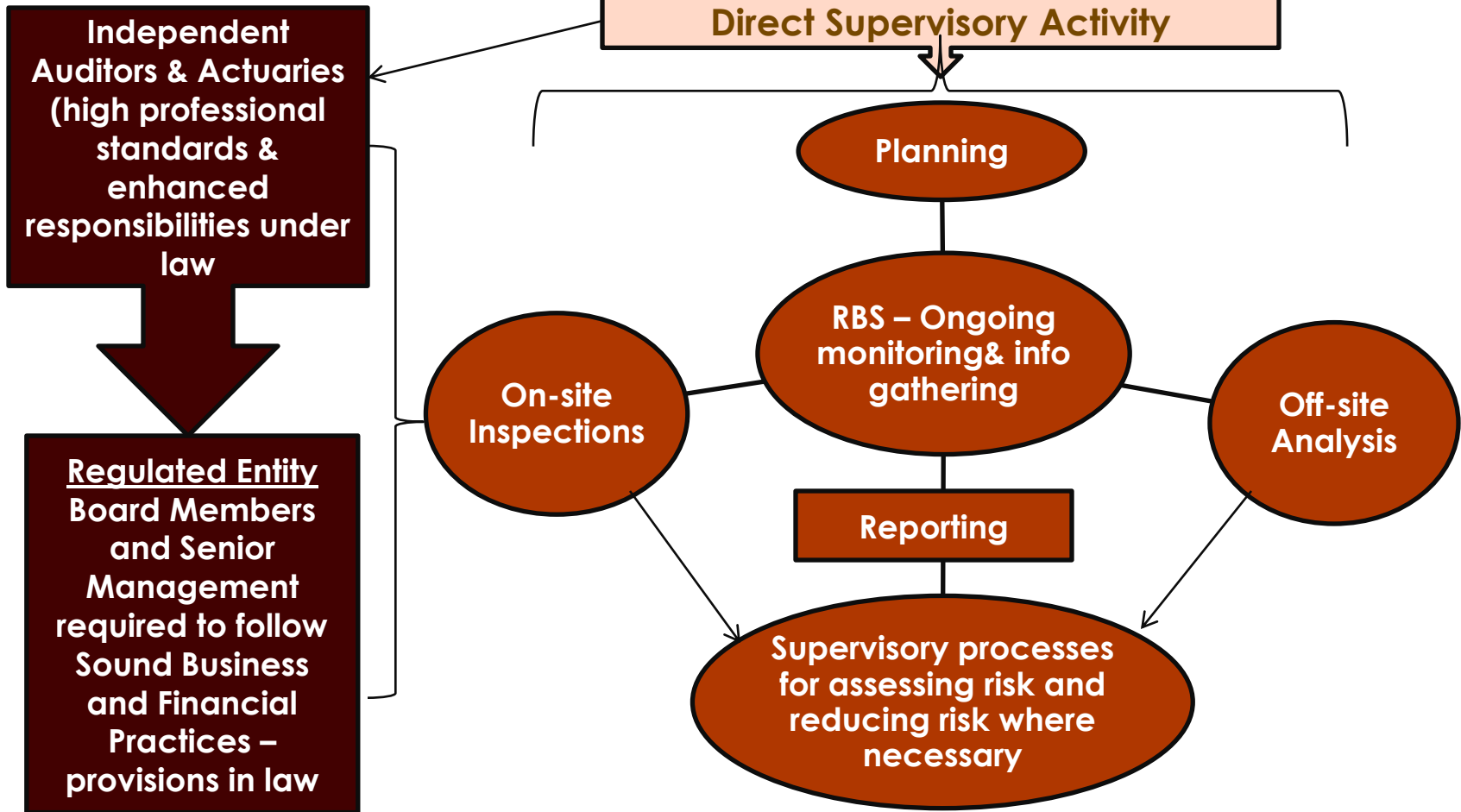


- Risk affects all areas of an insurer's business and influences the insurers overall success and failure
- Therefore, supervisors should also be able to assess and monitor each insurer's risks through an effective RBS system
- A RBS system that will allow the supervisor to assess four main risk factors:
 - ✓ Inherent risk – risk of an adverse event occurring
 - ✓ Controls – actions put in place to lessen the probability and severity of inherent risks
 - ✓ Residual risk – risk of an adverse event occurring even with controls in place
 - ✓ Additional support – any other additional factor that is in place to deal with the outcome of an event and lessen its impact

RISK A KEY BUSINESS ISSUE FOR INSURERS...



Effective RBS system in monitoring insurers capital adequacy and solvency



RISK A KEY BUSINESS ISSUE FOR INSURERS...



Example of assessing inherent risk of an insurer through RBS by a supervisor

- Two general insurers might write the same volume and proportion of vehicle insurance – relatively high risk line of business in Africa (most countries have no mandatory third party cover)
- Based on the above they will have the same level of inherent underwriting risk. However:
 - ✓ Insurer A has very good systems of underwriting controls
 - ✓ Insurer B has very poor control systems for underwriting
- The gross or inherent risk might be same for both insurers, but the net risk might be different
- We will need to assess the gross risk of each insurer and the quality of risk management to determine the actual level of net risk
- We also need to consider the aggregate riskiness of the inherent risk areas, adjust it by the quality of risk management and we will get net risk
- We finally have to account for the insurer's current financial strength (actual capital position). Insurer with weaker financial position will be supervised closely than the one with the strong financial position

RISK A KEY BUSINESS ISSUE FOR INSURERS...



The framework of assessing the inherent risk is – Composite Risk Rating



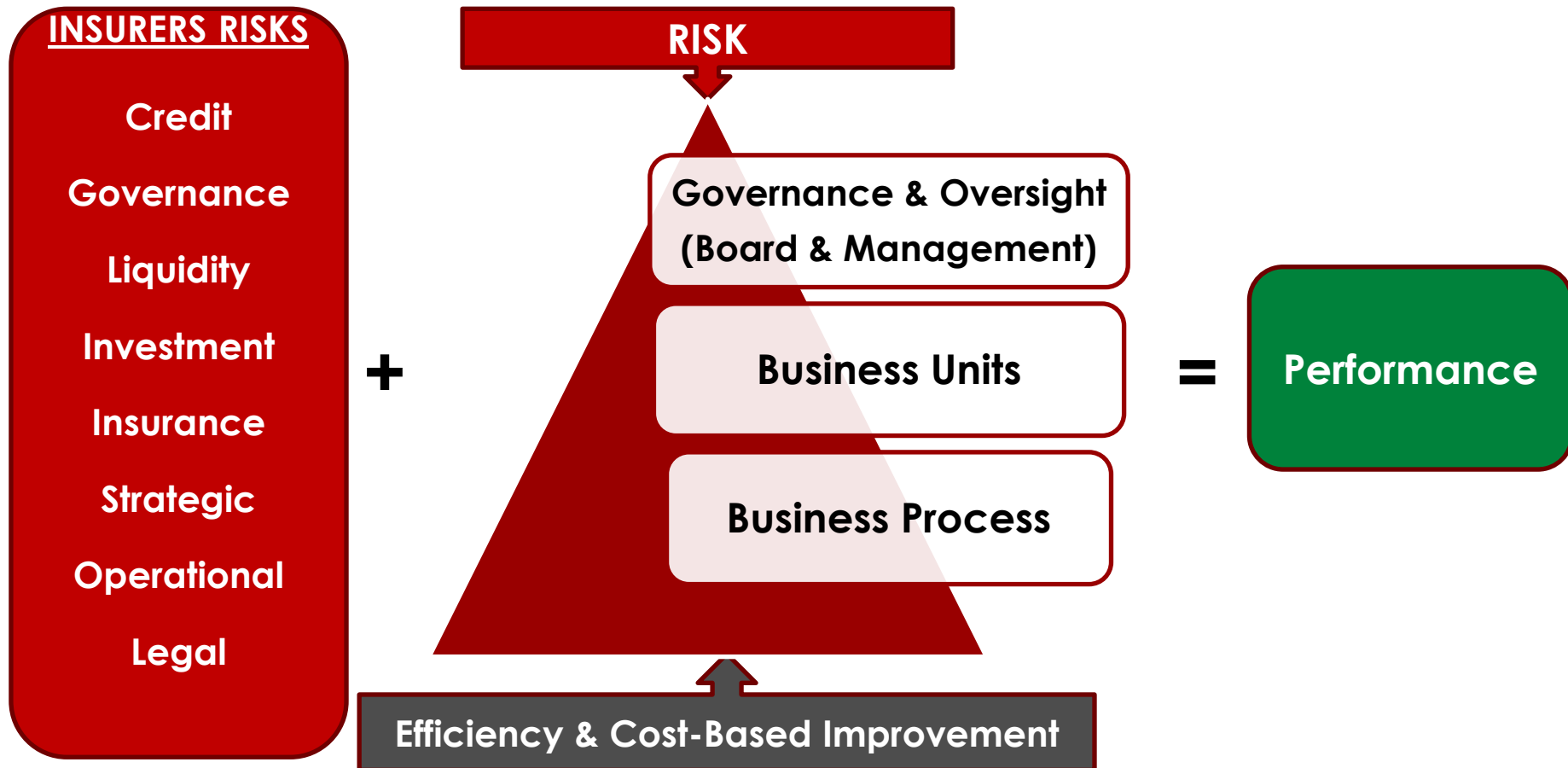
TYPE OF RISKS FACED BY INSURERS



- Credit Risk – risk of default by counterparties in which the insurer has financial interest
- Strategic Risk – risk associated with the insurer's business model and strategy
- Liquidity Risk – risk that the insurer does not manage its cash flow adequately – leading to its inability to meet obligations
- Operational Risk – risk to the insurer resulting from its own internal systems, processes and procedures
- Governance and Management Risk – risk to the insurer that arise from the failure of Board and Management to properly govern the insurer
- Legal Risk – risk to the insurer resulting from the legal system in which it operates
- Investment Risk – risk of loss in the value of an insurer's assets due to changes in interest rates or other factors (Market risk)
- Insurance Risk – risk that claims payable are greater than the contribution to make these payments from premiums received – writing business at loss (Liability risk)

RELATIONSHIP BETWEEN RISK AND INSURER'S BUSINESS

Risk is understood to affect all parts of an insurers business and influence both its success and failure!



ASSESSING RISK AND RISK MANAGEMENT



Exercise – Group Activity (15 minutes)

Assume that in our jurisdiction we are in the process of implementing a leading edge regime: fully functional risk assessment process, risk based capital requirements, high standards of corporate governance, etc.; What do you think the main areas of concern for insurers will be which they might be opposed to? Explain why? Present a general, high level strategy of how you will handle these objections.

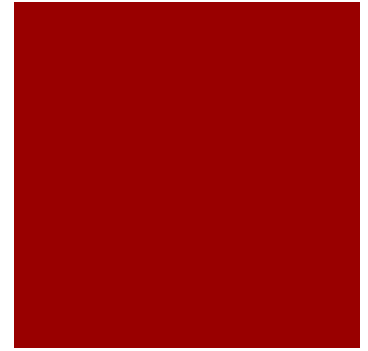
QUANTIFICATION PROCESS OF RISKS

- Quantification of Risk
 - Risk Modeling

QUANTIFICATION OF RISKS

- Risk Profile – the entire portfolio of an insurer's risk – cumulative probability distribution where various matrices and benchmarks are used to rate each risk
- Risk Performance Measures – most of the measures common to the practice of ERM are:
 - ✓ Measures related to the degree of the insurer's solvency; and
 - ✓ Measures related to the volatility of the insurer's performance on a “going concern” basis.
 - ✓ Both of these measures are used for different purposes and focus on distinctly different areas of the insurer's risk profile
- Solvency related measures
 - ✓ Concentrate on the adverse “tail” of the probability distribution
 - ✓ Relevant for determining economic capital and very important to policyholder, regulators, etc.
 - ✓ Some of them are:
 - Probability of Ruin
 - Shortfall Risk
 - Value-at-Risk (VaR)
 - Expected Policyholder Deficit (EPD) or Economic cost of Ruin (ECOR)
 - Tail Value at Risk (Tail VaR) or Tail Conditional Expectation (TCE)
 - Tail events

QUANTIFICATION OF RISKS...



- Performance related measures
 - ✓ Concentrate on the mid-region of the probability distribution
 - ✓ Relevant for determining volatility around expected results and are important to owners, stock analysts, etc.
 - ✓ Some of them are:
 - Variance
 - Standard Deviation
 - Semi-variance and downside standard deviation
 - Below-target-risk (BTR)

- IAIS – Standard and Guidance
 - ✓ Regardless of the measure used, causes of all the material risks and their impact should be considered and relationship between those risks exposures assessed

RISK MODELING



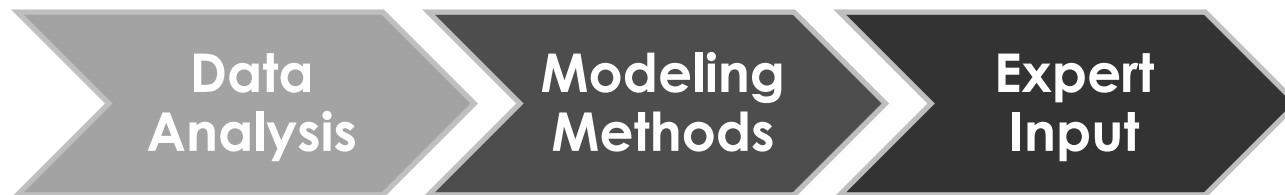
- These are the methods used to determine the risks and performance measures
- Major general classes for models used in ERM framework (insurer's will choose one or two and customized it to meet its unique needs):
 - ✓ Structural or Casual Financial Models
 - ✓ Stochastic or Probabilistic Models
 - Analytic Methods
 - Simulation Methods
 - Statistical Methods
 - Structural Methods
 - Dynamic Financial Analysis (DFA)
- The choice of modeling approach are generally between statistical analytic models and structural simulation models
- Methods such as Dynamics Simulation are generally suited for quantifying risks such as operational and strategic, which are not easily quantifiable

RISK MODELING...

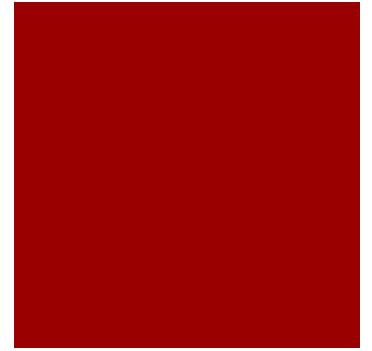


➤ IAIS – Standard and Guidance

- ✓ Risk should be modeled to assess their effect/impact on an insurer's business
- ✓ Analyzing and modeling the level of risks includes:
 - Stress and scenario analysis
 - Quantitative assessment
 - Internal Models
 - Qualitative assessment where the risk is not readily quantifiable
 - Measurements should be documented accurately



AGGREGATION OF RISKS



- Prioritizing of Risk
- Risk Aggregation

PRIORITIZING OF RISK



- An insurer can rank material risks it faces on an appropriate scale such as frequency, severity or both
- The process of prioritizing risks involves:
 - ✓ Risk mapping
 - ✓ Key Performance Indicators (KPI) probability distribution

Ran out of diagrams.....SMILE!

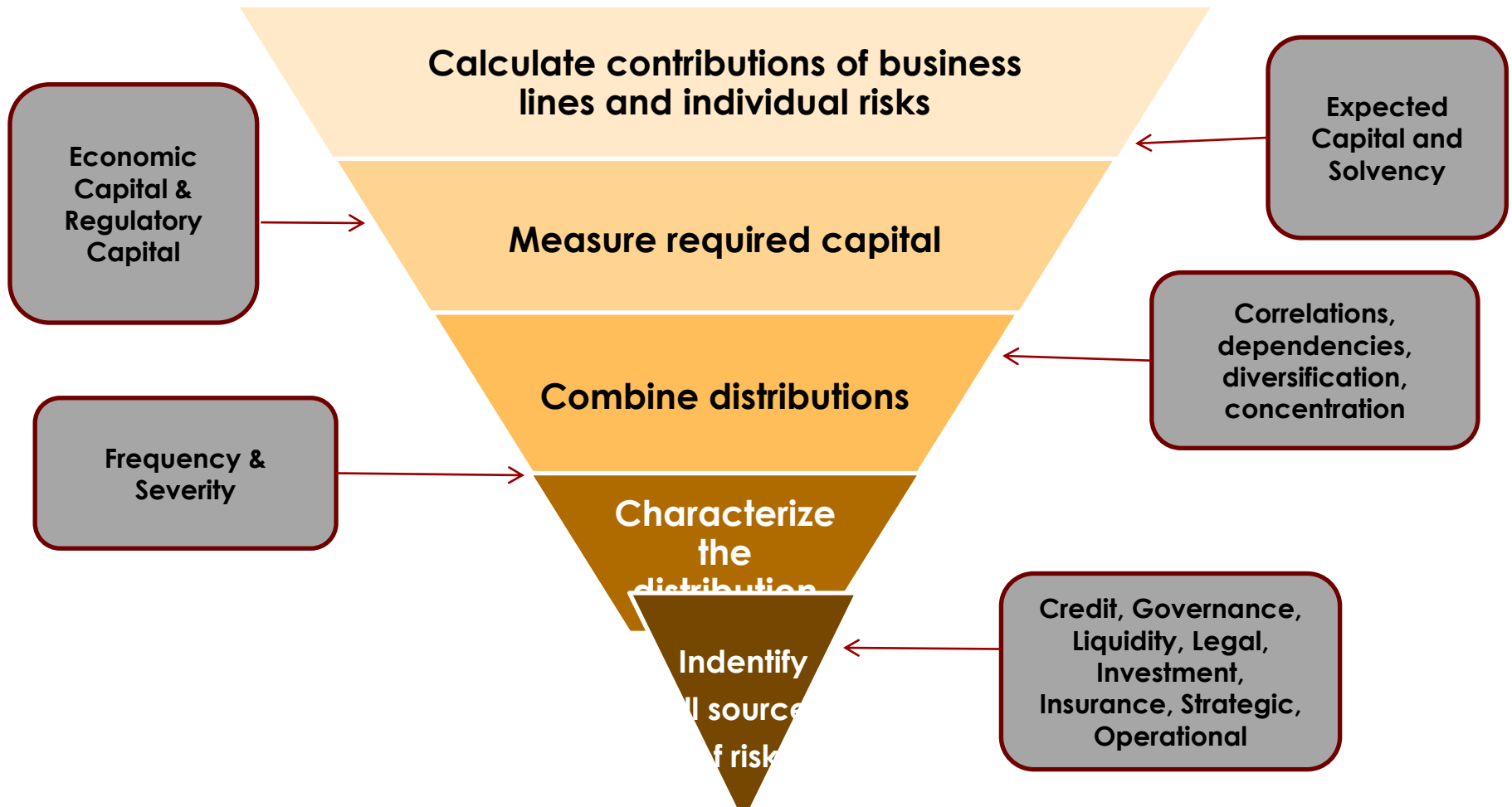
RISK AGGREGATION



- An insurer can integrate several of its risks with one another through the ERM process
- Within an ERM framework, an insurer can integrate various risks by estimating the statistical correlations between each of the individual risks through:
 - ✓ Covariance Matrix – a two dimensional display of the covariance' among several random variables (risks)
 - ✓ Covariance – a statistical measure of the degree to which two random variables (risks) are correlated
 - ✓ Structural Simulation Model
- When aggregating its risks, an insurer should take into account:
 - ✓ Risk dependency – indirect or direct dependency of risks – interconnectedness
 - ✓ Risk Concentration – higher than normal risk exposure in a single risk – not good
 - ✓ Risk Diversification – combining two risks result in less capital requirement – good
 - ✓ These factors should also be considered when assessing and modeling risks

RISK AGGREGATION

Putting it all together – two main elements of risk management framework



OPTIMIZATION OF OF RISKS

- ERM framework in Risk Optimization
 - Strategies for Managing Risk
 - Risk Monitoring and Control

ERM FRAMEWORK IN RISK OPTIMIZATION



- After identifying, assessing and measuring risks it faces, an insurer has to make number of decisions on how to control, exploit or treat the risks if it does materialized
- Several processes can be built into an ERM framework:
 - ✓ Generic application – optimization, candidate analysis
 - ✓ Capital management – capital adequacy, capital structure, capital distribution and capital allocation
 - ✓ Performance measures – risk-based metrics
 - ✓ Insurance/reinsurance/hedging strategy optimization
 - ✓ Crisis management
 - ✓ Contingency planning
 - ✓ Business expansion/contraction strategy
 - ✓ Distribution channel strategy
 - ✓ Strategic planning

STRATEGIES FOR MANAGING RISK



The general strategies for managing risk can be put in five major categories (IAIS).

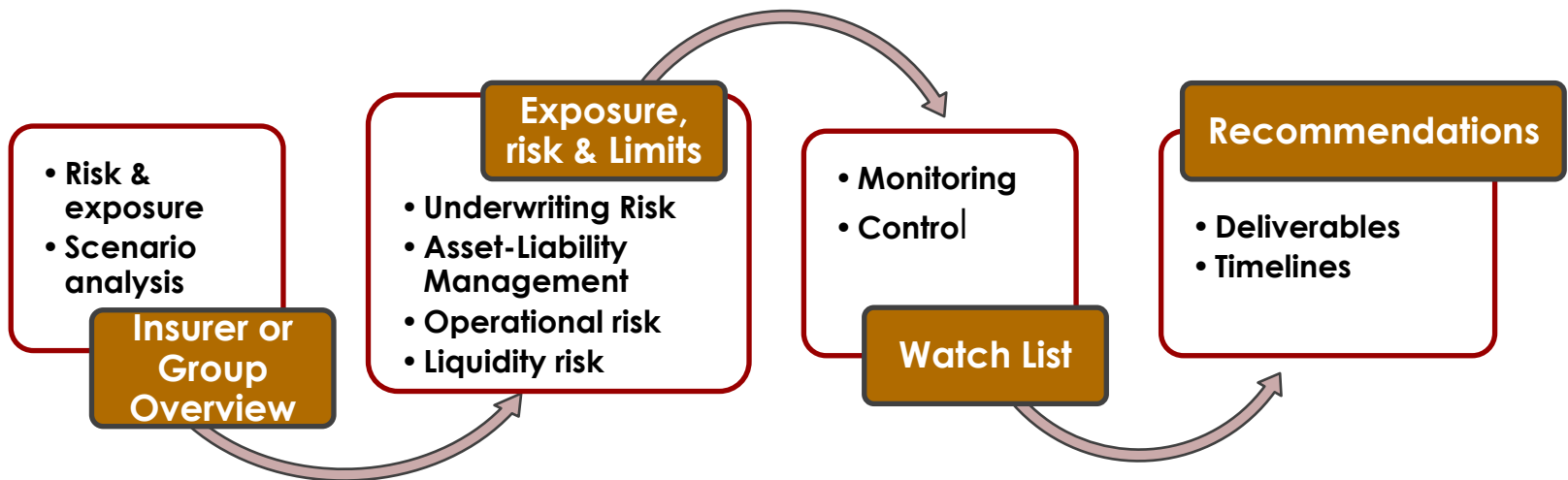
- Avoid – eliminate, stop, prohibit or sell the risk exposure
- Retain – accept and self-insure the risk exposure (i.e. integrate with other risks or diversify the risks)
- Reduce – mitigate or cap portions of the risk exposure
- Transfer – reinsure, hedge, securitize or outsource the risk exposure
- Exploit – expand and diversify the risk exposure

An insurer will select the optimal strategy that best suits its business needs

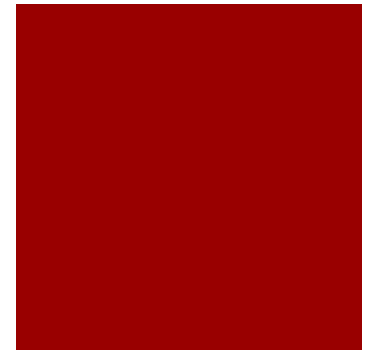
RISK MONITORING AND CONTROL



- Continual monitoring of the risk environment and the performance of the risk management process is essential as part of an insurer's ERM framework
- Most proactive way will be to create a "risk dashboard" that will incorporate:
 - ✓ Key data used to monitor the risk positions
 - ✓ Key process to operate within given tolerances



ERM FOR CAPITAL ADEQUACY AND SOLVENCY PURPOSES



- Risk Governance
- Role of Supervisors
- Transparency and Disclosure

RISK GOVERNANCE



- Governance and Risk Management
 - ✓ Insurer to have appropriate internal processes and controls in place – allowing for adequate monitoring and control by Board and Management
 - ✓ Risk management practices and procedures to be embedded throughout the hierarchy of the business
 - ✓ All processes of the ERM system should be well documented

- Risk Management Policy – as part of insurers ERM framework
 - ✓ Controlling and mitigating the risk
 - ✓ Processes and methods for monitoring risk
 - ✓ Linkage of risk management with insurer's management of capital
 - ✓ Linkage of risk management with corporate objectives and strategy

- Risk Tolerance Statement – as part of insurer's ERM framework
 - ✓ The level of risk to which it is willing and able to be expose – business structure
 - ✓ Define the insurer's tolerance limits – clear guidance to operational management of level of risk and limits of risk
 - ✓ Risk responsiveness and feedback loop
 - ERM framework to be responsive to change and risk management policy
 - There should be good feedback loop – decision made by Board and Management to be implemented and effect monitored and reported

RISK GOVERNANCE...



➤ Own Risk and Solvency Assessment (ORSA)

- ✓ An insurer to regularly perform its own risk and solvency assessment
- ✓ ORSA to incorporate all reasonable foreseeable and relevant material risks
- ✓ Economic and regulatory capital
 - Determine the overall financial resources needed to manage its business given risk tolerance
 - Risk management actions to be based on consideration of its economic capital, regulatory capital requirements and financial resources
- ✓ Using an internal model for ORSA
 - Internal model should assist insurer in assessing all risks faced and determine the economic capital needed to meet those risks
 - Internal model to address all those identified risks and assess their impact on business performance
 - In constructing its internal model for ORSA, and insurer may adapt risk modeling techniques and approaches appropriate to its business structure
- ✓ Continuity Analysis
 - This analysis is a process of ensuring sound, effective and complete processes, strategies and systems (assessment and maintenance of financial resources needed)
 - The analysis allows an insurer to better link its present capital requirements with future business plan projections – resulting in meeting capital requirements continuously
 - An insurer to demonstrate its ability to manage its risks over a long period under a range of plausible adverse scenarios
 - Its capital management plans and projections important to its overall risk management strategy

ROLE OF SUPERVISORS

➤ Risk Management

- ✓ Supervisor to assess the adequacy and soundness of the insurer's ERM framework and processes
- ✓ Review insurer's internal controls and monitor its capital adequacy – require strengthening thereof if necessary
- ✓ Monitor techniques employed for risk management and capital assessment
- ✓ Require regular reporting and request enough information – risk management and solvency
- ✓ Take appropriate action for non-compliance and adapt level of supervision for those who manages their risks and capital adequately

➤ Internal Models for Regulatory Capital Purposes

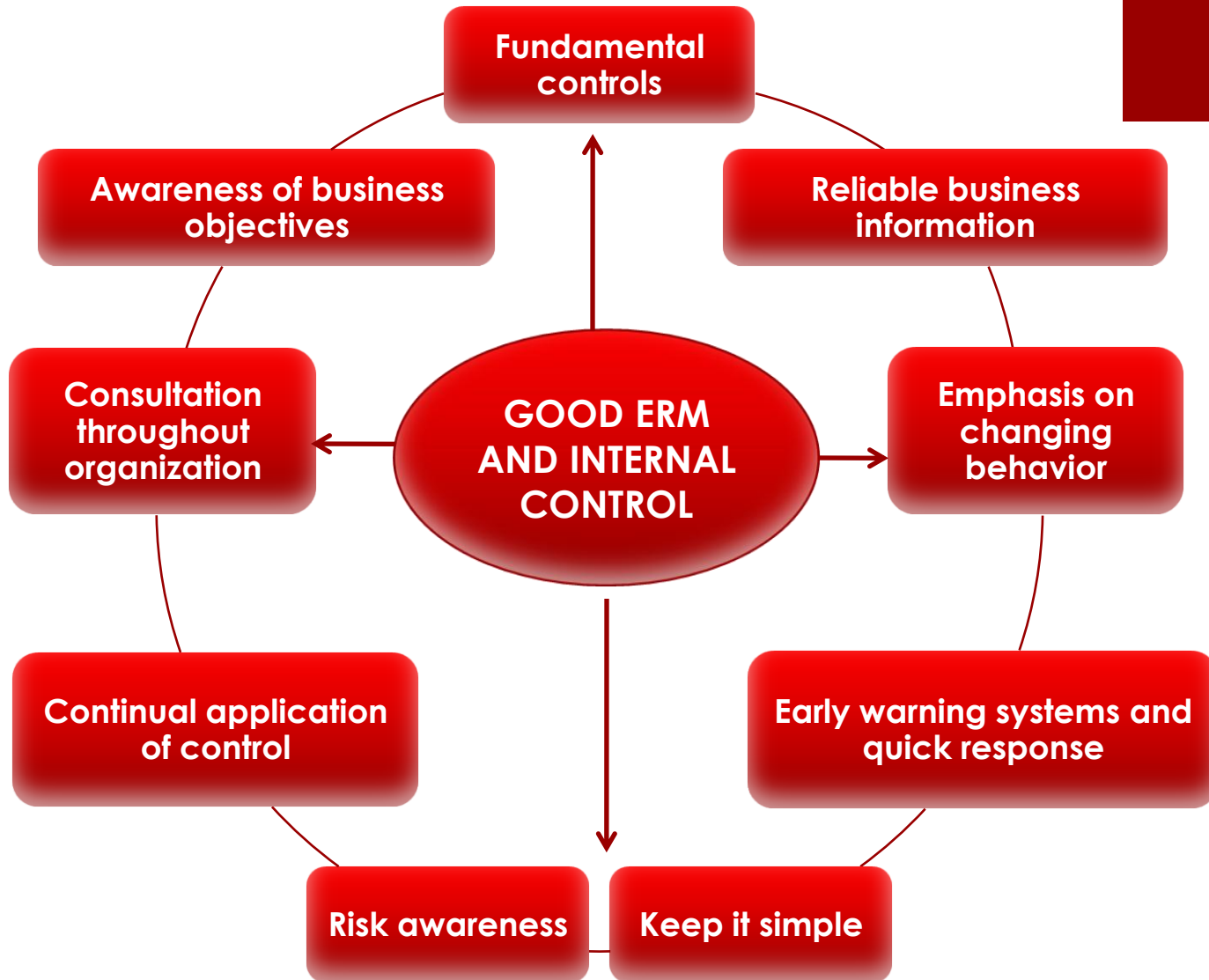
- ✓ When approving internal models initially a supervisor should at least use a minimum of the following assessments to test its viability:
 - Statistical Quality test
 - Calibration Test
 - Use Test
- ✓ Set appropriate modeling criteria to be used – if a regime allows for use of internal models by insurers to determine regulatory capital (PCR and/or MCR)
- ✓ Require an insurer to ensure that internal model, its methodologies and results are fully embedded into the risk strategy and operational processes (ERM framework)
- ✓ Ongoing validation and supervisory approval of the internal model

➤ In both of the above cases, a supervisor must have a formal, structured framework that will allow for the risk assessment process to be objective, consistent and transparent as possible

TRANSPARENCY AND DISCLOSURE

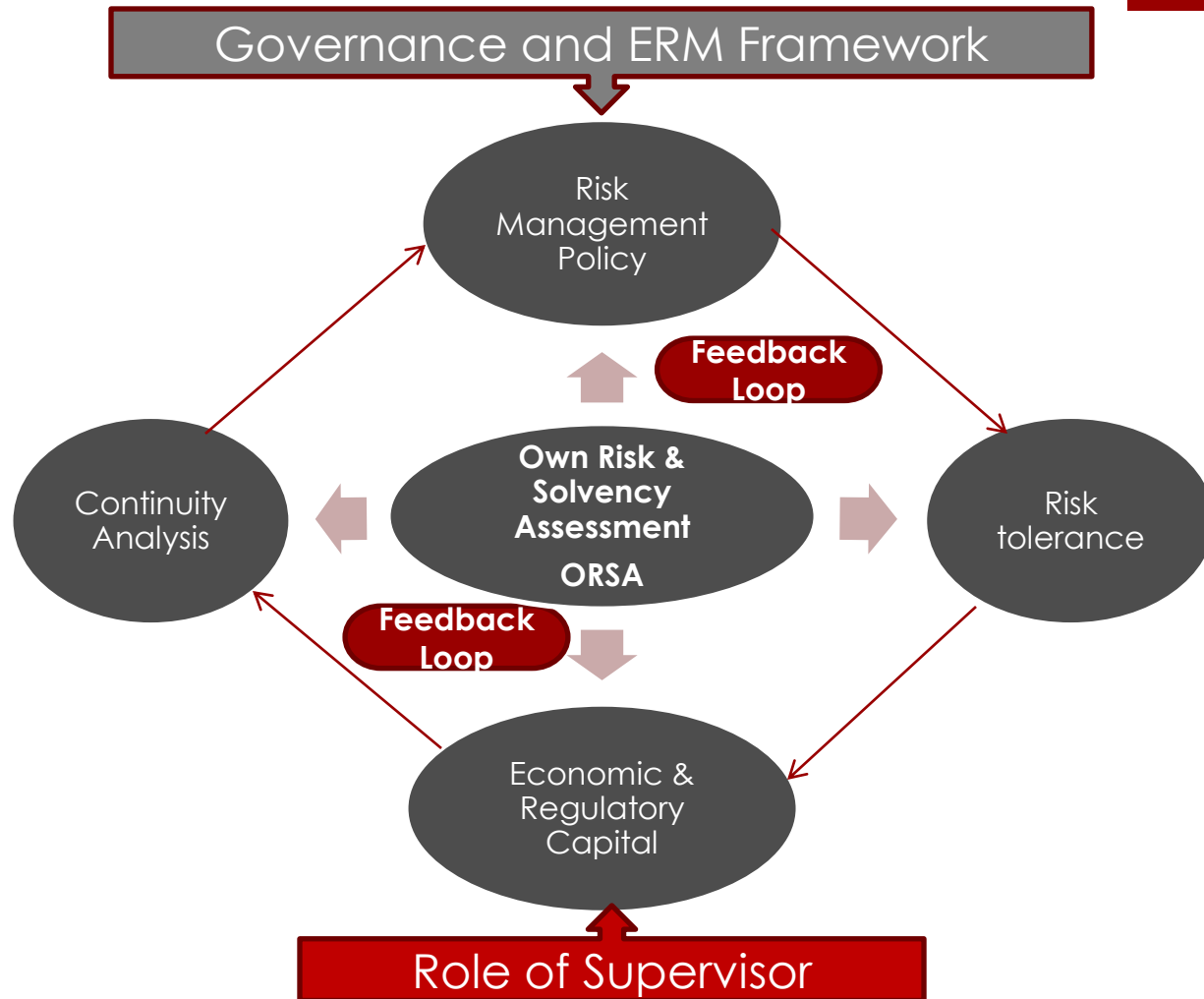
- Supervisors to require insurers to report relevant information timely relating to:
 - ✓ Their financial position
 - ✓ The risks they are exposed to
- Public disclosure of reliable and timely information facilitates the understanding of existing or prospective shareholders of an insurers financial status
- Insurers are to disclose quantitative and qualitative information on:
 - ✓ Financial position
 - ✓ Financial performance
 - ✓ Description of:
 - The basis, methods and assumptions upon which information is prepared;
 - Risks exposures and how they are managed; and
 - Management and corporate governance.
 - ✓ Produce at least annually audited financial statements
- For the benefit and protection of policyholders, supervisors are to maintain efficient, fair, safe and stable insurance markets
- Supervisors should however strike a balance between transparency and comparability when requiring insurers to publish their risk and capital management information and internal models used in managing these areas – limited disclosure to be required with due regard to any proprietary confidential information

IN SUMMARY



IN SUMMARY

ERM for Capital Adequacy and Solvency will only be effective in this framework



CREDITS



- Standard and Guidance Paper on the use of Internal Models for Regulatory Purposes – IAIS, 2008
- Standard and Guidance Paper on ERM for capital adequacy and solvency – IAIS, 2008
- Overview of Enterprise Risk Management – Casualty Actuarial Society (CAS), 2003
- Risk Based Supervision – Premier Series on Insurance, The World Bank, Issue 14, 2009
- Insurance Core Principles and Methodologies, IAIS, 2003



THANK YOU!



QUESTIONS???