The Changing face of ERM: The Insurance Company's Perspective

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History of Risk Management as a professional discipline

Developed as a response to new risk classes and instruments

1960s

Creation of the discipline:
Focus on insurable risks

- Mitigation of the severity of losses from hazards

1970s

New elements of risk:
Financial market risks

- End of Bretton Woods ('72)
  - Forex risk
- Oil price fluctuations in "oil crisis"
  - Commodity price risk
- Policy shift of US Fed ('79)
  - Interest rate risk

1980s

Expansion to cover:
Financial Risk Management

- Use of derivatives (eg forwards, futures, options, swaps) to hedge financial risks:
  - FX risk
  - Equity risk
  - Interest rate risk
  - Commodity price risk

1990s

New risk elements:
Operational and model risk

- Failure to manage derivatives appropriately (eg Orange County, Barings)
- Model failures (eg LTCM, recent fin. crisis)
- Improper accounting for derivatives (eg Enron)

2000s

Increased rigour & discipline:
Increased regulatory scrutiny

- Changed risk awareness following 9/11 event
- Overhaul of supervisory and rating agency approaches
- Financial crisis showed weaknesses in financial services industry

Today

- Constantly evolving regulatory environment
- Increasingly complex data management requirements
- Change is the only constant

The role of Risk Management is to drive organisational resilience and capacity to evolve in line with market pressures

Evolution of Enterprise Risk Management

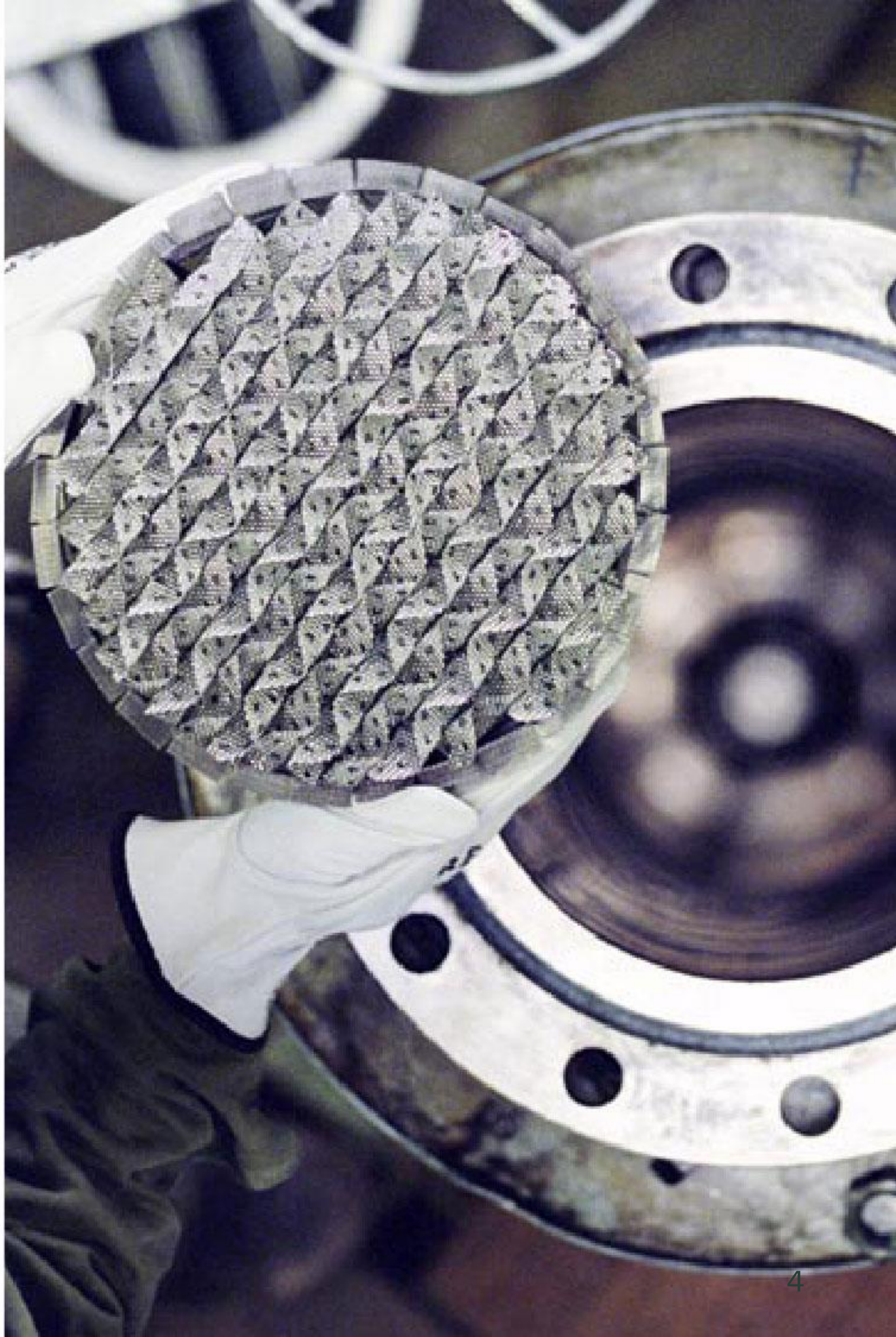
Evolution stages of ERM

- **Control function:**
  Potential size of loss from integrated perspective
  (all risks, ie operational, insurable and financial risks including dependencies)
- **Eco Capital allocation:**
  Capital needs of various business activities
- **Risk adjusted returns:**
  Economic performance measurement
- **Optimisation:**
  Steering based on economic risk and return considerations, efficiency of capital management

Principles established and processes executed to systematically and comprehensively address risks (threats and opportunities) across all functions in order to:

- Protect and secure the interest of policy holders
- Protect firm's appraisal value
- Enable sustained economic profit

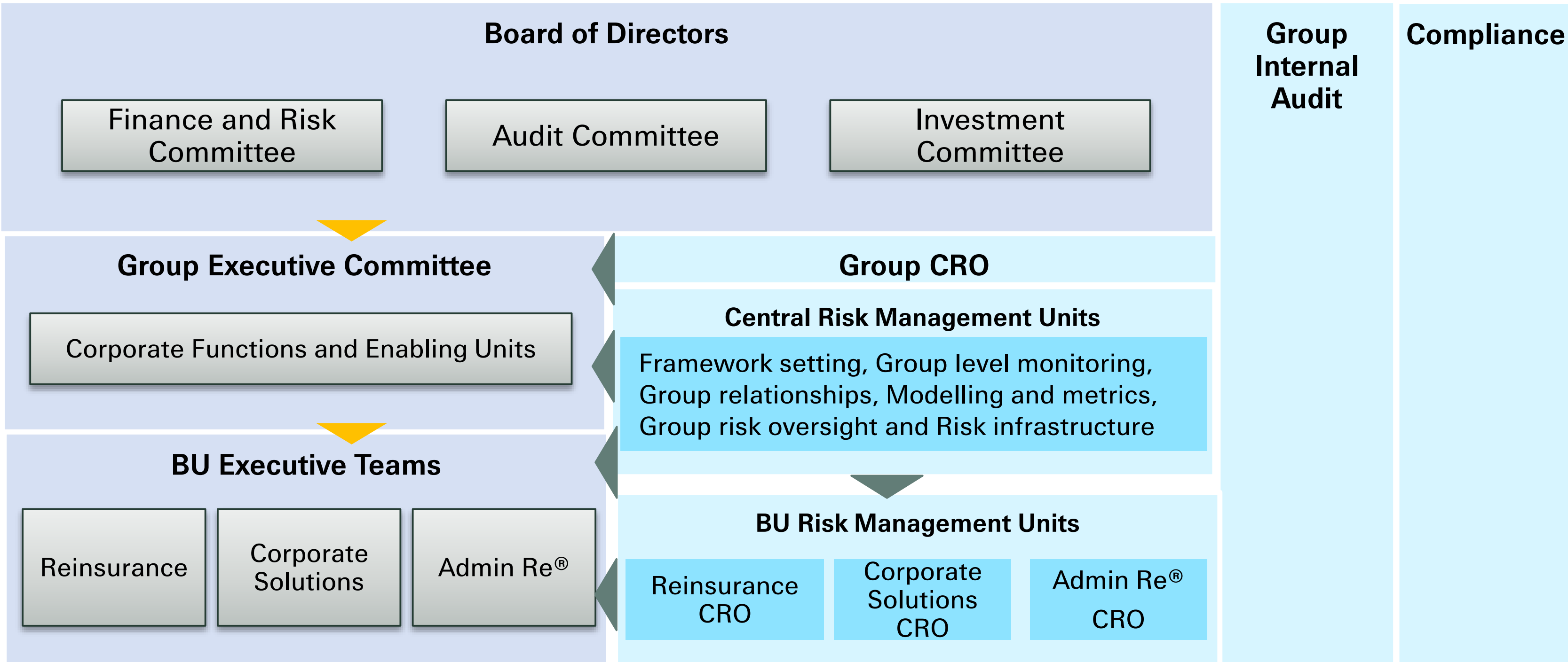
ERM in Practice
Swiss Re's current approach



Three pillars of Risk Management
Strong framework for disciplined risk taking

Quantitative risk management	Risk governance	Risk transparency
■ Sound valuation and risk measurement ■ Quantitative risk limit monitoring system ■ Reliable capital adequacy framework	■ Clearly defined responsibilities for risk taking and risk mgmt ■ Sound, documented: – risk mgmt policies – operating, reporting, limit monitoring, and control procedures ■ Regulatory compliance ■ Independent internal and external audits of processes and figures	■ Company risk culture ■ Financial and risk disclosure, incl. risk information

Key risk management bodies and functions



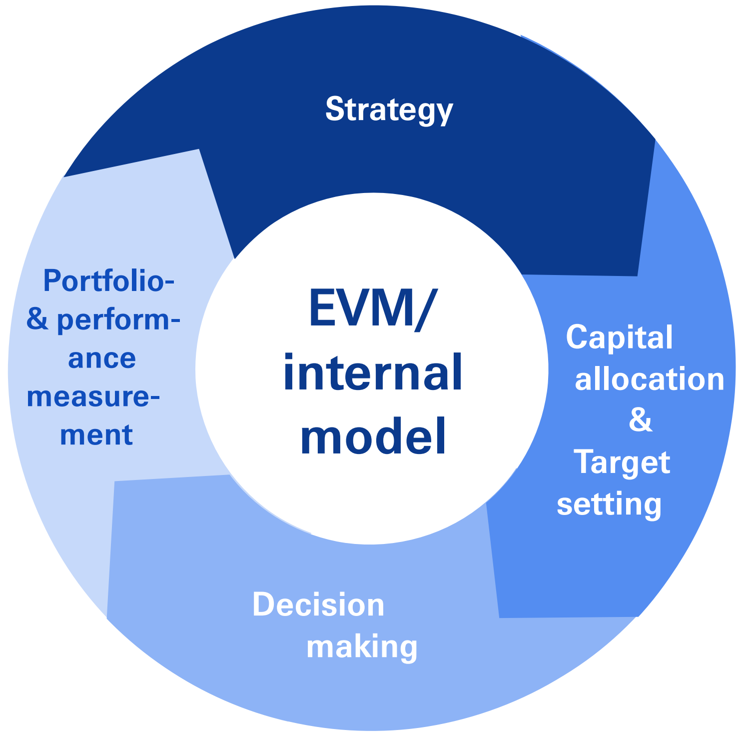
- RM is a Group-wide function, headed by the Group CRO with a dedicated BU CRO for each of the major Business Units.
- Group CRO participates in key board committees.
- Integrated assurance / three lines of defence model is **lived:** Business units perform day to day risk management, with Risk, Compliance and Internal Audit providing independent assurance on adherence to guidelines, risk tolerances, limits and control performance.

= delegation model

= risk oversight and enabling support

Steering cycle and involvement of Risk Management
Risk Management is embedded across the cycle

- Group risk policy and tolerance
- Group risk appetite



- Limit monitoring
- Accumulation control
- Reporting on changes in risk landscape and impact on capital adequacy
- Capital cost allocation

- Risk model outputs used as input in optimisation of planning
- Testing of risk tolerance and appetite
- Derivation of risk limit framework

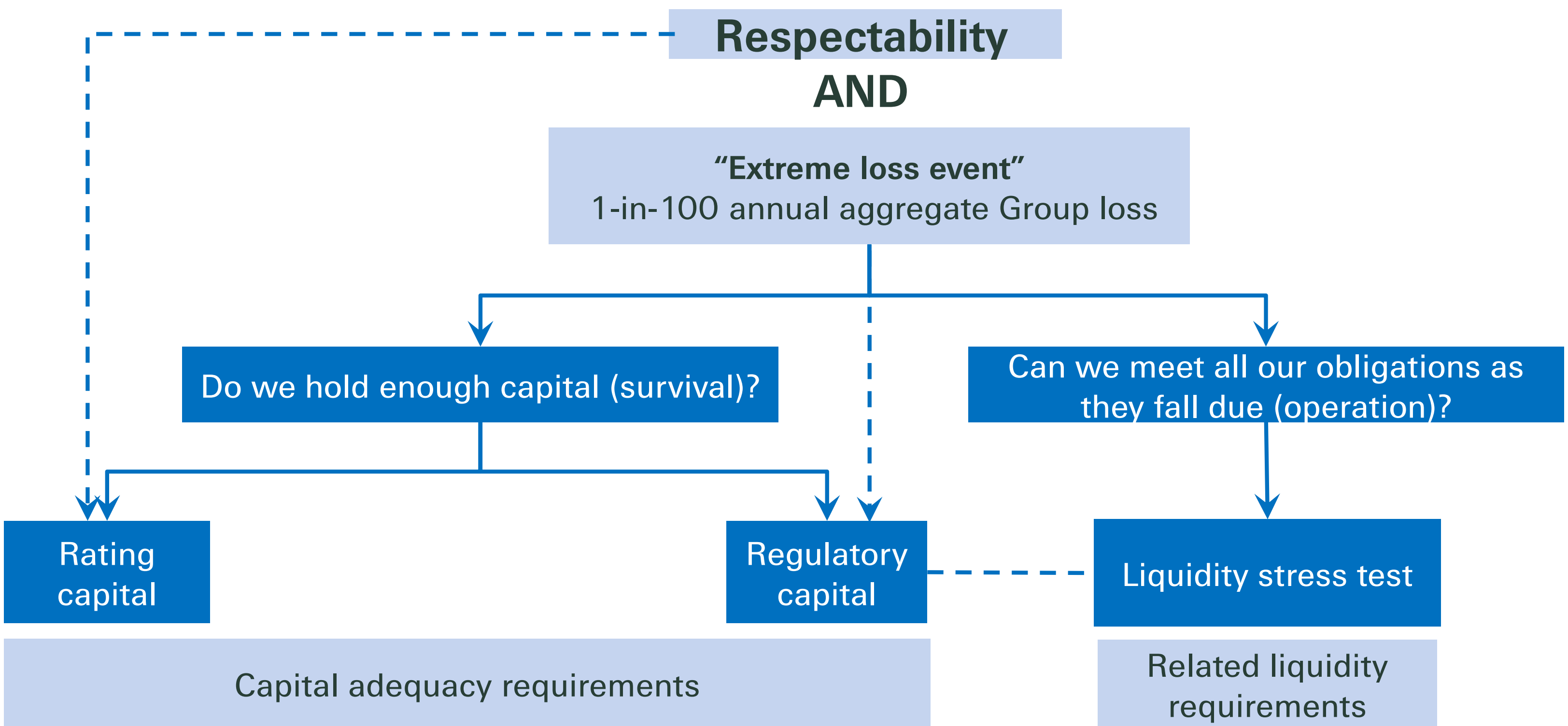
- Risk Management Standards
- Part of all decision taking bodies concerned with risk taking
- Large transaction approval

Risk tolerance definition

Basis for risk appetite decisions, capital management and risk limit setting

Swiss Re's risk tolerance:
"To be able to continue to operate following an extreme loss event."

The **amount of risk** we are willing to accept **within the constraints** imposed by **capital resources, strategy**, and the **regulatory and rating agency** environment



Group risk tolerance framework

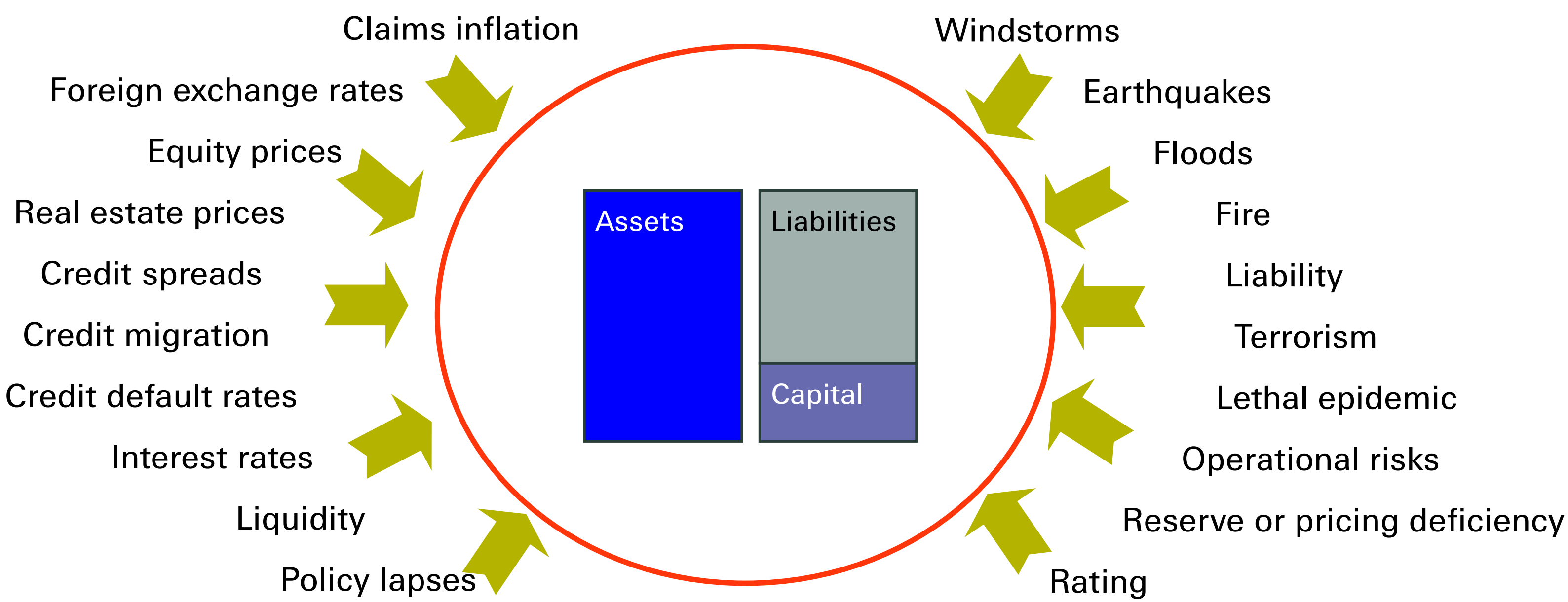
Risk tolerance criteria – respectability and extreme loss considerations

The risk tolerance represents the amount of risk Swiss Re is willing to accept within the constraints imposed by its capital and liquidity resources, its strategy, its risk appetite, and the regulatory and rating agency environment. It is based on the following objectives:

- Maintain capital and liquidity that are sufficiently **attractive from a client perspective**, and that **meet regulatory requirements** and expectations ("**respectability criteria**")
- Be able to **continue to operate following an extreme loss event** ("**extreme loss criteria**"):

	Group
Respectability criteria	Solvency I > 150%
	Rating ≥ AA
	SST > 185%
Extreme loss criteria	After an extreme loss event (99% shortfall) able to meet
	SST > 100%
	Liquidity

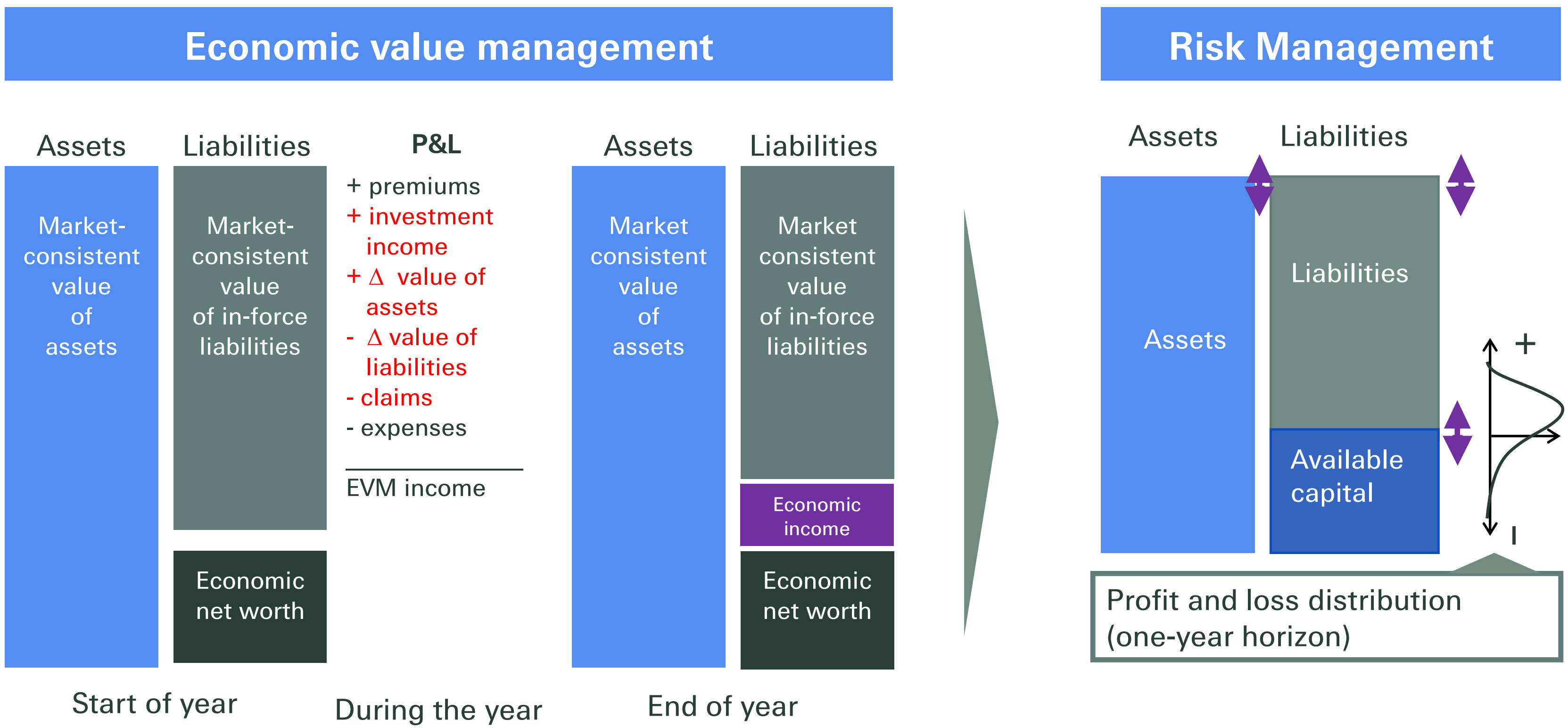
An integrated perspective is needed to measure risk for insurers



... and many more

An integrated risk model is needed to understand the aggregate impact of all risk factors on the total economic balance sheet

Economic (market-consistent) valuation and risk models for assets and liabilities



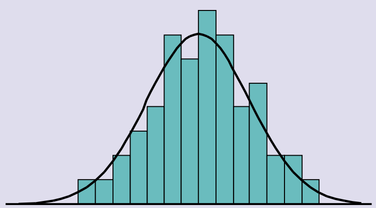
- Available capital is the total capital exposed to risk and is broadly equal to the difference between the market value of assets and the market-consistent value of in-force liabilities
- Risk is quantified by modelling the change in available capital for Swiss Re over a one-year horizon

Modelling risk factors and their structural relationships

Requires statistical analysis and expert judgement

Risk factor distributions

Statistical models derived from historical data



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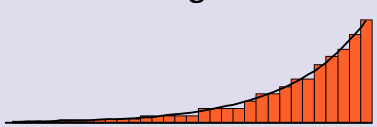
Scientific models and expert judgement

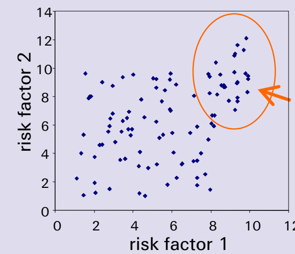
- conceivable losses
- potential changes to risk drivers



Threat scenarios

Dependency structure

Statistical dependency captured by copula



dependency in tail of distribution

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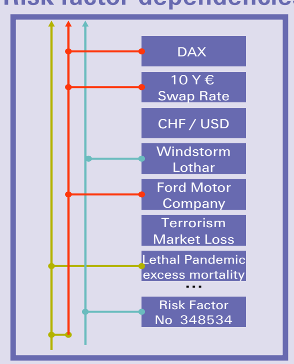
Structural dependencies *(illustrative examples)*

Risk factor dependencies



Structural dependency of FM with Pandemic

Risk Factor*	Excess Mortality 1.5 per mille	Excess Mortality 4.0 per mille
Equity	-20%	-40%
Swiss real estate CH	-7.5%	-15%
Other real estate	-15%	-30%
BBB credit spread	100bp	200bp
AAA credit spread	54bp	108bp
P&C loss	CHF100m	CHF200m

Integrated internal risk model

Capital assessment of Group and entities based on full bottom-up economic analysis

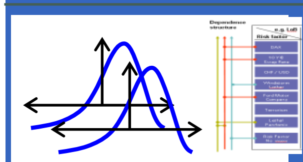
Risk factors and dependencies → **Gross exposures** → **Gross change in value of assets and liabilities** → **Intra-group transactions** → **Closing balance sheets**

This calculation is performed for 1'000'000 **joint** realisations of all risk factors

Risk factors and dependencies

Distribution for each relevant risk factor

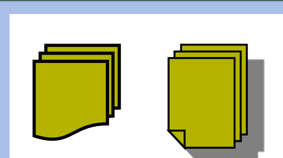
Dependency structure among risk factors



External world around Swiss Re

Gross exposures

Exposures describing how economic values of assets and liabilities respond to realisations of risk factors



Swiss Re's link to the external world

Gross change in value of assets and liabilities

Exposures are combined with risk factor realisations to obtain the change in value of assets and liabilities per realisation

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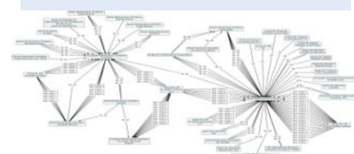
Impact of external world on Swiss Re's portfolios

Intra-group transactions

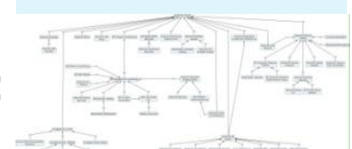
All losses are ceded according to network of intragroup transactions and booked on the relevant balance sheets as profits or losses



Network of intragroup transactions

Closing balance sheets

Economic net worth of all financial reporting entities is calculated including participation values



Network of legal entities belonging to the Group

ERM in Practice
Swiss Re's evolving approach

- Measuring and improving Risk Culture
- Increasing risk transparency for improved risk decisions
- Improving risk response through emerging risk awareness

Risk Culture

Tone from the top clearly emphasises the importance of the Journey towards ensuring the right risk awareness and behaviours

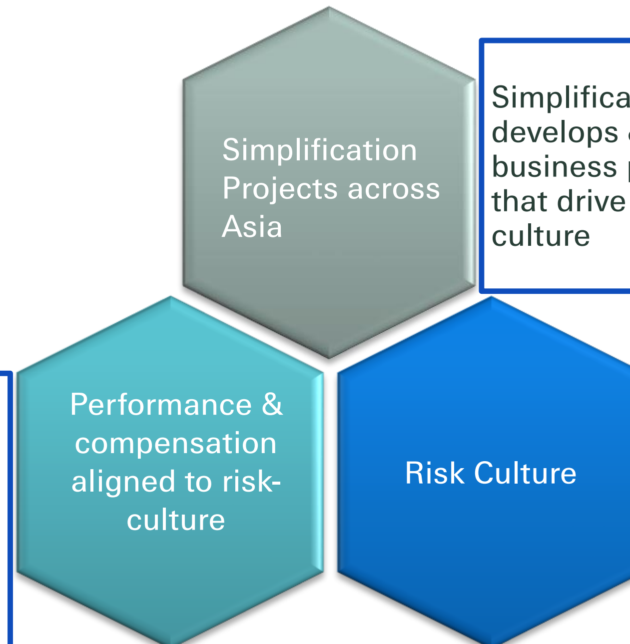
Swiss Re's Personal Imperatives

Drive the business
Exercise business judgement
Focus on the client
Drive sustainable performance

Show true teamwork
Inspire and engage
Collaborate

Take personal accountability
Improve continually
Stand for integrity
Navigate ambiguity

Simplification project develops & improves business processes that drive the right risk culture



Personal imperatives align compensation with appropriate risk behaviours

Risk behaviours assessment and reporting to Leadership and local Board supplement existing group processes

Risk Culture

How we measure Risk Behaviours and what we do with this information

Risk Management has defined a Risk Behaviour Diagnostic, which:

- uses both fact based and observational indicators;
- measures the extent to which individual leaders' demonstrate the risk management behaviours, defined and promoted by the Reinsurance BU Risk Management team;
- identifies potential weaknesses by leader or behaviour; and
- enables the CRO to tailor a dedicated plan in support of the leader.

	Aligns to risk appetite	Scans for risks	Follows through on GRACE items	Assesses risk v reward	Not afraid to speak up / challenge	Seeks diverse views
Leader 1	1	2	2	1	1	1
Leader 2	2	3	4	3	3	2
Leader 3	1	3	4	2	3	1
Leader 4	4	3	4	4	4	3
Leader 5	2	3	3	3	2	2
Leader 6	3	2	3	3	3	2

Exhibit 1 – Risk Behaviour Diagnostic (illustrative example)

Desired risk management behaviour **not** evident

Desired risk management behaviour **occasionally** evident

Desired risk management behaviour **usually** evident

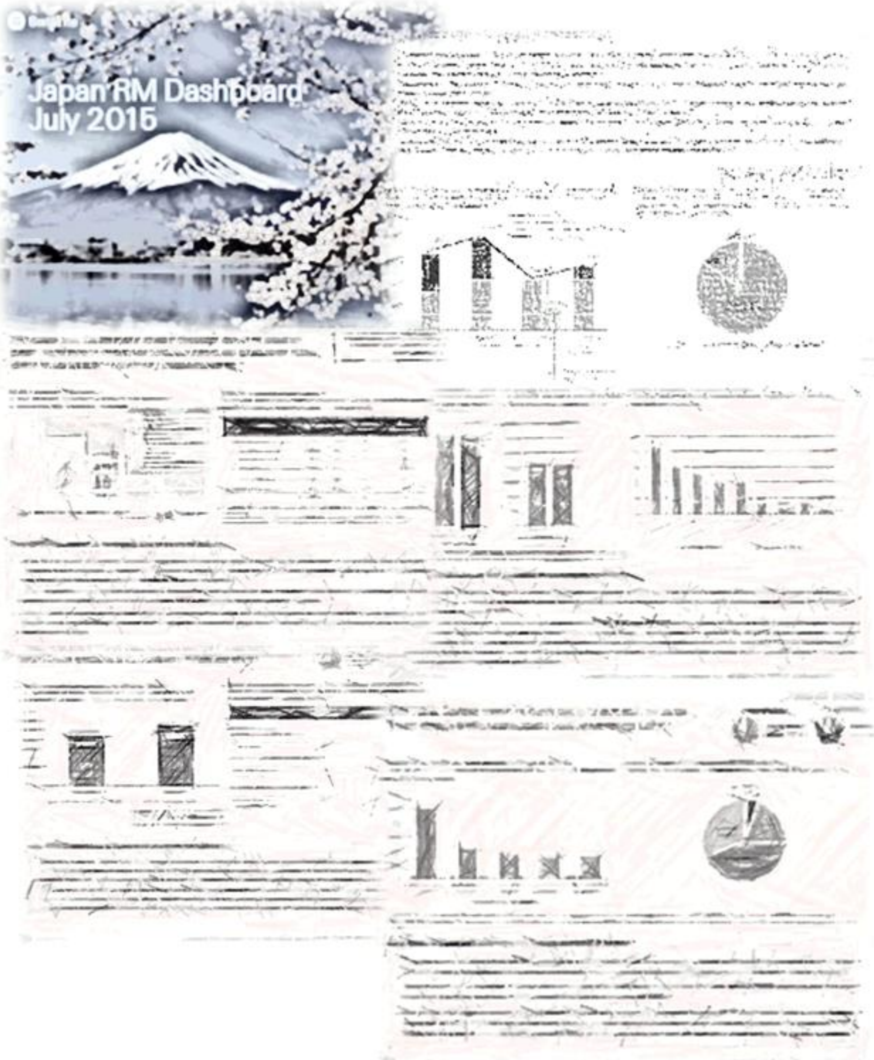
Desired risk management behaviour **always** evident

Risk Transparency
Risk Dashboard

Objective:

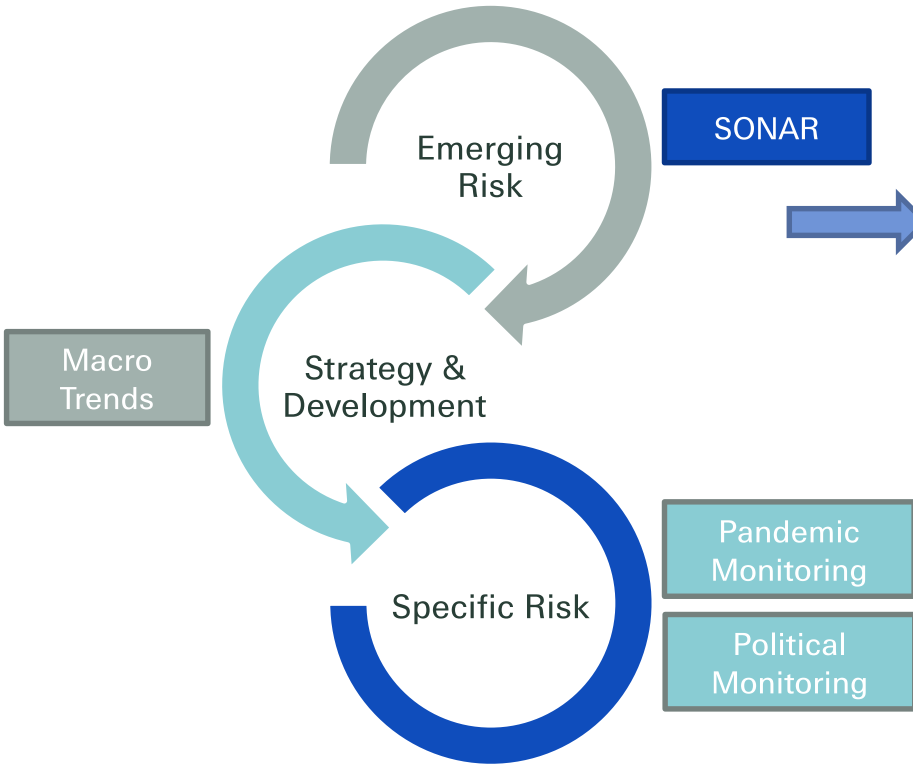
Concise, visually appealing, overview of key risks in the Region / Country, supported by the assessment of the Regional/Country CROs

- ☑ Consistent metrics and layout across Regions
- ☑ Information scalable (Branch → LE → Region → BU)
- ☑ Essential risk information may be extracted from other reports and presented in the regional context
- ☑ Quantitative risk information enhanced by smart analytics
- ☑ Address risk behaviour and risk culture, ie. not just focus on risk figures



Emerging Risk Management

Identification and monitoring of emerging risks allows us to validate SR's ERM approach



Recently identified emerging risks specific to Asia:

- China debt crisis
- Business impediment due to economic nationalism
- MERS pandemic in South Korea
- Political Instability in Hong Kong (2014)

Regular monitoring and feedback

* SONAR is Swiss Re's tool for identifying, assess and monitoring emerging risks.

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