

Model Risk Management (MRM)

2015 SEAC Fall Meeting

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Overview

- ▶ Introduction
- ▶ Model risk management framework
- ▶ Common challenges

Introduction

Background

- ▶ Model risk management is *not* a new concept
 - ▶ Traditionally, insurers have performed tests and validations on their models to ensure calculation accuracy
 - ▶ The need now is for a more holistic and formal approach that considers and mitigates the risks that can arise throughout the life cycle of a model
- ▶ Focus on model risk management has increased over recent years mainly due to Federal regulation
 - ▶ In 2011, the Federal Reserve Board (FRB) and the Office of the Comptroller of the Currency (OCC) released supervisory guidance on *Model Risk Management* (SR 11-7/ OCC 2011-12)
 - ▶ Although not all insurance companies are subject to Federal regulation, best practice around model risk management within the insurance industry is evolving consistently with FRB guidance

Introduction

What is a model?

“...A quantitative method, system, or approach that applies statistical, economic, financial, or mathematical theories, techniques, and assumptions to process input data into quantitative estimates.” – *Federal Reserve Supervisory Letter 11-7*

- ▶ Three components:
 - ▶ Inputs - Information such as data, assumptions and parameters used in the model to produce model output
 - ▶ Calculation engine - transforms model inputs into output
 - ▶ Reporting tool - translates model output into useful business information
- ▶ May exclude routine calculations or processes based largely on judgment

Introduction

What is model risk?

Model risk is the risk of adverse consequences from decisions based on the incorrect selection, implementation or usages of models.

- ▶ Occurs for several reasons:
 - ▶ Model may not be fit for purpose
 - ▶ Model may have fundamental errors and produce inaccurate outputs when viewed against its design objective and intended business uses
 - ▶ Model may be used incorrectly or inappropriately or there may be a misunderstanding about its limitations and assumptions

- ▶ Model risk increases with:
 - ▶ Greater model complexity
 - ▶ Higher uncertainty about inputs and assumptions
 - ▶ Broader extent of use
 - ▶ Larger potential impact

Introduction

Why does MRM matter?

Insurers rely heavily on the use of models

- ▶ Models have traditionally been used for functions such as financial reporting and product pricing.
- ▶ More recently, models are used to confront increasingly complex issues around topics such as enterprise risk management.

MRM is a key component to the recent regulatory review frameworks

- ▶ There is an increased focus by regulators across the globe on enhanced model risk management standards:
 - ▶ Federal Reserve Supervisory Letter 11-7 / OCC Bulletin 2011-12
 - ▶ NAIC Own Risk Solvency Assessment (ORSA)
 - ▶ Solvency II

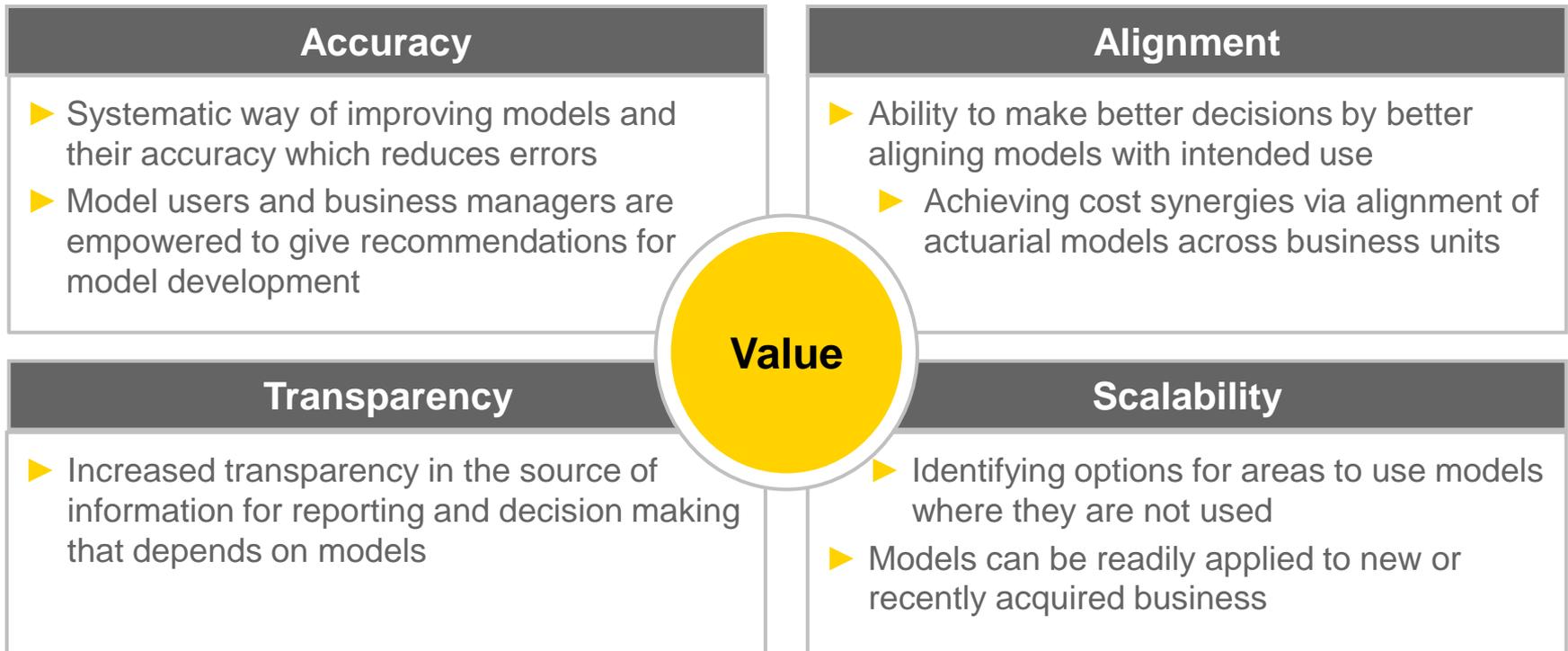
Industry best practice has evolved to include it as part of the standard “toolkit” for risk management

- ▶ There have been several standards developed or in draft related to modeling and MRM:
 - ▶ Generic Technical Actuarial Standard M: Modeling (April 2010)
 - ▶ Proposed Actuarial Standard of Practice (ASOP) on Modeling - Second Exposure Draft (November 2014)
 - ▶ International Standards of Actuarial Practice (ISAP) 5: Insurer Enterprise Risk Models – Exposure Draft (October 2015)

Introduction

Adding value through MRM

MRM activities add value to the enterprise by enhancing:

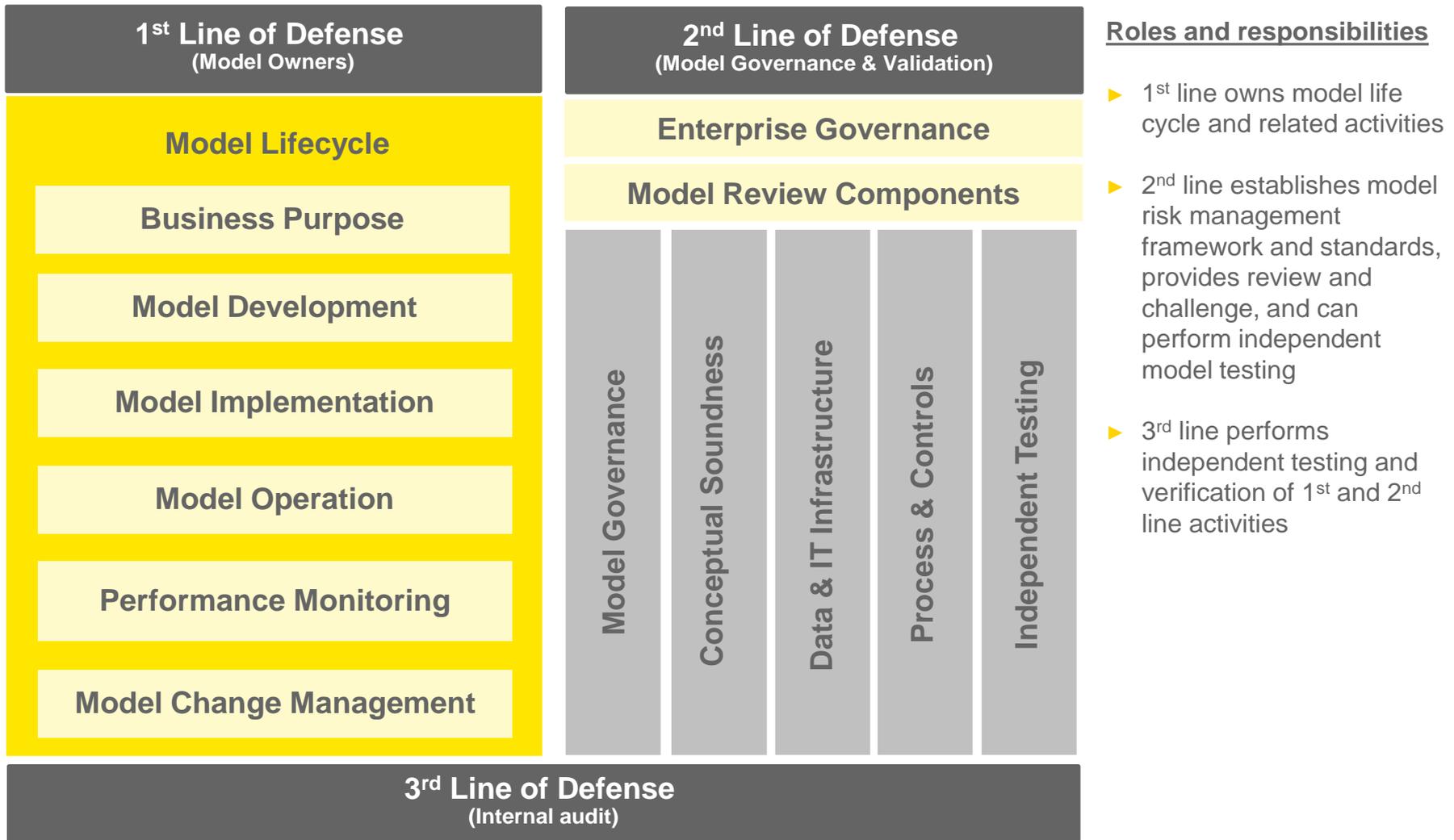


MRM should be proportional with:

- ▶ The size, complexity, level of sophistication and nature of activities of the institution
- ▶ The scope and materiality of a specific model

Model risk management framework

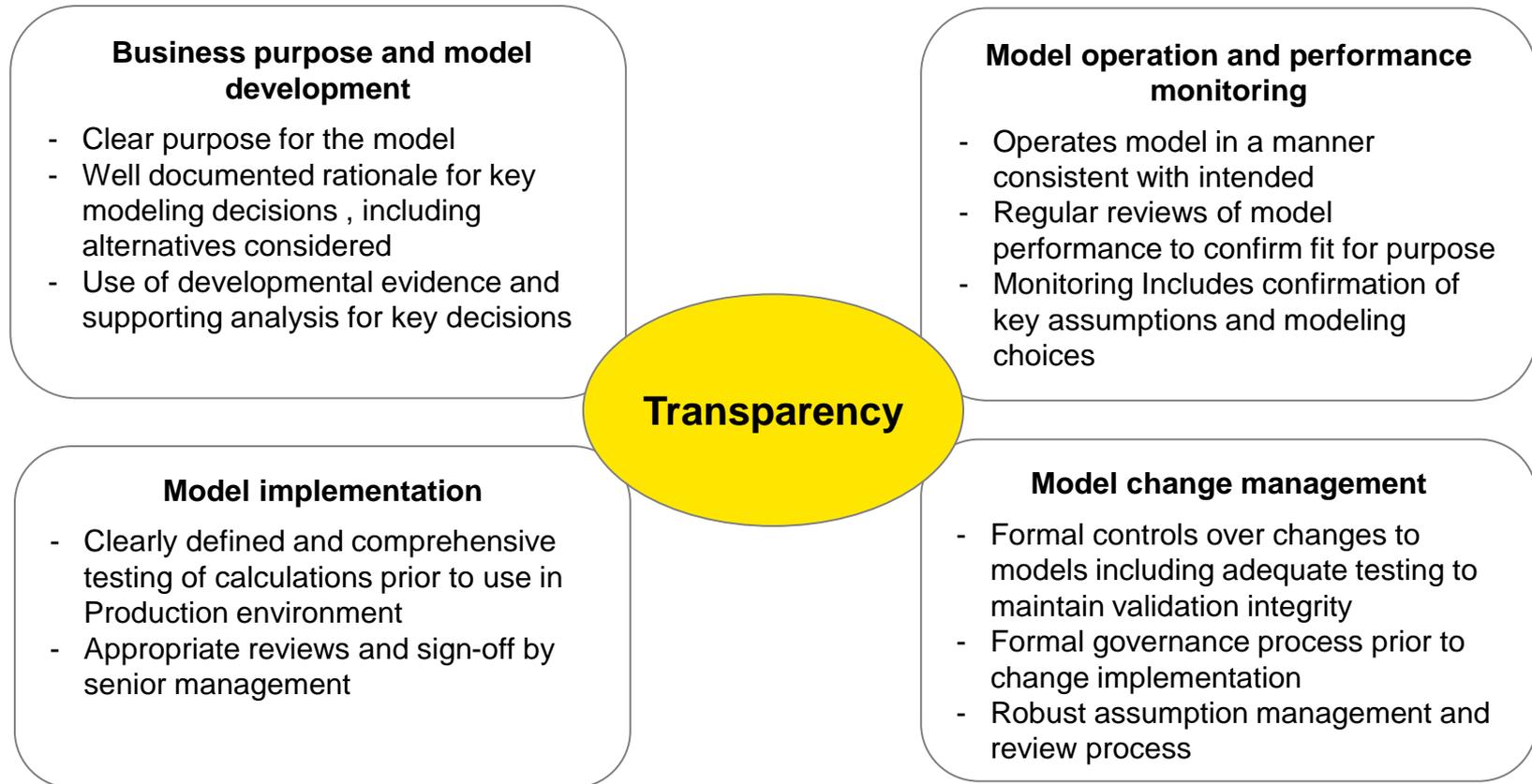
EY MRM framework



Model risk management framework

Responsibilities – 1st line of defense (model owners)

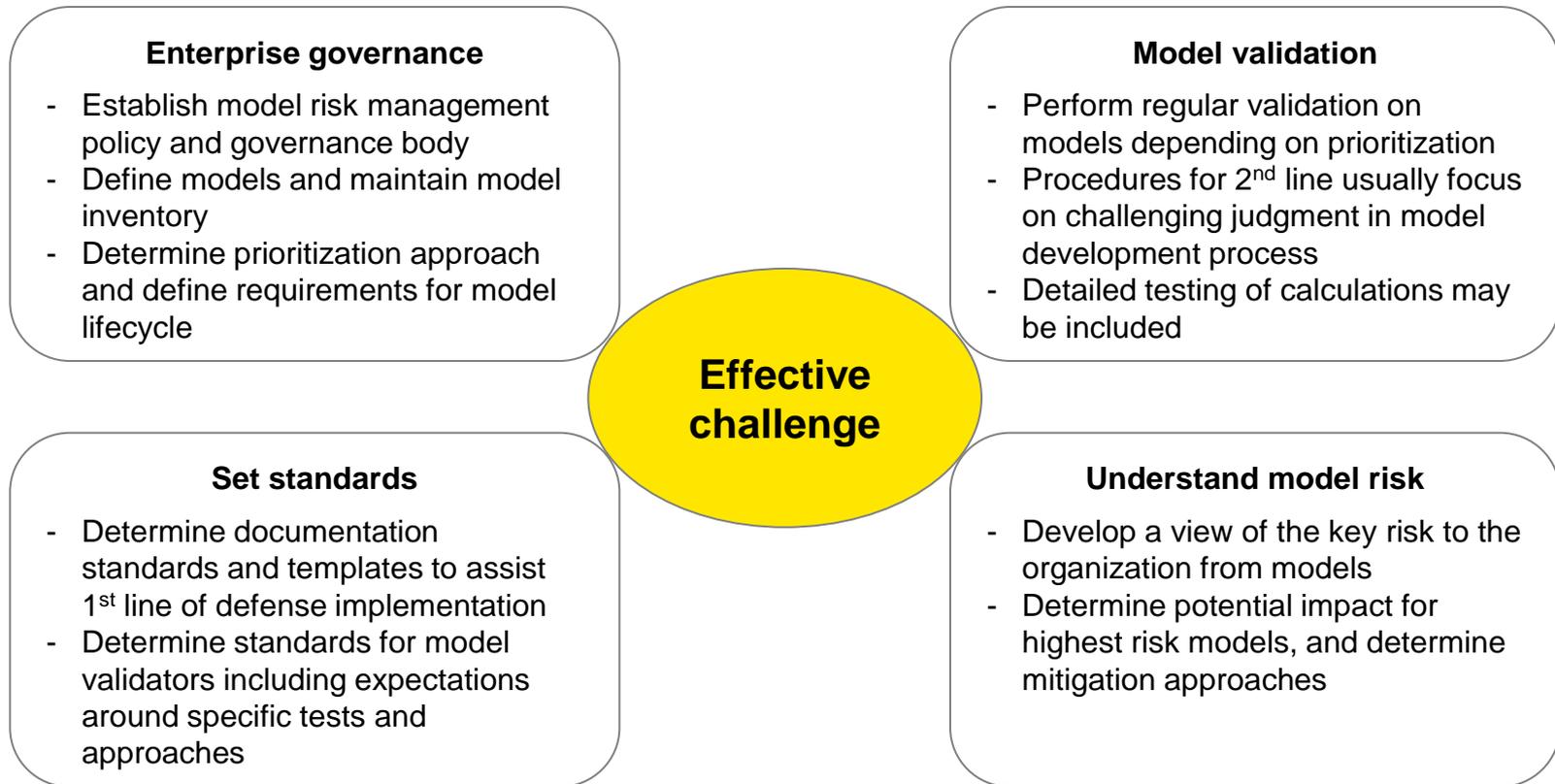
Objective: Manage the model risk of the organization by ensuring that models are developed, used and maintained consistent with enterprise policies. Focus on thoughtful and transparent model development, well controlled and tested model implementation, rigorous change management procedures and ongoing performance monitoring.



Model risk management framework

Responsibilities – 2nd line of defense (governance and validation)

Objective: Manage the model risk of the organization by establishing and implementing a model risk management policy. Key roles include maintaining and monitoring model inventory, performing independent model validation and providing effecting challenge throughout the model development process.



Model risk management framework

Responsibilities – 3rd line of defense (internal audit)

Objective: To ensure that the 1st and 2nd line of defense are complying with the model risk management policies within the organization.

1st Line review components

- Confirm model documentation requirements are being followed throughout model development lifecycle – including development, implementation and performance monitoring
- Ensure all models included in reviewed processes are included on model inventory
- Confirm testing performed during model development confirms with policy

Confirmation

2nd line review components

- Review model validation reports and confirm compliance with policy and presence of effective challenge
- Confirm model governance committee charters, agendas and meeting minutes are compliant with firm expectations
- Confirm the execution of the model risk policy and validation schedules/calendar

Model risk management framework

Implementation

Key steps	1st Line	2nd Line	3rd Line
Establish MRM policy and governance structure <ul style="list-style-type: none"> Defines what models and model risk are Clearly defines roles and responsibilities of all three lines of defense Creates a framework for model validation including documentation standards and appropriate validation activities 		●	○
Create model inventory <ul style="list-style-type: none"> Identify models across the enterprise based on model definition Capture critical model information such as intended and actual use 	◐	●	○
Perform model risk assessment <ul style="list-style-type: none"> Assess models, recognizing the different levels of inherent risk Prioritize models for validation 		●	○
Model documentation and testing <ul style="list-style-type: none"> Typically requires significant investment as documentation and testing procedures may not exist or be consistent with documentation standards 	●		○
Validate models <ul style="list-style-type: none"> Incorporates end-to-end view of process (inputs, processing, outputs) and controls across key validation components (e.g., conceptual soundness) Evidence of effective challenge is critical 	◐	●	○
Prioritize and remediate findings <ul style="list-style-type: none"> Process should be consistent with model change management framework 	●	◐	○
Implement ongoing MRM procedures <ul style="list-style-type: none"> Applies to models in all parts of lifecycle (i.e., includes new and existing models) Upkeep may be less onerous than initial effort, but still requires diligence 	●	●	○



Common challenges

- ▶ Scaling for organization complexity
- ▶ Governance and policy:
 - ▶ Board more involved
 - ▶ Centralized or decentralized MRM function
- ▶ Model definition and inventory
- ▶ Model validation:
 - ▶ Definition important
 - ▶ Vendor models are tricky
 - ▶ Truly independent model review is difficult
 - ▶ Easy to over-rely on 3rd party validation
- ▶ Model documentation

Questions

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