



Model governance

'What could possibly go wrong'
Part I

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working world

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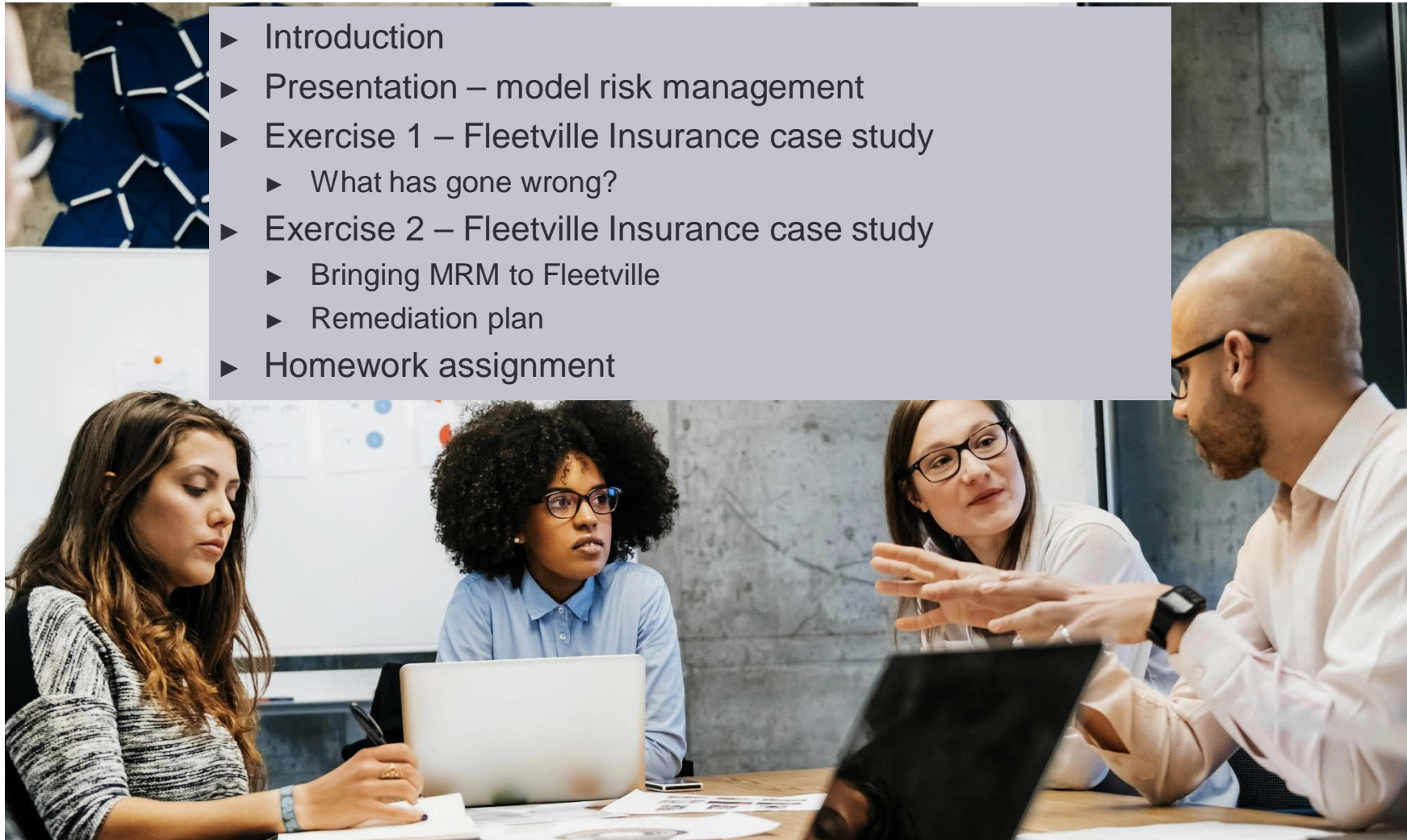
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Model governance

What could possibly go wrong – Part I agenda

- ▶ Introduction
- ▶ Presentation – model risk management
- ▶ Exercise 1 – Fleetville Insurance case study
 - ▶ What has gone wrong?
- ▶ Exercise 2 – Fleetville Insurance case study
 - ▶ Bringing MRM to Fleetville
 - ▶ Remediation plan
- ▶ Homework assignment



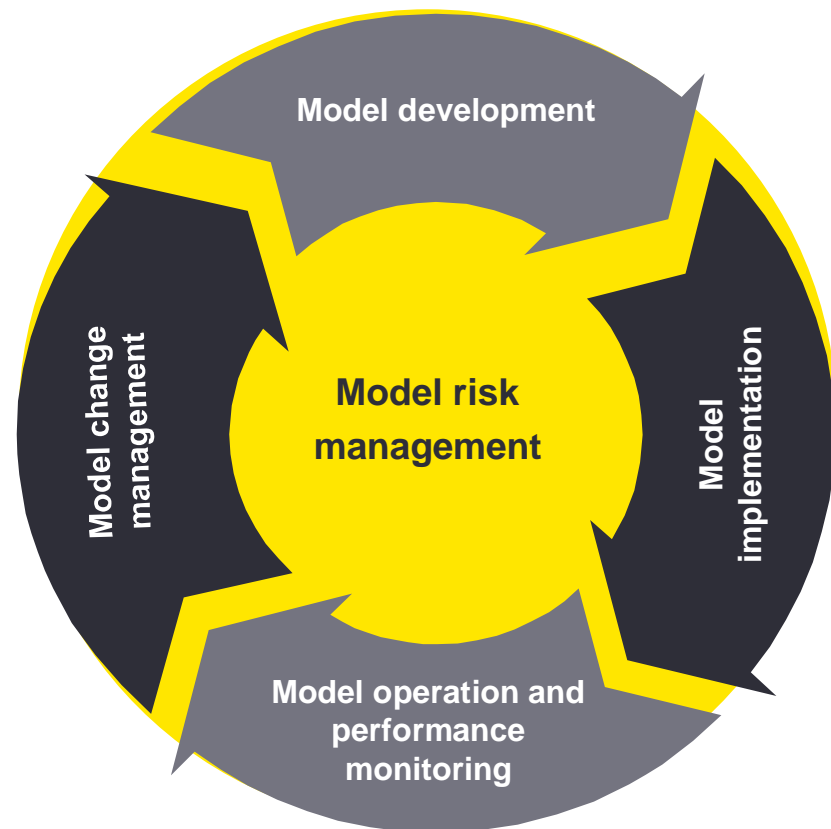
Model risk management



Introduction

Background

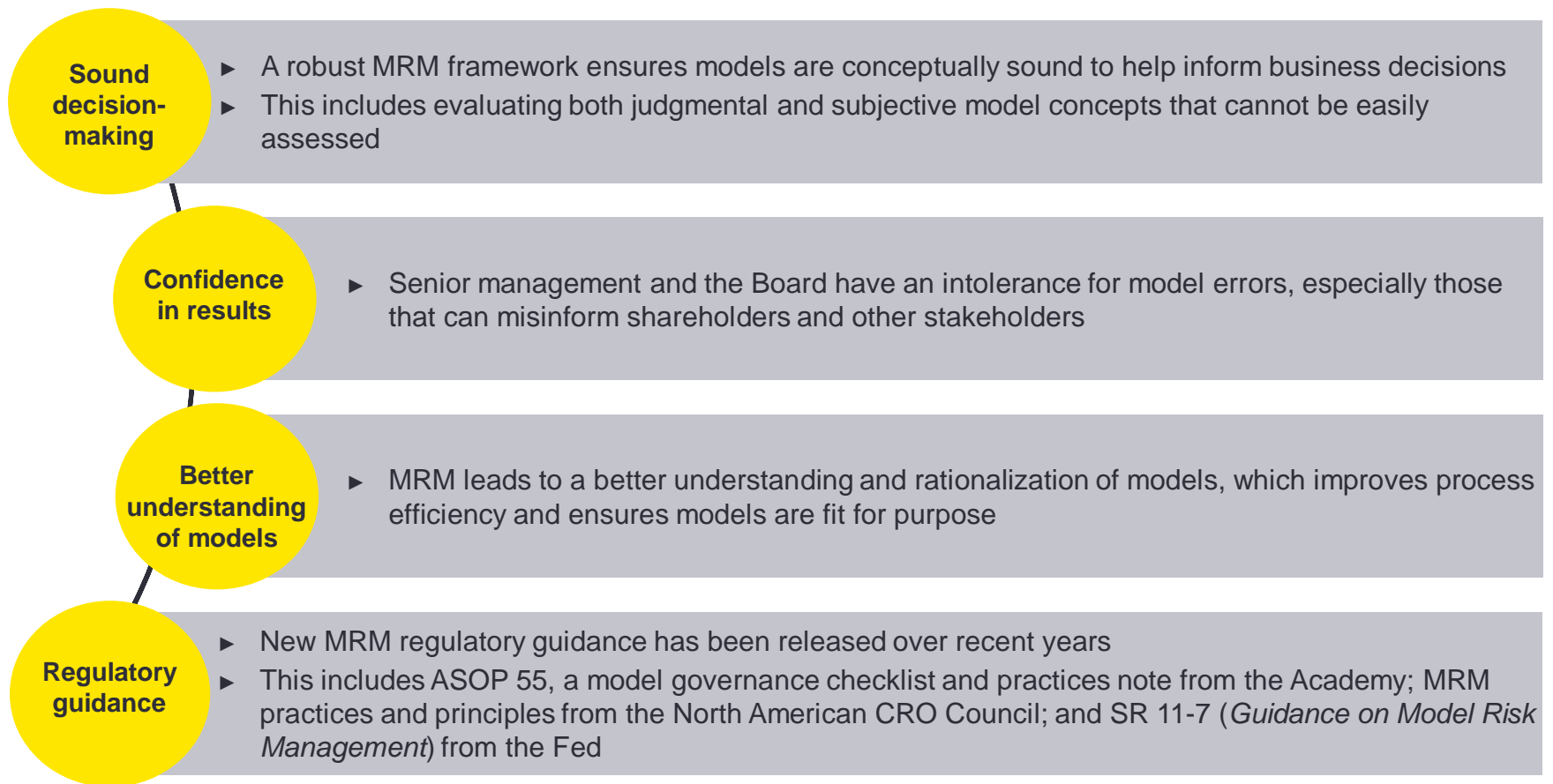
- ▶ Model risk management is not a new concept
 - ▶ Traditionally, insurers have performed tests and validations on their models to ensure calculation accuracy
 - ▶ The need now is for a more holistic and formal approach that considers and mitigates the risks that can arise throughout the life cycle of a model



Introduction

Why is MRM important?

Insurers are becoming increasingly reliant on models across Finance, Risk and Actuarial. The demand for and use of complex, principles-based models will continue to grow as expectations of stakeholders rise. As such, a robust MRM framework is important for a number of reasons, including:



Introduction

What is model risk?

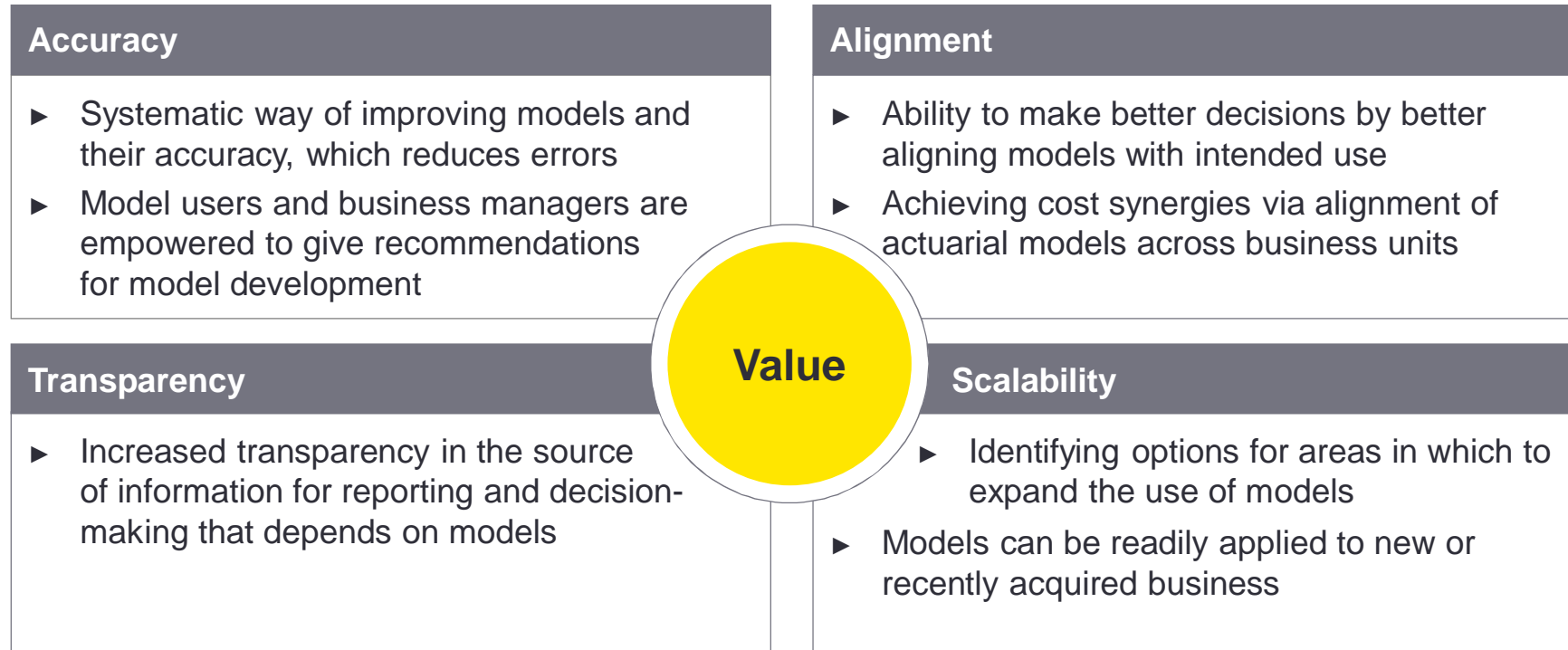
Model risk is the risk of adverse consequences from decisions based on the incorrect selection, implementation or use of a model.

- ▶ 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

Adding value through MRM

MRM activities add value to the enterprise by enhancing:



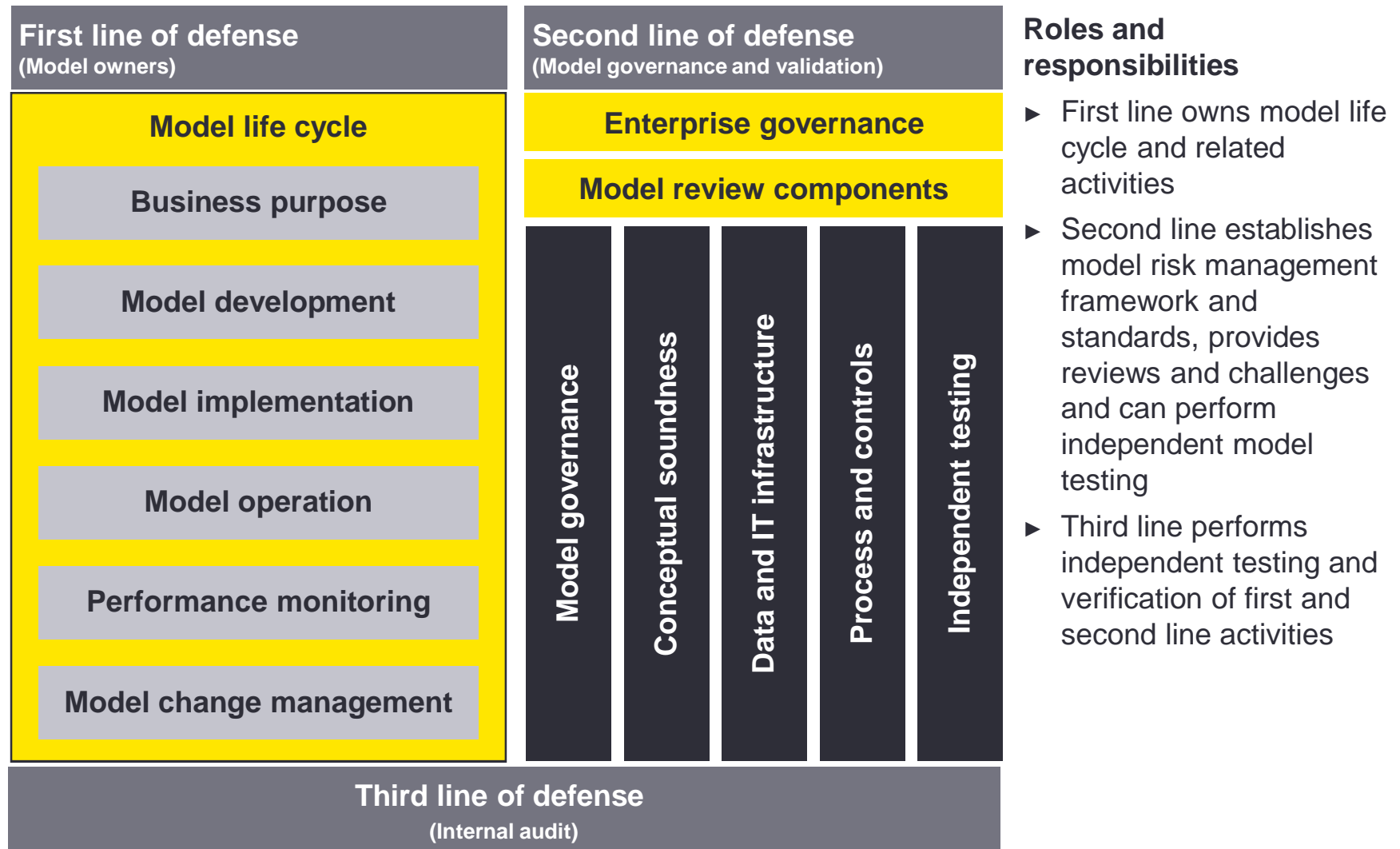
MRM should be proportional with:

- ▶ 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



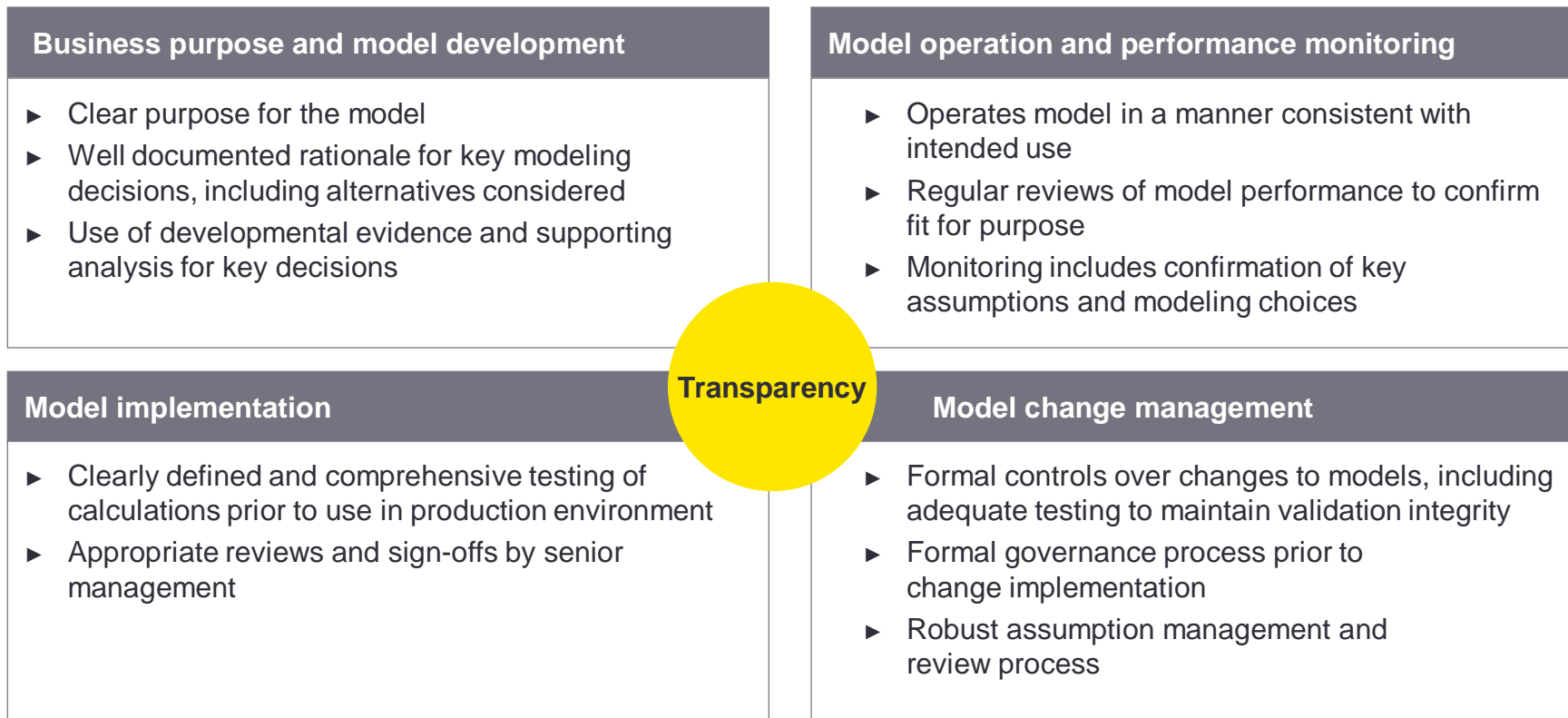
Model risk management framework



Model risk management framework

Responsibilities – first line of defense (model owners)

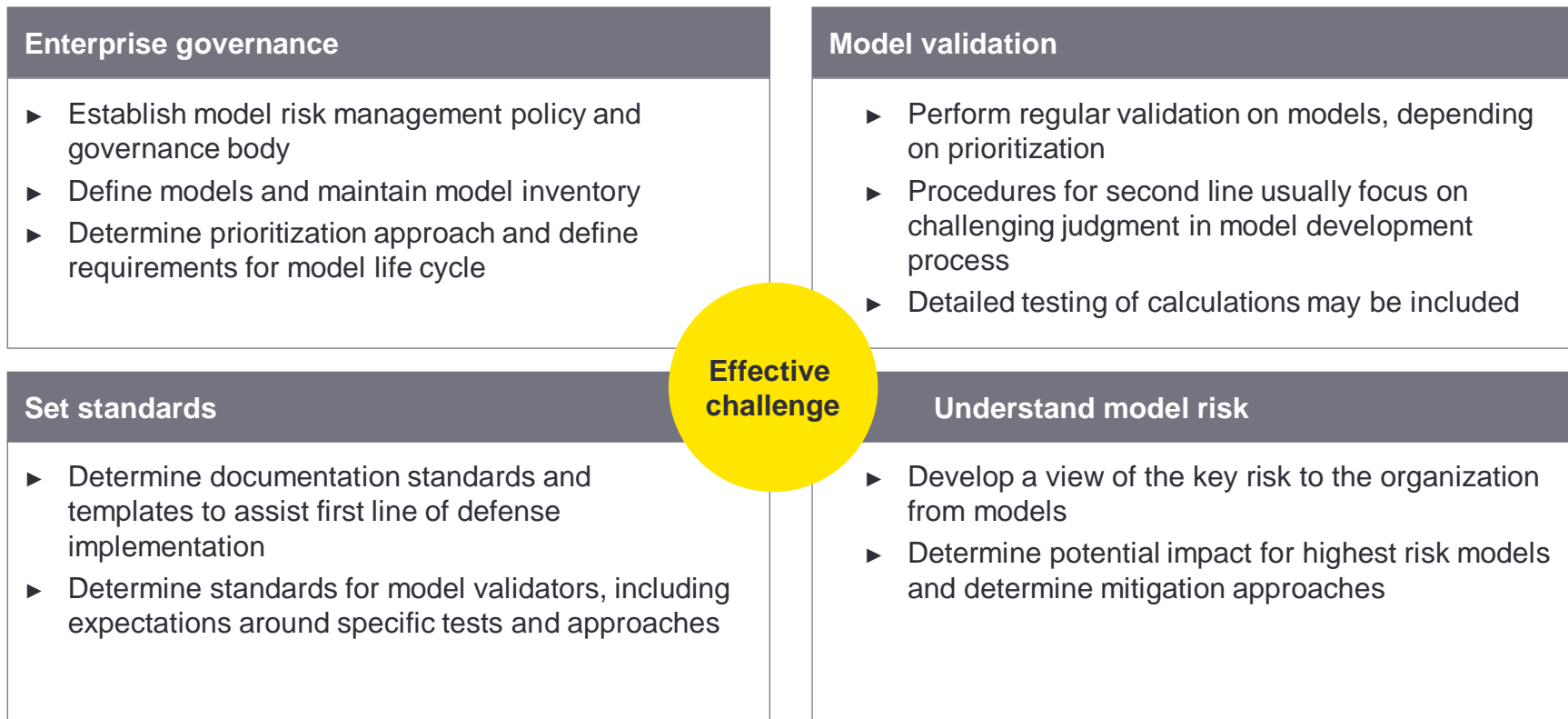
Objective: Manage the model risk of the organization by ensuring that models are developed, used and maintained consistent with enterprise policies. Focus on thoughtful and transparent model development, well-controlled and -tested model implementation, rigorous change management procedures and ongoing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



Model risk management framework

Responsibilities – second line of defense (model governance and validation)

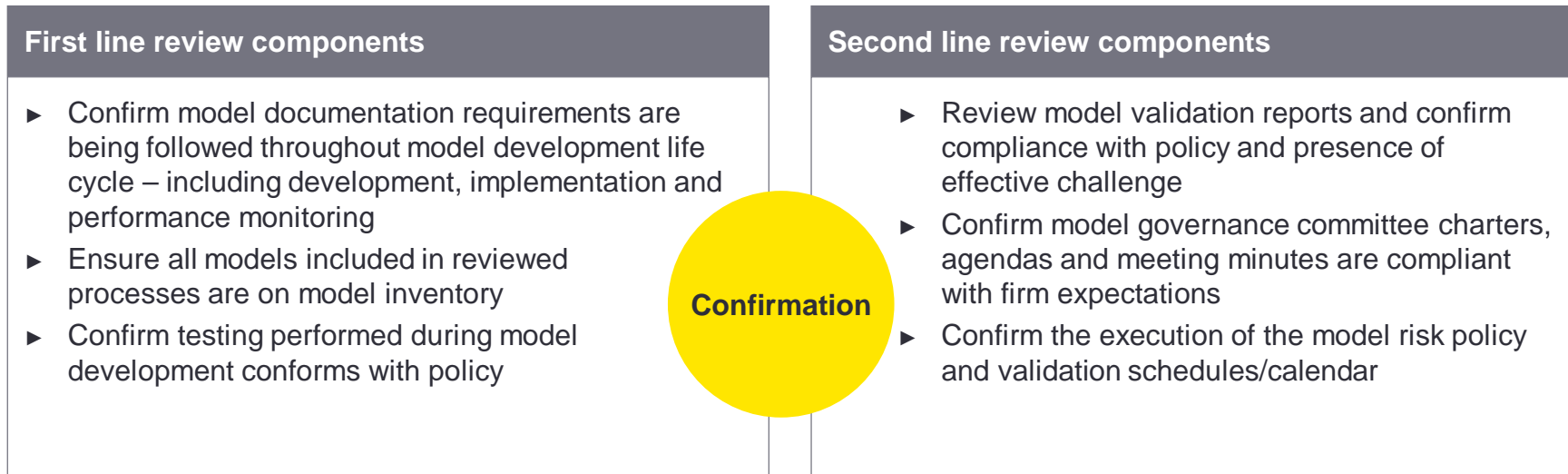
Objective: Manage the model risk of the organization by establishing and implementing a model risk management policy. Key roles include maintaining and monitoring model inventory, performing independent model validation and providing effecting challenge throughout the model development process.



Model risk management framework

Responsibilities – third line of defense (internal audit)

Objective: To ensure that the first and second lines of defense are complying with the MRM policies within the organization.



Model risk management framework

Implementation

Key steps	First line	Second line	Third 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"> ▶ Identifies models across the enterprise based on model definition ▶ Captures critical model information, such as intended and actual use 	◐	●	○
Perform model risk assessment <ul style="list-style-type: none"> ▶ Assesses models, recognizing the different levels of inherent risk ▶ Prioritizes 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 life cycle (i.e., includes new and existing models) ▶ Upkeep may be less onerous than initial effort, but still requires diligence 	●	●	○



Primary responsibility



Secondary/potential responsibility



Review compliance

Exercise 1



Exercise 1

Fleetville Insurance case study

Instructions

- ▶ All teams are to review the Fleetville Insurance case study exhibits (10 minutes)
- ▶ Discuss the case study within each team (5 minutes) and answer the following questions:
 - ▶ *What difficulties is Fleetville encountering from an MRM perspective?*
 - ▶ *What mistakes do you feel have been made by Fleetville?*
- ▶ Each team will designate a spokesperson to present their responses

Exercise 2



Exercise 2

Fleetville Insurance case study

Instructions

- ▶ All teams are to prepare a MRM remediation plan outline for Fleetville (15 minutes), addressing the following questions:
 - ▶ *What components of model risk management have been missing from Fleetville?*
 - ▶ *Do the organizational structure and roles and responsibilities need to be changed?*
 - ▶ *What actions need to be taken to enhance the models?*
 - ▶ *How should the remediation plan be sequenced? How long will it take?*
- ▶ Each team should be prepared to discuss their remediation plan with entire group (10 minutes)

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