

MODEL GOVERNANCE

Adjusting to change

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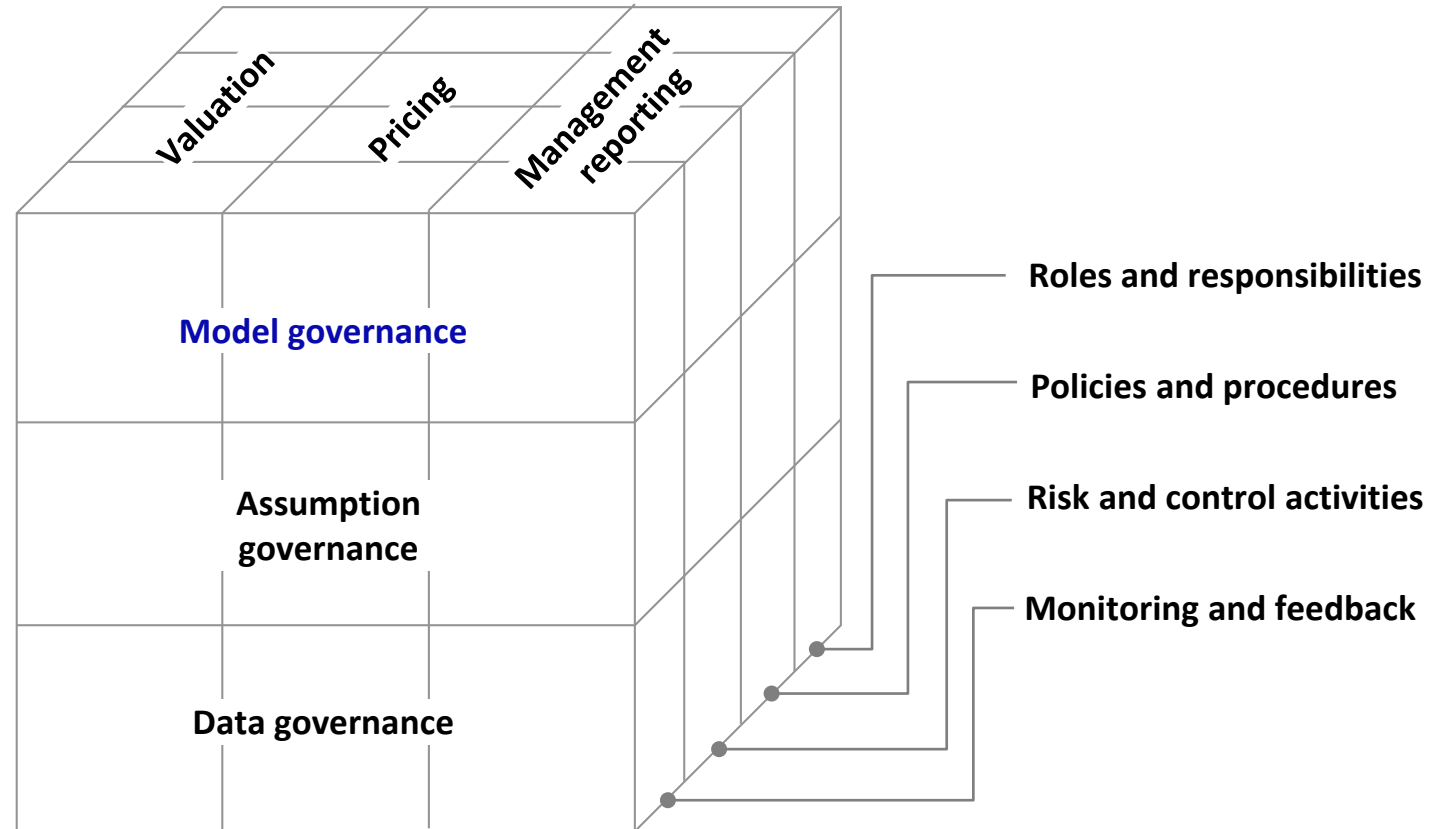
03 Strategic considerations

01

INTRODUCTION

ACTUARIAL GOVERNANCE

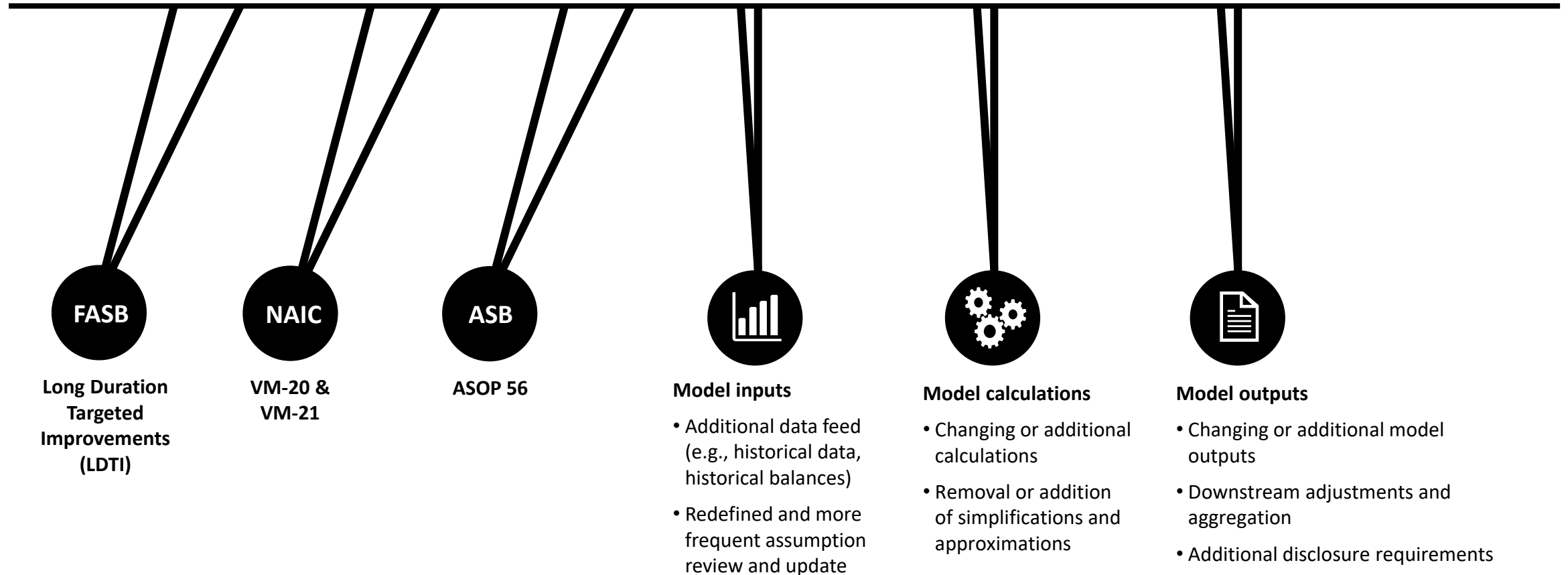
A robust actuarial governance framework consists of multiple cross-functional frameworks that focus on governing data, assumptions, and models



Effective processes, controls and governance are critical to support accurate financials

REGULATORY DEVELOPMENTS

Recent regulatory requirements necessitate comprehensive actuarial model governance and validation



STANDARDS OF PRACTICE

Various ASOPs address key themes related to actuarial governance

ASOPs 10, 22, 54

U.S. GAAP, Asset Adequacy Analysis, Pricing methods

- Internal consistency of assumptions
- Use of simplifications and approximations
- Appropriate documentation and disclosures
- Model change controls
- Model validation and review procedures

ASOP 43

Actuarial Communications

- Maintenance of clear and comprehensive documentation
- Ownership of material assumptions and methods

ASOP 23

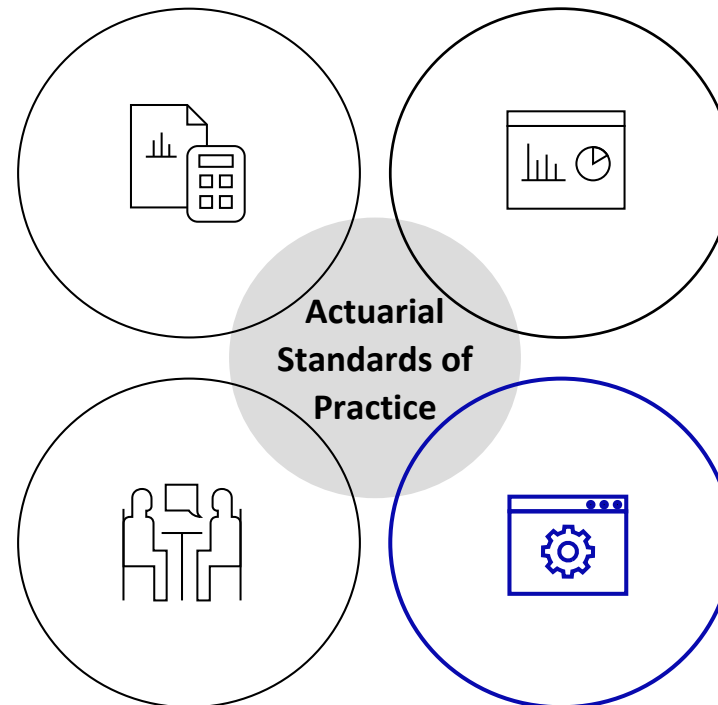
Data Quality

- Documentation of data sources and limitations
- Internal and external consistency of data
- Data availability
- Defining data requirements

ASOP 56

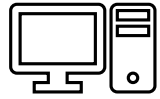
Modeling

- Data selection and confirmation
- Assumption selection and confirmation
- Model design
- Model validation procedures
- Model documentation
- Classification of models by risk



ASOP 56 – MODELING

ASOP 56 specifies recommended practices for an actuary working with a model



3.1 Model meeting the intended purpose

- Design, development, and modifications to a model
- Data and assumptions
- Model structure



3.2 Understanding the model

- Fundamental calculations
- Dependencies and sensitivities
- Model weaknesses and limitations
- Data limitations



3.6 Evaluation and mitigation of model risk

- Degree of risk mitigation
- Input, calculation, and output validation
- Governance and controls

ASOP 56

Professional standards and guidance when “designing, developing, selecting, modifying, using, reviewing, or evaluating models.”

02

MODEL GOVERNANCE

WHAT IS A MODEL?



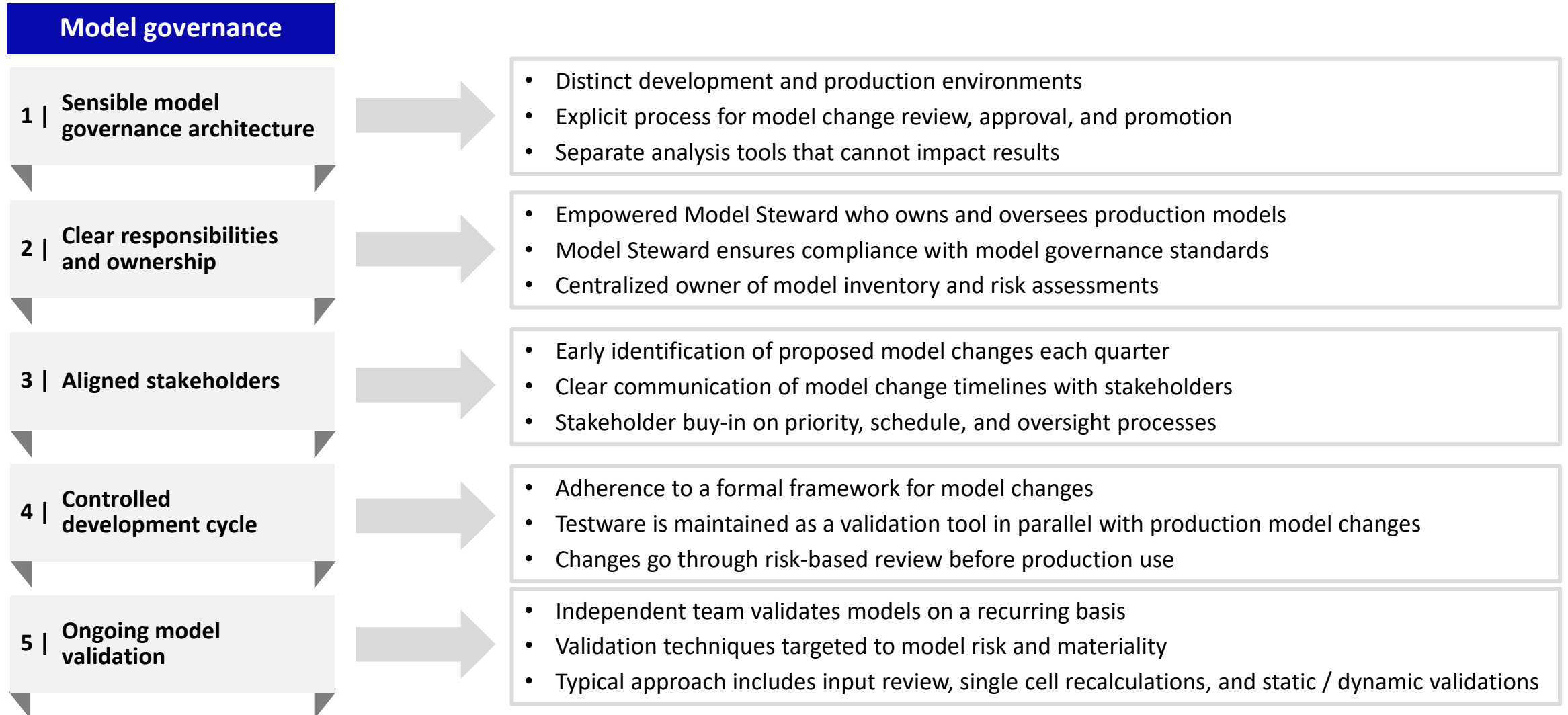
A simplified representation of relationships among real world variables, entities, or events using statistical, financial, economic, mathematical, non-quantitative, or scientific concepts and equations.

A model consists of three components:

- **Information input** component, which delivers data and assumptions to the model
- **Processing component**, which transforms input into output
- **Results component**, which translates the output into useful business information



PRINCIPLES OF A WELL-DESIGNED MODEL GOVERNANCE PROGRAM



1 | MODEL ARCHITECTURE DEFINITION AND PRINCIPLES

Definition

/'mädl 'ärkə,tek(t)SHər/

noun

¹ Describes the ecosystem in which the model operates and evolves. This ecosystem includes environments for development, testing, production, and analytics, as well as governance and principles guiding the interaction between those environments.

² Covers all components (and interaction between components) starting with source inputs and ending with the feed to the ledger.

Principles



EFFICIENCY



FLEXIBILITY



AUTOMATION



CONTROLS



DOCUMENTATION



TRANSPARENCY



SIMPLICITY

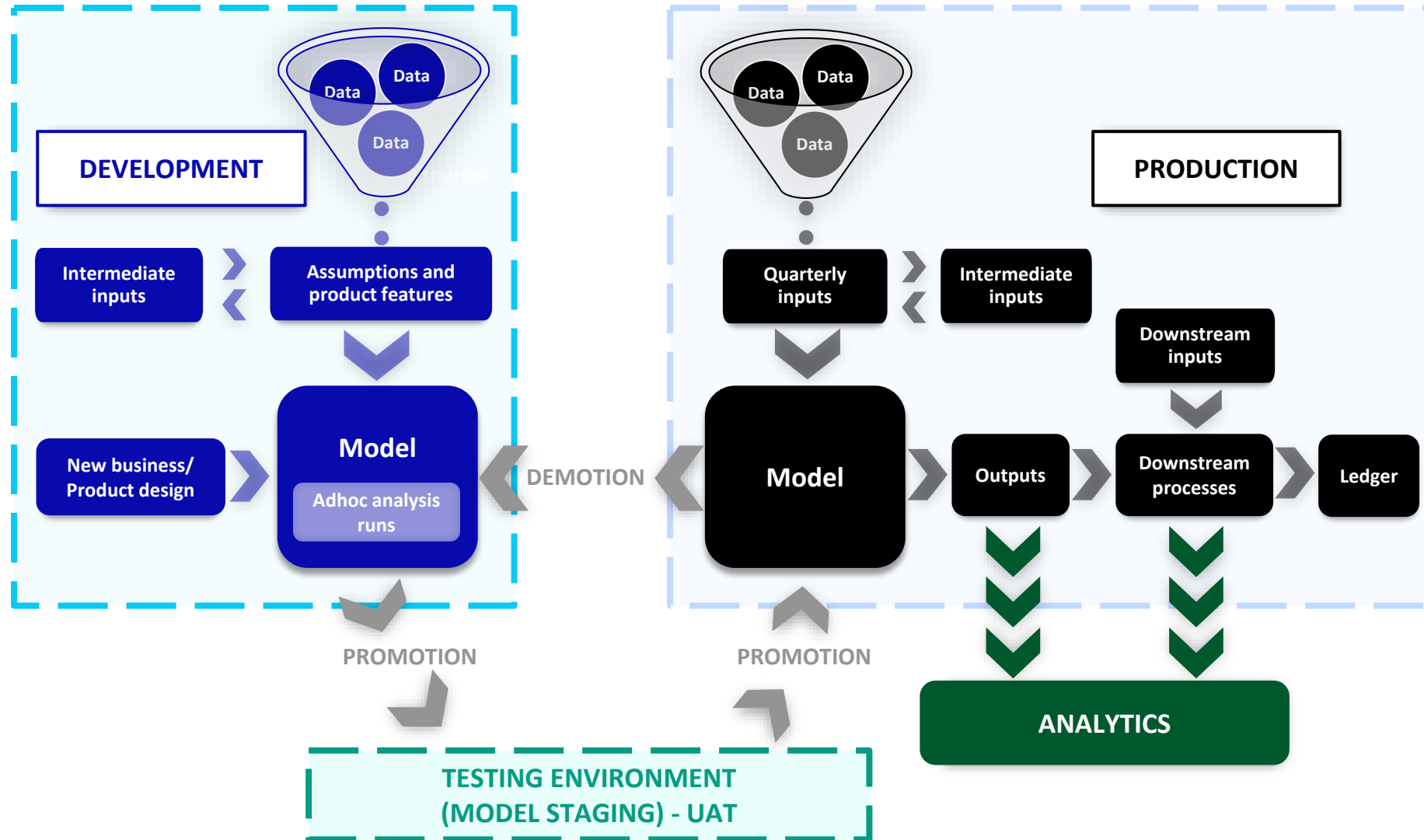


SEGREGATION
OF DUTIES



CENTRALIZATION
OF SOURCES

1 | SENSIBLE MODEL GOVERNANCE ARCHITECTURE



2 | CLEAR RESPONSIBILITIES AND OWNERSHIP

A Model Steward enforces standards and structure for strong governance

Model Steward duties	In scope
Work with model users to produce/review model change reports	✓
Release scheduled version updates	✓
Review production models	✓
Monitor and communicate best practices	✓
Ensure compliance with model standards	✓
Serve as gatekeeper to production model, approving all changes	✓

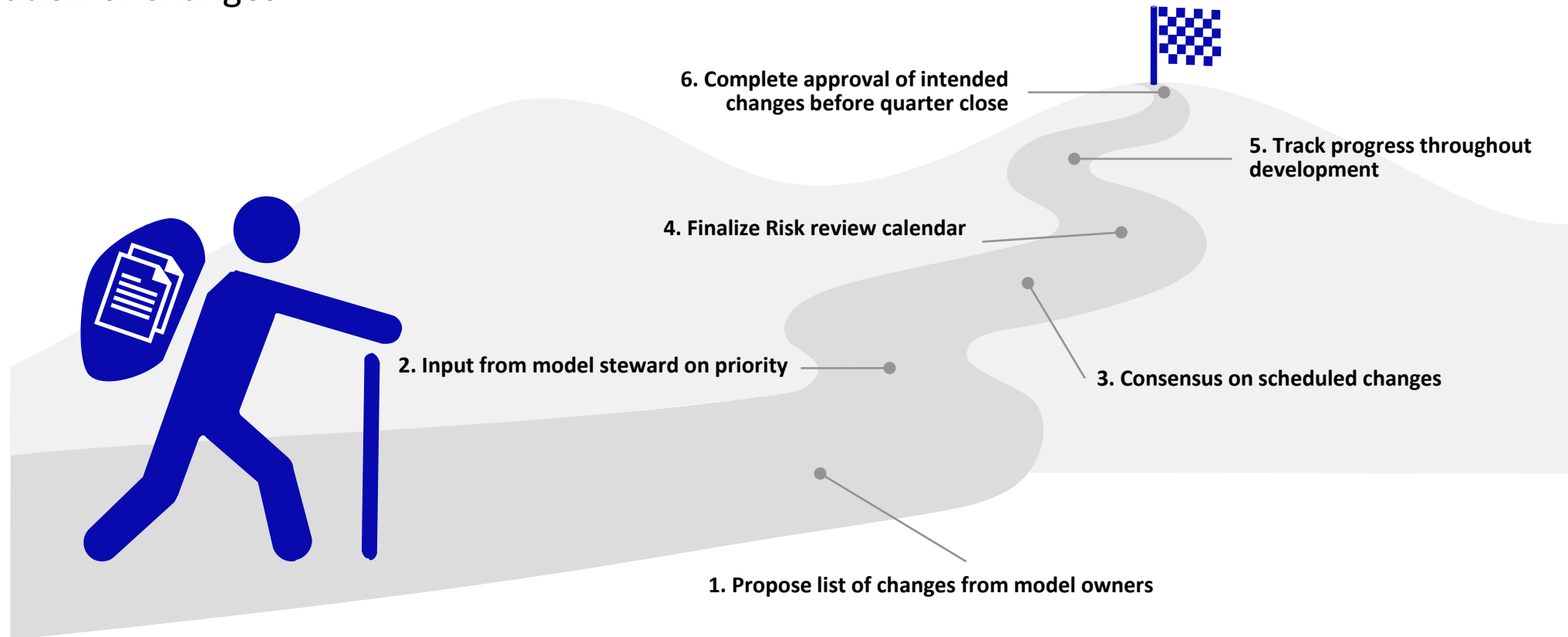


- Create an **independent, centralized** Model Steward role
- **Empower** this individual to **ensure adherence** to model governance standards
- The Model Steward should be **fully responsible** for production models

Model Stewards must have sufficient seniority and influence to enforce the standards

3 | ALIGNED STAKEHOLDERS

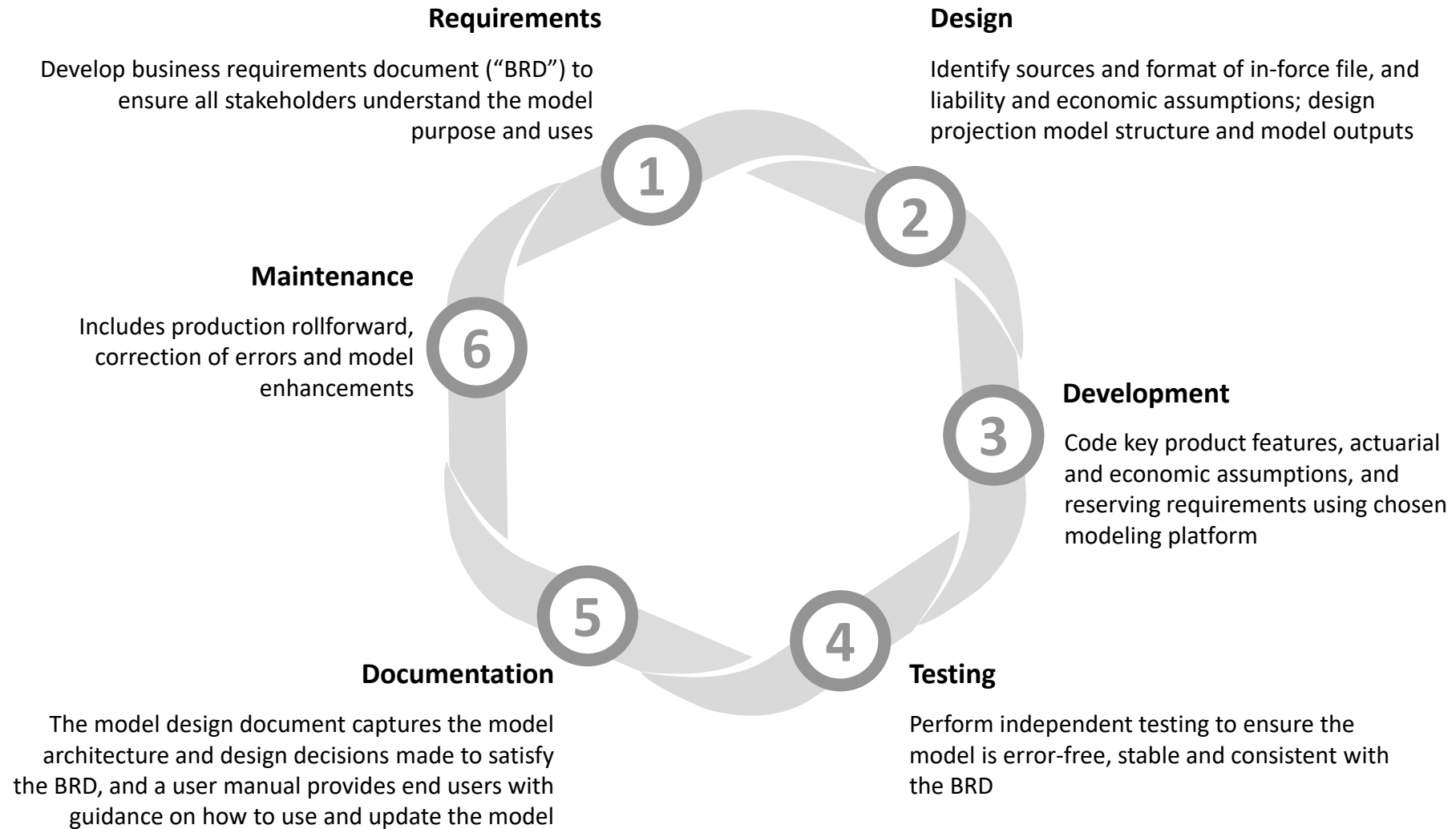
Schedule set early on ensures “no surprises” amongst stakeholders and allows for sufficient review and validation of changes



Protocol should be established in case of model issues that pop up late in the quarter and cannot follow the established schedule

4 | CONTROLLED DEVELOPMENT CYCLE

The Model Steward should clearly coordinate roles, requirements, and timelines



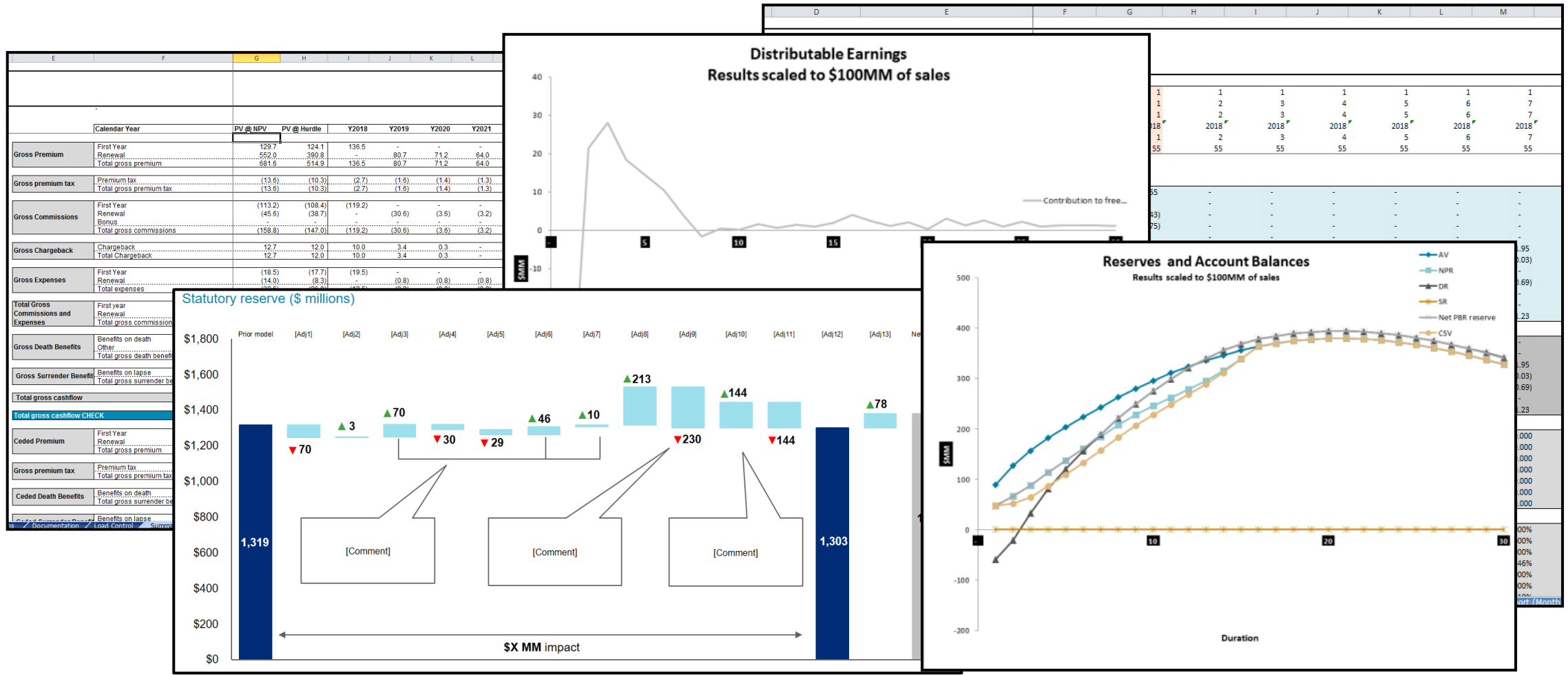
5 | ONGOING MODEL VALIDATION

An effective model validation program applies techniques tailored to model risk and materiality

		① INPUT VALIDATION	② CALCULATION VALIDATION	③ OUTPUT VALIDATION
<p>Degree of rigor</p>	High	<ul style="list-style-type: none"> Reconciliation against input source Implied rate analysis 	<ul style="list-style-type: none"> Independent full/sample model replication Attribution analysis Trend analysis 	<ul style="list-style-type: none"> Independent downstream process replication Data handoff testing
	Medium	<ul style="list-style-type: none"> Dynamic validation Assumption benchmarking 	<ul style="list-style-type: none"> Sensitivity analysis Dynamic validation 	
	Low	<ul style="list-style-type: none"> Static validation Spot checking Regression test on no-impact use cases 	<ul style="list-style-type: none"> Implied rate analysis Static validation Rule-of-thumb approximation Formula inspection Regression test on no-impact use cases 	<ul style="list-style-type: none"> Ledger reconciliation Regression test on no-impact use cases

Greater rigor should be used for high-risk models with material impacts to financial statements

5 | MODEL VALIDATION TOOLS



Changes should be reviewed using a variety of analysis and testing tools to ensure they are appropriate and well understood

03

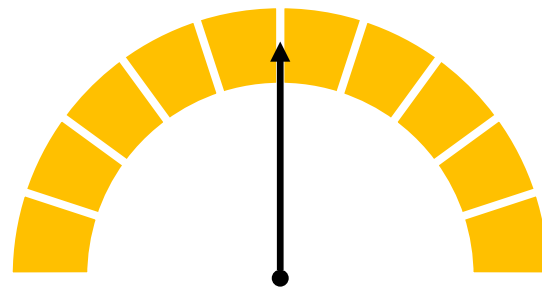
STRATEGIC CONSIDERATIONS

COMMON PITFALLS IN APPLYING MODEL GOVERNANCE

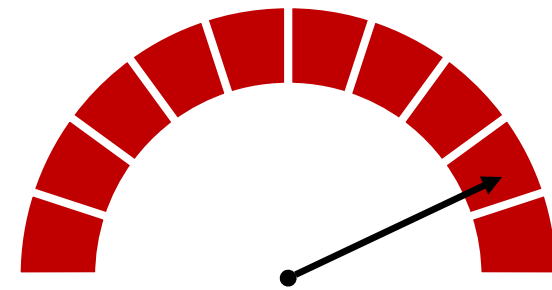
The following themes are practical barriers to effective model risk management



“IT’S NOT A
MODEL”



CHAMPIONS WITH
LIMITED
INFLUENCE



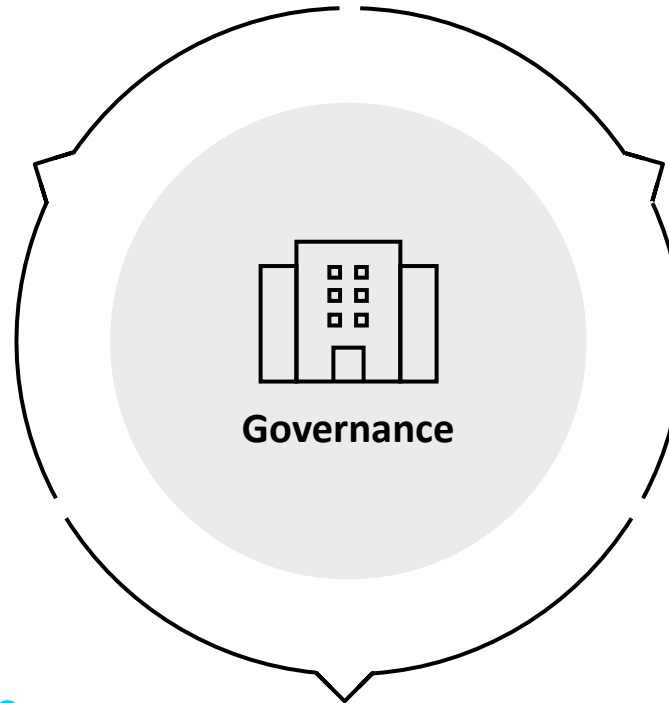
ONEROUS
STANDARDS

Addressing the human and practical elements of model risk management supports more effective oversight, validation, and use

KEYS TO SUCCESS

1 Capability

- Frameworks must include sensible governance structures, controlled cycles, formal documentation, comprehensive tracking, increased coordination, and ongoing monitoring/validation
- Procedures are easy to define, but very difficult to ‘right size’ the process to be sustainable and effective
 - Despite tight timelines, many companies (58%) do not use a risk-based approach to reduce the review effort¹



2 Capacity

- Resources must be dedicated, empowered, and have clear responsibilities and ownership
- Critical to identify a Steward to oversee and own the overall process
- Securing resources is noted as a significant challenge faced by a majority of companies (60%), yet few utilize dedicated teams (34%) or external resources (31%)¹

3 Culture

- Compliance is an important outcome of a well-functioning governance process, but it should not be the stated objective
 - As observed in other industries where professionals solve complex problems, the desired outcome rarely is achieved when compliance is the sole objective
- Governance needs to be deeply embedded in an organization’s culture to encourage discipline and must seek to achieve a strategic goal

COMPLIANCE VS. CULTURE: A CASE STUDY

Surgeons saw markedly different impacts implementing surgical checklists (a form of governance)

Compliance-driven outcome

0%
improvement
in surgical death rates

- In Canada, the surgical checklist was deployed by making it a law
- Hospitals had to sign off that they performed the checklist to be compliant

Culture-driven outcome

22%
improvement
in surgical death rates

- In contrast, South Carolina's implementation of the same checklist was voluntary and had a thorough training and implementation process to ensure employees understood the value of the checklist and made it their own
- **Equivalent of eliminating all car crash deaths in that same population¹**

Broad benefits to culture driven governance

Key takeaways

- Where the motivation was homegrown and presented as a strategic initiative, the results were tremendous
- **Actuaries need to approach governance with strategic mindedness, driven by internal culture to foster engagement and result in long-term success**

¹Boyle, Tara, Shankar Vedantam, and Renee Klahr. You 2.0: Check Yourself. *The Hidden Brain*, NPR, August 27, 2018.

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