Session 8: Adding Value with Model Validation

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SOA Antitrust Disclaimer
SOA Presentation Disclaimer

Adding Value with Model Validation

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Model Validation Objectives
Beyond the Requirements

Our objective is a model validation effort resulting in a transformed workforce and organizational culture change from a routine task-oriented, "production" mindset to a "value-add" perspective that is focused on analysis, risk management and continuous improvement.

Requirements

- Checkmark-in-the-box for management

- Professional Standards and Guidelines
  - ❑ V&M Guidelines in PBR

- Rating Agency Assessments

- Governing Bodies and Regulations
  - ❑ ORSA

- External Auditors

- Corporate Audit and Compliance

- Market forces
  - ❑ Competitive advantage
  - ❑ Cost and pricing pressure

…and Beyond

- Provide peace of mind to leadership and other stakeholders (external and internal)

- Effect culture change toward risk awareness, focus, management and mitigation

- Reduce key person dependency
  - ❑ Enable focus on value-added activities vs. production mindset (e.g. data updates, maintenance and administration)
  - ❑ Play to the strength of actuarial talent to foster innovation
  - ❑ Free up resources for analytics and risk management activities

- Generate a return on investment in company resources
  - ❑ Improve efficiency and reduce cost of re-work
  - ❑ Reduce cycle time of model updates

Model Validation Program
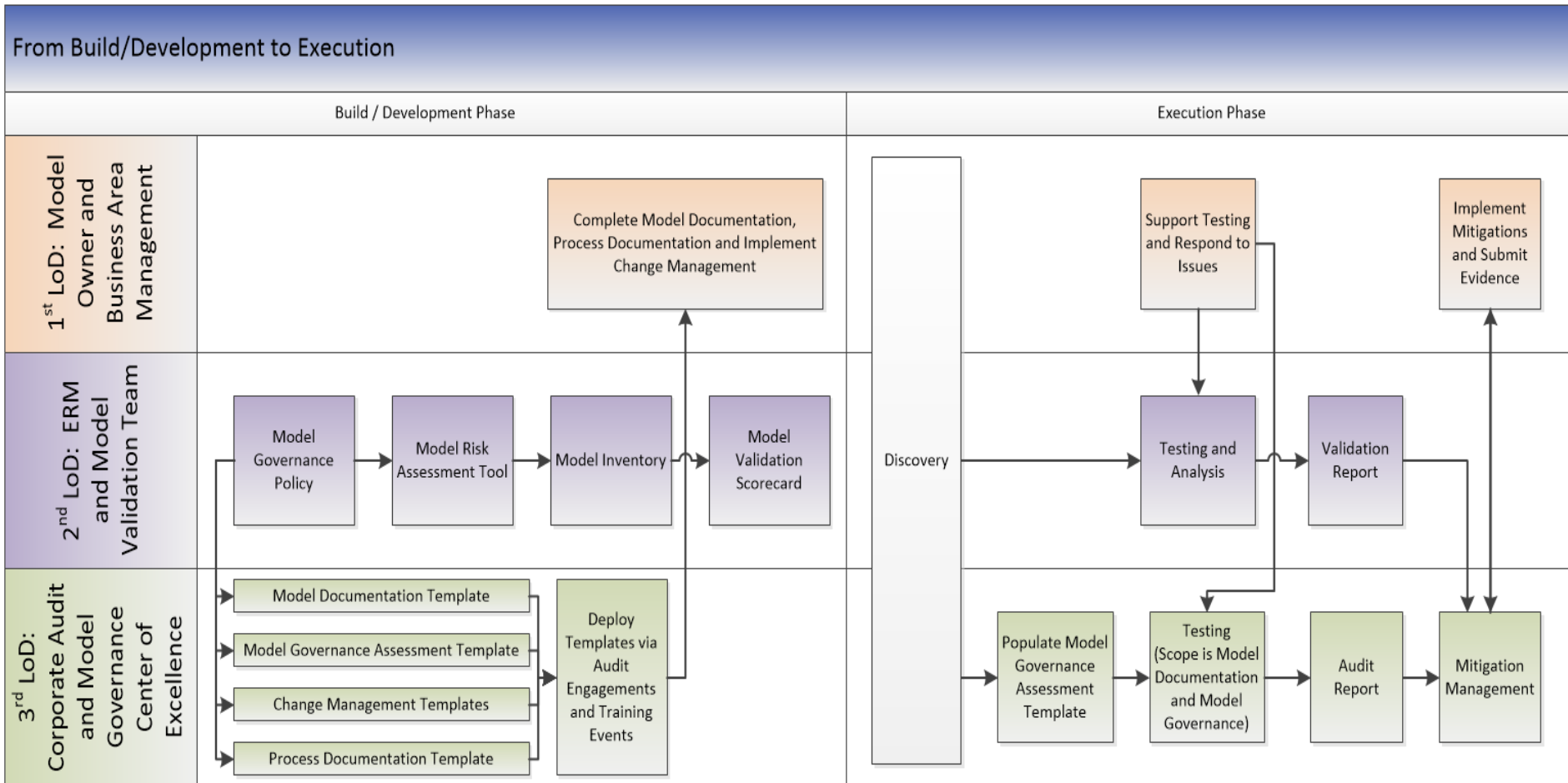
Model Validation Program Building Blocks
Model Governance Policy

As we rely on models to execute our business objectives, impact financial statements, decision making and planning abilities, a Corporate Model Governance Policy (CMGP) is essential to provide consistent requirements for the creation, use, documentation and validation of models. The goal is to develop and maintain standards to be applied to models based on their risk and criticality and ensure that the right level of controls is in place for their nature and use.

- Model definitions and framework

- Governance domain and scope

- Lines-of-defense roles and responsibilities

- Model inventory and certification

- Risk assessment, quantification and oversight requirements

- Risk based control structures – standards and evidence of compliance

- Documentation requirements and guidelines for model lifecycle artifacts

- Risk exposure reporting and dashboarding

Model Validation Program Building Blocks (cont'd)
Model Risk Calculator

The risk assessment and calculation process must be designed to specifically address the unique characteristics of the business unit and business processes the models support. Risk factors must be identified and weighted to create a consistent approach to evaluating the models.

Define **accurate** and **consistent** risk rankings across different model types, including:

- Materiality of financial impact

- Decision support role and reliance on model results

- Complexity and interoperability with other systems and applications

- History of overrides and exceptions

- Volume and extent of past changes

- Number of end users and access to model inputs and functionality

- Staffing to address key person dependency

- Other model risk parameters in line with business objectives

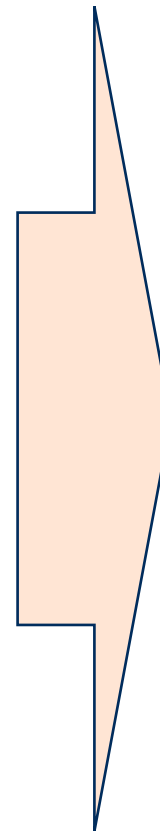# Model Validation Program Building Blocks (cont'd)
Model Inventory

A model validation program is built around the availability of an accurate and up-to-date Enterprise Model Inventory, covering all models and their supporting applications for the entire organization. This inventory is maintained at the local business area level but is consolidated at the corporate level.

Inventory Elements

- Model characteristics

- Model's role in a business process

- Downstream usage of model results

- Upstream sources of assumptions and data (historic, market, etc.)

- Model risk (from Model Risk Calculator)

- Risk control standards and evidence of compliance

- Inventory certification by business areas

Inventory Based Validation Program

- Rely on complete and current inventories to capture all potential model risk exposures, provide transparency to company leadership and properly prioritize validation efforts

- Minimize burden on local business areas (e.g. concurrently validate several models supporting a single process or residing on the same platform)

- Ensure comprehensive 360° 'holistic' evaluation (e.g. validate upstream and downstream models as part of a single engagement)

- Optimize use of validation resources based on skill sets appropriate for individual engagements, availability and magnitude of effort required for each validation

Model Validation Program Building Blocks (cont'd)
Model Validation Scorecard

Transparency, objectivity and consistency of evaluating a model are the principles ensuring that different independent validators with similar experience and expertise come up with roughly the same, or similar, scores for all model categories. These principles help build trust and credibility with the stakeholders, achieve a collaborative (non-adversarial) environment and improve the likelihood of achieving consensus on findings.

The model **validation scorecard** should cover the following dimensions:

- Fit for purpose

- Accuracy of calculations

- Design and data processing

- Model governance and documentation

- Ongoing monitoring

Validation findings can constitute a wide **range of opinions**, but typically can be **classified** as:

- Issue / deficiency

- Model risk

- Improvement recommendation

Model Validation Program Building Blocks (cont'd)
Model Governance Assessment Template

To ensure that there is consistency in model governance assessments and to facilitate leveraging each other's work product, Corporate Audit and ERM Model Validation developed a standard risk and control matrix (RCM).

- Use Internal Audit's RCM and parse the Model Governance Policy into controls

Control Procedures			
1.1	**ERM Model Inventory** - There is a Model Governance Lead who catalogued the model within the Enterprise Risk Management (ERM) Model Inventory and risk-ranked the model in accordance with ERM's risk-ranking methodology.	1.6	**Data Backup & Version Control** - Model data and code is appropriately backed up, restorable and version controlled.
1.2	**Fit for Purpose** - When designing, building or developing a model, the user confirms the capability and constraints of the model (based on underlying methodology and assumptions) are consistent with the intended purpose. Ongoing oversight and testing of key aspects of the model are validated, reviewed and approved by an independent manager or modeling committee.	1.7	**Input & Output Validation** - Data that is input to the model, and the output generated, are reviewed for completeness and accuracy.
1.3	**Assumptions** - Assumptions are reviewed (or approved, depending on risk level) prior to model results being relied upon. Assumptions are evaluated periodically (frequency based on risk level) to verify they are still relevant and reasonable.	1.8	**Data Integrity** - A process exists to prevent or identify accidental or malicious overrides (of data, formulas, processing functionality, etc.) within models.
1.4	**Change Controls** - A formal process is used to establish, approve, analyze, test, communicate and record model changes (including assumption changes).	1.9	**Model Documentation** - Documentation is sufficient for other individuals to run the model, understand how it works, and understand the intended objective of the model.
1.5	**Restricted Access** - Access to models is appropriate for job responsibilities.	1.10	**Process Documentation** - Step-by-step instructions of the process (including folder locations, file names, file owners and controls) are sufficient to allow another user with an appropriate level of systems access to perform the process and reproduce prior results.

- Base testing requirements for each control on Model Risk Assessment

- Promotes uniformity amongst auditors and validators

- Model Owners are able to see "What Good Looks Like"

- Completed assessments and supporting files are archived and accessible to Model Validation

Model Validation Program Building Blocks (cont'd)
Model Documentation Template

Model documentation should significantly mitigate model risk and key person risk. These risks are mitigated by documenting functionality, model and input limitations, the modeling flowchart, data dictionary and ongoing monitoring activities.

- Based on Model Documentation requirements in the Model Governance Policy

- Captures the "What" and "Why"

Model Limitations

The information provided in this section is a requirement for model documentation as outlined in the following section(s) of the model governance policy:

> Model Documentation Requirements – General: description of the model, purpose and limitations

Since models are approximations of reality, identify limitations of the model as well as conditions under which such limitations would be amplified

- Map each section to a requirement in the Model Governance Policy and provide guidance

- Although other templates are recommended this template should be required

- Completed model documentation should be stored in a central location

- Consider using team collaboration software to facilitate review, feedback and searching

Model Validation Program Building Blocks (cont'd)
Process Documentation Template

- Captures the "How"

- Will mitigate key person risk if written at a level such that someone with similar access could reproduce results

  - Process flowchart – connects all the content
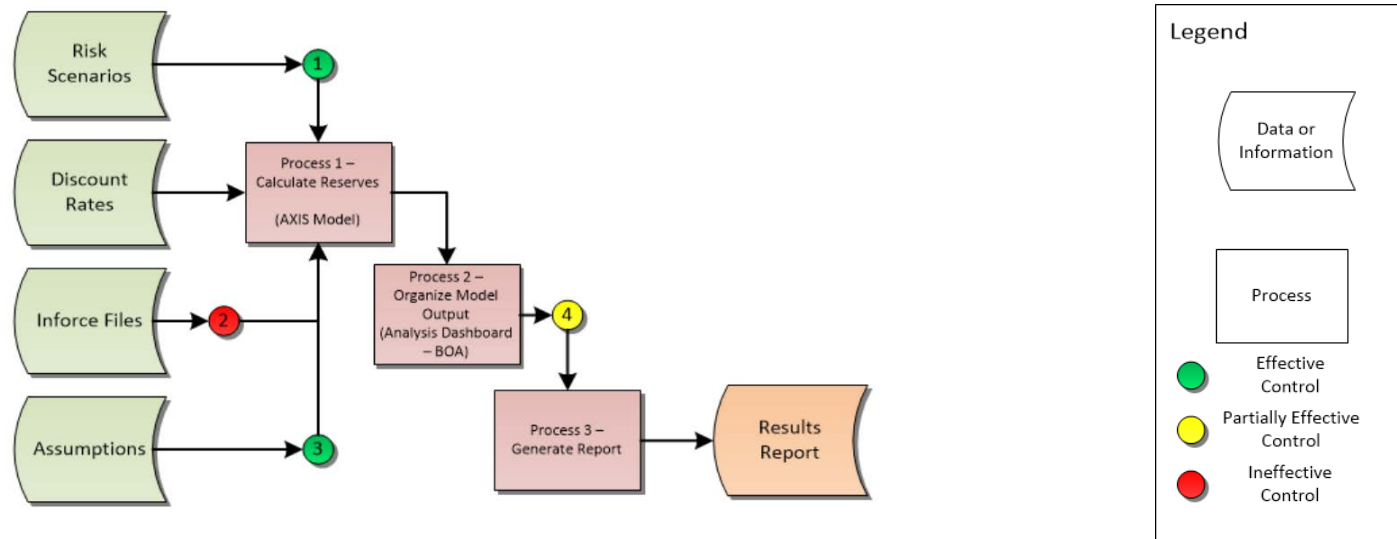
  - Inputs, Models, Business Owned Applications and Outputs

  - Process steps with controls

- Should be continuously updated

Model Validation Program Building Blocks (cont'd)
Change Management Templates

Develop change control templates for business specification, project plan, testing strategy, technical changes and change memo. Advise the business area on how to set up a model oversight committee and implement change controls.

- Each template documents a phase of the model development lifecycle

  - Business specification - Provides the model developer with specifications for the change, example or prototype of the change and a quantification of the expected impact

  - Project plan - A project plan is usually only required for large, complex changes

  - Testing strategy - Defines test requirements for unit testing, User Acceptance Testing (UAT) and attribution testing

  - Technical changes - Documentation of the changes made to the model and the purpose for each.

  - Change memo - Provides a summary of the business reason for the change, support for how the model owner gained comfort with the impact.

- Provide content guidance within the template

- Scalable based on development complexity which will encourage use

Post Validation Activities
Mitigation Management, Tracking and Trend Analysis

It may be prudent to establish a mechanism whereby Internal Audit takes an active part in managing post- validation deliverables, as they often have the infrastructure and tools to track and guide post- audit actions. Model governance should play the main role, however, in tracking major themes emerging from validations and providing communication among business areas if common threads (e.g., trends) are observed or new ones are emerging.

Post-validation **risk mitigation or acceptance**, **issues remediation**, **improvement** plans

- Discussions with stakeholders and signoffs:
    - ❏ Roles and responsibilities
    - ❏ Timelines
    - ❏ Deliverables
    - ❏ Communication and escalation venues

- Collaboration between ERM Model Validation and Corporate Audit:
    - ❏ Leverage Audit's expertise in assessing compliance and managing mitigations
    - ❏ Streamline mitigation efforts and achieve consistency across business areas
    - ❏ Use a common GRC tool for issue and mitigation management and tracking

Model Validation Success Story

For More Information on Our Approach

Please read our articles in *The Modeling Platform*

"Adding Value With Model Validation" *The Modeling Platform*. Issue 6 November 2017

"Adding Value With Model Validation: AG43 Model Validation Case Study" *The Modeling Platform*. Issue 7 April 2018

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