Insurers, Model Risk Management Deserves Your Nod

Say Yes and Build Trust

By Dom Lebel and Sebastien Cimon Gagnon

Reliable, robust models are part of the foundation of a well-performing and well-trusted insurance company, and model risk management (MRM) is an important way to ensure that models deliver on expectations.

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Risk management, and the development and use of models are two skills that the insurance industry has usually performed well. Now the role of risk management is being expanded to ensure that models deliver on their target goals. This is especially important since the insurance market is experiencing a new level of competition and regulation that increases the industry's dependence on models.

Modeling has long been integral to the business operations of insurance companies, defining important functions including pricing, asset/liability matching, and internal capital and reserving. However, the boundaries of model usage are being pushed as the insurance industry is increasingly reliant on more sophisticated modeling to give them a competitive edge. For example, leading-edge companies are using predictive models to streamline the life underwriting process and minimize invasive underwriting procedures. In addition, all over the world, there is a shift away from a one-size-fits-all formula or factor-based reserve and capital approaches to model-based approaches that better reflect company-specific products and risks. This has allowed some companies with robust models to reduce regulatory reserves or capital and increase earnings.

A Necessary Safeguard

However, without strong MRM, these advances may fail to reflect the company's intentions. They may also become susceptible to misuse or errors that can have significant adverse consequences, including:

- **Financial.** Models are used for core financial functions such as financial reporting, where any oversight or errors can result in financial restatements, which can lead to the loss of investor, regulator and policyholder confidence. Inaccurate model outputs can also result in volatile, inefficient or inadequate capital or reserve requirements required by local insurance regulators or accounting boards.
- **Business strategy.** Models are integral to accurate pricing, decisions about the amount of business to write, market entry and exits, capital decision making, asset/liability management, and planning. An unreliable model can produce wrong results, which can compromise strategic decision making and lead to financial losses or missed opportunities.

A strong MRM process allows an insurer to develop an engaging story about how it proactively became and remains comfortable with the integrity of its models and financial projections. It provides evidence to stakeholders that it has taken ownership of its models and the results produced by those models. And should it have to defend the robustness of its models and their results to third parties, it will be able to do so.

Some regulators have started to take note. Solvency II and the U.S. Federal Reserve, among others, require independent model validations to ensure that models are robust.

What to Look For

We've determined that precise, reliable modeling is critical, but how do you verify that your company's models fall into those parameters? What should senior management, the board of directors and external stakeholders be looking for? How can a systematic, comprehensive approach be developed? These are questions that can't be ignored.

The development of an MRM framework goes a long way to answering these questions and establishing protections that will shield forward-thinking companies from the risks that can derail them.

MRM does not stand by itself; it is a component of a more comprehensive enterprise risk management (ERM) program that creates a safety net of risk protection. Most insurance companies already have an ERM program or at least the components of ERM, although the levels of sophistication can vary. What does not vary is the need for a risk culture that supports long-term ERM success, widely deemed essential. That risk culture ensures that a company's day-to-day behaviors align with its risk approach, embodied in prescribed risk appetites, tolerances and limits.

Many of the fundamentals of MRM — the development of a risk appetite statement and the calibration of risk tolerances and limits — are already addressed in ERM, so there is no need to reinvent the wheel. Since modeling is an element of ERM, there might be a basic MRM framework available, or at least the current ERM framework should facilitate a formal MRM implementation.

A thorough MRM framework includes three important elements:

- Model governance
- Model development
- Model validation

Model Governance

Model governance starts with the board of directors and senior management, who typically define key MRM activities. These include model development and validation, which are discussed in the next section.

Other key elements of a governance framework include the allocation of adequate MRM resources and the clear definition of MRM roles and responsibilities. For example, once key activities are defined, policies, processes and procedures to implement these activities are typically delegated by the board or senior management to less-senior members of risk management.

Before an insurer can govern a model, there needs to be an understanding of how "model" is defined. At its most basic, a model is a representation of some aspect of an insurance or business function based on simplified assumptions. However, most models used by insurers are far more complex. For example, a stochastic asset/liability model for projecting economic capital can involve dozens of economic variables on the asset side. Assumptions may be required on the distribution of each variable and of their correlations with one another. Similar complications arise on the liability side, where a variety of demographic and other assumptions are needed. Many decisions also have to be made on data grouping, including which assets, policyholders or cash flows should be grouped together. Models need to be understood, at least at a high level, by those charged with developing a model governance framework.

Once "model" has been defined, there needs to be a thorough assessment of the company's modeling programs, whereby models are inventoried and categorized into low, medium and high risk depending on the impact each model has or can have on the company. The degree of governance often depends on the complexity and risk of a company's models.

Model Development

Model developers are on the front line of MRM. Leading companies have recognized this and have created model development policies related to model developer qualifications; model inputs such as market data and assumptions; modeling controls including access, version and change controls; documentation and testing requirements; and approvals.

Model inputs. Model developers need to assess the reasonableness of the model's input data and assumptions. They should evaluate the appropriateness of the source of the input data and any transformations of the data. Model developers should assess the reasonableness of each assumption using company and industry experience studies, to the extent possible.

Documentation. Model developers should document the purpose and intended use of the model. The documentation should also cover the entire modeling process, from input to reporting. However, documentation is ultimately specific to the model and its purpose.

Testing. A key responsibility of model developers is the review of a model's calculations, which can be accomplished using a variety of methods. One approach is to sensitivity-test the model to changes in input data, product features and assumptions. This ensures that the model's integrity remains intact and offers clarity about the effects of a change in an assumption or product feature.

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The governance framework should also ensure that future changes to data input, assumptions or methodology follow the same model development controls.

Model Validation

A necessary and valuable component of MRM is to periodically validate models to ensure they are succeeding in meeting the goals established when they were initially created. Model validation thus serves as an evaluation of model implementation.

Impartiality is important, and an independent validator can ensure this happens. A validator should not have an interest in the outcomes of the validation. For this reason, the validator should not be a model developer or user. Developers may be overly invested in their creations, and users, depending on their experiences, may be either positively or negatively biased. Validators should be knowledgeable about the products modeled, modeling standards of practice, industry practices and regulatory requirements. They also need to understand the purpose of the model and how it is currently being used. Particular attention is required when the model is using new methodology, such as predictive modeling for life insurance, or there is a lack of company experience or industry data to support assumptions.

Validators need to establish a validation plan. All model components including inputs, engine, analytics, output and reporting need to be validated. If an insurer has created a validation template, this can be used to initiate work on the plan. The degree of validation can vary depending on the risk or complexity of the model being validated.

Since validation of company models is meant to be performed regularly, it often is staged such that not all models are validated at once. Higher-risk models are typically validated during the initial validation effort. Lower-risk and new models are usually validated in future validation phases.

Modeling gaps are often identified by checking model output against another, independently developed model. This approach can confirm that the model is properly implemented and that results are within reasonable ranges. A review log is helpful in categorizing gaps and issues into estimated levels of materiality, which can be assessed through collaboration between the independent validator, model developers and users.

Once the testing is complete, a model validation report should be created. It can include a detailed report for management and an executive summary for an insurer's board of directors. The report should contain test results, conclusions and recommendations. In addition, the report should explain the rationale and justification for the findings and demonstrate independence throughout the end-to-end validation process.

Action plans should be developed to implement key model validation recommendations. These could include suggestions for changes to key MRM activities, which might require board or senior management approval, or changes to MRM processes or procedures, which might involve model developers, for example.

As recommendations are implemented, this marks the beginning of a new MRM cycle of model governance, development, use and validation.

The Importance of MRM

Complex models are a critical component of insurance company decision making and reporting. Therefore, it is vital to avoid material modeling issues, which can have a devastating impact on insurers.

A robust MRM process instills confidence in an insurer's modeling processes from both internal and external constituents, allowing them to feel more comfortable that model outputs are reliable.

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