

Risk Practice

The next S-curve in model risk management

How banks can drive transformations of the model life cycle in a highly uncertain business landscape.

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The economic effects of the COVID-19

pandemic have thrown into stark relief the significant challenges facing banks' financial models. Some models have failed in the crisis, an outcome that has drawn attention to models generally. The causes of the failure include not only COVID-19 effects but also regulatory requirements and models' increasing time to market. Institutions are realizing that even models which have not been significantly affected by these stresses are wanting in other ways.

The present crisis is creating a moment in which banks can rethink the entire model landscape and model life cycle. The next S-curve for model risk management (MRM) includes new model strategies to address new regulation and changing business needs. Models must become more accurate, so banks need to recalibrate them more frequently and develop new models more rapidly. A sustainable operating model is needed, since monitoring, validation, and maintenance activities must support the redevelopment and adjustment of models. The solution will have to be designed to manage models effectively over the long term.

The new strategy will require a top-down approach to model development because the institution has to be able to identify those changes that can be made through overlays and those that need recalibration and redevelopment. Once the model-development wave is complete, model validation, monitoring, and maintenance can be "industrialized"—conducted in a methodical, automated manner, sufficient for managing an increasing number of models. High standards are needed for both model risk management and regulatory requirements.

For the most part, quick solutions become unsustainable in the long run, for several reasons: experience has shown that banks cannot rely on expert judgment alone; many solutions address temporary conditions (such as the effects of government intervention or changes in customer behavior); budgets are strained by the resources needed to monitor, recalibrate, and develop or redevelop the ever-increasing model inventory; and finally, the short time periods in which the work must be done demand a more industrialized and comprehensive approach.

An optimized model landscape

As the economy begins to revive, organizations will likely be under budgetary stress. Differing priorities will compete for fewer resources. Leaders will have to make smart choices to realize model strategies, investing efficiently and sustainably. Banks will likely seek to upgrade their modeling capabilities, rationalize the model landscape, and streamline the processes for developing, monitoring, maintaining, and validating models.

Banks will have to manage trade-offs among expected impact on capital, regulatory provisions, costs to remediate issues, and capacity constraints. The objectives will be best served by avoiding unnecessary complexity. As part of the effort to rationalize the model landscape, better models will be built—those that ensure regulatory compliance but are also more accurate and best serve the business.

Models will also be recalibrated and run more frequently. Some will be replaced by next-generation models, an effort that will require investment in technology and data initiatives to serve the business. The development cycle for new models will be shortened, so that they can be deployed faster. To manage increasing costs, banks will have to ensure that model development, monitoring, and validation are performed efficiently. Banks also must demonstrate to regulators that their model-management frameworks are robust and that the impact of the crisis on models is being capably addressed.

The role of the model-risk-management function

Proactive MRM activities, aligned with both business needs and risk-management objectives, must be in place to prevent overgrowth of the model inventory. To ensure that the inventory is rational and effective, banks need to manage the model landscape as a whole. They also need to ensure that model quality is high. Gaining transparency to direct such efforts can involve deploying model workflow and inventory tools, consistently applied model-risk-rating approaches, and regular monitoring of model performance and use.

The MRM function can support the bank by fully optimizing the portfolio of models. This support goes beyond performing validation work and ensuring consistency across modeling and monitoring practices. Model development is also in need of optimization and consolidation, since development is usually fragmented across different business units.

Hundreds of models now need to be adjusted, developed, and recalibrated. There is a lesson in this—the effective and efficient development of new models must result in models that are easy and inexpensive to maintain in the future. In taking stock of existing models, banks should seek to improve the quality of the best models while decommissioning poor-quality, ineffective, and outdated models.

Sharing responsibility for model management

Model management can no longer be primarily or even mainly the responsibility of the MRM function, a fact that the COVID-19 crisis has underscored. The responsibility must be with the business stakeholders—those who use the models and extensively rely on their outcomes. MRM has to be approached as the collaborative work of all three lines of defense. The second line—the MRM/validation function and the risk function—should enable a clear program for building MRM capabilities among all business stakeholders and model owners. Only through real collaboration can banks ensure that effective controls are designed and models are properly monitored.

As responsibility for MRM is shared, so are its benefits, and certain activities undergo changes and adaptations.

- **Validation.** The MRM function and risk function will still focus on validation practices, ensuring that models are of good quality and model risk is capably managed. But the business stakeholders and model developers are the ultimate users of models. As such, they must be responsible for ensuring that development

costs are justified, programs are run efficiently, and models are well monitored and maintained. Such active collaboration eliminates work silos, allowing the use of common elements across the model life cycle. This minimizes friction and boosts efficiency.

- **Capability building.** The effort to build the model strategy must be supported by a thorough capability-building program. All model users and owners and the leaders of affected functions and business units need to be trained in the new approach to MRM, so that they all understand their risk-management responsibilities. Given the current environment, defined by new and complex technology and accelerating automation, an aware and responsive workforce is indispensable to strong model governance.
- **Agenda setting.** The MRM function should work closely with the first line to set the agenda, identifying the models that are most important to the business and operations and defining the priority model activities. That requires a forward-looking view into how pandemic-related factors have affected or will affect models. Those that are adversely affected will need recalibration or redevelopment.
- **Active management of the model landscape.** Managing the model landscape will be a joint effort between first- and second-line teams. Model-risk managers will guide the efficient allocation of model-risk appetite by setting definitions for where models should be used, thresholds for materiality and complexity, and precision requirements based on use cases. At the same time, model developers will be given incentives to consolidate similar functions, reduce model count and complexity, and promote modularization and reuse of code.
- **An agile operating model.** The function also needs to determine the best operating approach to manage delays in development and validation plans that were made before the pandemic. This would include a flexible project-management approach, with joint calendars

Modeling teams and business stakeholders will need to work alongside risk, including the MRM and model-validation teams.

for both development and validation. New organizational structures should be established to ensure cross-functional teams, career- and knowledge-development opportunities, rotation programs, and an effective location strategy. A multidisciplinary team, with representatives from the business, development, technology, and validation, can be used to break down siloes and meet the needs of various stakeholders.

- **Ownership.** Most organizations that have been successful in optimizing their model landscape have established clear model ownership and defined roles for those model owners. This ensures that the model-life-cycle process is integrated across the organization, with stakeholders interacting in a coordinated manner. Where model ownership has not been established, strong focus should be given to onboarding programs to ensure the business understands its model risk management responsibilities.

Streamlining and automation

This perfect storm of model-inventory revisions and development presents organizations with a unique opportunity to act strategically. The requirement is clear: institutions need to streamline the entire model life cycle, including ideation, development, implementation, validation, and monitoring. The

objectives are to avoid future bottlenecks, support business continuity, and improve institutional performance, while minimizing risk and cost. Crucially, banks must develop a model strategy for the coming years that meets these demands in a cost-efficient manner.

As model-life-cycle processes are reimagined, the ultimate goal is to bring about strategic change. But flexibility is built into the process, so progressive efficiency gains, such as technical solutions, can be made to capture near-term benefits until more fundamental strategic programs are completed. For automation, processes need to be standardized. This is accomplished through a complete review of process maps, applying lean fundamentals.

MRM should become the agency driving model efficiency. Modeling teams and business stakeholders will need to work alongside risk, including the MRM and model-validation teams. Together they can fully utilize MRM frameworks to manage the increasing number of models efficiently—including newly developed and redeveloped models as well as the monitoring and validation conforming to the increasing level of standardization and automation. The big lesson for the new MRM framework is that it must establish standards and standardize processes. This work is essential for streamlining and automation.

A significant challenge is the increasing number of models. These must be validated within budgets but without eroding quality. Banks should therefore ensure a high-quality, independent model review that is also cost-efficient.

assess and review their current model process maps, rethinking the processes themselves.

Processes can be redesigned and automated using standard digitization programs, generating efficiencies in a range of areas:

Finding efficiencies in the model life cycle

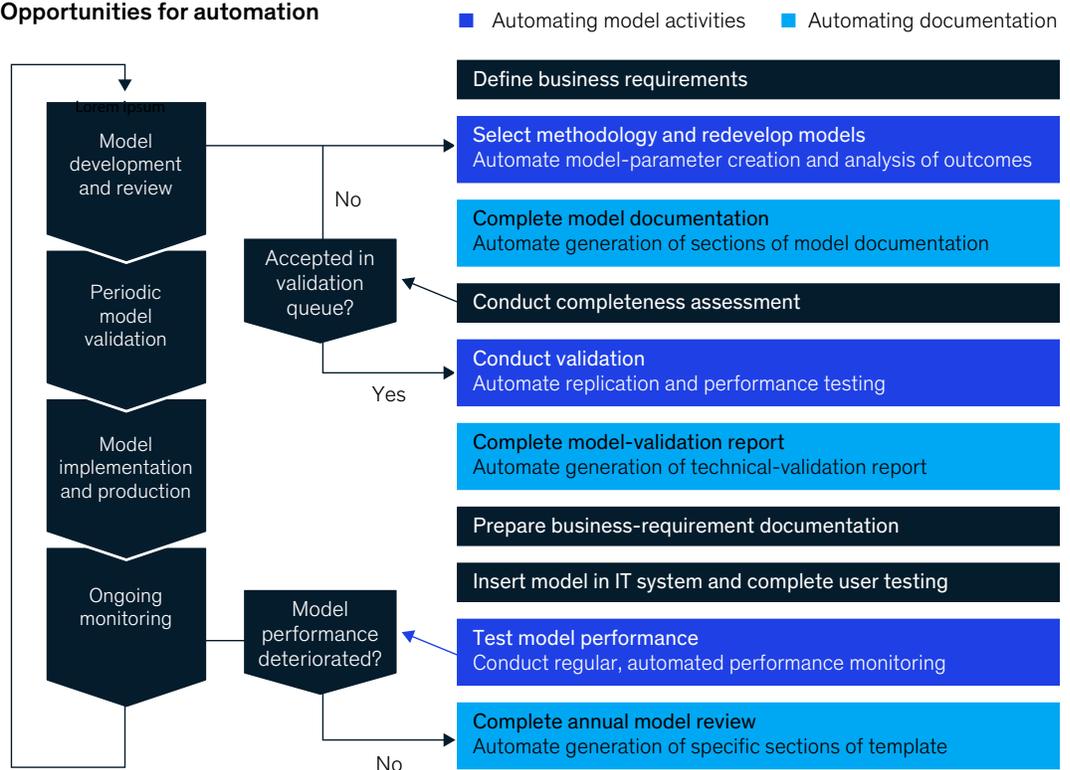
Banks can find efficiency opportunities throughout the model life cycle (exhibit). To do this, they can

- *Model testing.* Some firms have been able to reduce the time it takes to perform testing during development by as much as 30 percent by applying standard model principles, a

Exhibit

Significant savings result from optimizing the model life cycle, especially in validation processes.

Opportunities for automation



standard library of testing codes, automatic testing, and other techniques.

- **Model validation.** Banks have reduced the time it takes to validate and produce the associated report to comply with regulations and ensure business continuity, in some cases by as much as 65 percent. The key drivers of the savings are standardized tiering, automated test selection and testing by model type, and automated population of documents and reports.
- **Model monitoring.** A predefined monitoring pack built around a library of key performance indicators can reduce the time required to execute ongoing monitoring activities by as much as 35 percent.
- **Data-quality standardization and automation.** Banks can reduce the workload for data-quality testing for models by 20 to 40 percent. For both models in the pipeline and models being monitored, testing can use standard libraries. With machine-learning techniques and automation, banks can scan terabytes of data without human intervention. With only gray areas left to be addressed, the savings in time and effort are significant.

The streamlining and automation of model-related processes—from model development to validation, monitoring, and maintenance—is thus an MRM project integrated across the lines of defense.

Proactive MRM owned by all lines of defense is needed now—not only to meet new regulatory expectations but also to strengthen institutional resiliency in this crisis and the next. It is also needed to maintain and improve model efficiency. A redefined MRM framework will include all stakeholders and cover the entire model life cycle. The model inventory will be reshaped to better support the needs of the business. Standardized processes will provide the foundation for the use of advanced analytical and digital tools and progressive automation.

Banks have to do all this while maintaining high standards for MRM and regulatory compliance. A lot of ground must be covered in the coming months, and given the depth of the present crisis, banks should get started right away.

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