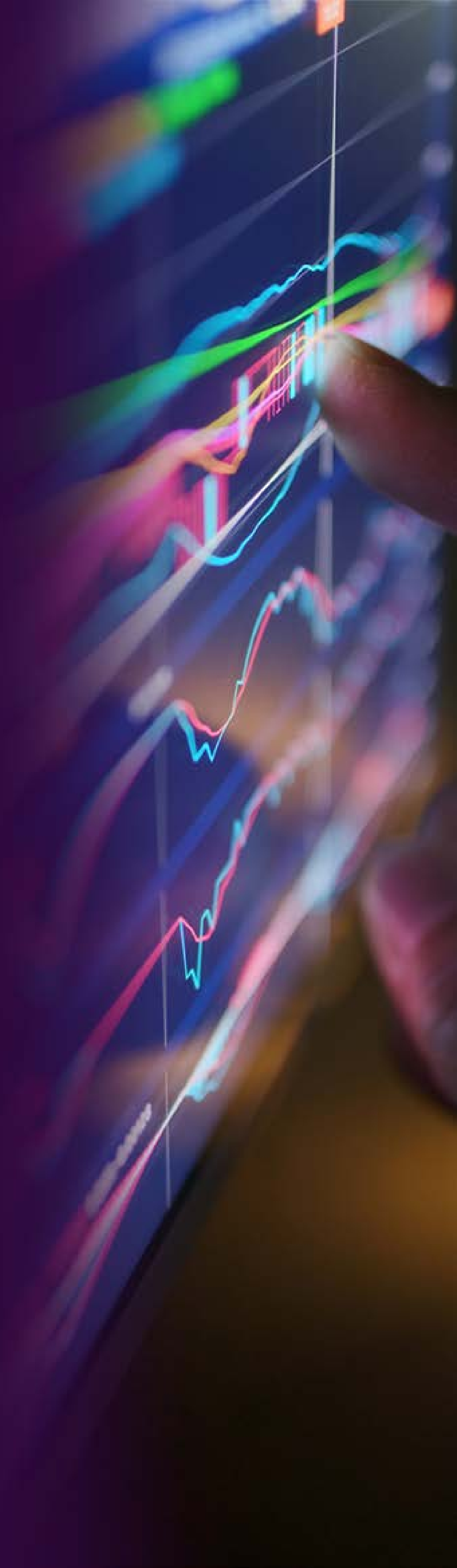
# Modern strategies for a bold new era of Model Risk Management



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# The race is on to manage automation, complexity and regulatory scrutiny

**Heightened regulatory scrutiny. Inadequate practices and expertise. Increasing complexity and automation. Growing financial and reputational risks. Today's Financial Institutions (FI) are enduring an array of critical challenges as their reliance on models increases.**

The use of models to evaluate risk, assess capital adequacy and liquidity requirements, monitor customer behavior, manage data analytics, and support investment decisions has become crucial to business efficiency, risk management and overall profitability in today's environment. FIs are increasingly exploring new strategies to enhance and better manage models as their number and complexity increase amid the proliferation of digital technology, use of big data in sophisticated modeling techniques and fast-emerging automation capabilities.

Make no mistake — Model Risk Management (MRM) is becoming a leading priority today as FIs increasingly realize its critical importance to their operations, growth and future prosperity. Model Risk is increasingly being elevated as a standalone 'principal risk' that demands robust and transparent model validation capabilities and controls, anchored within formalized MRM governance. As dependence on models grows, FIs are realizing that poor MRM can result in a failure to meet evolving regulatory requirements and significant financial and reputational risk.

Inadequate practices and standards regarding model development and usage may lead, among other things, to sub-optimal lending decisions and pricing that can significantly impact financial performance.

**Regulators, meanwhile, are intensifying their focus on MRM, with regulatory inspections and exams connected to MRM increasing and regulators publishing new guidance.**

Most FIs implement their approaches to MRM based on the requirements of the US Federal Reserve/OCC's SR11-7 guidelines. But other significant initiatives — including the European Central Bank's Target Review of Internal Models (TRIM), and guidance from the Bank of England (BOE) Prudential Regulation Authority (PRA) — continue to emerge as supervisors look to contain model risk through standardized modeling.

We are also seeing stakeholders demand improved risk management. Among boards, senior leaders, regulators and shareholders, expectations are increasing for sophisticated risk management at an enterprise level across capital, liquidity and credit, and loss forecasting.

While reliance on models is growing, so is their complexity amid the growing use of Artificial intelligence (AI) and Machine Learning (ML) — based algorithms. As FIs pursue strategies to control the emerging and increasing challenges of model risk, there remains much ground to cover in the journey ahead. And as this paper will reveal, KPMG's model validation professionals have been working with major global banking clients to help them drive progress towards a more effective and efficient model validation value chain.

The future is about sound lifecycle management, effective inventory practices, a coherent validation framework, strong governance that includes senior management and board involvement, and effective use of technology as key features of robust MRM.

# Key findings on model validation

**KPMG research conducted in 2021 reveals the following key findings on model validation based on interviews with risk management and validation professionals in the Americas, EU, UK and ASPAC. Key themes include automation and data use, the need to enhance efficiency and workflow management, and the value of managed services for model validation:**

The leading ‘pain points’ cited are: erroneous, unclear or incomplete model documentation, examinations by regulators, task prioritization, and a lack of skills.

Machine learning/automation implications, data privacy and access to clean data are also cited as significant operational challenges.

The most important ‘model validation goal’ cited was improving the quality of deliverables, followed by improving validation consistency, reducing validation costs, and improving validation workflow, efficiency and time management per model.

**On the subject of managed services for model validation, key findings include the following:**

61%

Most respondents (61 percent) have used or would be willing to use a managed service for model validation.

Leading ‘concerns’ cited regarding managed services include service quality, regulatory boundaries, confidentiality, data sharing/integration, and keeping expertise in-house.

67%

A total of 67 percent believe a managed service would, or potentially could, provide value via key benefits such as access to talent, scalability, enhanced efficiency and best practices.

Source: Modern strategies for a bold new era of Model Risk Management, KPMG International, 2021

**Meanwhile, key findings from another KPMG survey of 48 significant banks across 16 countries included:**

55%

Regulatory or supervisory initiatives for MRM are increasing — a third of respondents have undergone an MRM-related regulatory exam or inspection, rising to 55 percent among banks with assets exceeding US$500 billion.

Half of banks already consider AI or ML capabilities as part of their internal definition of a model.

75%

75 percent of respondents cited deficiencies in model documentation as the most-common validation finding, followed by poor performance, data quality and model methodology.

As more banks view model risk as a principal risk and will need to establish model risk appetite from a quantitative standpoint, two-thirds of respondents have not established a model risk appetite and associated limits.

58%

96%

While 58 per cent of respondents use the SR 11-7 definition of a model exactly as written or with some modifications, 96 percent of respondents said they require greater regulatory clarity on various aspects of MRM.

50%

50 percent of banks are outsourcing validation services.

Overall, half of banks surveyed are investing in automation of their MRM framework, and workflow management is most commonly seen as the area where automation promises significant benefits.

Source: Model Risk Management: A global benchmark analysis of significant banks, KPMG International, 2020

# Today's challenges demand a new focus on solutions

**As emerging digital capabilities, big data use and automation continue to heighten both model reliance and complexity — and as rising regulatory scrutiny poses its own significant challenges — forward-looking FIs are expected to increasingly embrace the appropriate use of sophisticated models.**

In addition, as complexity and sophistication increase, model performance monitoring will likely need to be enhanced through the introduction of new performance metrics and controls to monitor the predictive power and stability of new modelling components over time, as well as the intended model use.

In our view, as FIs look to enhance compliance and efficiency, they should also realize that increased reliance and complexity can make model risk a major risk category in the future. What are the leading challenges that FIs in today's global markets need to solve without delay? They include the following:

**The lack of a clear model definition:** Overcoming ambiguity and clearly defining a model has been a key pain point for FIs. As a result, there is a critical need for consistently defined models that can better serve the industry and its various asset classes. For example, many FIs are considering whether marketing models and chatbots should be captured by the model definition.

**Model tiering:** Based on the implications of a model 'going wrong,' FIs generally categorize their models as *high*, *medium* or *low risk*. Unfortunately, precisely defining what constitutes high, medium, or low risk is posing challenges. FIs should decide on the relevant factors to consider when tiering models, such as materiality, impact, uncertainty, regulatory implications, etc. Regulators expect transparency in the classification methodology, the use of limited subjectivity, and clear documentation of all assumptions and rationales for conclusions. At the same time, banks say they would welcome enhanced guidance on model-tiering methodology. There is also a need to solve today's insufficient linkage to risk appetite.

**Insufficient and inconsistent model documentation:** A key element of effective model risk management is the development and maintenance of model documentation. Without adequate documentation, model risk assessment and management become extremely difficult. This is a crucial issue today. What we are seeing is a broad range of documentation quality, clarity and completeness — some models have detailed and comprehensive documentation, while others are lacking in these areas. Documentation tends to be inadequate in key areas such as data sources and input, data and model limitations, model assumptions, implementation, monitoring and use.

**Model inventory visibility and management:** Large banks often lack a clear picture of precisely how many models exist across the organization, particularly where global geographies and diverse regulations are involved. Banks thus face a significant obstacle that impacts the challenge of enhancing model definitions and tiering, and establishing priorities related to model validation. Challenges here also include model identification, comprehensiveness of metadata stored in the model inventory, as well as the need for more efficient and automated workflow management throughout the model lifecycle. In terms of model identification, models are needed to address areas that include ESG initiatives, pension obligations, embargo, marketing and more, some of which may not currently be captured in the model inventory.

**Automation:** Powerful and fast-emerging automation capabilities are enabling significant cost efficiencies in today's competitive markets by eliminating the need to complete tasks manually. Workflow management is most commonly seen as the area where automation can bring potential benefits. Beyond that, automation can improve reporting and aspects of validation, as well as enhance documentation processes.

**ML & AI:** Machine learning and artificial intelligence pose diverse challenges for forward-looking FIs, with new types of risks that include: *Explainability*, the risk that algorithm/model complexity makes it difficult to determine how an outcome was achieved; *Resilience*, the risk of a model evolving inappropriately amid inaccurate feedback or algorithm changes; and *Fairness*, the risk of biased results. In addition, the need for appropriate skills to validate complex models is becoming a pivotal challenge.

As today's organizations identify and address these challenges, many are turning to a managed-service approach. Reliance on managed services can deliver critical efficiency and expertise advantages, and forward-looking FIs are turning to successful partnerships and alliances for support. Our research shows that half of banks surveyed are relying on outsourcing of validation services. But others have avoided implementing a managed services approach citing concerns that include: service quality, regulatory boundaries, confidentiality, data sharing and keeping expertise in-house.

# Case Study:

## Global banking leader takes MRM to the next level

**While banks face clear and significant challenges that in our view warrant strategic action without delay in today's fast-evolving environment, more banks are making MRM a priority for future efficiency, growth and success.**

A large global bank based in Europe engaged KPMG's network of member firms to explore solutions after identifying multiple gaps between their existing model risk governance framework and regulatory requirements. They turned to KPMG professionals for assistance in developing a comprehensive MRM policy with detailed operating procedures around model development and validation. In addition, the bank sought KPMG firms' assistance in handling the validation peaks amid Brexit, development of new CECL models, and short-notice regulator demands. The following framework elements were implemented:

- Design and implementation of a consistent and robust model risk governance framework across the organization to help ensure full compliance with regulatory requirements, with guidance and requirements for the three lines of defense across the model lifecycle;
- Introduction of aggregate model risk assessment, risk appetite and reporting across the organization;
- Execution of 'model inventory attestation' to help ensure completeness and accuracy of the model inventory.

KPMG professionals also provided an end-to-end validation managed service for a book-of-work covering a broad range of models. Our onshore and offshore teams jointly performed validation activities and produced reports for more than 500 models across Credit and Market Risk, Liquidity and ALM, Valuation, Asset Management, Monitoring and Oversight, and Algos. To further increase efficiency, KPMG professionals developed an automation tool which uses a guided workflow to generate standardized reports in multiple formats and templates.

# Innovative alliances can deliver critical advantages

**While our research shows that some banks remain cautious amid their concerns about adopting managed services, research also reveals a significant number of banks are looking to managed MRM services as the way forward.**

KPMG offers three delivery approaches to model validation outsourcing depending on specific business needs. KPMG can manage a full book of work or a portion of a FI's existing inventory, providing everything from basic staff augmentation to a full managed-service model, based on short- and long-term investment priorities.

1. **Staff augmentation:** This is primarily an addition of expertise and skills resources to the existing FI team to help handle validation peaks. The client is responsible for validation steering and KPIs, as well as standardization of validation processes. Client systems and infrastructure are used for validation activities. The end-to-end process remains controlled by the FI. Automation or process optimization is not achieved with this model, nor are cost and resource efficiencies.

2. **Managed Services — peak absorption:** This model involves outsourcing a portion of the client's book of work. The client is responsible for validation steering and KPIs and is supported with KPMG guidance within the outsourced validation elements. KPMG provides experienced specialists for the specific requirements of the client's book of work. Advantages here include: support to handle validation peaks, more manageable scope of work for existing FI staff, and efficiencies that are unlocked via automation. At the same time, this model does not optimize the full scope of the validation process or cost savings.

3. **Full managed service:** This model delivers a complete scope of validation support as well as governance and organization of those activities. KPMG is responsible for steering validation activities and for all operations, providing highly standardized service and strong incentive for automated processes. KPMG professionals are in charge of organization, resource allocation and operation, and validation activities are conducted with KPMG technology on client architecture. This full managed service model can deliver higher cost savings and resource optimization.

# Conclusion — The journey ahead is difficult but inevitable

**FIs are realizing that taking MRM to the next level is difficult today but the journey is inevitable as the pace of change continues to accelerate. What priorities should today's FIs establish and pursue to enhance their model lifecycle?**

- FIs will likely need to catch up quickly as regulators increase their scrutiny
- Optimized model risk workflow between model owners and model validators should be a top priority
- Creating consistent model definitions and comprehensive model inventories is critical
- Automation in MRM is currently underutilized — there is scope for banks to do more here to help optimize the efficiency of their frameworks
- AI and ML should be adequately incorporated in model risk frameworks, considering the specific risks arising from these technologies as they add to model complexity

Finally, while many of today's FIs are indeed sharpening their focus to enhance MRM and capitalize on its tested advantages in today's competitive markets and highly scrutinized regulatory landscape, many continue to delay change that in our view is inevitable for future success.

As the face of the financial sector rapidly evolves, the importance of MRM is unmistakably on the rise and now poised to become a key element in the operational success of FIs. Today's organizations will delay progress at their own peril as the pace of change accelerates and increasingly complex models create new risks.

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Designed by Evalueserve.
Publication name: Modern strategies for a bold new era of Model Risk Management
Publication number: 137699-G
Publication date: November 2021