



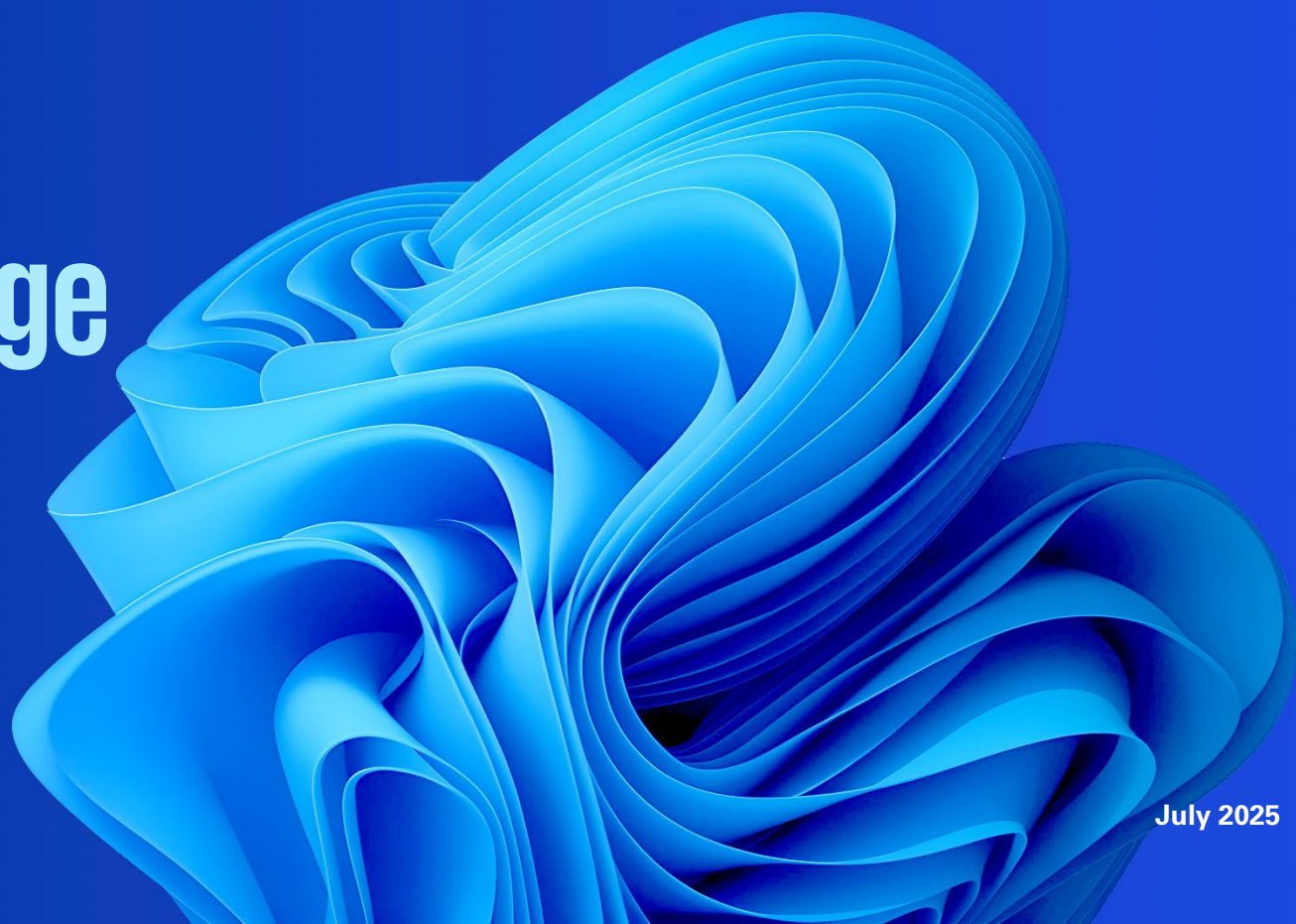
Turning compliance into competitive edge

Benchmarking of model risk management practices
in Middle East

KPMG Middle East

KPMG. Make the Difference.

July 2025



Foreword

Model risk management is taking the front seat across the financial landscape of the Middle East.

The banking sector in the Middle East is undergoing rapid transformation, driven by digital acceleration, rising supervisory expectations and a growing dependence on complex decision models. These models have quietly become the core engines of decision-making — influencing everything from credit underwriting and capital planning to fraud detection, customer engagement. The influence is now expanding further, adding new dimensions to model risk with the rapid rise in use of machine learning (ML) and AI techniques, especially in data-rich and customer-facing use cases. As this reliance and use deepens, so does the need for robust model risk management (MRM). No longer just a regulatory requirement, MRM is emerging as a strategic priority for banks seeking to manage complexity, mitigate risk and remain resilient in a fast-changing environment as well as maintain competitive advantage.

Supervisory bodies across the region are at different stages of formalizing regulations for MRM. The Central Bank of the UAE (CBUAE) has led the way with the release of the Model Management Standards and Guidance — signaling a shift towards more rigorous and risk-based requirements for model risk management. In Saudi Arabia, the Saudi Central Bank (SAMA) is expected to release its own guidance soon. Across the region, banks are increasingly aware of these evolving regulatory expectations and are proactively working to align their model management practices with both supervisory requirements and broader industry standards.

Against this backdrop, we engaged with 23 leading banks across the United Arab Emirates (UAE), Saudi Arabia, Oman and Qatar to conduct a first-of-its-kind survey for better understanding how the MRM landscape is evolving — and the challenges institutions continue to face. This article is more than just a summary of findings, it is a mirror and a map reflecting the shared intent behind that effort — to benchmark MRM practices, spark dialogue, and contribute to the region's journey towards more resilient model governance. The report is designed to help banks and risk leaders reflect on their current maturity, recognize shifting regulatory expectations, and take meaningful steps to shape the future of MRM in the region.

This evolution raises new questions

- ✓ Are current governance structures equipped to identify model risks and pro-actively address them?
- ✓ Is the model inventory complete, accurate and risk-aligned?
- ✓ Do internal frameworks and standards provide sufficient coverage and clarity to support effective model development, validation, and monitoring?
- ✓ Are dynamic and emerging risks — particularly those arising from increased reliance on AI and complex models — being strategically managed and integrated into the broader risk management approach?
- ✓ Is the current level of automation and the resourcing strategy sufficient to meet the evolving and future demands of model risk management?

Our perspectives on MRM in banking



I see a real determination by boards and senior management to tackle these challenges of model risk. There is an expectation from the supervisors and policy makers, to make this work. We hope this report serves as a valuable tool for banks to validate their strategic plans and assess their progress against industry standards and regulatory expectations.

We are sincerely grateful to all participating banks for generously sharing their time and perspectives, which have shaped the findings of this study.

Abbas Basrai

Partner, Head of Financial Services
UAE and Oman



Saudi Arabia is at a pivotal stage where MRM frameworks are being actively shaped in response to growing regulatory expectations. Themes like risk appetite, validation depth, and policy alignment are gaining traction. What this report does well is spotlighting these exact areas—not just in Saudi Arabia but across the region—allowing banks to prioritize what matters most. It offers both strategic clarity and operational direction at a time when MRM is fast becoming a board-level agenda.

Ovais Shahab

Partner, Head of Financial Services
Saudi Arabia



Across the Middle East, banks are making steady progress in strengthening model governance and validation practices. While maturity levels vary, there is a clear recognition of the need to scale capabilities and embed more structured, risk-aligned approaches.

This report offers the region’s Banking sector valuable insights to benchmark realistically, ignite internal dialogue, and take decisive steps toward building robust, future-ready MRM functions.

Omar Mahmood

Partner, Head of Financial Services
Middle East, South Asia, Central Asia and Caucasus (MESAC)



I’m seeing a global pivot where MRM is becoming core to strategic decisions. This report captures how Middle East banks are aligning to that vision—offering a roadmap for what’s next.

Around the world, we’re witnessing MRM move from a compliance afterthought to a core pillar of model-driven decision making. The shift is not just regulatory—it’s strategic. What stands out is how Middle East banks are beginning to close that gap, despite the maturity variance across countries.

Anjum Mukhtar

Director, Financial Risk Management
UAE

Key findings

01



Model governance

Banks are making clear progress in formalizing model governance framework including establishment of model oversight committee. Practices for Model risk reporting to Board varies in consistency and maturity.

02



Model risk tiering

61% of the surveyed banks have adopted structured model risk tiering frameworks with model materiality, usage, and complexity identified as preferred drivers.

03



MRM inventory and automation

83% of surveyed banks maintain a formal model inventory with coverage still expanding. Inventory management and model management processes remain manual, with signs of transition to automation visible.

04



Policy maturity

Despite existing standards and frameworks, the absence of strong governance around data and infrastructure continues to hinder policy maturity across the model lifecycle.

05



MRM resourcing

Banks vary in their MRM resourcing models—some scale internally, while others rely heavily on outsourcing or operate with limited internal capacity.

06



Model validation

Banks are strengthening and restructuring validation frameworks to address constraints around model complexity, data availability, and internal resourcing.

07



Risk appetite and capital assessment

Growing adoption of model risk appetite and capital assessment frameworks reflect increasing maturity and integration of model risk in broader risk management.

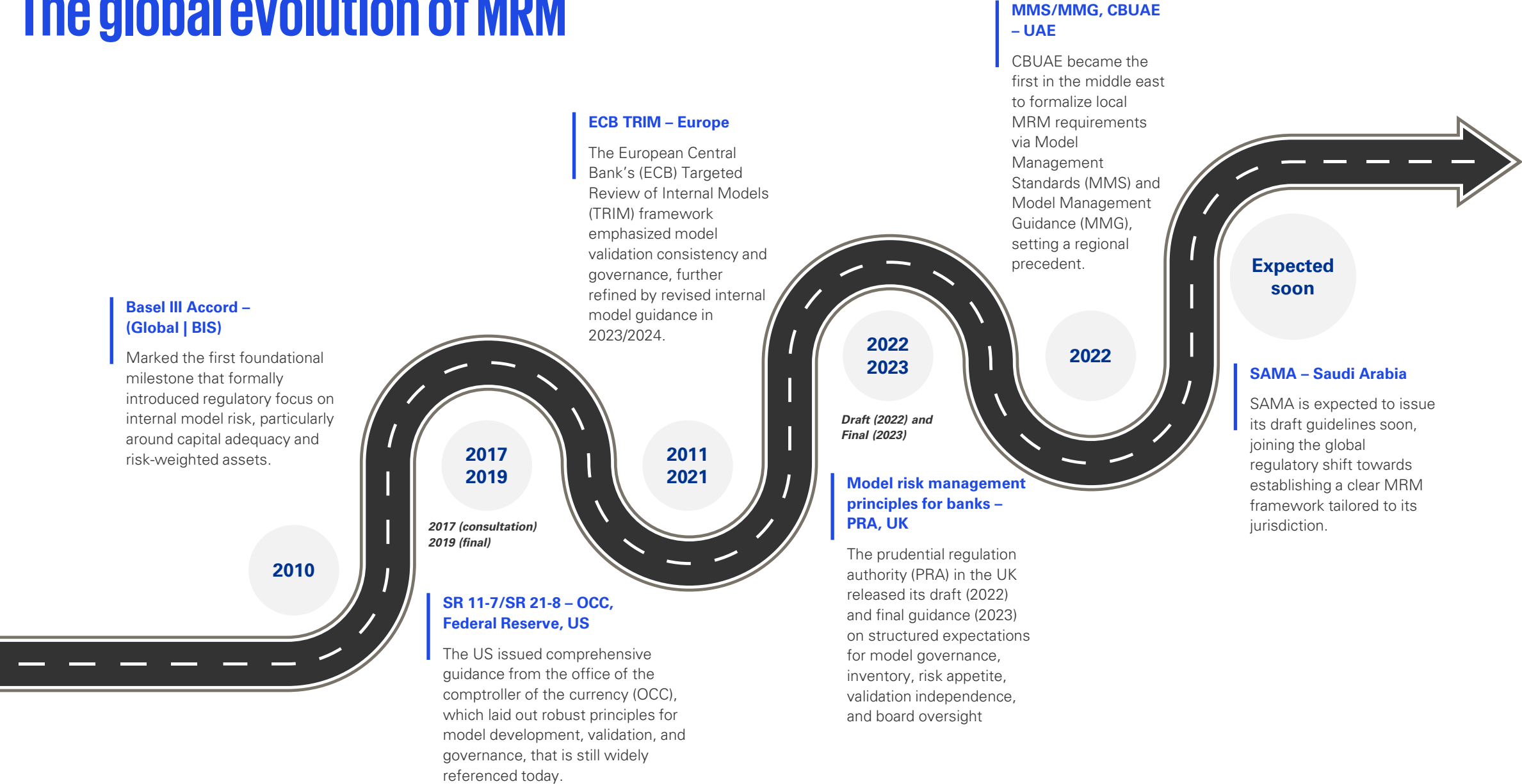
08



Regulatory readiness

Many banks are progressing to ensure compliance with supervisory expectations over next twelve months in the regions with formal MRM regulations, while others are proactively aligning with leading industry practices.

The global evolution of MRM



Total responses

23

banks

Participating countries*



UAE



Saudi Arabia



Qatar



Oman

D-SIBs

5

responses

G-SIB with ME presence

1

responses

**Note: Findings and insights presented are based solely on survey responses provided by participating banks. No external validation was conducted.*

Key themes of the survey



Model governance



Model risk tiering



Inventory and automation



Policies and Standards



Resourcing in MRM function



Model validation and monitoring

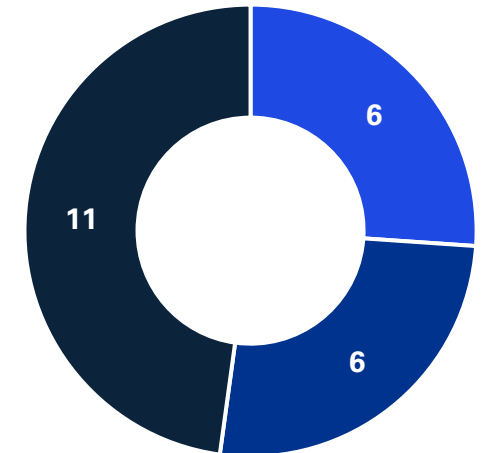


Model risk appetite and capital assessment



MRM regulatory readiness and future priorities

Bank representation by total assets



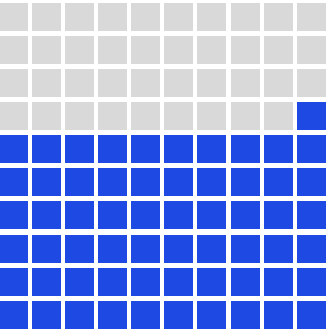
- Large-sized - Total assets > 75US\$ billion
- Mid-sized - Total assets 20 to 75US\$ billion
- Small-sized - Total assets < 20US\$ billion

Model governance

Growing focus on model risk as a distinct risk category **requiring attention from senior management and board through formal governance is evident** across majority of banks.

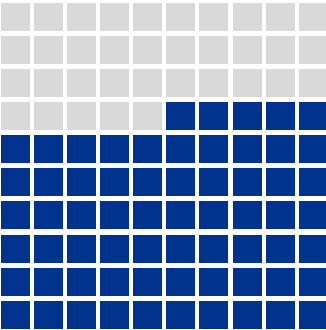
Regulation drives reporting discipline but signs of voluntary board-level engagement are emerging in regions with no formal MRM regulation.

61%



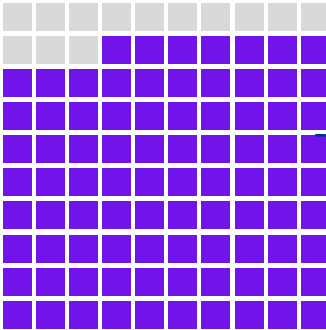
have clearly defined roles and responsibilities for each model

65%



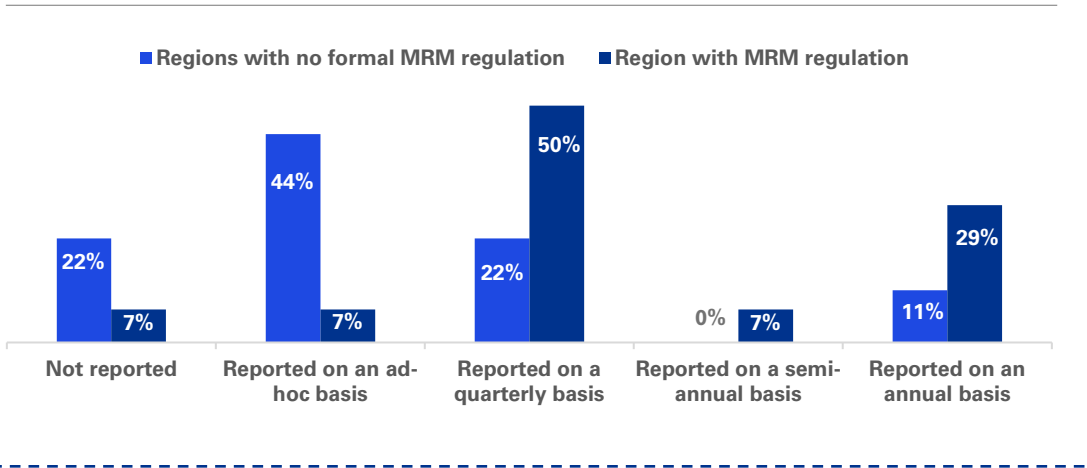
have established and fully functional model management committee

87%



Model risk status is reported to the board or a board risk committee, while frequency vary

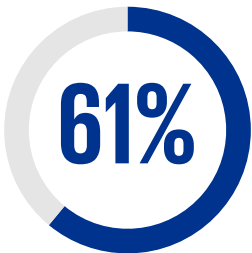
Frequency of model risk reporting



Model governance continues to gain prominence across the region, with banks in UAE with introduction of Model Management Standards (MMS) – demonstrating strong and formal governance practices. In absence of formal model risk regulations, many banks in the other regions are proactively strengthening governance frameworks and embed clearer accountability structures. As regulatory expectations evolve across jurisdictions, a region-wide convergence in governance maturity is likely to follow.

Model risk tiering

As banks mature in MRM practices, **model tiering is becoming more structured, serving as a key enabler** for model life cycle management.



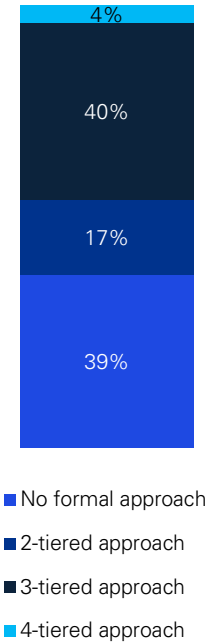
61% of surveyed banks have implemented a formal model tiering framework, helping standardize model risk assessment across the inventory.

93%

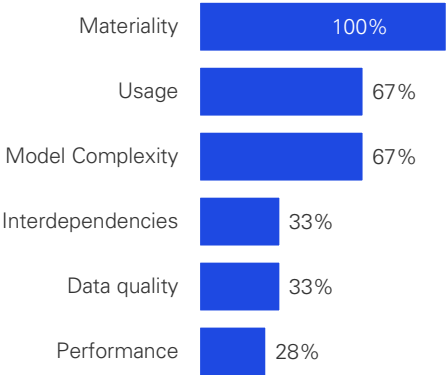
of banks with formal model tiering frameworks are in the region with MRM regulation. In contrast, adoption remains limited among banks in the regions where formal MRM regulations do not exist.

Risk tiering structure

Many banks have formal model risk tiering frameworks in place - **with the 3-tiered approach emerging as the common practice, while 39 percent still lack a formal tiering approach.**



Model materiality, usage, and complexity emerge as primary drivers of risk tiering across banks while other dimensions continue to play supporting role.



Banks prioritize materiality and complexity when ranking tiering dimensions, underscoring a risk-weighted mindset—while other factors remain lower on the priority scale.

01

Model materiality

02

Model usage

03

Model complexity

Our view

Banks are increasingly adopting structured, risk-based model tiering, reflecting a growing maturity in model governance. A common trend is the use of a three-tier framework, with materiality, usage, and complexity serving as key drivers for determining model risk. The adoption of risk tiering by banks currently lacking such frameworks is likely next step. Banks with established frameworks shall continue to evolve, enhancing risk-based model life cycle management.

Model inventory

Formal model inventory is a foundational element for robust MRM. Banks in the region continue to formalize and enhance model inventory practices.

83%

of surveyed banks maintain a formal model inventory.

What’s (still) missing?

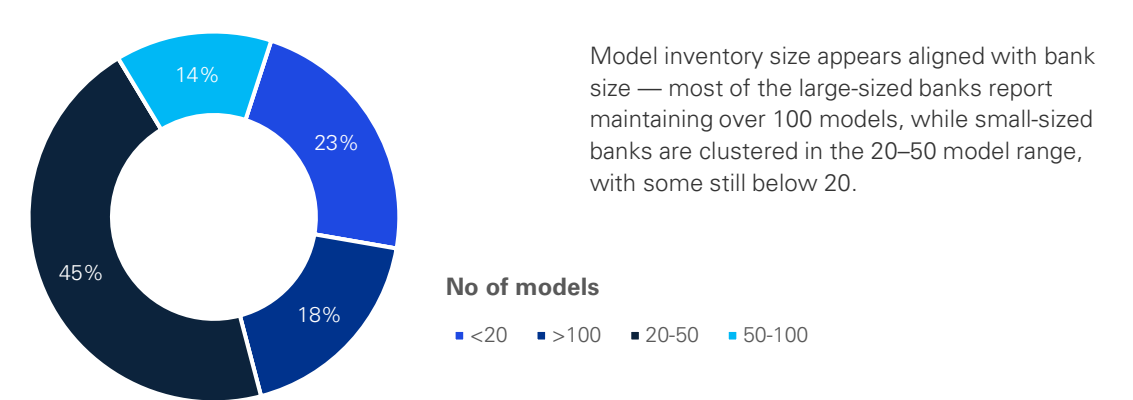
While most banks include core risk model types such as credit, market, liquidity, capital and stress testing - coverage of emerging areas remain limited. Only 17% include AI/ML, AML/fraud, or climate/ESG models in their inventories, with just four banks selecting each category.

Additionally, models used outside the risk function are captured by only 9% of banks, highlighting persistent scope gaps.

!

This underscores a critical maturity gap: as model risk expands beyond conventional domains, inventories must evolve to provide a holistic, enterprise-wide view of model risk.

Size of the model inventories



Model inventory size appears aligned with bank size — most of the large-sized banks report maintaining over 100 models, while small-sized banks are clustered in the 20–50 model range, with some still below 20.

65%

Of surveyed banks (15 out of 23) maintain MS- excel based inventory.

Our view

Formalization of model inventory is a positive step. Banks are steadily institutionalizing model inventory management with MS excel being preferred tool. However, as emerging use cases expand and model volume grows, inventories must evolve in both count and scope to reflect enterprise-wide exposure. We anticipate model inventories to mature further — moving from core risk models to broader non-risk areas & incorporate AI / ML models.

Automation in MRM

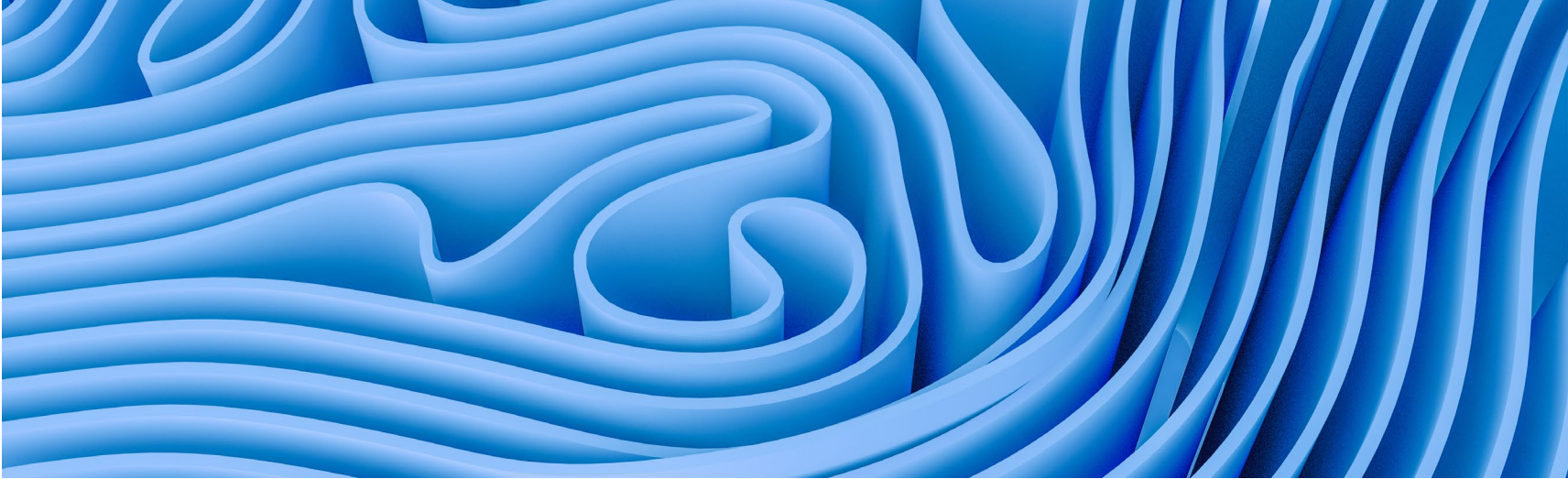
Inventory management via automated platform remains an untapped opportunity

- ✓ Despite momentum in formalizing model inventories, most 65 percent of surveyed banks continue to rely on MS-excel, with limited automation in place.
- ✓ Despite some banks indicating formal cycles (annual, quarterly, or real-time updates), our findings suggest inventory refresh practices remain largely non-formalized, with most banks lacking clear governance protocols or dedicated triggers to guide update cycles.

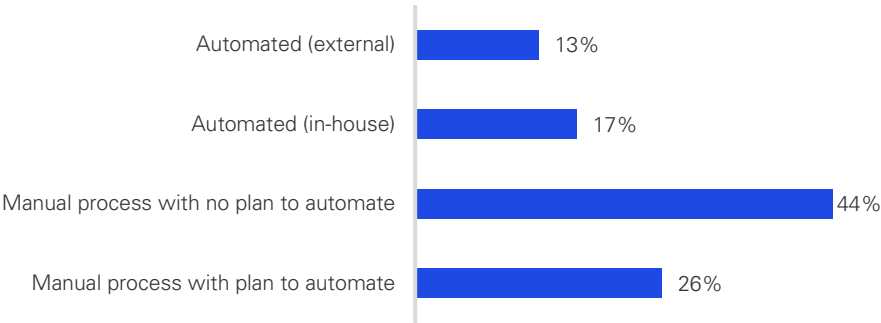
Automation can support enabling centralized, real-time inventory tracking and system-driven refresh schedules.

Why MRM automation matters?

Automation offers the potential for centralized, real-time inventory tracking and lifecycle traceability, reducing manual dependencies and supporting timely refreshes. However, many banks face implementation hurdles around data integration, IT resourcing, internal ownership and control design. While some banks have signaled intent to modernize, many are yet to take any concrete action.



Automation maturity across MRM processes



MRM automation adoption is concentrated among few small to medium size banks with large local banks are yet to meaningfully embark on this journey.

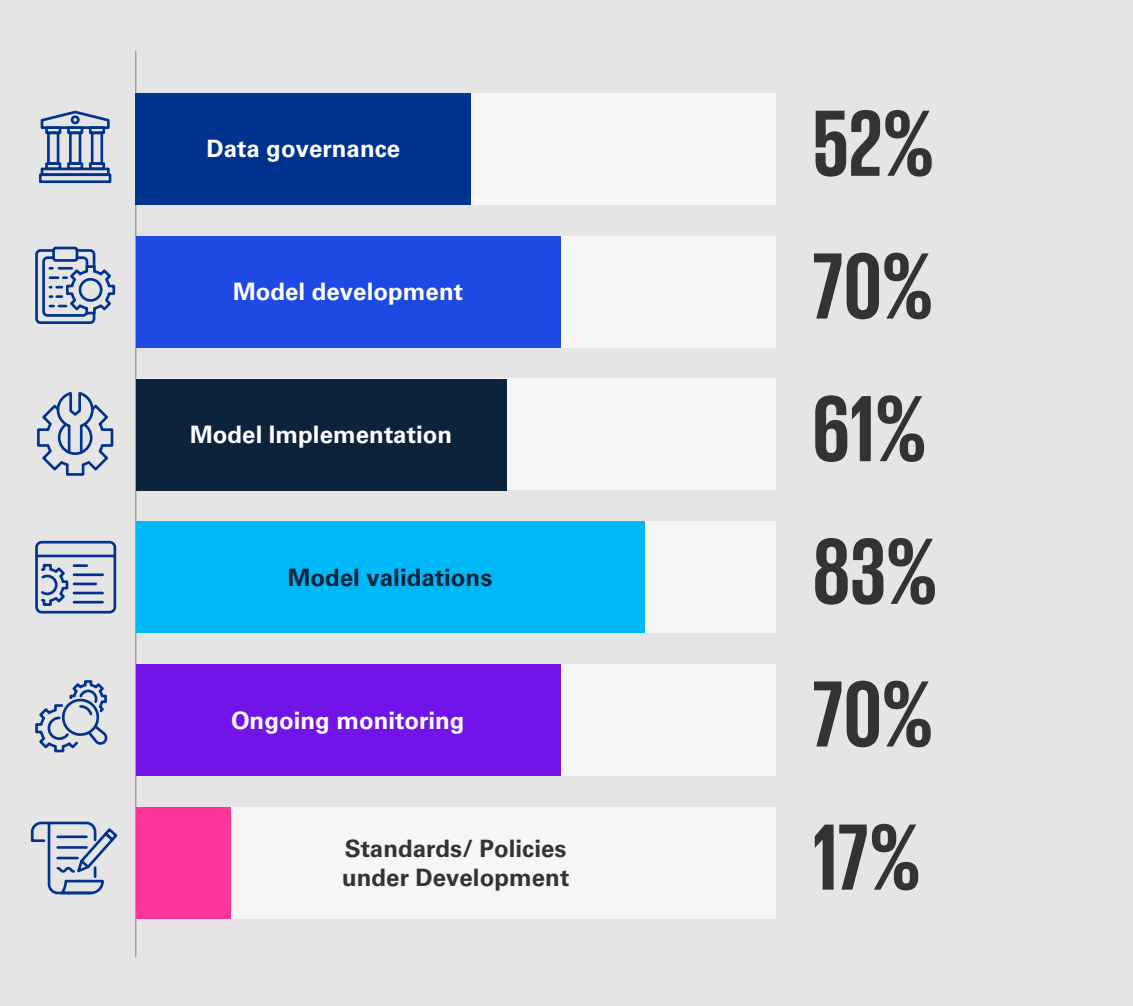
Our view

While automation in MRM is evolving, adoption remains limited across both inventory management and model life-cycle management aspects. As regulatory scrutiny deepens and model ecosystems become more complex, banks must prioritize automation to ensure sustainable, scalable risk governance. It’s no longer just about efficiency — automation is now a critical enabler of compliance, traceability, and operational resilience.

Policies and standards

Share of banks with Internal Polices and Standards Across the Model Lifecycle

- Most banks have established policies for validation, development, and monitoring, while gaps remain in implementation and data governance.
- The establishment of policies and standards across banks in the region is widespread, particularly in key areas such as development, monitoring, and validation, with better adoption in region with formal MRM regulations.



Our view

While most banks have established standards for model validation, policies and standards and policies for other areas -including data governance remain less mature. With growing regulatory scrutiny, we expect banks to have established policies and standards for all stages of model life-cycle management.

Resourcing in model risk function

Banks in the Middle East are at varying stages of aligning their MRM resourcing with supervisory expectations. While some are actively scaling teams, others are relying on outsourcing or maintaining status quo.

Key highlights

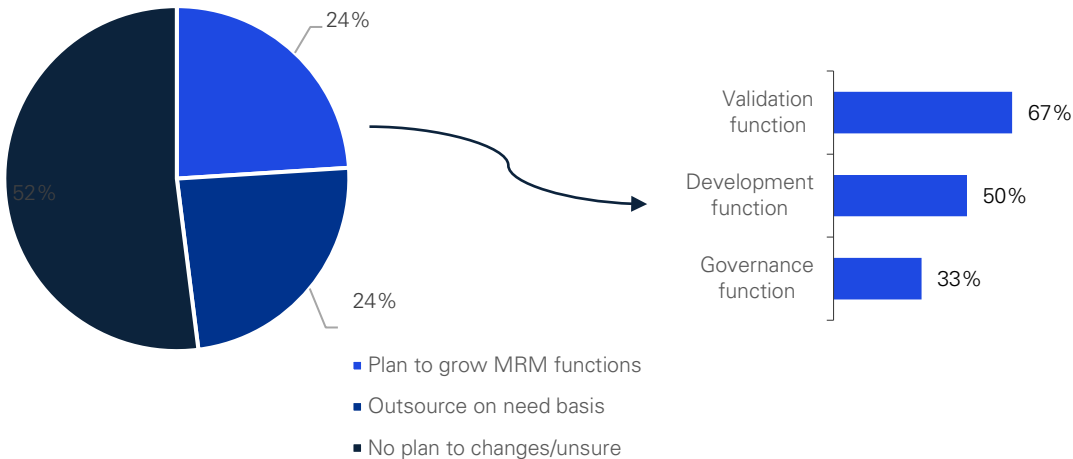
- More than half of the banks (52 percent) either remain steady or undecided on resourcing, while 24 percent of banks plan to outsource on need basis.
- Nearly three-quarters of banks (74 percent) rely on external consultants for at least 25 percent of MRM activities—signaling capability gaps or strategic outsourcing.

Our view

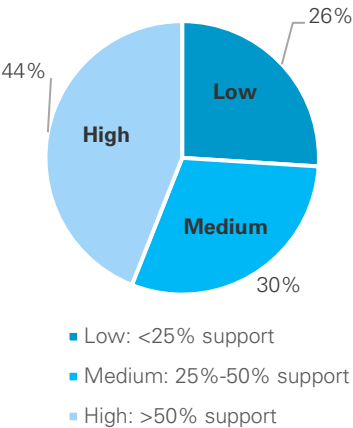
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**Note: These figures are based on median headcounts reported across banks.*

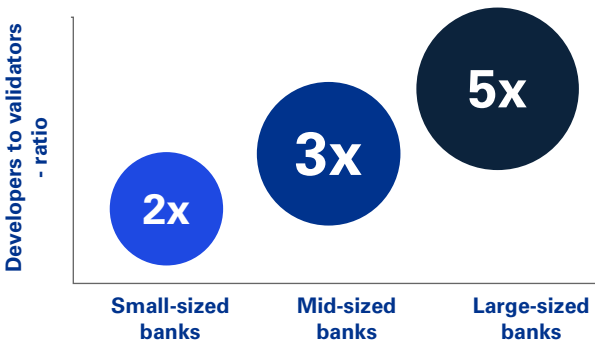
MRM organization structure – future priorities



Reliance on external advisors



Team composition across bank sizes*



A clear trend is visible across all types of banks, with stronger resourcing emphasis for model development function

- The median FTEs allocated to development/validation functions are 23/5 for large, 6/2 for mid-sized, and 2/1 for small banks.
- Large-sized banks typically have a 5:1 ratio, i.e., model development teams are five times larger than validation teams, mid-sized banks operate at a 3:1 ratio, while small-sized banks maintain a 2:1 ratio.

Model development function outweighing validation—highlights a notable departure from trend in mature markets - likely driven by an evolving regulatory landscape and reliance on offshoring/outsourcing across banks.

Model validation and monitoring

Model validation is emerging as one of the most resource-constrained and operationally stretched pillars of MRM across regional banks. As models grow in complexity and regulatory scrutiny intensifies, banks are grappling with how to ensure credible and independent validation.

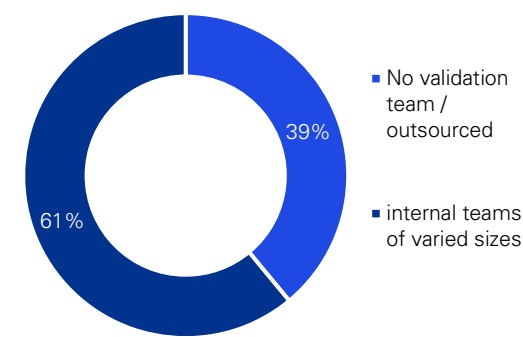
17%

Of surveyed banks plan to restructure or expand their validation teams in the next twelve months.

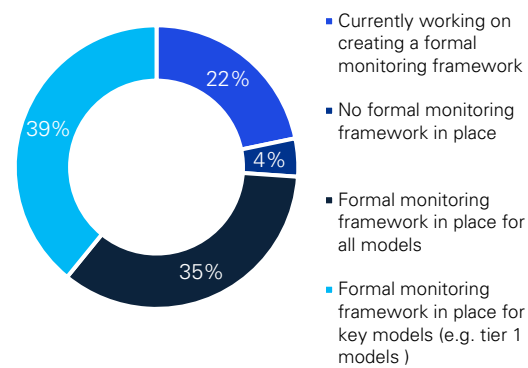
26%

of surveyed banks flagged model validation as a key area requiring improvement.

Validation operating model



Formal Model Monitoring Process



Our view

Effective and independent validation is increasingly central to model risk governance. Yet execution remains a challenge for several banks — driven by limited resourcing, increasing model complexity, and data availability constraints. Strengthening internal frameworks and validation planning will be critical to ensure models are robustly challenged. Formalized model monitoring is a work in progress area, and we expect banks to equally focus on monitoring along with validation to ensure models are fit for purpose.

Top 3 model validation challenges

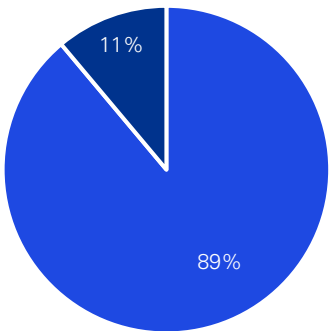


Model risk appetite and capital assessment

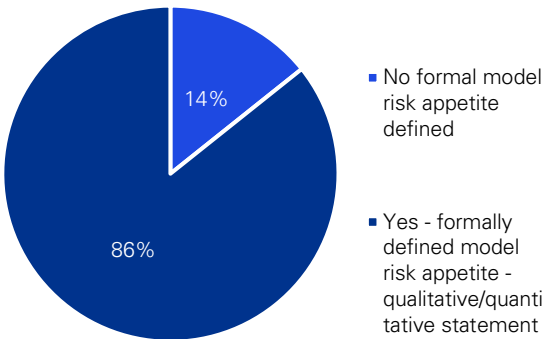
Model risk appetite

- 57% of surveyed banks have formally defined a risk appetite.
- 69% use only qualitative statement
- 31% incorporate quantitative indicators
- 43% still lack a formal model risk appetite

Countries with no formal MRM regulations



Countries with MRM regulations



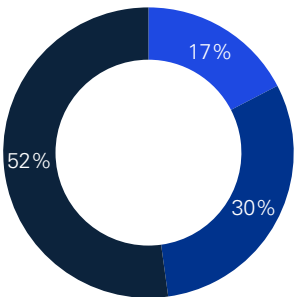
Our view

Model risk appetite is an emerging discipline. As banks refine their frameworks, we see a growing trend toward not just defining appetite but also quantifying model risk in alignment with broader enterprise and capital planning disciplines.

Assessment of capital requirement for model risk, especially via ICAAP or Pillar 2 is a visible mark of risk awareness and can strengthen regulatory confidence. We expect these areas continue to evolve shaped by regulatory feedback.

Model risk capital assessment

Use of formal methodology for model risk capital quantification under Pillar 2



- No formal approach present
- Qualitative assessment established
- Quantitative methodology/approach established

83%

Of surveyed banks have some form of model risk capital assessment under Pillar 2 in place, a balanced uptake across regions with and without regulatory mandates is observed — signaling growing maturity of banks in this area.

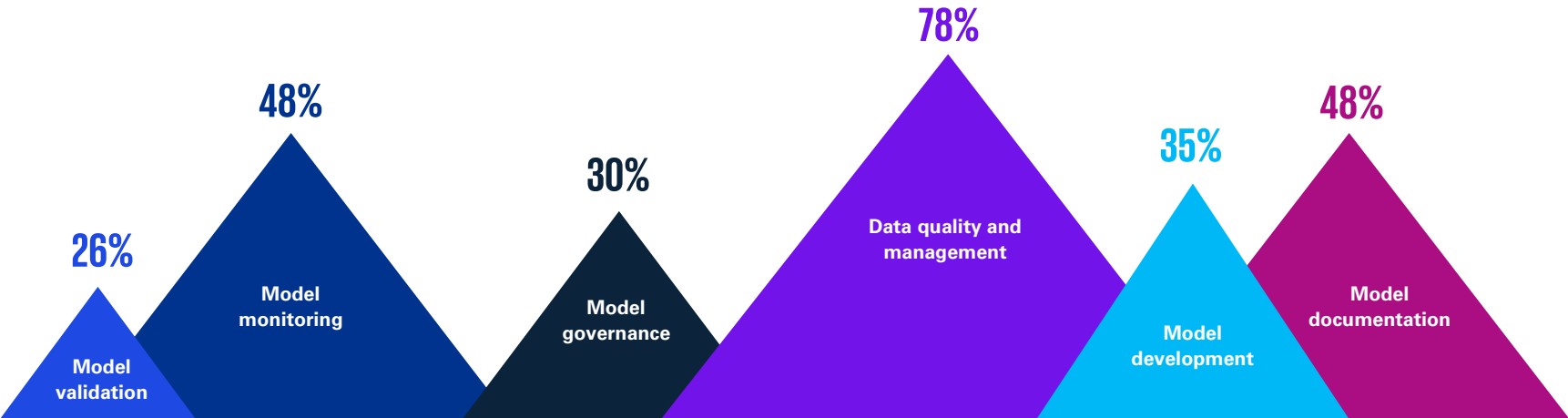
Regulatory readiness and future priorities

Banks across the Middle East are at different stages of regulatory compliance on MRM. While banks in region with formal MRM regulations (specifically UAE) are aligning with CBUAE requirements. Banks in other countries i.e., Qatar, Saudi Arabia, and Oman currently operate without formal MRM regulations but are proactively aligning with global best practices.

Emerging MRM standards in the region

-  Most UAE-based banks report reasonable alignment with regulatory MRM expectations, with the majority targeting full compliance within the next 12 months.
-  SAMA is expected to publish its Model Risk Management Guidelines soon.
-  Other jurisdictions, despite the absence of formal regulation, are proactively aligning with international best practices in anticipation of future regulatory developments.

MRM priority areas



Audit of MRM framework is on agenda of many banks

According to our survey, 65 percent of the banks have not conducted an internal audit of their model management framework in the past year, although over half of these institutions intend to do so in the current or next review cycle.

Our view

Banks in the region are steadily progressing to comply with supervisory guidance, with a strong focus on enhancing data governance, model documentation, and model monitoring practices. Internal Audit is expected to play a pivotal role as the third line of defense, ensuring regulatory compliance through targeted and independent reviews.

Charting the future of MRM in the Middle East

Our research shows that MRM is gaining prominence as banks across the Middle East recognize its critical role in achieving regulatory compliance & use as strategic enabler. **While benefits of a robust MRM are acknowledged, implementation remains challenging across various dimensions.**



Our survey indicates that the MRM (Model Risk Management) framework & practices are steadily advancing across the region. As supervisory expectations evolve - particularly with the increasing emphasis on machine learning and AI—banks will need to take actionable steps to futureproof their MRM functions.

We expect banks to make investments to strengthen and streamline following areas:



Governance and ownership to deepen

Strengthening of overall governance, deepening of accountability across all functions, and formalization of model risk reporting.



Model risk tiering frameworks needs formalization

Consistent adoption and implementation of risk-based tiering frameworks that incorporate drivers aligned with regulatory expectations and industry practices, enabling stronger lifecycle management.



Investment in MRM automation and inventory management is essential

Significant investments in advancement of automation to support implementation of centralized and dynamic model inventories and model life-cycle management tools or platforms.



Policies and standards must mature across lifecycle

Accelerate alignment of internal MRM policies with international benchmarks, while simultaneously investing in areas which are identified as pain points including data governance, model monitoring and model implementation.



MRM resourcing models require rethink and redesign

Reassess and optimize resourcing strategies to ensure sustainable internal capability, reduce dependency on outsourcing, and build cross-skilled MRM teams aligned with risk complexity.



Validation must emerge as a true second line

Strengthen independent validation by investing in dedicated talent pools, defining robust validation protocols, and integrating challenge functions across all model types.



Model risk appetite and capital assessment practices shall evolve supported by ongoing regulatory feedback

Establishment and ongoing enhancements in model risk appetite aligned with business strategy, risk profile and regulatory expectations.

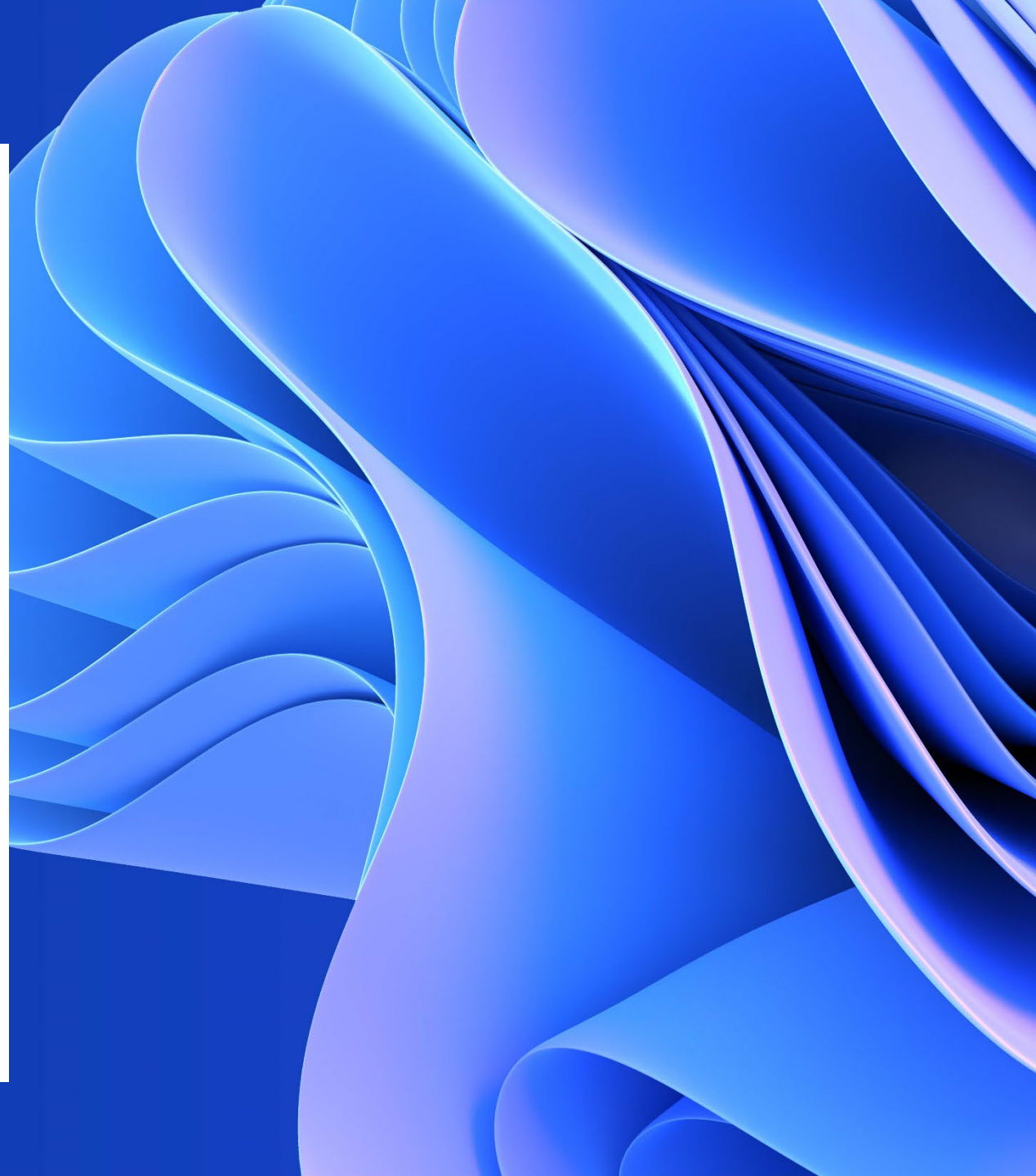
Methodology

KPMG's model risk management survey was conducted in Q1 2025, engaging 23 prominent banks across four Middle East countries.

The participating institutions represent a diverse mix of conventional and Islamic banks, ranging in asset size. Coverage spans the UAE, Saudi Arabia, Qatar, and Oman, highlighting the geographic breadth of practices. Notably, the survey sample includes 5 D-SIBs and 1 G-SIB, suggesting strong representation from banks with elevated regulatory scrutiny. Further, the diversity in bank sizes—large (6), mid-sized (11), and small (6)—provides valuable insight into how MRM practices differ based on institutional scale.

Respondents included chief risk officers and other senior leaders responsible for model risk governance and control. The objective was not only to benchmark current practices but to bring to light the areas of convergence, divergence, and aspiration across the region's banking ecosystem.

Banks provided both multiple-choice and open-ended responses, allowing for a quantitative view of maturity levels as well as qualitative perspectives on pain points, initiatives, and aspirations.





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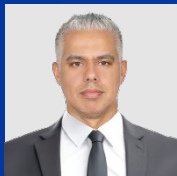
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