Model Risk Management

pwc

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Foreword

In these turbulent times, marked by high inflation and the Russian war in Ukraine, risk managers face a significant challenge in developing and maintaining sound model risk management practices. Furthermore, they need to adapt to the regulatory requirements introduced by many supervisory bodies worldwide. For example, the European Central Bank (ECB) has designed guidelines on regulatory models and their governance. The Prudential Regulation Authority (PRA), in its Supervisory Statement, seeks to enhance MRM frameworks and the operational resilience of the banks.

Another evolving factor in model risk management is the use of Artificial Intelligence (AI) and Machine Learning (ML). Utilising AI tools and advanced ML algorithms can increase efficiency and improve model performance, respectively. Implementing such technological advancements is a rather challenging exercise, which, if done incorrectly, can be quite costly.

Last year, our research focused on understanding the various MRM frameworks implemented by the respondents, as well as on model lifecycle and model taxonomy.

This year, we have put increased focus on two emerging trends:

- How financial institutions approach risk tiering
- The integration of AI and ML into existing MRM practices.

You will find valuable insights in this report, which could help you enhance the current MRM practise in your organisation. We would like to thank all the respondents for their valuable time and answers.

Rostislav Černý
Partner

About This Survey

>> Between April and August 2023, PwC conducted an in-depth survey centred around Model Risk Management (MRM). The respondents consisted primarily of banks and insurance companies contacted via connections from the PwC internal network. The answers were anonymous and optional; however, not all respondents answered all the questions. In our analysis, we only considered complete answers. The section regarding personal data was facultative. We used Qualtrics as the data gathering platform.

We have collected complete answers from 26 respondents from various institutions.

These institutions are geographically distributed, with a significant presence in Western Europe 13 (50%), followed by CEE 4 (15%), Asia 3 (12%), Middle East 1 (4%), South America 1(4%) and Canada 1 (4%). 3 (12%) respondents chose not to disclose their geographical location.

These organisations were stratified based on various attributes, such as the number of risk-relevant models, including institutions with a few (0-20) up to those with many (100+). The survey brings a diversity of collected answers and provides a comprehensive view on MRM areas that were the focus of the analysis.

Geographical representation of respondents

1 Canada

3 Others

1 South America

13 Western Europe

4 Central & Eastern Europe

1 Middle East

3 Asia

Executive Summary

The survey uncovered the following key findings:

- **Assessing the overall readiness of the financial market:** A majority of risk managers (88%) express their confidence in the strength and suitability of their institutions' Model Risk Management (MRM) functions.
- **Addressing the current technology landscape:** An important finding is that almost half of the surveyed institutions have adopted effective technological solutions for their Model Risk Management (MRM) functions. The remaining 54% have not yet implemented such a solution. Nevertheless, half of these institutions plan to do so in the near future.
- **Operational efficiency:** Based on our survey, 65% of institutions find operational efficiency to be a significant advantage for financial institutions when establishing robust MRM frameworks. Regulatory compliance also remains a critical factor.
- **Risk tiering is an essential attribute in managing model risk:** More than half (54%) of the surveyed organisations employ a detailed risk tiering approach to assess the inherent risk of each model precisely. The remaining 46% factor the model risk in through a high-level tiering approach.
- **Machine Learning models are not yet widespread:** Our findings indicate that the adoption of Machine Learning models in risk management seems to be limited to a minority of financial institutions. However, Artificial Intelligence appears to be the most prominent topic in the MRM area in the future.

Mastering Model Risk Management

A Comprehensive Introduction to Strategic Risk Oversight

Financial institutions depend heavily on credit, market, and statistical models for daily operations. These risk models are now essential in every aspect of the financial world, boosting operational efficiency within risk management.

Model Risk Management (MRM) is a crucial function that strengthens financial institutions. By integrating model risks into the decision-making process, organisations operate more accurately, and their senior management has additional insights for strategic actions. Yet, an inefficient MRM function can lead to negative consequences such as poor decisions, non-compliance with the regulation, and financial or reputational losses. Thus, mastering MRM is vital for ensuring a successful and secure path for financial institutions.

Model risk involves the possibility of losses due to flawed use of models or improper decision-making. It stems from various stages of a model's life, including flawed data, ambiguous methods, and misinterpreting results. Addressing these origins helps institutions reduce model-related risks, making decisions more robust and operations more resilient.

Financial institutions establish a robust Model Risk Management Framework to navigate model risks effectively. This framework guides model risk identification, assessment, mitigation, and reporting. It sets the foundation for risk governance by formalising standards, policies, and processes. By integrating this structure, institutions can address model risks comprehensively, fostering a proactive risk culture that aligns with organisational goals.

Approach to MRM in financial institutions

The landscape of mathematical models is characterised by a perpetual evolution, marked by fluctuations in their number, complexity, and sophistication. As a result, organisations must recalibrate their Model Risk Management (MRM) Frameworks to accommodate these dynamic shifts effectively.

Regulatory bodies across the globe have formulated new requirements for Model Risk Management to fortify the financial sector's stability. Noteworthy institutions such as the European Central Bank, Prudential Regulatory Authority, Federal Reserve System, and Canadian regulatory bodies have articulated stringent expectations. These expectations centre on the imperative of establishing

a robust governance framework encompassing MRM. Financial institutions are required to adopt and adhere to these guidelines, underscoring the pivotal role of MRM in fostering prudent risk practices, enhancing transparency, and fortifying the resilience of the financial ecosystem.

Over the past two decades, many new regulatory frameworks have been developed and introduced into the MRM area. Following the well-acknowledged American Federal Reserve System Supervisory Letter 11-7, the ECB guides regarding internal models set the elementary requirements on the model life cycle and related governance of regulatory models for financial institutions operating within the European Union. This guideline addresses the complexities of managing model risk, a critical aspect of financial risk management. It outlines key principles and best practices for the effective design, implementation, validation, and ongoing monitoring of regulated models. The ECB's guidelines underscore the importance of governance, risk assessment, and control mechanisms in mitigating model-related risks.

The Prudential Regulation Authority (PRA) released their Supervisory Statement SS1/23 earlier this year and outlined their expectations regarding how banks adeptly handle model risks. It emphasises the importance of robust governance, effective validation processes, and transparent documentation in managing model risk. Compliance with SS1/23 is crucial for institutions seeking to enhance their MRM practices and align with regulatory standards in the financial industry.

By adhering to these guidelines and statements, financial institutions aim to enhance the reliability, accuracy, and transparency of their models, contributing to the overall stability and integrity of the financial sector in the EU.

> The purpose of this SS is to support firms to strengthen their policies, procedures, and practices to identify, manage, and control the risks associated with the use of all models, developed in-house or externally, including vendor models, and models used for financial reporting purposes." Prudential Regulation Authority (PRA) - SS1/23 – Paragraph 1.3
>
> Prudential Regulation Authority (PRA) – SS1/23 – Paragraph 1.3

Selected Regulation over Time and Space

> The number of mathematical models and their complexity is growing, which leads to a need to adjust MRM frameworks.
>
> David Dolejší, Manager,
> MRM Subject Matter Expert

2023
PRA (SS1/23)
Detailed regulatory expectations on model risk management in the United Kingdom.

2022
CB of United Arab Emirates
"Model Management Standards" for all licenced banks in UAE.

2015
KNF (Recommendation W)
The list of 17 detailed recommendations on MRM.

2016
OSFI (Guideline e23)
Expectations around sound policies and practices for an enterprise-wide MRM framework.

2011
FED (SR 11-7)
This guideline sets the standard and basis for the model risk management in the U.S. and across the globe.

2014
EBA (SREP)
Outlines the high level expectations regarding the model risk assessment for internal models.

2017
ECB (TRIM)
Structure of 3 lines of defense and expectations about a model risk framework.

2021
FSA of Japan
The regulator sets out "Principles for Model Risk Management" for systemically important financial institutions in Japan.

Assessing the Strength of MRM Expertise: A Look into Organisational Headcount

Dedicated MRM teams are a recognised practice, playing a crucial role in overseeing models and preventing errors. Our survey found that 38% of financial institutions have strong MRM commitment with teams of four to ten professionals, and 23% have shown even greater dedication with over 11 individuals engaged in MRM activities. 31% of respondents have 1-3 individuals dedicated to MRM matters. The significant role of MRM is emphasised by only 8% of institutions having no individuals dedicated to MRM activities.

How many individuals are there in your organisation with focus on Model Risk Management?

23%
11 or more individuals

8%
No individuals dedicated to MRM matters

All institutions

38%
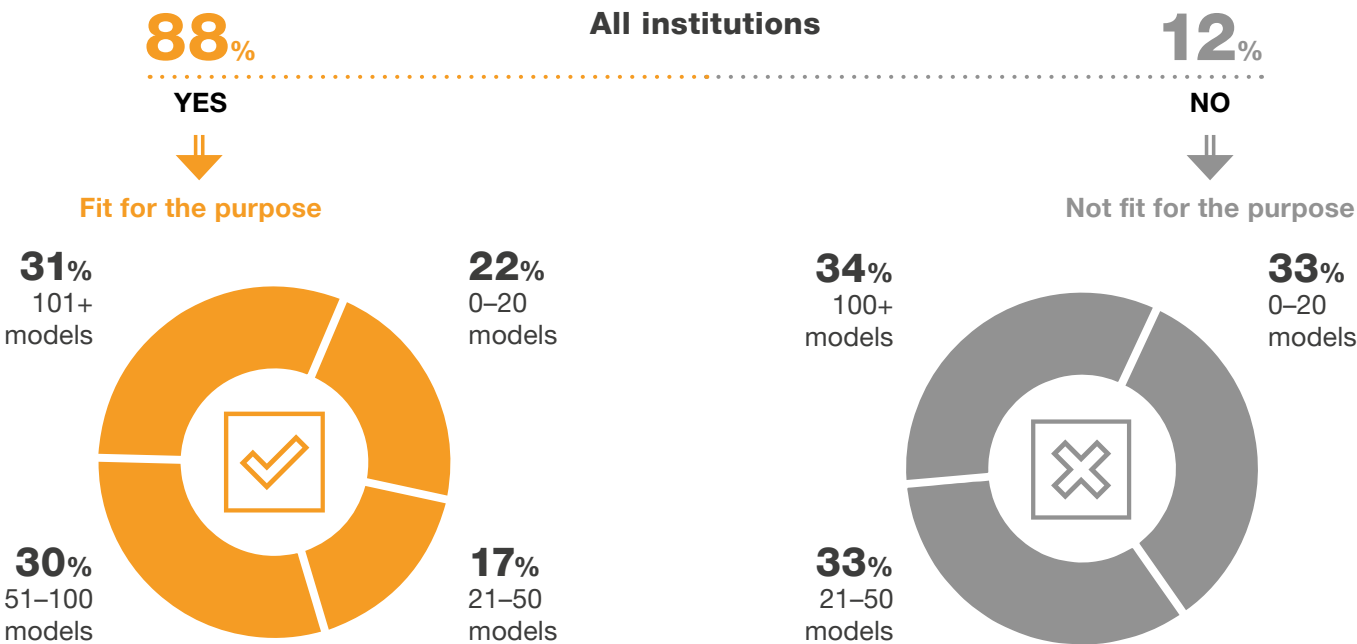4-10 individuals

31%
1-3 individuals
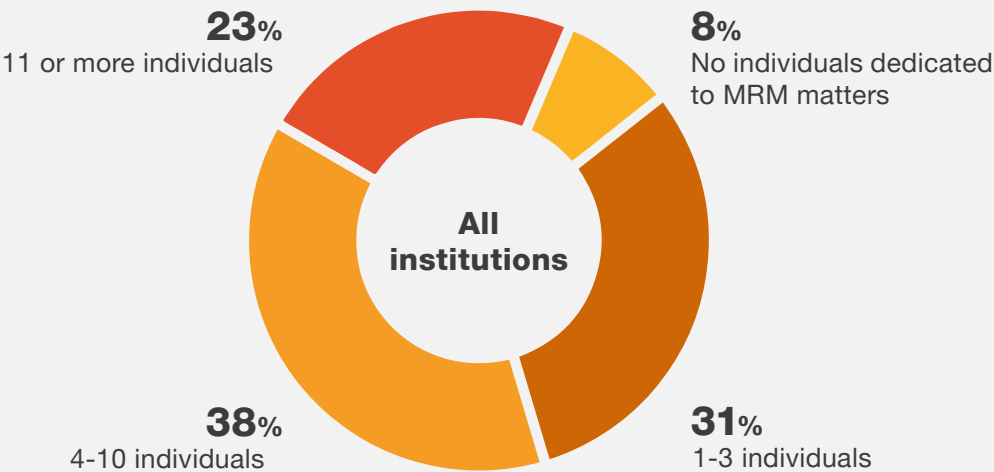
Evaluating the Effectiveness of Your Organisation's MRM Function

Model Risk Management's significance is strongly recognised, with 88% of risk specialists considering their MRM function robust and fitting its purpose, roughly in line with last year's results. However, it is important to acknowledge the room for ongoing enhancement, as a notable 12% of risk specialists have identified their MRM as still evolving and not yet entirely stable for fully meeting the organisation's requirements.

The survey results highlight that organisations with a larger number of models tend to establish strong MRM functions. Consequently, they allocate more dedicated personnel to MRM activities. Intriguingly, organisations that perceive their MRM function as less robust and fitting have around 10 individuals engaged in MRM activities. Despite this, they are required to manage between 20 and, in certain instances, even more than 100 models.

Do you consider the current MRM function in your organisation to be strong and fit for the purpose?

All institutions

88% **12%**

YES   **NO**

⇓   ⇓

Fit for the purpose   **Not fit for the purpose**

31% 101+ models

22% 0–20 models

30% 51–100 models

17% 21–50 models

34% 100+ models

33% 0–20 models

33% 21–50 models

Update on Model Landscape

## Assessing the Number of Risk-Relevant Models in Your Organisation

Representation of risk-relevant models in the organisations in the financial sector

The number of risk models present in the financial sector is high. Financial institutions have dozens, sometimes hundreds, of risk relevant models in their portfolios.

Our survey reveals a varied distribution of models across financial institutions. Roughly one-third (31%) manage more than 100 models, including 2 (8%) with over 500 models. Meanwhile, 23% of the financial institutions in scope handle 20 models or fewer. Another 19% maintain model counts between 20 and 50, and 27% organisations manage between 50 and 100 models.

How many risk relevant models do you have in your organisation?

31% 101+ models

23% 0-20 models

All institutions

27% 51-100 models

19% 21-50 models
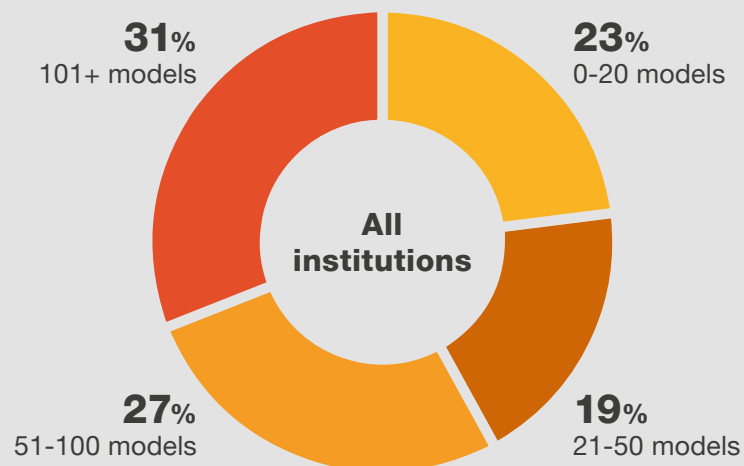
Managing Model Risk (MRM) is a big challenge that requires a lot of resources. Different financial institutions allocate a different number of people to handle these tasks. Traditionally, it's assumed that larger institutions need more people due to their size and workload. However, our survey shows a different pattern. This unexpected trend points out the complexity of MRM and how it differs across financial institutions, regardless of their size.

Our survey reveals a notable trend: adopting technology to enhance MRM functions. Most organisations with over 100 models have already embraced these solutions, highlighting their role in improving MRM. This sentiment is widespread among respondents. Even institutions with fewer than 100 models have adopted automated and digitised MRM software or have plans to do so.

"

The need for a digitised tool for model risk management increases with expanding model inventory. Based on our experience and observed market practice, any institution with more than 50 models should significantly benefit from implementing such a solution.

Jan Bilek, Senior consultant, MRM Subject Matter Expert

Digitalisation

Model Risk Management is becoming increasingly more digitised

Using technology is crucial in order for financial institution to operate smoothly. Digital transformation has the potential to revolutionise processes, improve efficiency, and enhance customer experiences.

Digitising the Model Risk Management (MRM) Framework has become a strategic necessity. This shift empowers organisations and risk experts to proactively identify, assess, and mitigate risks throughout the model lifecycle.

Our research highlights a key point: a significant portion of financial institutions (54%) haven't yet embraced technology to enhance their Model Risk Management (MRM) efforts. Out of these, 27% of survey participants admit that they lack an MRM tool but plan to adopt one soon. Despite the potential benefits of digital solutions, our results show moderate progress, with only 46% of surveyed

organisations already using technical solutions in their MRM practices. This points to growth opportunities and advancements as institutions navigate toward improved MRM in a digital age.

The survey shows that institutions with various sizes of MRM-dedicated teams have already implemented a technical solution. Surprisingly, 17% of organisations already using a digital solution have no dedicated MRM staff. We suspect this is due to misinterpretation of the Survey question by some of the participants.

The survey reveals varying maturity levels in MRM functions across financial institutions. This perspective provides a comprehensive grasp of the industry's dynamic landscape, offering insights into progress, gaps, and potential growth in the MRM arena.

Do you have a technological solution supporting the model risk management function in your organisation, or do you plan to implement such a solution in the near future?

Financial institutions with implemented technological solution

27% No, we do not plan to implement a solution

27% We plan to implement a suitable solution
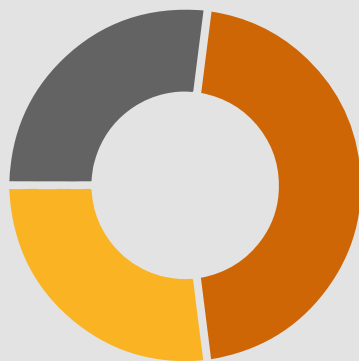
46% Yes, we have such technological solution

25% 11 or more MRM-dedicated individuals

33% 4-10 MRM-dedicated individuals

17% No MRM-dedicated individuals

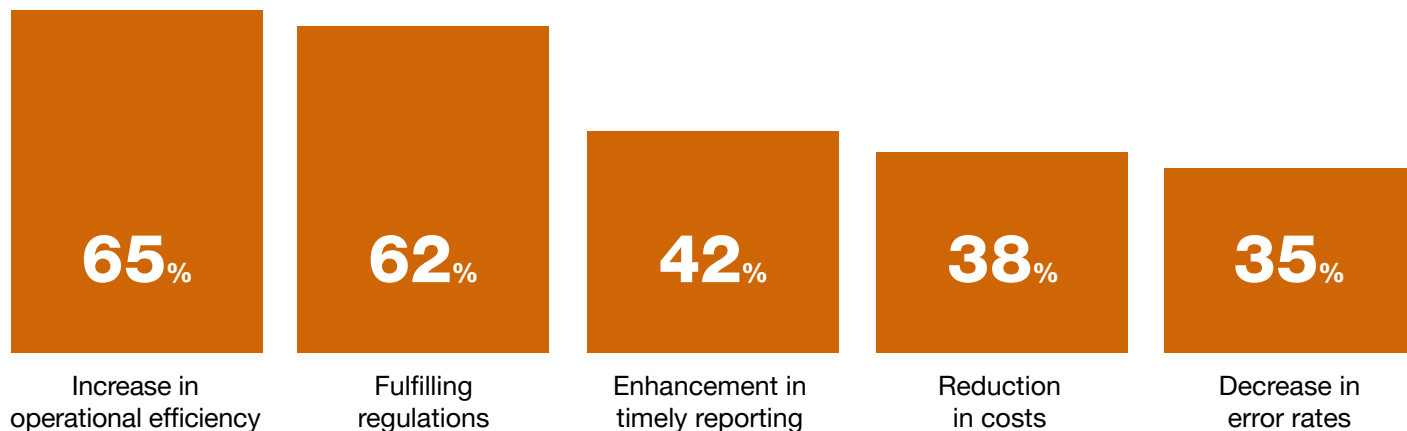**25**% 1-3 MRM-dedicated individuals

Benefits of MRM

A robust MRM framework improves the model life-cycle management and ensures compliance with regulations. It establishes clear roles and responsibilities, promoting accountability and transparency across the organisation.

A strong MRM framework offers many benefits, including streamlining validation and audits, preventing errors, and improving communication. This framework is essential not just for risk mitigation, but also for boosting efficiency, allowing for more informed decisions, and creating a resilient organisational culture.

Our survey findings show that operational efficiency is a key advantage for financial institutions in building robust MRM frameworks. Regulatory compliance is also crucial, as highlighted by many respondents.

Timely reporting improvement, cost and error reduction are important benefits of a proper MRM framework. The survey reveals that a well-structured MRM framework helps organisations adhere to higher documentation standards, improve clarity on model use, and improve the administration of models, which organisations highly value. These results emphasise the diverse benefits of such frameworks.

In what domains do you think your organisation gain advantages by implementing an appropriate MRM Framework?

65% Increase in operational efficiency

62% Fulfilling regulations

42% Enhancement in timely reporting

38% Reduction in costs

35% Decrease in error rates

Other benefits include improved documentation standards, clearer understanding of model use, and streamlined administration.

Risk Tiering

> The scope and frequency of risk management for each model should align with the level of risk it poses to the institution. By introducing risk-tiering, financial institutions can categorise and assess the diverse risk profiles of their models. This enables an understanding of the varying degrees of risk exposure, allowing for targeted resource allocation and making informed decision-making.
>
> David Dolejší, Manager, MRM Subject Matter Expert

A risk-tiering assessment is a heuristic process of categorising models into broad risk groups or tiers, which represent different levels of risk a model possesses to the institution. To do so, risk managers use a variety of dimensions to assess a particular model tier, from which the model use and purpose dimension is pivotal. High-risk models are frequently associated with important business decisions or regulatory and financial reporting and are subject to rigorous assessments. Low-risk models are typically not used for valuation, pricing, or risk measurement so therefore do not require complex risk assessments. **Common risk-tiering dimensions are:**
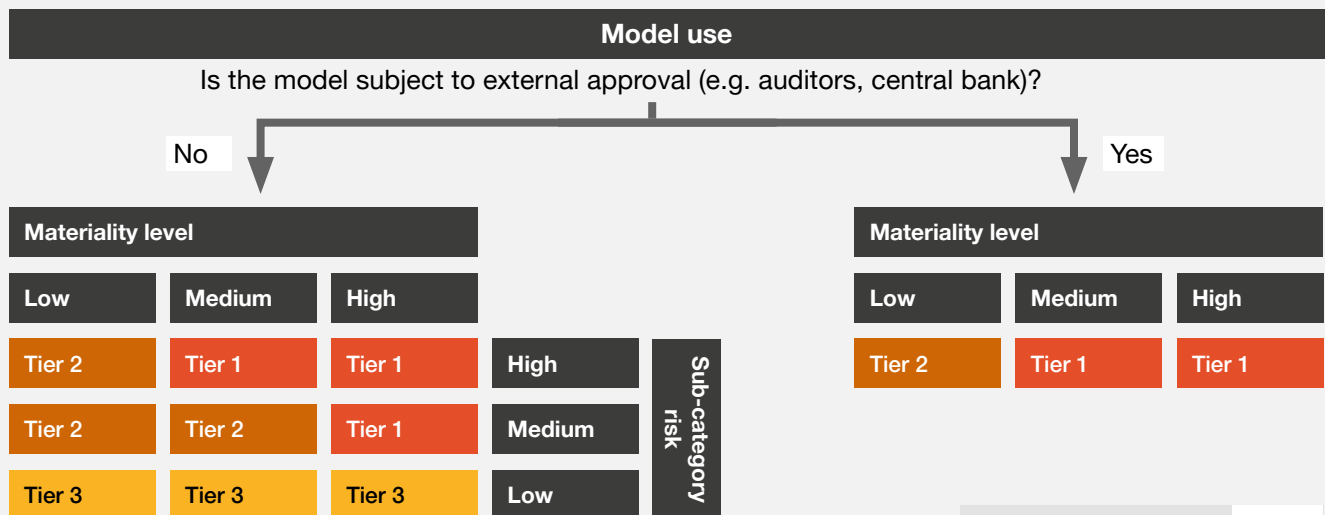
- **Model use and purpose**
- **Materiality** associated with the extent of model usage or its impact
- **Complexity** of model data, products, methodology, and model implementation
- **Reputational impact** in the case of model failure or misuse
- **Uncertainty** of model outputs due to input data, methodology, or processes.

In the risk assessment process, it is essential to categorise potential hazards into different risk tiers; for instance, low, moderate, and high-risk tiers, to prioritise mitigation strategies effectively. Examples of risk tiers are shown in the table below.

Risk tier level	Desription
Tier 1	**Critical models subject to internal and/or external approvals with rigorous and regular risk assessment.**
Tier 2	**Important models with limited and infrequent risk assessment.**
Tier 3	**Model outcomes with minimal risk assessment.**

Risk-tiering methodologies vary in the industry. One that is commonly used is the multiple-step approach when the first step is associated with a highly impactful risk dimension such as model use and the following steps apply further model risk dimensions utilising matrix or scoring approaches.

Model use
Is the model subject to external approval (e.g. auditors, central bank)?

No

Yes

No branch:

Materiality level				
Low	**Medium**	**High**		**Sub-category risk**
Tier 2	Tier 1	Tier 1	**High**	
Tier 2	Tier 2	Tier 1	**Medium**	
Tier 3	Tier 3	Tier 3	**Low**	

Yes branch:

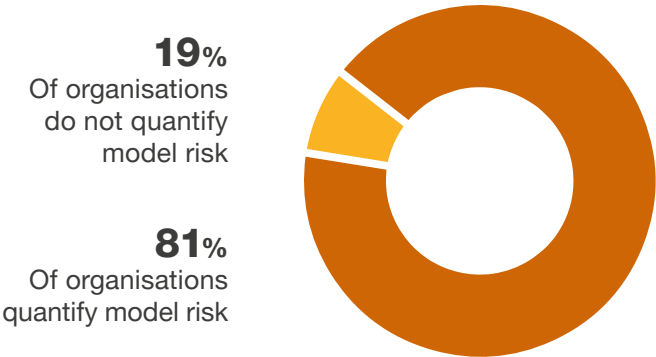| Materiality level		
Low	**Medium**	**High**
Tier 2	Tier 1	Tier 1

Do you consider model classification when assessing an appropriate level of control over model risk?

Our survey reveals a notable trend: all participants incorporate model classification as a foundation for evaluating model risk. Remarkably, more than half (54%) of the surveyed organisations employ a detailed risk tiering approach to precisely assess the inherent risk of each model. The remaining 46% of the surveyed organisations factor in model risk through a high-level tiering approach. This widespread practice showcases the importance of risk classification in assessing model risk, underscoring institutions' commitment to thorough risk governance.

46%
High-level risk tiering

54%
Detailed risk tiering
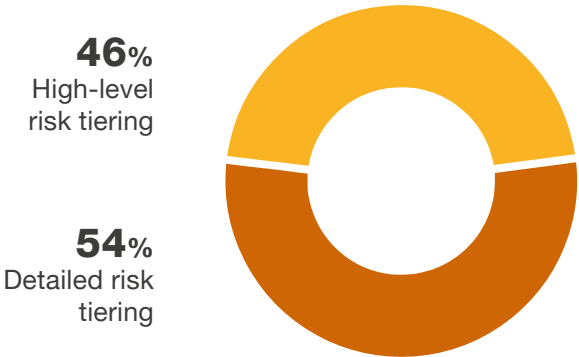
How do you assess (quantify) model risk tiering (classification) in your institution?

Within our survey, most organisations (representing 81%) evaluate model risk tiering by quantifying the inherent risks associated with their models. This approach may suggest a commitment to data-driven decision-making. The remaining 19% of institutions choose a qualitative approach toward risk tiering.

19%
Of organisations do not quantify model risk

81%
Of organisations quantify model risk

Which of the following ways do you use to quantify the model risk in your institution?

Our survey shows that the institutions which quantify model risk choose various metrics to do so. Notably, materiality for the intended use (86%) and the model's role in regulatory, P&L, and business (76%) are key. Complexity (71%) and input uncertainty (52%) are also valued. Risk managers might employ expert judgement and issue identification as additional assessment factors.

Quantifying Model Risk:
Assessment Methods in Institutional Practice

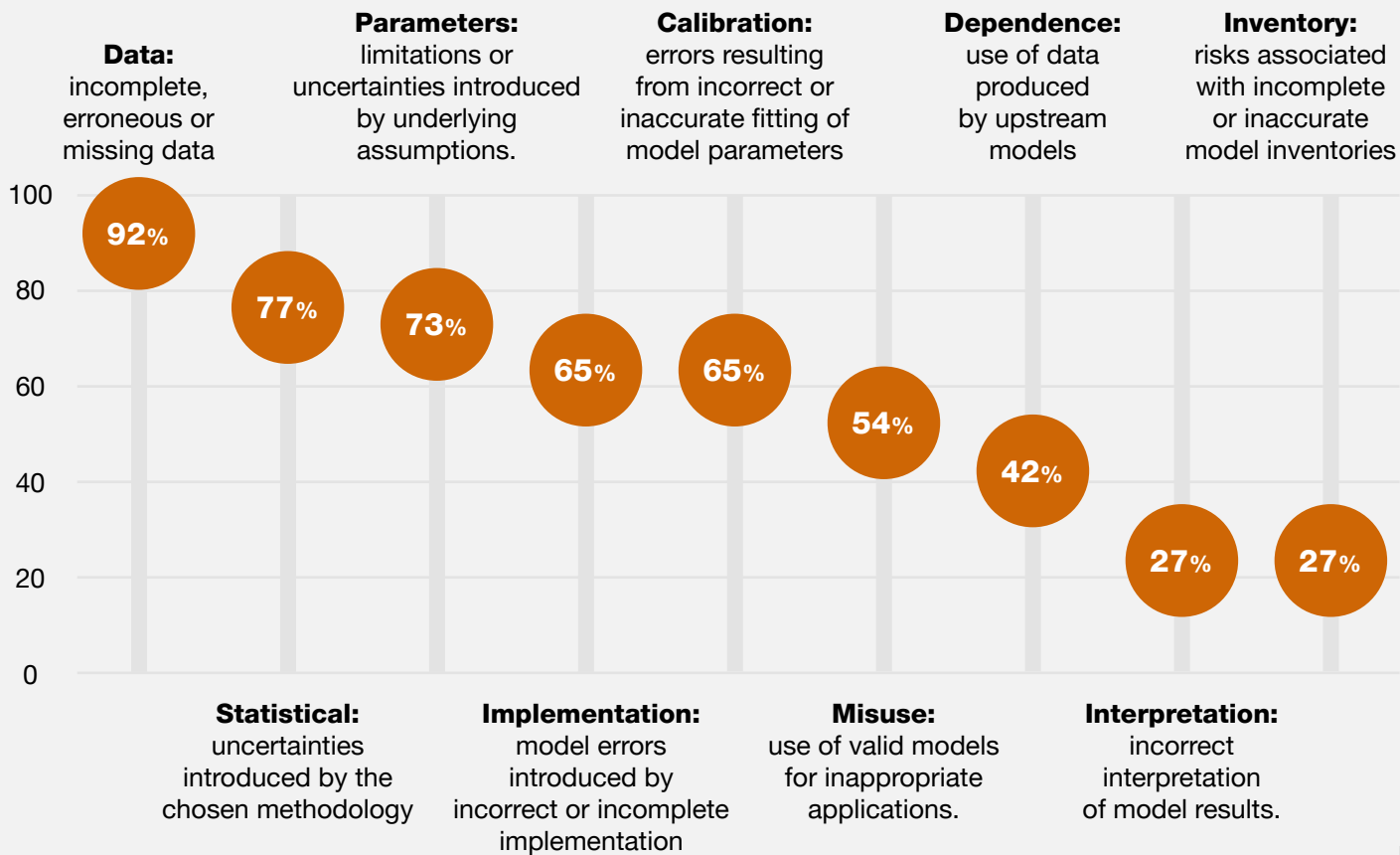| 86%	76%	71%	52%
Materiality of intended model use	Model use (regulatory, P&L, business, etc.)	Model complexity measures	Model uncertainty in inputs and/or assumptions

Which of the following risk types do you consider when assessing model risk?

When assessing model risk (using either a qualitative or quantitative approach), it is crucial to consider various risk types. The primary concern, stated by 92% of respondents, is the potential for incomplete, erroneous, or missing data affecting the accuracy of the model. Implementation errors follow at 65%, where incorrect or incomplete implementation can introduce errors to the model. Uncertainties stemming from the model methodology (77%) and underlying assumptions (73%) are also significant concerns. Calibration errors (65%) and the misuse of models (54%) are noteworthy. Interpretation (27%), dependence on data from upstream models (42%), and inventory-related risks (27%) are also factors to consider. A comprehensive approach to model risk assessment must encompass these elements to ensure model reliability and integrity in practical applications.

Data: incomplete, erroneous or missing data

Parameters: limitations or uncertainties introduced by underlying assumptions.

Calibration: errors resulting from incorrect or inaccurate fitting of model parameters

Dependence: use of data produced by upstream models

Inventory: risks associated with incomplete or inaccurate model inventories

92%	

Statistical: uncertainties introduced by the chosen methodology

Implementation: model errors introduced by incorrect or incomplete implementation

Misuse: use of valid models for inappropriate applications.

Interpretation: incorrect interpretation of model results.

Chart values: 92%, 77%, 73%, 65%, 65%, 54%, 42%, 27%, 27%

AI and ML Advancements

With the continuous improvement in computational power and data-storing capacity, advanced machine learning (ML) algorithms and AI tools are becoming more accessible. It has raised interest in their potential benefits for businesses, including the benefits for their financial risk management. While advanced ML algorithms may improve model performance (e.g., more accurate risk differentiation) and AI tools could make some tasks more efficient (e.g., automation of repetitive tasks, technical support in model development), the shift to more complex solutions still presents new challenges that we discuss in this section. The discussion here primarily focuses on modelling, particularly the use of advanced ML techniques.*

Complexity & Performance

While there are instances where advanced ML models can outperform traditional ones (fraud detection, risk differentiation), these performance improvements are not granted. Complex models do not equal better models, and there are situations where the stakeholders prefer already established models or solutions. Especially if those models are less costly to maintain, easier to understand, and have sufficient performance.

More complex models can arguably lead to higher model risk and maintenance costs. It raises the question of whether we will see a significant shift towards more complicated ML algorithms.

Data

Poor data quality may result in inaccurate models and inappropriate decisions (which is one of the key model risks). As advanced ML makes use of much larger quantities of data, the data quality integrity will become even more crucial.

The use of large amounts of data also emphasises the risk related to biases in data (sampling bias, underrepresentation of certain groups, etc.) and opens the discussion on fairness in models (to comply with anti-discriminatory laws).

Transparency and interpretability

One of the barriers against using advanced ML models is the lack of transparency (which is central in risk management for making informed decisions). The relationships captured by these models are difficult to describe, which hinders the role of human judgement in quickly detecting any model

*The discussion here is primarily focused on the modelling aspect, particularly the use of advanced ML techniques.

deficiencies, e.g., whether the models are consistent with business expectations or economic theory.

While there are interpretability methods that can be utilised to help with transparency issues (Shapley values, SHAP, etc.), these methods are approximative and do not come without limitations or their own risks.

Staff and responsibilities

If we shift to more complex models, the staff needs to be adequately trained and educated. Model developers and validators must understand the assumptions and limitations behind these models to avoid misinterpretation. IT must know how to put these algorithms into production. Internal and external auditors must be familiar with the processes and controls that mitigate the risk related to these models. The managers need to have sufficient understanding to make informative decisions.

Without the appropriately trained staff, the shift towards more complex algorithms might lead to a higher model risk without the benefits of using a more complex approach.

Additionally, when it comes to the use of AI tools in general (not just the use of advanced ML models) in risk management, it is also critical to assign clear roles and responsibilities regarding the outputs (especially if AI tools are used to automate some of the tasks previously done by personnel).

Are there any Artificial Intelligence models used in Risk Management in your organisation?

Only 38% of survey participants have integrated AI models into their Risk Management strategies, with a significant majority of organisations (62%) yet to adopt these advanced technologies in their risk management processes. The limited adoption of AI and advanced machine learning models can be attributed to the challenges mentioned earlier in this study, which are associated with transitioning to more complex solutions. Respondents may prioritise other areas over adopting AI solutions, especially if their existing models or solutions continue to yield satisfactory results. Nevertheless, in our expert opinion, the results of this particular question are not in line with the overall situation on the market, where we observe higher usage of AI models

38%
AI used
in Risk
Management

62%
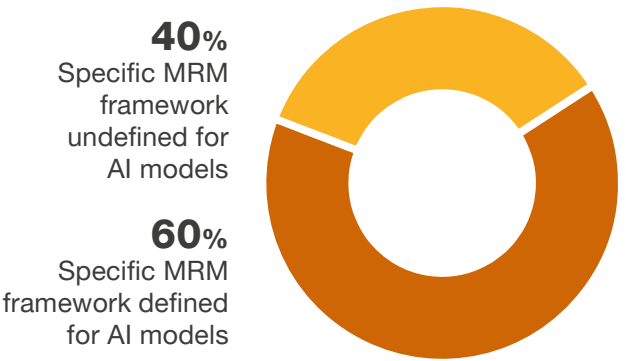AI not used
in Risk
Management
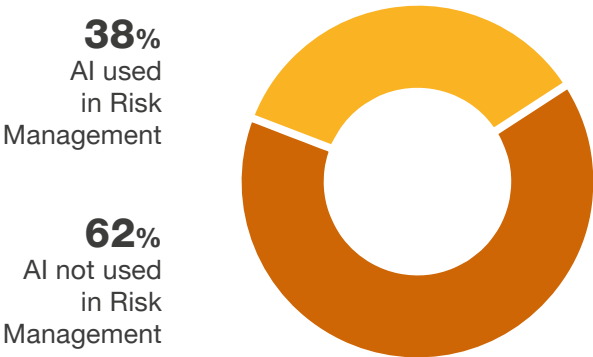
How many Artificial Intelligence models are used in Risk Management in your organisation?

Our survey findings reveal a diverse landscape regarding the utilisation of AI-based models within Risk Management functions across the 10 respondents who already use such models. While some entities possess a limited number of these models, ranging from a few to approximately 10-20, other deploy over 100 AI-based models to fortify their Risk Management efforts.

Do you have a specific MRM framework / model validation defined for your Artificial Intelligence models?
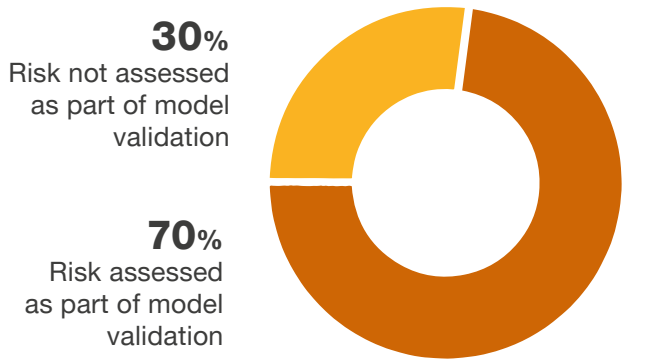
Among the organisations encompassed within the scope of our survey, a predominant majority (60%) who use AI models have established dedicated Model Risk Management (MRM) frameworks tailored specifically to validate their AI-related models. However, it is noteworthy that a fairly large number of organisations (40%) remain without a defined MRM framework, despite their utilisation of AI models.

Do you assess it as part of the model Validation?

A prevailing trend is apparent among those institutions that use AI models in their risk management activities. Such models are consistently evaluated as integral components of model validation processes, with 70% of organisations assessing the associated risks within this framework. However, it is essential to note that instances exist (30%) where organisations consider risks within their operational framework, yet do not explicitly incorporate risk assessment as part of the formal model validation process. This reflects diverse risk management strategies as organisations balance innovation and risk mitigation. Some prioritise a holistic approach, evaluating risks during model validation, while others address risks separately. This dynamic landscape showcases how organisations navigate AI integration within risk management.

40%
Specific MRM framework undefined for AI models

60%
Specific MRM framework defined for AI models

30%
Risk not assessed as part of model validation

70%
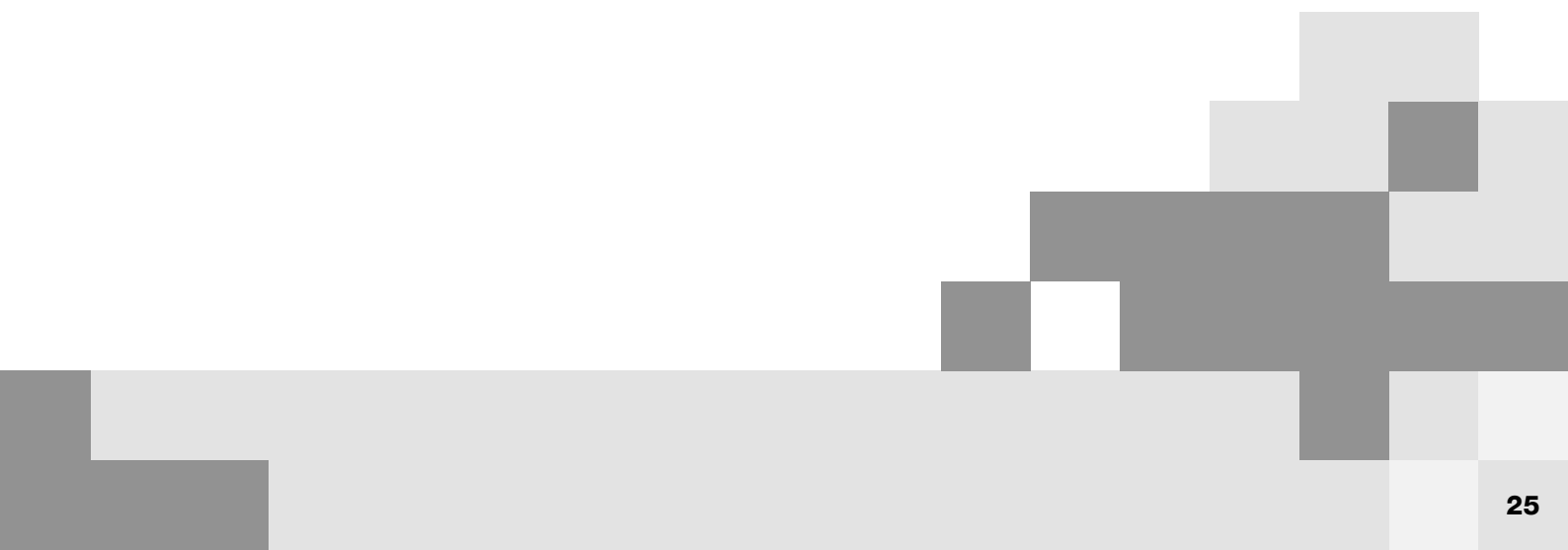Risk assessed as part of model validation

Are you considering implementing Artificial Intelligence models in the credit risk area within the next year?
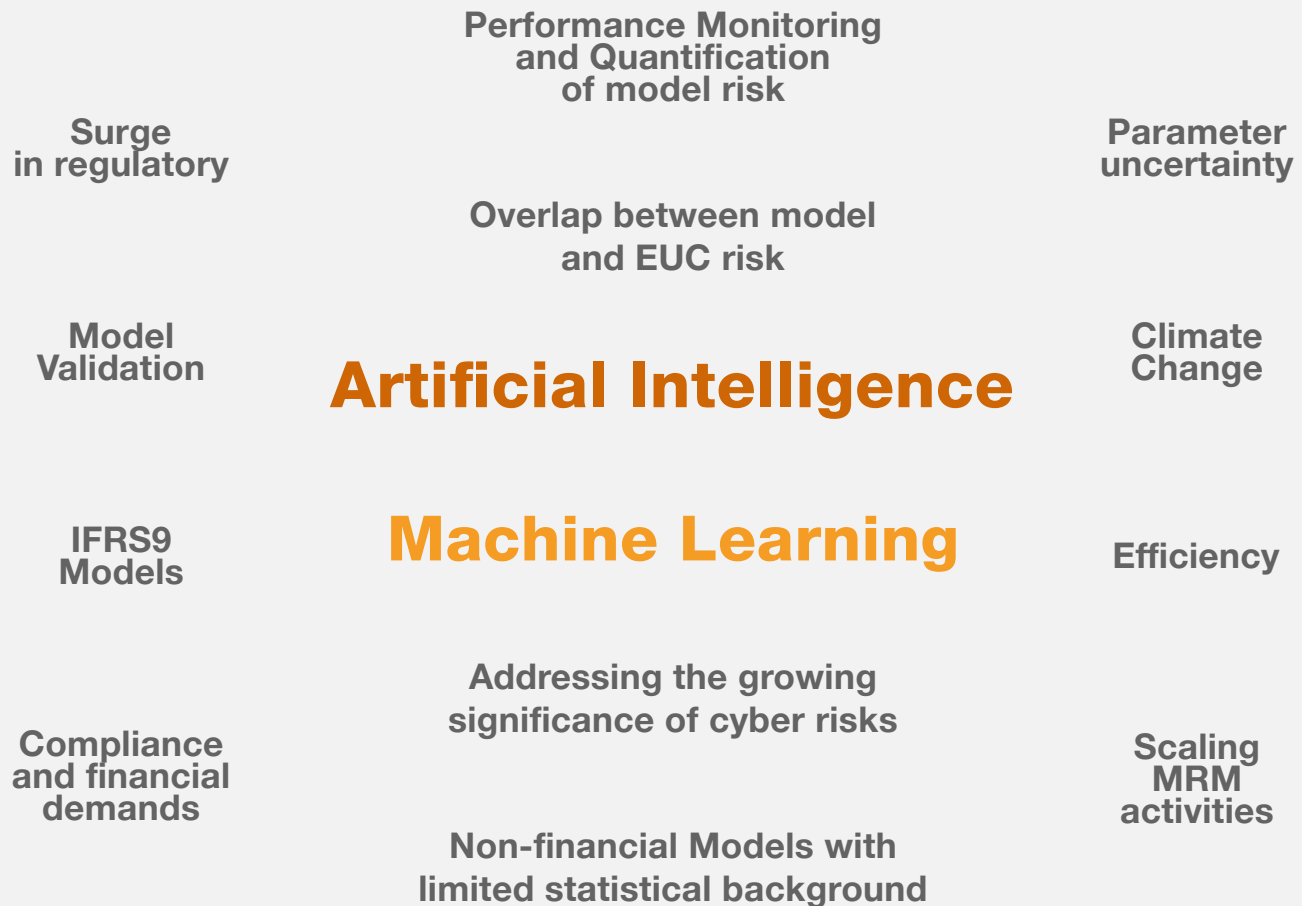
As noted earlier, a substantial number of respondents continue to operate without the integration of AI-based models within their Risk Management functions. Moreover, our survey findings show that these organisations do not plan to incorporate AI models into their credit risk domain over the coming year. Only 13% of these institutions plan to implement AI models in the near future. Our findings indicate that prioritising the adoption of ML models isn't widespread.

How many other (non-Risk-Management-related) Artificial Intelligence models are assessed / validated within your Model Risk Management framework?

Our survey shows that the majority (62%) of institutions use non-risk-management AI models. Nevertheless, the use of AI models outside of risk management is rather limited, with all institutions who use such models having up to 10 of them in their inventory.

What is currently considered the most prominent topic in the field of Model Risk Management?

Performance Monitoring
and Quantification
of model risk

Surge
in regulatory

Parameter
uncertainty

Overlap between model
and EUC risk

Model
Validation

Artificial Intelligence

Climate
Change

IFRS9
Models

Machine Learning

Efficiency

Addressing the growing
significance of cyber risks

Compliance
and financial
demands

Scaling
MRM
activities

Non-financial Models with
limited statistical background

Conclusion

» As the number and complexity of models within financial institutions continue to increase, the need for a digitised solution ensuring sound governance of the models is highlighted.

Our survey shows a good level of maturity of the overall model risk management frameworks used by the respondents, with 88% evaluating their MRM function as solid and equal to the purpose. Nevertheless, only half have implemented a technological solution to support its MRM activities. Encouragingly, half of the institutions still need to digitise their respective MRM plan to implement it in the near future.

A crucial component of an effective Model Risk Management is designing a framework aligned with regulatory requirements and leading market practice. To achieve this, the implementation of an automated Model Inventory Solution is one of the critical steps.

We at PwC have the right expertise, including hands-on experience, and relevant solutions in place to support you in enhancing your Model Risk Management function.

Yours sincerely,

Rostislav Černý
Partner

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