Deloitte.

Preparing for a growing model landscape in a fast-changing world

EMEA Model Risk Management Survey

2023

Contents

Foreword

On behalf of Deloitte we are pleased to present the latest edition of the EMEA Model Risk Management Survey. This report presents the latest insights regarding current model risk management practices and challenges faced by banks across Europe, the Middle East and South Africa.

We would like to express our gratitude to the survey participants for taking the time to provide the responses and valuable insights which are the foundation of this report. The collected inputs have been aggregated to form an insightful picture of the current state of Model Risk Management (MRM) in banks.

At Deloitte, our mission is to help our clients become more responsible businesses that can grow sustainably. Directly or indirectly, models are used within banks to inform key decisions that impact customers and therefore also society. As they become more embedded in businesses, the appropriate use of models becomes a critical factor for business resilience. We believe that a mature model risk management framework creates insights into the entire model landscape of the bank, raising awareness and mitigating model risk across all steps of the model lifecycle. This helps our clients become more responsible and sustainable businesses by ensuring management teams have appropriate safeguards around the use of models in making decisions for their customers.

Model risk management continues to increase in importance as banks rely more on models than ever before. The increasing risks (e.g., from AI and machine learning) are recognized by prudential regulators and risk practitioners around the world.

This survey contributes to both a systemic and business-specific understanding of model risk, which will help firms to achieve a more mature model risk management framework and ensure responsible use of models. The survey is based on insights from 85 banks, ranging in size from balance sheet totals of less than EUR 30 billion to more than EUR 1,000 billion. The survey covers all the critical building blocks of model risk management across four key themes:

1. model landscape and inventory,
2. technology and tooling,
3. governance, and
4. artificial intelligence.

We hope that the results of this survey provide you with valuable insights to support your journey to improve model risk management.

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Executive summary

This model risk management survey was conducted between July and September 2023. In total 85 banks across Europe, the Middle East and South Africa participated in the survey. It covers the key building blocks of model risk management across four key themes: model landscape and inventory, technology and tooling, governance, machine learning and artificial intelligence. We hope this survey will provide valuable insights into model risk management that will support banks to create more sustainable business outcomes.

Model landscape and inventory

The model inventory is the central repository for model-related information and the foundation of an effective model risk management framework. It contains the information that defines the scope of MRM in the bank, and is the main source for the majority of information about model risk.

The model inventory starts with a clear and bank-wide definition of a model. This defines the scope of the models that are included in the model inventory.

65% of participating banks have started to include other types than pillar 1 models in the MRM framework such as financial risk models (pillar 2 capital and liquidity), compliance and other models (e.g., cyber, marketing and HR models). The tendency seems to be that with increasing reliance on models, the number of models in the inventory and the scope of the model risk management framework also expand. Model types that are subject to regulation, such as financial risk models (pillar 1 capital and accounting), are most frequently included in the model inventory.

In general, the larger banks have more mature MRM frameworks and, as expected, also a higher number of models in the model inventory. The average number of models in the inventory is 70, 150 and 300 for small, medium and large banks, respectively.

The survey results show that large banks have an increased number of models reported (compared to 2021). For instance, the large banks with the largest number of models (top quartile), the number of models increased from 1.600 (2021) to 2.130 (2023). Small and medium sized banks have a similar number of models in the inventory. This indicates that as the model inventory and process for model identification becomes established, the reported scope of models grows. This enables management to assess previously "unknown" model risks.

Executive summary

Technology and Tooling

Successful MRM framework implementations are often supported by model risk management tooling. Having one valuable model risk management tool integrates the model inventory, document repository, lifecycle management and workflow, analytical and reporting capabilities into a single platform. The tool and the functionalities can greatly contribute to the effectiveness of model risk management activities.

The survey shows that banks have shifted their tooling from external vendor tools to in-house developed tools. Qualitative feedback from banks indicates that they struggle to justify investment in vendor solutions, whilst recognising the need to move away from MS Excel based solutions.

Large banks apply vendor solutions more than medium and small banks. Our analysis shows that two thirds of those banks using vendor solutions are large banks. 29% of large banks have vendor solution compared to 15% for medium banks and 4% for small banks. This reflects both the higher number of models and increased regulatory scrutiny for larger banks, making investments more easily justified.

Governance

Strong model governance across the entire model lifecycle is a key requirement for the model risk management framework.

The role of model owner remains important, with 87% of respondents having clearly defined and documented the role of the model owner. The model owner role is increasingly separated from the model developer role, and the survey results indicate an increase in model users acting as model owners (compared to 2021). This should help firms build stronger knowledge of models in the business, improving buy-in and hence making the use of models more effective.

The key areas that most respondents identified as needing improvement relate to governance and controls, including monitoring and validation. This is driven by banks seeking to meet expectations of regulators and other stakeholders (e.g., statutory auditors). Regulatory requirements for model risk continue to expand geographically (e.g., Model Management Guidance Central Bank of the UAE) and increase the scope of MRM (e.g., PRA SS1/23). Banks will need to continue to invest, to address specific gaps and make necessary improvements.

The head of the MRM function reports directly to the CRO in 46% of banks. This reporting structure is considered leading practice as it acknowledges the importance of model risk in the risk taxonomy. In the other 54%, the head of MRM reports to a level below the CRO. This could indicate that for these banks, model risk is perceived to be less critical than other risk types (e.g., market risk, credit risk or operational risk) in the enterprise risk management.

Executive summary

Artificial Intelligence and Machine Learning
More than half of the participants are using some variation of artificial intelligence or machine learning (AI/ML) techniques. There is a big difference between banks of different sizes, as 80% of large banks use AI/ML techniques whereas only 20% of small banks use such techniques.

Notably, only 33% of the banks have not analysed the impact of the proposed EU AI Act on their businesses. Of the respondents that have analysed their AI/ML models on the level of risk, 31% found that their organization uses high-risk AI/ML models.

57% of participating banks have no policies around the use of generative AI or Large Language Models. There is once again a significant difference between banks of different sizes, as 43% of large banks lack such policies, whereas it is 80% for small banks.

The top challenges identified by the banks regarding the use of AI/ML techniques are transparency and explainability, data quality & availability, and compliance (regulation and governance). This indicates that the use of AI/ML techniques requires changes to all phases of the model life cycle.

The emergence of AI modelling techniques alongside traditional financial risk models brings ethical complexities to the forefront. Finding a balance between innovation and ethics is crucial for organizations, as it ensures that AI models enhance accuracy while upholding fairness and stability within financial risk modelling.

65% of participating banks with AI/ML models have an ethics framework or strategy in place but only 17% consider AI being part of the ethical framework.

83% of the banks with models using AI/ML techniques conduct independent model validation before the approval and use of these models. Of this 83%, most banks conduct these validations internally. Feedback loops to users of such models, for monitoring and evaluating these models, are not yet common.

Notably, regardless of size, three out of five banks agree that AI/ML is critical to their organisation's overall success in the next 5 years.

"More than half of the banks are using some variation of artificial intelligence or machine learning techniques".

Importance of model risk management

Dependence on models and scope extension
Banks rely more and more on models. Models are used for decision making and execution of policies throughout all operations of the bank. Changes and innovations within banks and the marketplace also demand more and better models that enable faster decision making, spanning a vast array of business functions, for example from loan and mortgages approvals to transaction monitoring.

Not only is the dependence on models increasing, but the range of models that a bank relies on is also expanding. As a result, most banks now include, for instance, compliance and cyber risk models in the scope of their model risk management framework.

"Models are used for decision making and execution of policies throughout all operations of the bank".

This increases the number of models in scope and leads to a larger variety of models. Additionally, models are increasingly becoming more complex with, for instance, the use of machine learning techniques in selecting parameters within models or direct use of machine learning for specific use cases (e.g., AML, credit decision models).

Regulatory expectations to MRM
Since the publication of SR 11-7 Supervisory Guidance on MRM in 2011 the regulatory requirements continue to expand. EU, UK and the Middle East have published guidance within this field. Lately, the consultation paper PS6/22 – Model risk management principles for banks was published (June 2022) by the PRA* and the supervisory statement SS1/23 – Model risk management principles for banks followed in May 2023. The paper outlines five MRM principles which are considered key in establishing an effective MRM framework. In October 2022 EBA finished the consultation on a supervisory handbook on validation of IRB models and in the Middle East the Model Management Guidance was published in November 2022 by the Central Bank of the UAE. We expect the regulatory requirements to continue to increase.

Use of technology
In order to create a detailed and up to date overview of the model landscape and keep track of models throughout the model lifecycle, the role of technology in model risk management becomes more important. More and more banks are developing model risk management tooling as they mature from low-technology model inventory lists. Technology is also key for model monitoring. Automation of model monitoring reduces the manual work for both model development and model validation and increases efficiency in the model lifecycle. In addition, it contributes to a more relevant and up to date view of the quality of models, especially when monitoring is performed frequently and automated.

"We expect the regulatory requirements continue to increase".

About the survey

This report presents findings from Deloitte's assessment of model risk management practices. The survey is based on information gathered from 85 banks across Europe, the Middle East and South Africa and was conducted from July to September 2023. The survey has roughly even split between large, medium and small banks with the majority being in Europe.

Figure 1. Percentages of banks in each of three size categories. Small banks with a balance sheet total of less than EUR 30 billion, medium banks between EUR 30 and 100 billion and large banks with more than EUR 100 billion.

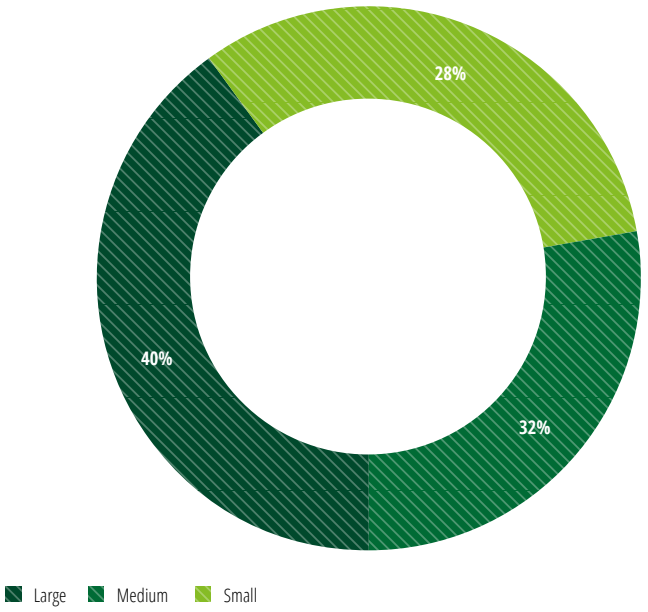
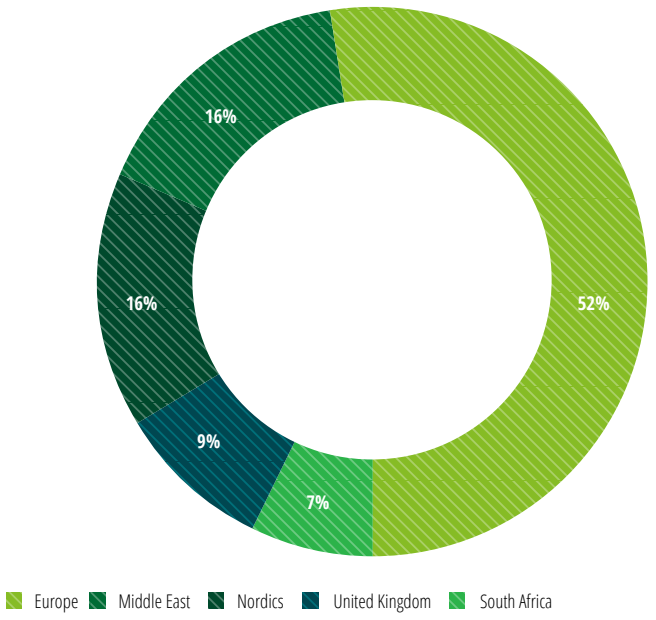


Figure 2. The survey included an even mix of banks from eighteen countries with the majority (76%) being in Europe



About the survey

Figure 3. Number of banks in each country

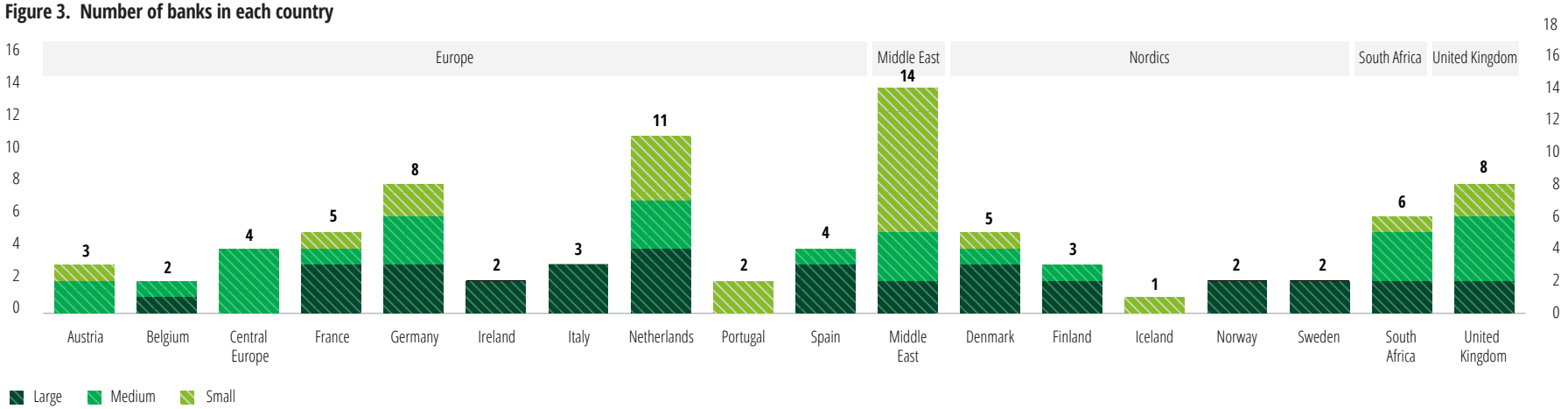
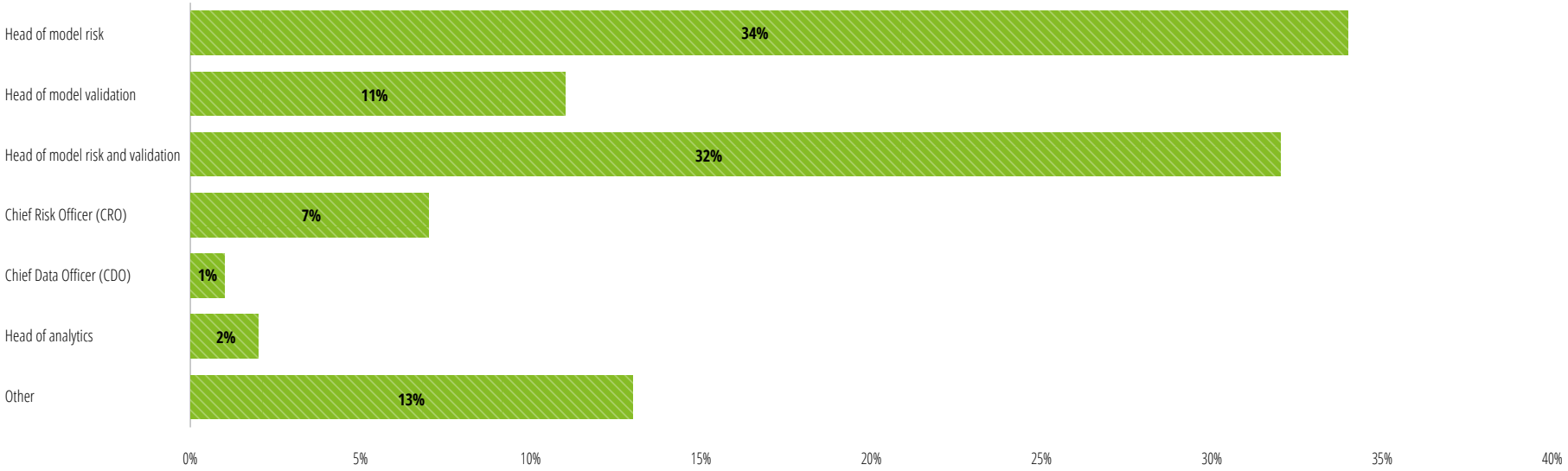


Figure 4. Role within the bank of the participant that completed the survey



Model landscape and inventory

Model landscape and inventory

The model inventory is the central repository for model-related information and the foundation for efficient model risk management. It sets the scope for model risk management, but it is also the source for the vast majority of information about model risk. This includes for instance information about the position of the model in the model lifecycle, information about the quality of the model such as validation results, and the overall risk appetite statement of the bank for model risk.

A clear and bank-wide model definition

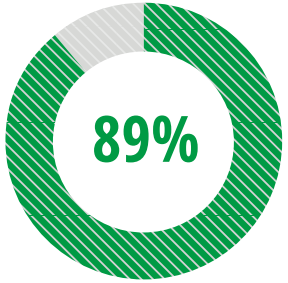
The model inventory starts with a clear and bank-wide definition of a model. This defines the scope of the models included in the model inventory. The definition of a model varies across banks, and there is no single definition that works for all of them. However, from the previous Deloitte EMEA MRM Survey 2021 it was indicated that the large majority of banks used the regulatory definition from SR 11-7*, in most cases enriched with additional guidance or enhancements.

The SR 11-7 definition states that "the term model refers to a quantitative method system, or approach that applies statistical, economic, financial, or mathematical theories, techniques, and assumptions to process input data into quantitative estimates".

Model Risk Policy

89% of the banks answered "yes" to the question of whether there is an existing model risk policy in their organization. This model risk policy specifies, amongst others, the (risk-based) processes, standards, governance, roles and responsibilities relating to the management of model risk in the organization.

Figure 5. Banks with existing model risk policy



"a model is a quantitative method, system, or approach that applies statistical, artificial intelligence, economic, financial, or mathematical theories, techniques, and assumptions to process input data into quantitative estimates"

* The Supervisory Guidance on Model Risk Management issued by the Board of Governors of the Federal Reserve System and Office of the Comptroller of the Currency (2011).

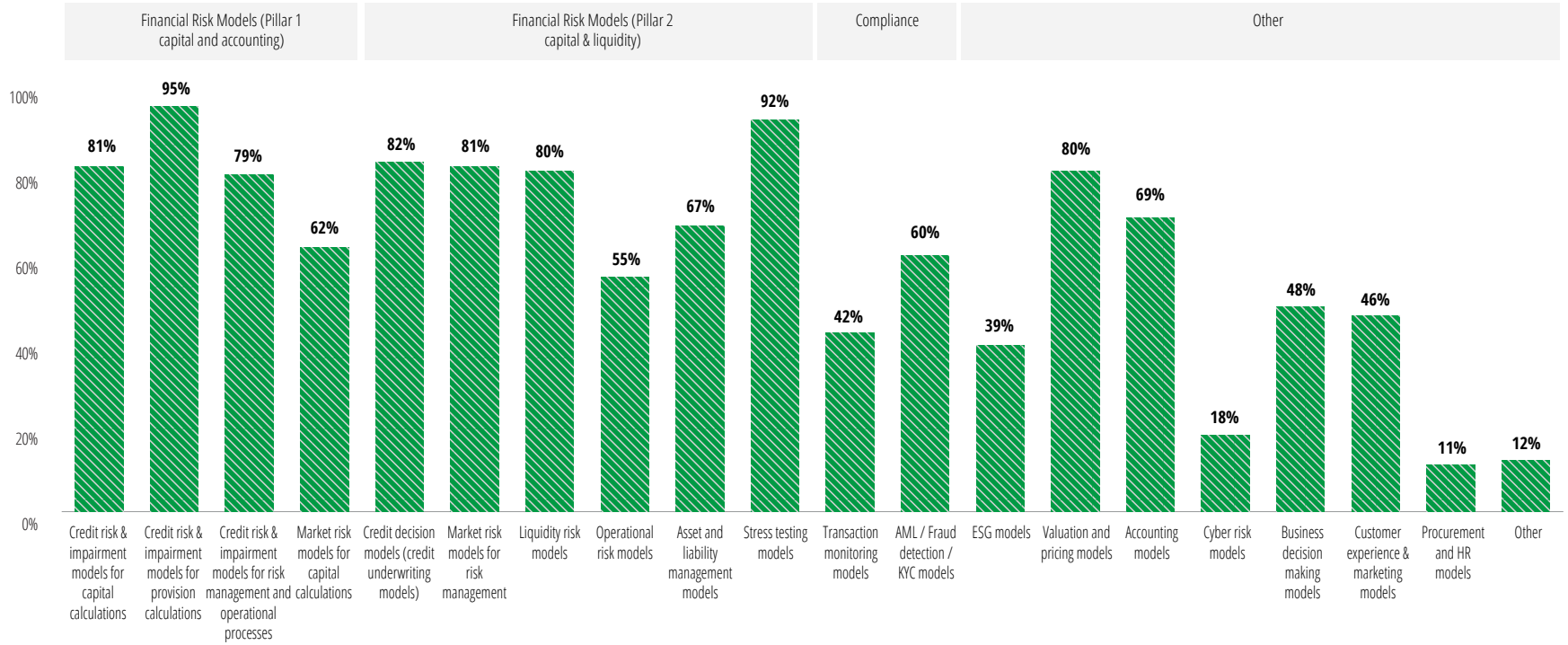
Model landscape and inventory

Use of models

Pillar 1 and 2 (capital and accounting, capital and liquidity) models are used by most of the banks.

Compared to the MRM survey from 2021, ESG models have become a distinct category this time and more than one third of banks have developed models for this purpose. Large banks tend to use ESG models more often than the medium and small sized banks.

Figure 6. Proportion of respondents who have the model type in question in use



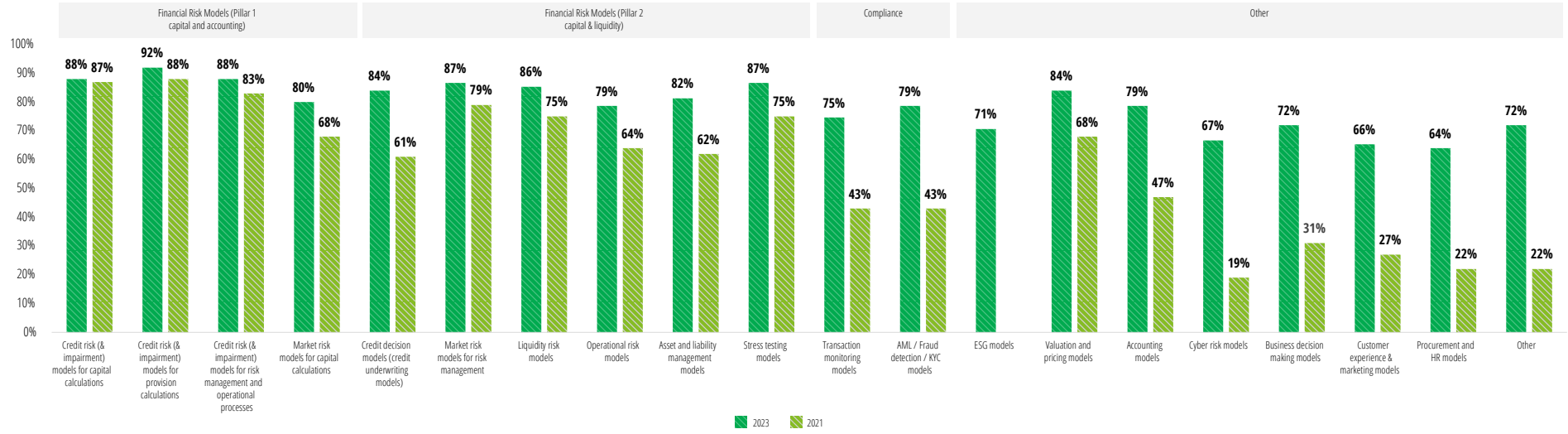
Model landscape and inventory

Scope of the model risk management framework

Compared to the 2021 MRM survey more banks are now including a wider variety of models in scope of their model risk management framework. This tendency is particularly clear for compliance-related and other model types such as cyber risk, procurement, business decision and HR models and customer experience & marketing models. The banks that include financial risk models (pillar 2 capital and liquidity), compliance and other models in scope of their model risk management framework are mostly large and medium banks with mature model risk management frameworks.

Financial risk models (pillar 1 capital and accounting) are most often in scope of the model risk management framework. It is not surprising, given regulatory attention, that these models for credit risk and market risk are most often in scope.

Figure 7. Scope of the model risk framework for each of the model types as a percentage of those that use models (Figure 6)



Model landscape and inventory

ESG and Climate Risk models in scope

More than one third of the banks answer "yes" to using ESG models within their organisation. The most commonly modelled ESG risk drivers are the Environmental risk drivers. Within the Environmental risk drivers, mainly climate stress testing models are used within banks followed by rating models.

For ESG models, the main model risk identified is data quality for model development and validation.

Figure 8. Use of ESG models

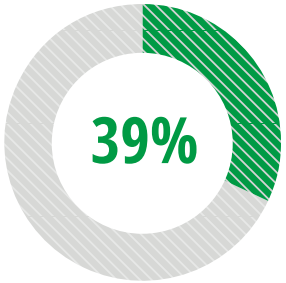


Figure 9. ESG risk drivers modelled

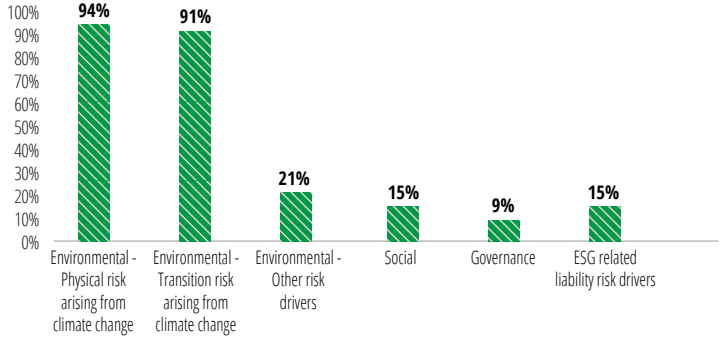


Figure 10. Currently modelled Environmental (E) topics

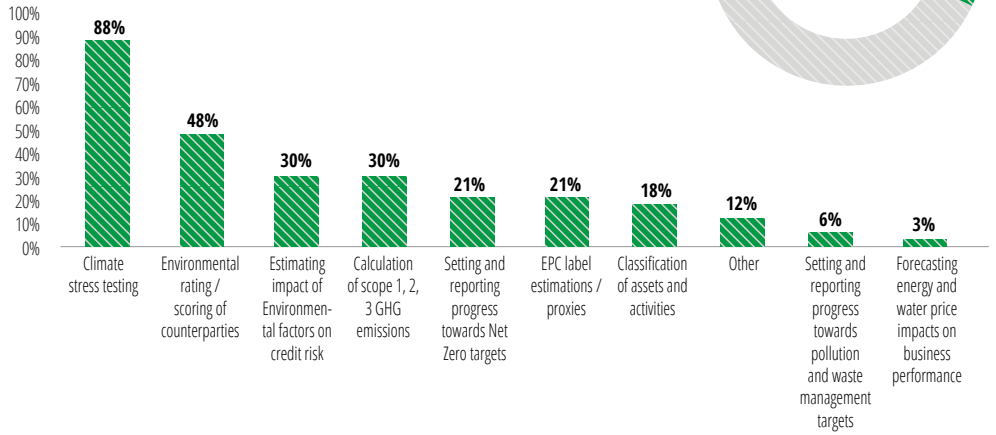
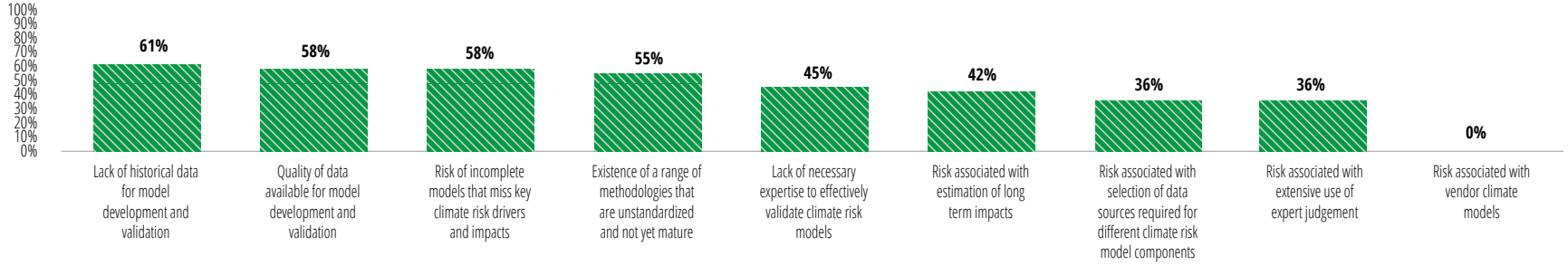


Figure 11. Addressed risks and issues associated with climate risk models



Model landscape and inventory

Model inventory size

The number of models in a bank's model inventory is constantly subject to change. The survey results show that practices diverge widely between small, medium and large banks. This is not unexpected, as large banks tend to have more mature model risk management frameworks and also include more model types, as shown in the previous figures.

Small banks indicate that they have an average of 67 models in their model inventory, medium banks have 147 models and large banks 299 models, with strong outliers excluded. These figures should be compared cautiously, as the model definition used by each bank can vary, for example in a credit risk context a model can be a single rating system or an individual PD model.

However, even between large banks the size of inventories is seen to vary considerably. The lowest quartile of the large banks have a maximum of 111 models and for the top quartile the number of models has increased from 1.600 (2021) to 2.130 (2023). Small and medium sized banks have a similar number of models in the inventory. This indicates that as the model inventory and process for model identification becomes established, within a more mature MRM set up, the reported scope of models grows. This enables management to assess previously "unknown" model risks.

Six large banks have more than 1000 models in their model inventory. Therefore these banks are considered outliers in the current dataset and thus have not been included in the chart for Figure 13. These banks have 1.500, 1.500, 2.115, 2.300, 2.436 and 4.061 models in their inventories.

Medium sized banks also have a wider range of inventory sizes. Lower quartile of these banks have a maximum of 46 models and the upper quartile have more than 230 models in their inventory. For small banks these numbers are 20 models for the lowest 25% and 80 models for the highest 25%.

Figure 12. Do you have a model inventory?

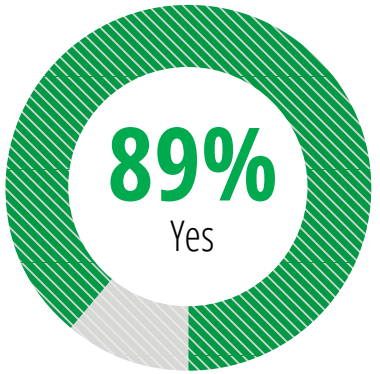
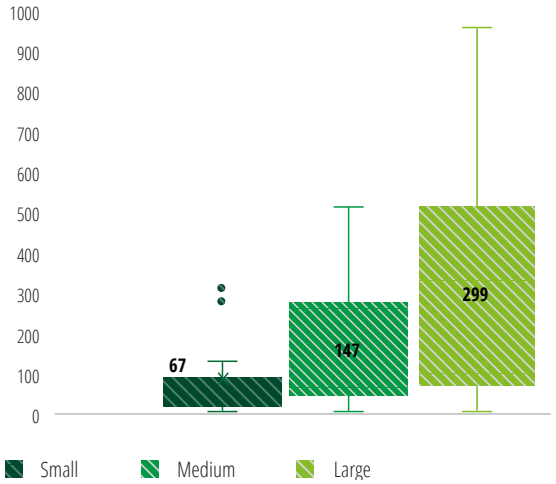


Figure 13. Number of models in the model inventory*



* Outliers excluded

Model landscape and inventory

Model inventory information

A model inventory can store large amounts of information at the individual model level. Structured and high quality information is the foundation of efficient model risk management. Small banks store on average approximately 30 data fields on the models, where medium and large banks store on average 46 data fields in their model inventory. Although these differences may appear minor in terms of absolute numbers, they do mean that bigger banks store - and need to maintain - approximately 50% more data fields than smaller banks.

50% of the banks with less than 10 data fields in their model inventory are from the Middle East.

Figure 14. Number of data fields in model inventory

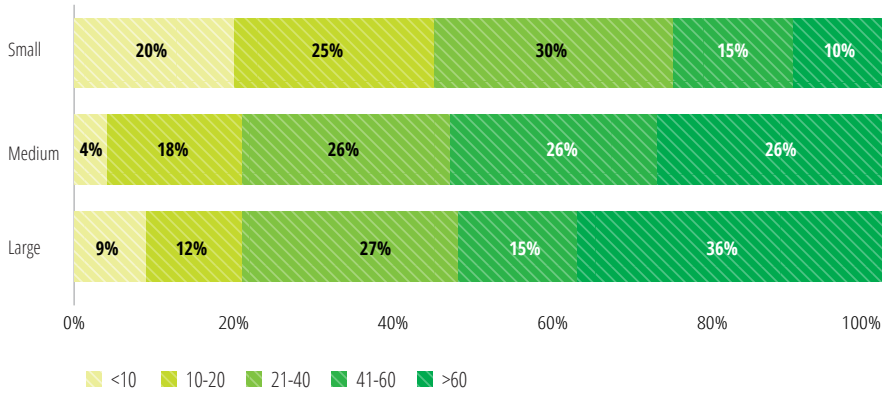
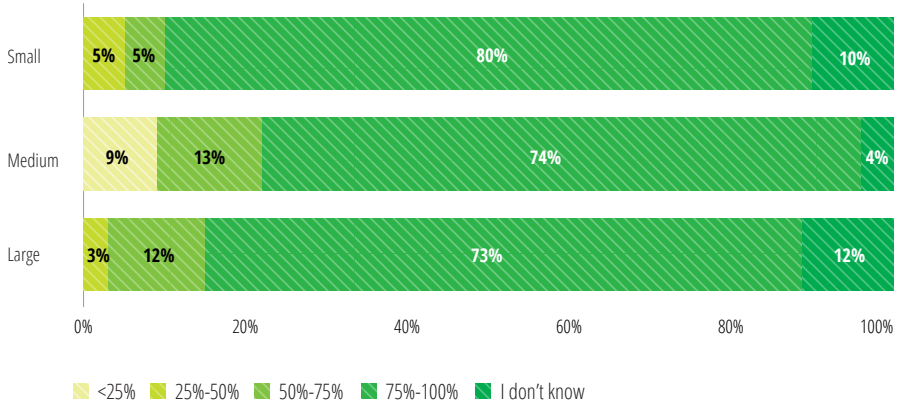


Figure 15. Proportion of models included in the model inventory



Three out of four banks included at least 75% of their models in the model inventory. 85% of the banks included at least 50% of their models in the model inventory.

Technology and tooling

Technology and tooling

Successful model risk management framework implementations are often supported by model risk management tooling. Model risk management tools integrate the model inventory, document repository, lifecycle management and workflow, analytical and reporting capabilities into a single platform. The use of a singe tool with shared functionalities can greatly contribute to the effectiveness of the model risk management activities.

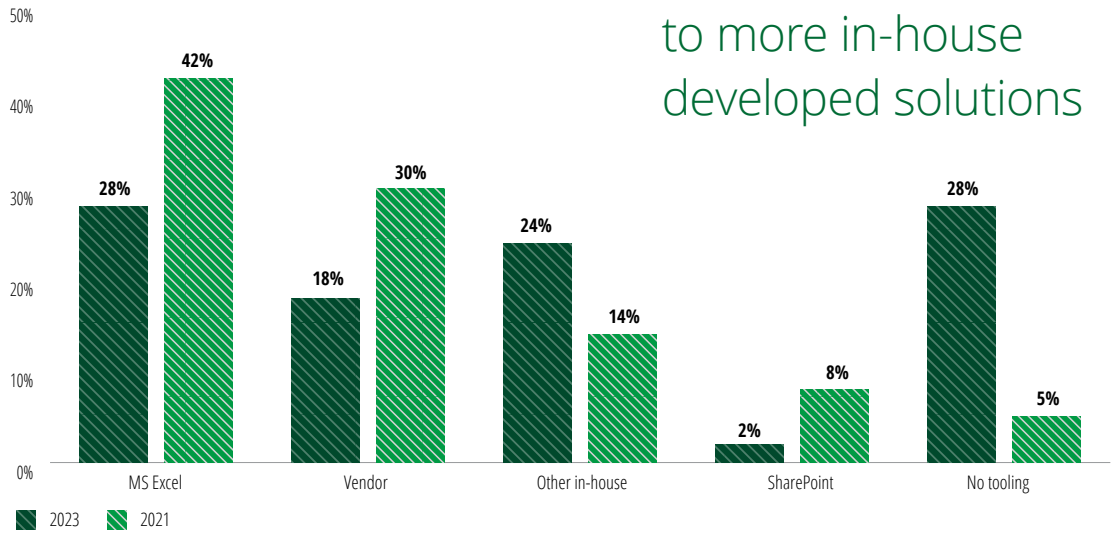
Tooling types: From Excel to solutions developed in-house

The survey results showed 28% of respondents use MS Excel as their model risk management tooling. In 2023, fewer banks use SharePoint than in 2021 but we see an increase in in-house developed solutions. Even though MS Excel is still the most wildly used tool, there is a trend where banks move towards in-house developed solutions.

Large banks apply vendor solutions more than medium and small banks. Our analysis shows that two thirds of those banks using vendor solutions are large banks. 29% of large banks have vendor solution compared to 15% for medium banks and 4% for small banks. This could reflect both the higher number of models and increased regulator scrutiny for larger banks, making investments more easily justified.

Compared to 2021, we observe an increase in respondents that do not use tooling for model risk management. This is mainly driven by the higher population of small banks and banks from the Middle East. For example, 60% of the banks located in the Middle East indicated that they do not use tooling for model risk management.

Figure 16. Tool or system used for model risk management practices



Model Risk Management tools shifted from MS Excel and vendor solutions to more in-house developed solutions

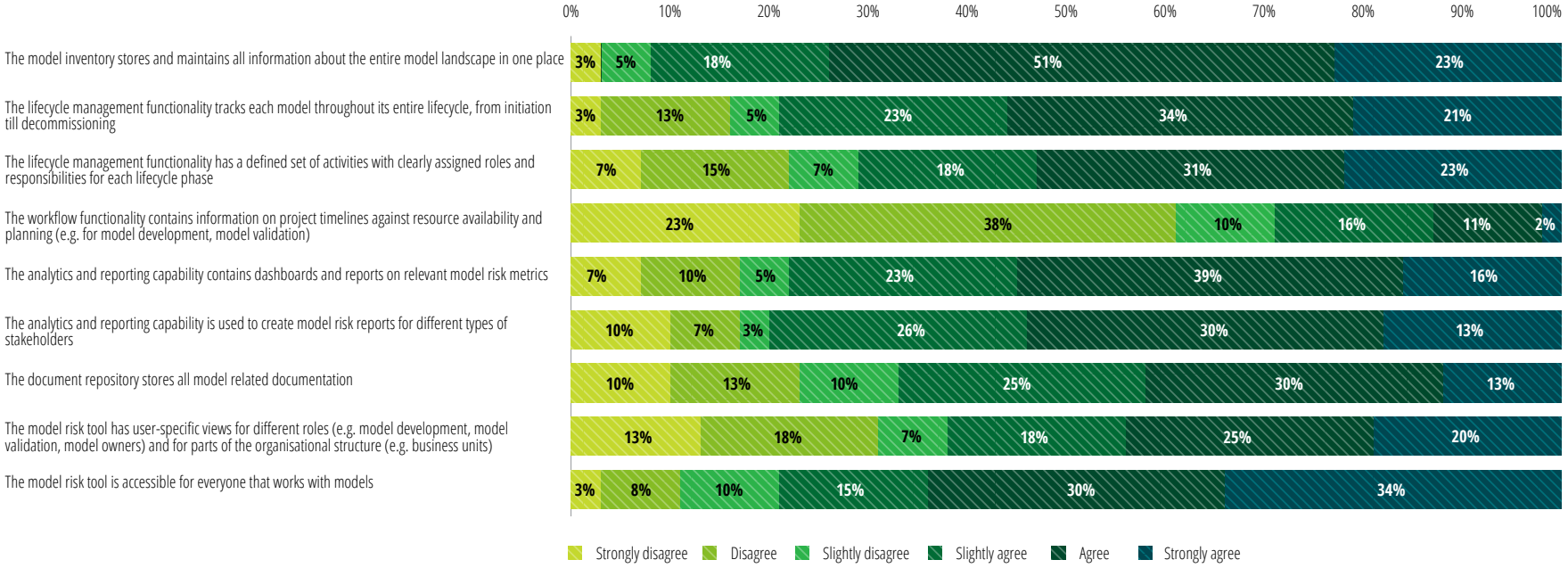
Technology and tooling

Tooling in practice

Although qualitative feedback from banks indicate that most of them are aware of the benefits of using model risk management tooling, the answers to the statements show that such tooling does not yet support all building blocks of model risk management for the majority of the banks. The overwhelming majority of the participating banks agree that the model inventory stores and maintains all information about the entire model landscape in one place. The results are similar for the accessibility of the tooling and the functionality of the tooling to track models throughout their entire lifecycle.

The majority of the participating banks are not using functionalities to analyse project timelines against resource availabilities, for instance for model development and model validation. This functionality could help improving bank's model risk management tooling.

Figure 17. Agreement with statements regarding the model risk management tooling



Governance

Governance

The role of model owner remains important, with 87% of respondents having clearly defined and documented the role of the model owner. The model owner role is increasingly separated from the model developer role. Overall, large banks tend to separate MRM into a team separate from model validation. The key areas that most respondents identified as needing improvement relate to governance and controls, including monitoring and validation.

Model owner

One of the key roles for effective model risk management is that of the model owner. The model owner is responsible and accountable for a specific set of models, including the quality of those models. The model owner also acts as a bridge between the first line of defence and others, for instance by ensuring that findings from independent model validation are resolved with appropriate resources on a timely basis. Most banks (87%) have indicated that the role of the model owner is clearly defined and documented. Large and medium banks have clear definitions in almost all the cases while more than one third of the small banks responded that they do not have a clear definition for the role of "model owner".

Compared to 2021 the number of model owners from the model development team has decreased from 65% to 50%. Model owners identified among model users and/or reporting has increased from 25% to 31%. 82% of all banks have appointed a model owner for at least 75% of their models for all sizes of banks.

Figure 18. Percentages of banks that clearly defined and documented the role of the model owner in the model risk management documentation

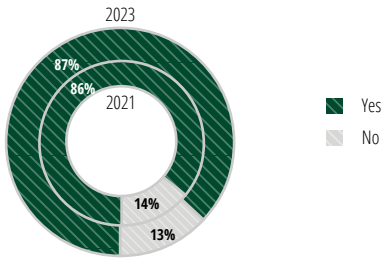


Figure 19. Proportion of the model landscape with appointed model owner

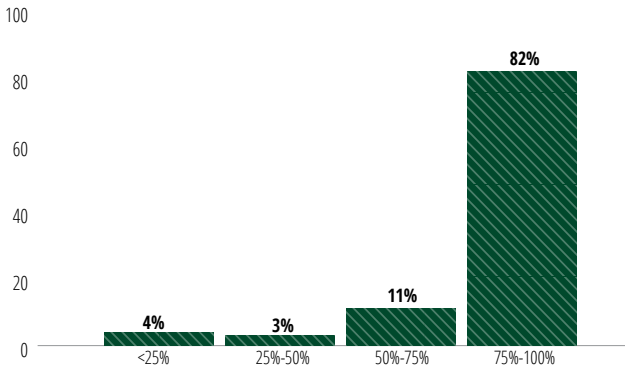
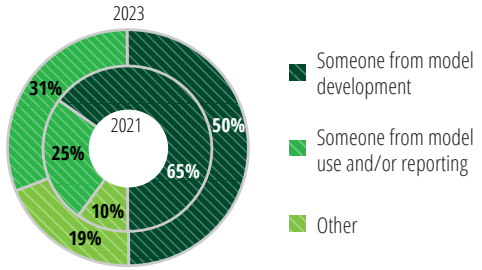


Figure 20. Most often appointed model owner



Governance

Model risk management teams and responsibilities

Years after the publication of the SR11-7 MRM document, stand-alone model risk management departments or teams have emerged, especially at the larger banks. Most large banks indicate that model risk management responsibilities are carried out by a separate team or jointly carried out by the model risk and the model validation team. Medium and smaller sized banks indicate that model risk management responsibilities are still carried out by the model validation team. In an ideal model risk management framework model risk management responsibilities and model validation responsibilities are separated to manage competing

Figure 21. Model risk management team structure

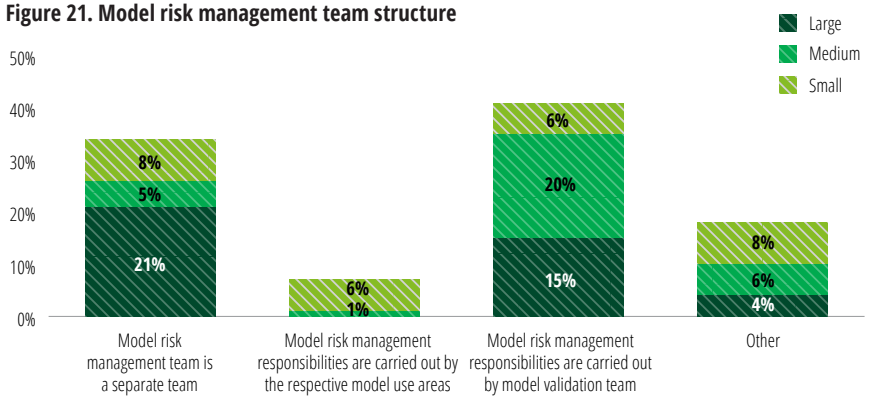
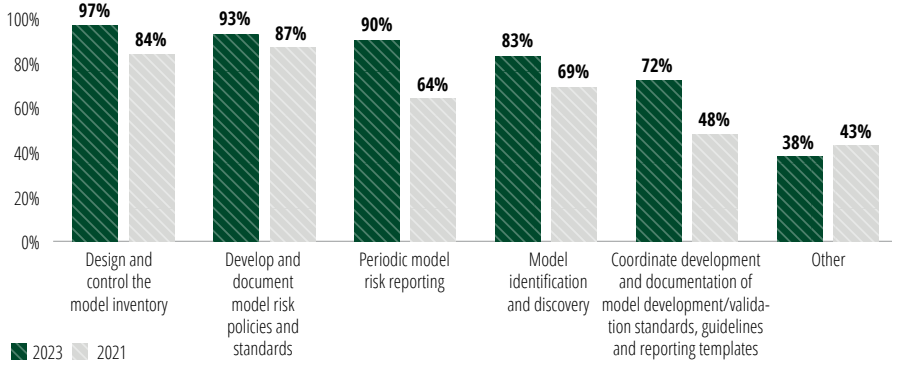


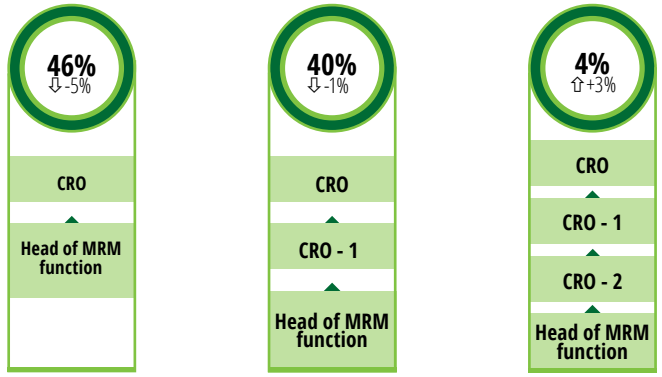
Figure 22. Model risk management team responsibilities



Model risk management reporting lines

The reporting structure that is used by slightly less than half of the respondents – and also evolves as best practice for banks – is where the head of model risk management reports directly to the CRO. Another 40% of participants indicate that the head of model risk management reports just one level below the CRO. Only a very limited number of banks indicate that the head of model risk management reports to a level that is two levels below the CRO.

Figure 23. Reporting lines to the CRO (compared to 2021)



Governance

Model development and model validation teams

Generally, small banks have fewer full time employees (FTEs) dedicated to model development and model validation than larger banks. 96% of small banks have at most 10 full time employees dedicated to model validation while for large banks this number is only 24%. Approximately half of the largest banks (with a balance sheet greater than EUR 500B) have above 100 FTEs dedicated to model validation; these are the banks that have at least 1000 models in their inventory.

In the past two years the number of FTEs dedicated to model development has increased. The average number of FTEs dedicated to model development is 1.5 times bigger compared to 2021. On the other hand, the responses show that the number of FTEs dedicated to model validation have not changed significantly over the past two years. This means that the ratio of the FTEs dedicated to model validation compared to model development has decreased. There could be several reasons behind this decrease e.g., validation becoming more efficient, models are increasingly embedded in businesses while validation remain to focus on regulatory requirements or the application of AI/ML techniques in model development.

Figure 24. Number of FTEs dedicated to model development

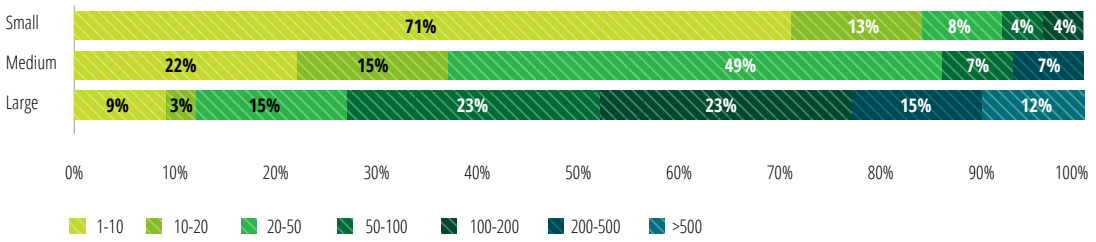


Figure 25. Number of FTEs dedicated to model validation

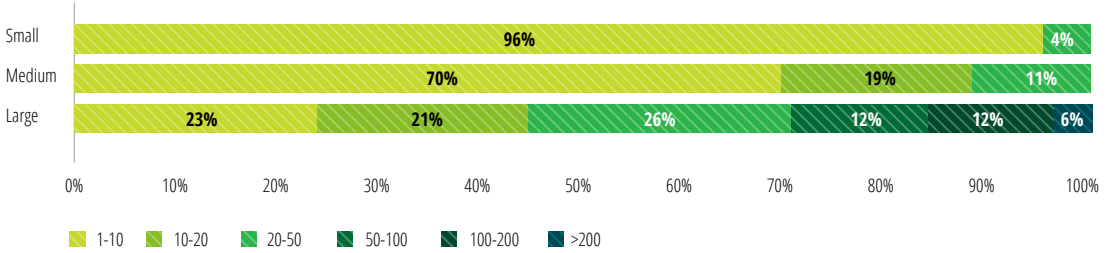
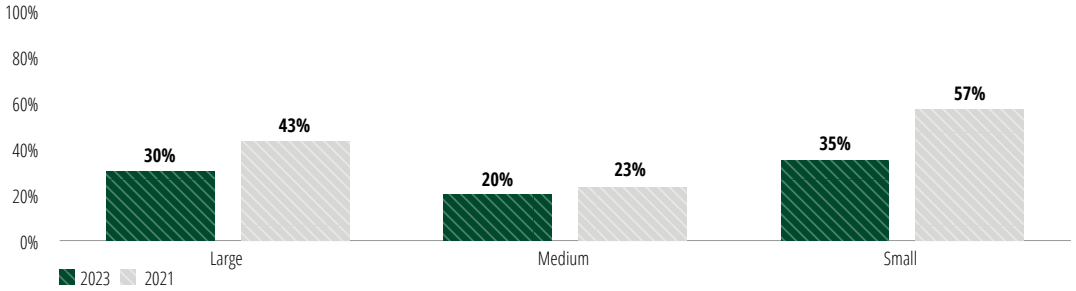


Figure 26. Ratio of FTEs dedicated to model validation compared to model development



Governance

Model risk appetite and model monitoring

Approximately two-thirds of the respondents indicated that they have a defined risk appetite for model risk. Of the respondents with a risk appetite for model risk, the majority applies either quantitative limits or a combination of both quantitative and qualitative limits.

Almost all respondents monitor their models at least partially. Models are mainly monitored by the model developer. However, the model owner is also often indicated as the person monitoring models.

Figure 27. Banks with defined risk appetite for model risk and the characteristics of the risk appetite

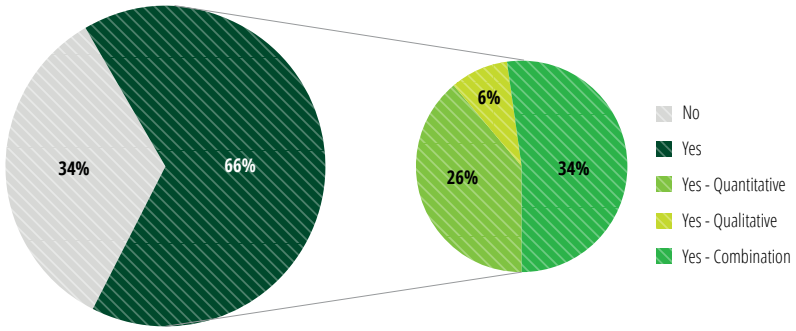
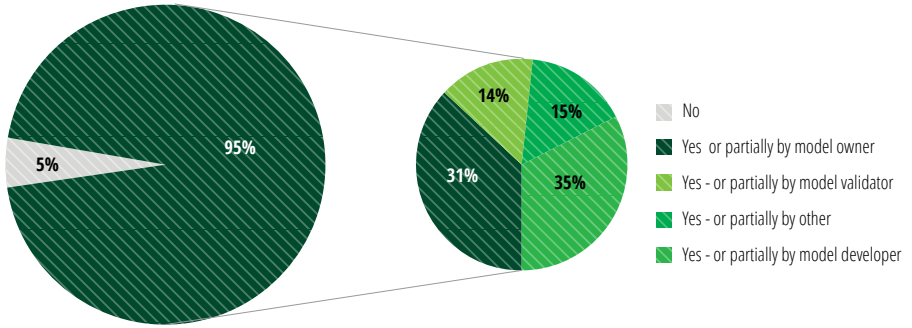


Figure 28. Existence and execution of model monitoring

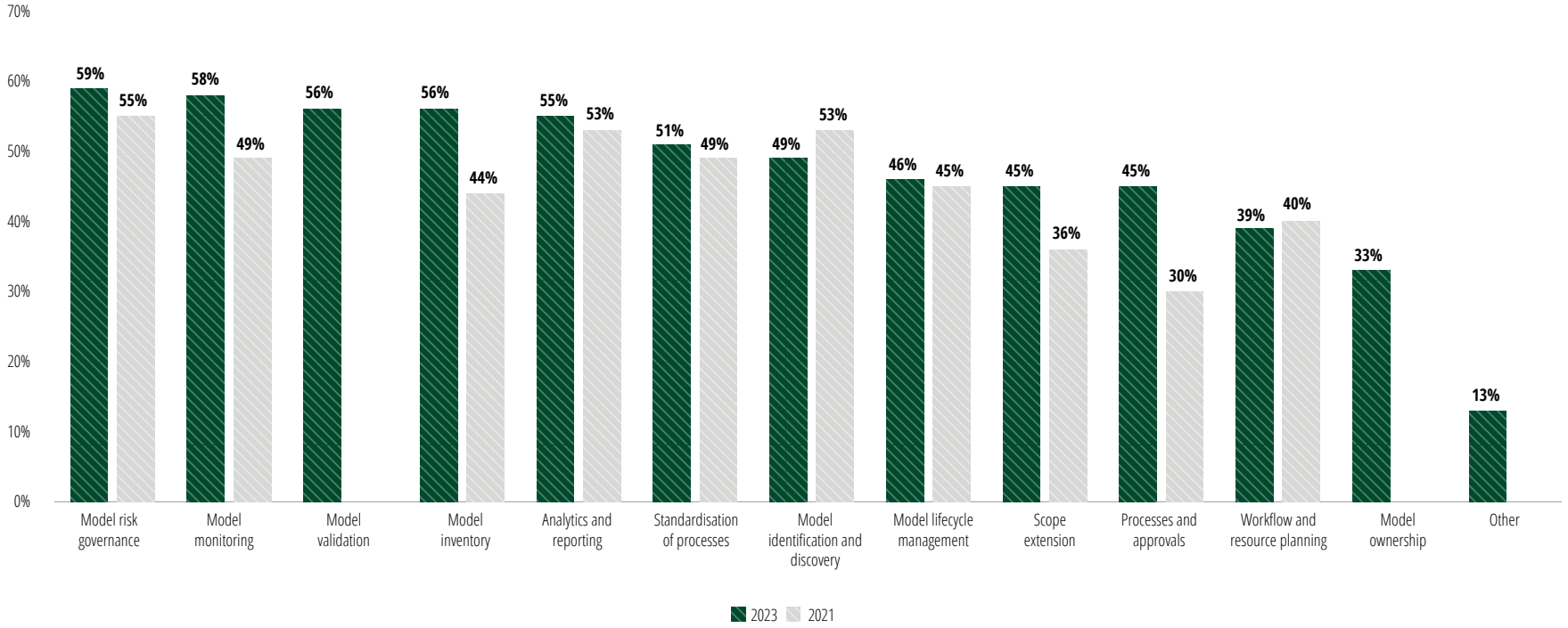


Governance

Model risk management improvements

Going forward, there are many areas where banks indicate that they intend to enhance their model risk management framework within the next few years. Just over half of the banks intend to enhance their framework in the areas of analytics and reporting, model validation, model risk governance, and standardisation of processes. Except for model validation, these improvement areas were also the most noted in the 2021 MRM survey.

Figure 29. Intended improvement areas for model risk management



*"Model validation" and "Model ownership" are new categories compared to 2021

AI – Scope and Governance

This part of the survey only considers the 56% of the banks that have identified use of AI and/or ML modelling techniques in their organisation.

AI – Scope and governance

56% of the participants responded that they are aware that artificial intelligence (AI) or machine learning (ML) models are used in their organisation. Of those, 96% stated that models using AI/ML techniques are included in the model inventory, and 69% included such models in their model definition.

Risk categories in the proposed EU AI act

The EU AI Act is a proposed legislation developed by the European Union (EU) to regulate the development and use of artificial intelligence (AI). The goal of the act is to establish a common framework for AI regulation across the EU, to ensure that AI is developed and used in a way that is ethical, safe, and transparent. The new rules establish obligations for providers and users of AI depending on the level of risk from artificial intelligence.

Figure 30. Banks that analyzed the impact of the proposed EU AI act

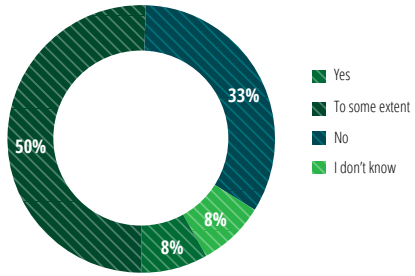
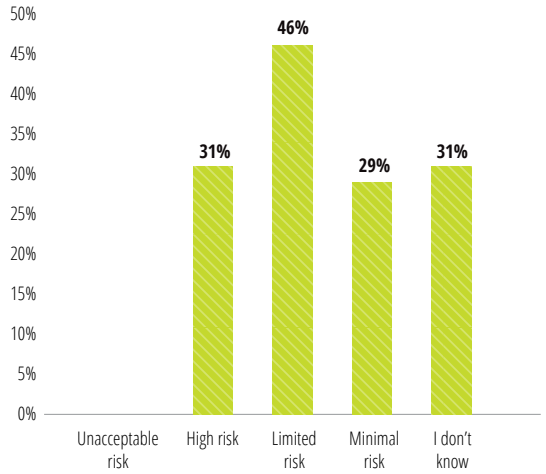


Figure 31. Risk of AI system



33% of the banks with AI/ML models answered that they have not analyzed the impact of the proposed EU AI Act on their AI/ML modelling techniques. Banks with models using AI/ML techniques categorized their models on the level of risk, and 31% of the respondents found that their organisation uses high risk AI/ML models. **No banks have indicated the use of models with unacceptable risk.**

Unacceptable risk: Use cases that pose an unacceptable risk to people's safety, rights, or livelihoods, such as AI systems designed to manipulate individuals or systems or enable social scoring.

High Risk: Use cases that have the potential to cause harm but can be managed with appropriate safeguards, such as AI systems used for essential private services and benefits, such as credit scoring.

Limited risk: Use cases that have a lower risk of harm and don't require specific regulatory oversight, such as chatbots or recommendation systems used in e-commerce.

Low or minimal risk: Use cases that have little or no potential for harm, such as standard AI applications in spam filters or voice assistants.

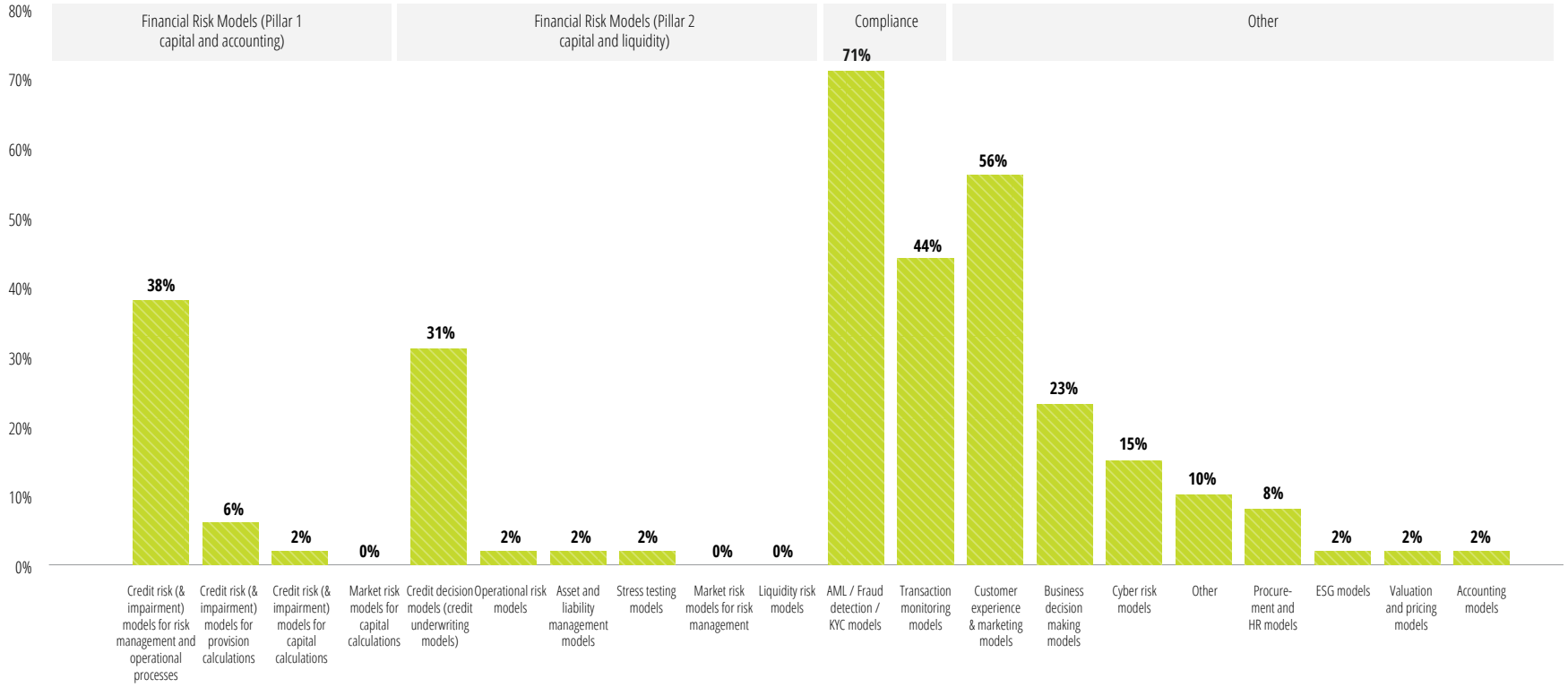
AI – Scope and governance

AI/ML modelling techniques in use

AI/ML modelling techniques are mainly used for AML and transaction monitoring purposes, customer experience and marketing models. 38% and 30% of the surveyed banks apply AI/ML models for credit risk management and credit risk decision, respectively.

AI/ML modelling techniques are rarely used for economic capital models and valuation and pricing models.

Figure 32. Use of AI/ML modelling techniques in the organisation



AI – Scope and governance

Governance of AI/ML models within the model risk management framework

Three out of four banks include AI/ML models in the scope of their model risk management framework. 83% of the banks consider their model risk management framework adequate to govern these AI/ML models to at least some extent. However, only 9% agree with this statement entirely. 40% of these banks have developed additional model risk management processes and procedures to address the unique characteristics of AI/ML models.

Figure 33. Banks that include AI/ML models in the MRM framework

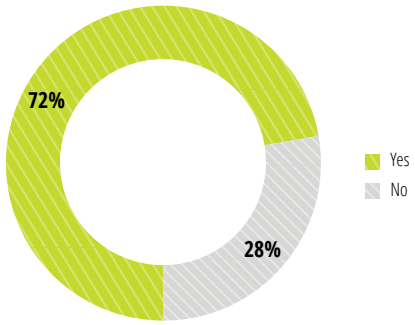


Figure 34. Banks that assess their their MRM framework as adequate to govern AI/ML models

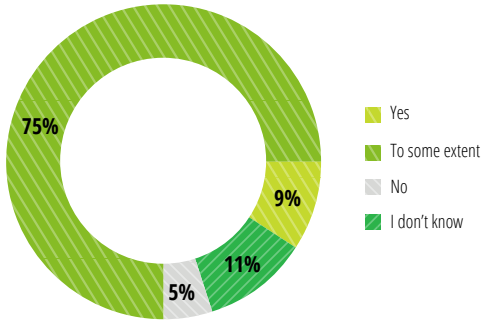
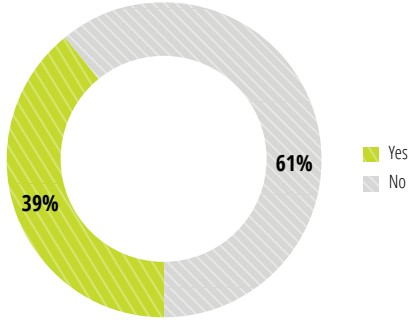


Figure 35. Banks that have developed additional processes to address unique characteristics of AI/ML models



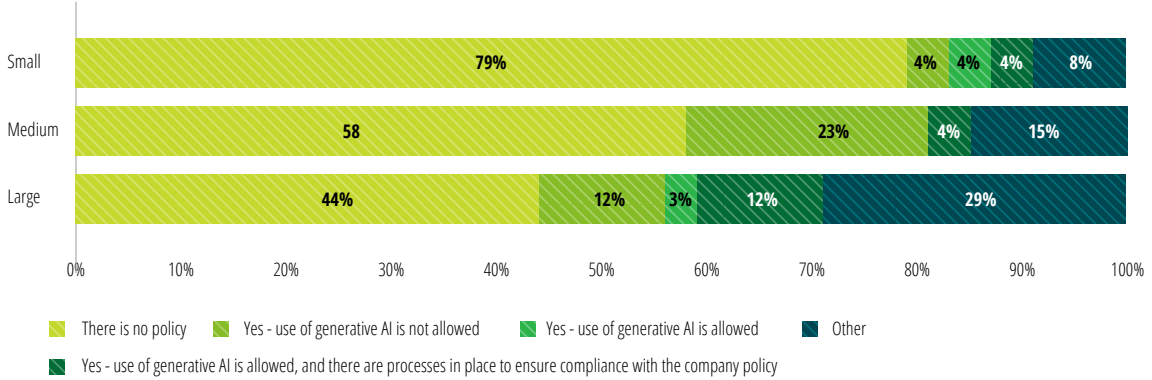
AI – Scope and governance

Significant challenges of using AI/ML models

Banks using AI/ML modelling techniques face various challenges stemming from the use of these models. Three out of four banks find challenges related to transparency and explainability and half experience difficulties regarding compliance (regulation and governance), and data quality and availability. Banks are least concerned about the adoption and the safety and security of these models.

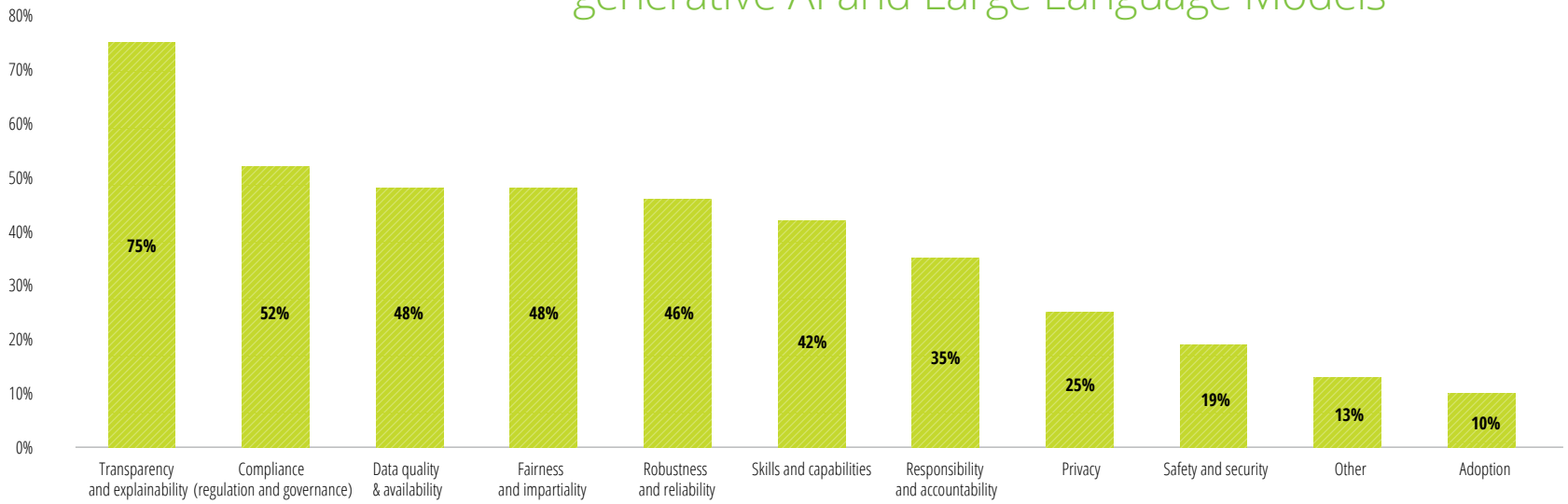
A significant percentage of participating banks not (yet) using AI/ML modelling techniques think that the lack of skills and capabilities might be one of the biggest challenges for them.

Figure 36. Policies around the use of generative AI and Large Language Models



58% of all banks have no policies around the use of generative AI and Large Language Models

Figure 37. Significant challenges of using AI/ML models



AI – Scope and governance

Model lifecycle management for the traditional versus AI/ML models

87% of banks applying AI/ML modelling techniques answered that their AI/ML model lifecycle is similar to the model lifecycle of traditional models and for almost half of the banks both traditional models and these models follow the same lifecycle. Model risk management related risks are reported to the management board in 98% of the banks. 87% of the banks using AI/ML modelling techniques report the related risks to management board with various detailedness.

Figure 38. MRM risk reported to management board

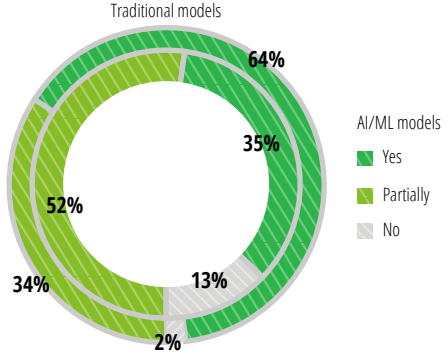


Figure 39. AI/ML model lifecycle is similar to the traditional models

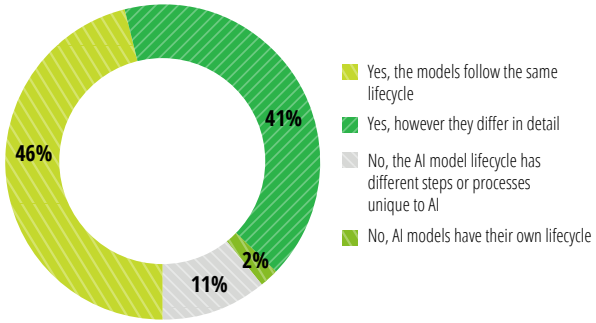
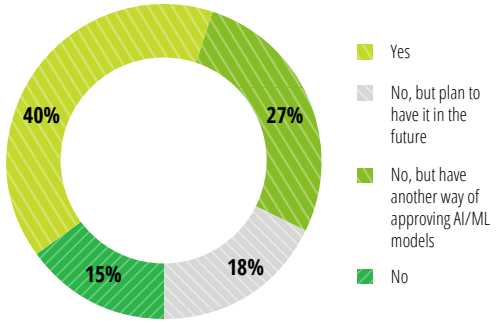


Figure 40. AI/ML approval committee



AI – Ethics and processes

AI – Ethics and processes

The emergence of AI modelling techniques alongside traditional financial risk models brings ethical complexities to the forefront. 83% of the banks with models using AI/ML techniques conduct independent model validation before the approval and use of these models. Notably, three out of five banks agree that AI/ML is critical to their organization's overall success in the next 5 years.

Ethics for AI

The emergence of AI modelling techniques alongside traditional financial risk models brings ethical complexities to the forefront. While AI can offer enhanced predictive capabilities, it also raises questions around a number of challenging topics e.g., bias, fairness, transparency and explainability.

Finding a balance between innovation and ethics is crucial for organizations, as it ensures that AI modelling techniques enhance accuracy while upholding fairness and stability within financial risk modelling.

Only 8% of the banks with models using AI/ML techniques have already established processes, methodologies or tools to ensure the fairness of these models. For 38% of the banks, it is an ongoing initiative and 34% expects to define fairness processes within the next 1-3 years.

The majority (65%) of participating banks with AI/ML models have an ethics framework or strategy in place but only 17% consider AI being part of the ethical framework.

Three out of five banks with AI/ML techniques do not communicate with their customers about the use of these models and personal data.

Figure 41. Ethics framework in place for AI/ML models

Figure 42. Banks with established processes, methodologies, or tools to ensure the fairness of AI/ML models

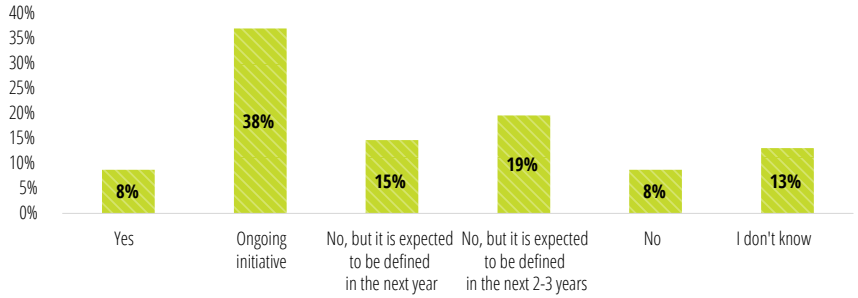
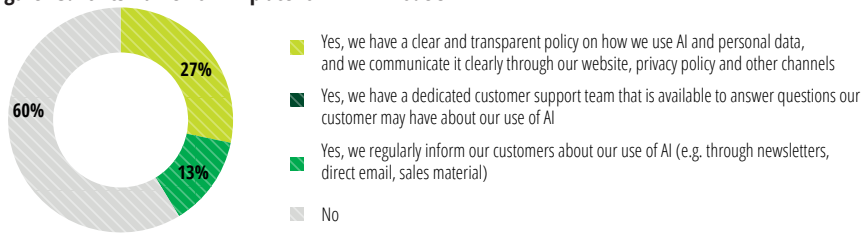


Figure 43. Ethics framework in place for AI/ML models



AI – Ethics and processes

Validation and monitoring of AI/ML model

Models using AI/ML techniques are more data-driven and subject to a wider range of risks, e.g., changing data patterns, data bias. Validation and monitoring of such models therefore require more comprehensive and dynamic approaches.

Approximately 85% of the banks with AI/ML modelling techniques, conduct independent model validations before the approval and use these models. Of this 85%, most banks conduct these validations internally.

Feedback loops to the users of models using AI/ML techniques are not yet common to monitor and to evaluate these models.

Communication of of AI/ML model outcomes

Effective communication of AI/ML model outcomes to users enables users to understand the model's predictions and make informed decisions. The two most common ways to communicate the outcomes of the AI/ML models to its users are through user guides and dedicated teams.

Figure 47. Communication of the outcomes of AI/ML models to its user

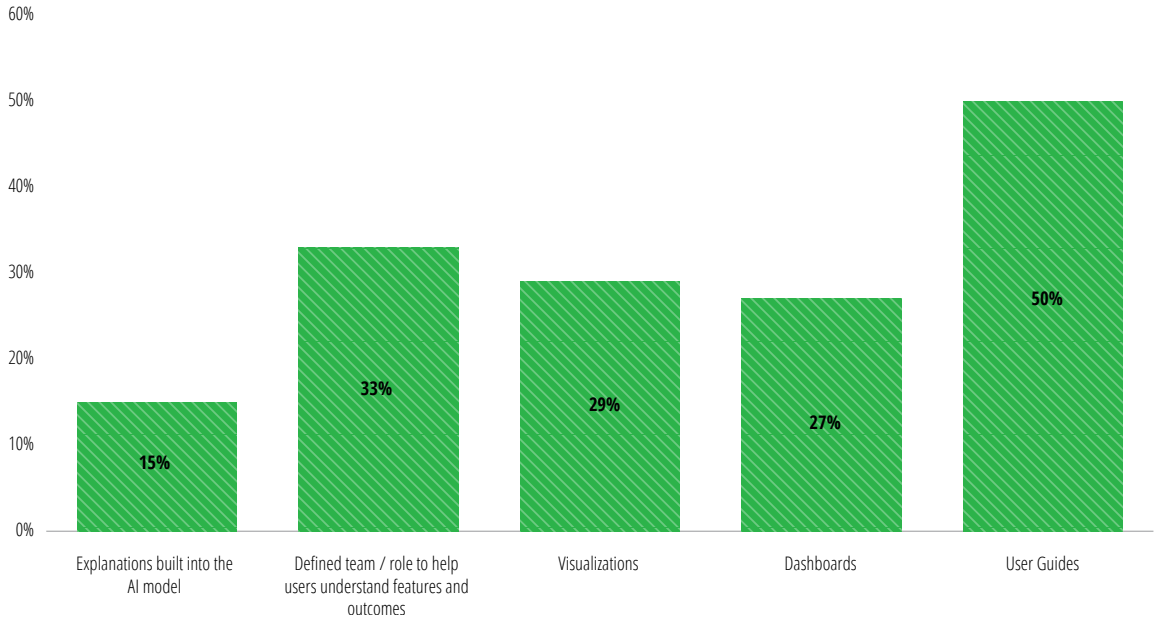


Figure 44. Independent model validation conducted before approval and use of AI/ML models

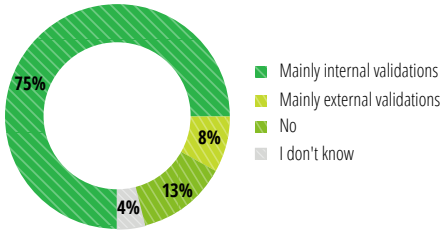


Figure 45. Monitoring of the performance of AI/ML models in use

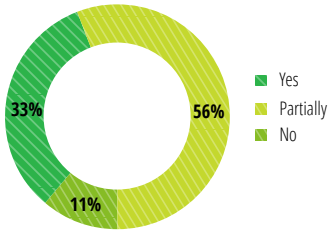
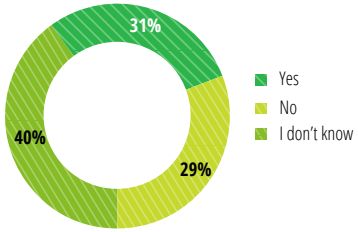


Figure 46. Banks with feedback loop to the users



AI – Ethics and processes

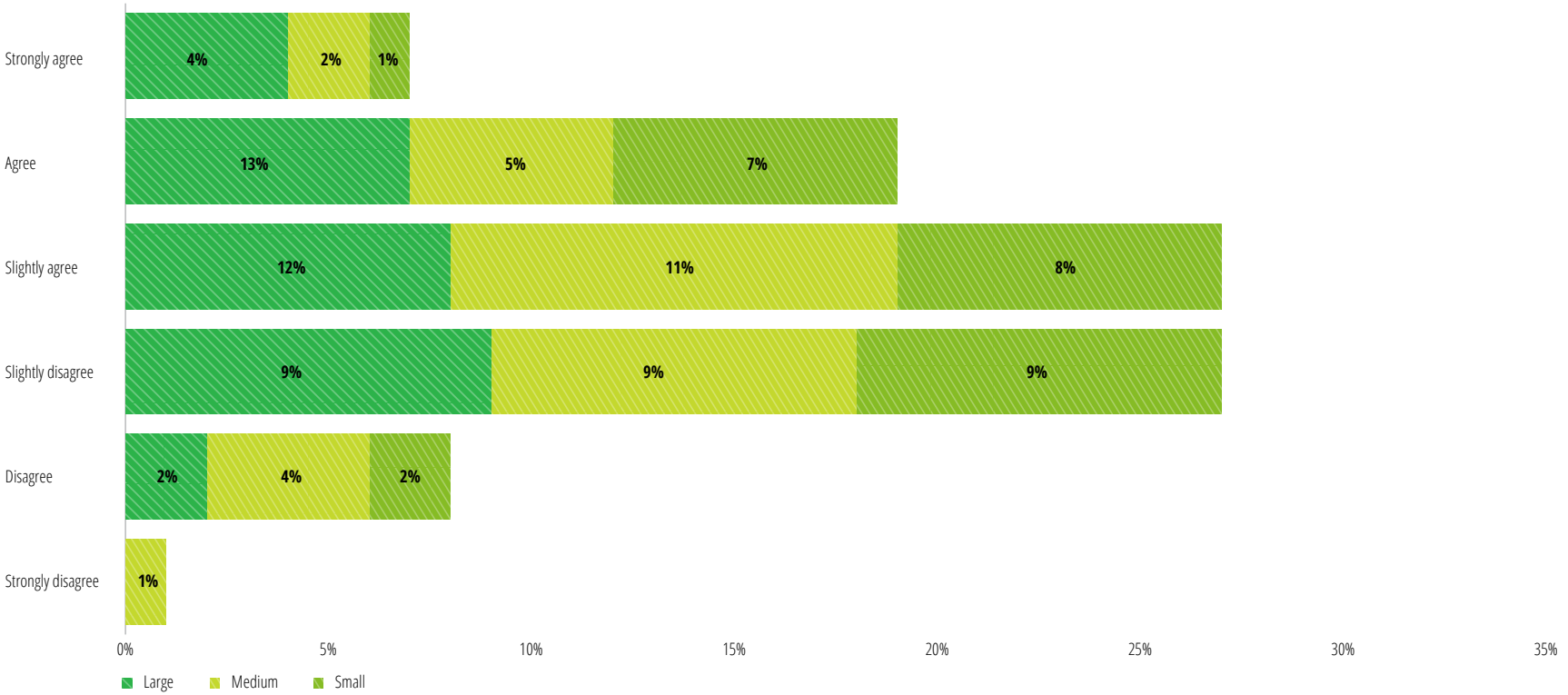
AI/ML model malfunctions and audits, and the role of AI/ML models in the future success of the organisation

A policy or guidelines regarding model malfunctions, when AI/ML modelling technique is used, is a proactive approach to mitigate model risks associated with the usage of these models. 35% of the banks with such models have a policy or guidelines regarding accountability if the model using AI/ML techniques malfunctions.

28% of the banks with AI/ML modelling techniques, engage external third parties to independently audit or validate their AI/ML technique using models.

Notably, three out of five banks agree that AI/ML is critical to their organisation's overall success in the next 5 years.

Figure 48. AI/ML is critical to our organisation's overall success in the next 5 years



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