



August 15, 2023

Dresner Advisory Services, LLC

2023 Edition

ModelOps Market Study

Wisdom of Crowds® Series

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2023 ModelOps Market Study

Disclaimer:

This report is for informational purposes only. You should make vendor and product selections based on multiple information sources, face-to-face meetings, customer reference checking, product demonstrations, and proof-of-concept applications.

The information contained in this Wisdom of Crowds® Market Study report is a summary of the opinions expressed in the online responses of individuals that chose to respond to our online questionnaire and does not represent a scientific sampling of any kind. Dresner Advisory Services, LLC shall not be liable for the content of this report, the study results, or for any damages incurred or alleged to be incurred by any of the companies included in the report as a result of the report's content.

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Definitions

Business Intelligence Defined

Business intelligence (BI) is “knowledge gained through the access and analysis of business information.”

Business Intelligence tools and technologies include query and reporting, OLAP (online analytical processing), data mining and advanced analytics, end-user tools for ad hoc query and analysis, and dashboards for performance monitoring.

Howard Dresner, *The Performance Management Revolution: Business Results Through Insight and Action* (John Wiley & Sons, 2007)

ModelOps Defined

ModelOps is the discipline of defining, implementing, monitoring, automating, and improving the life cycle of analytical models, including but not limited to artificial intelligence (AI) and machine learning (ML) models, including Large Language models (LLM).

Model Defined

For the purposes of this study, we define models to include all types of artificial intelligence and machine learning models as well as less-sophisticated analytical and decision-intelligence models.

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Introduction

For 16 years, Dresner Advisory Services has been dedicated to serving clients and communities through independent, objective research leadership in data, analytics, business intelligence, and performance management.

Last year, in support of our members, we published over 3,500 pages of independent and objective primary research across 20 different Flagship and thematic market reports, 50 Research Insights (thought leadership articles), and 55 Vendor Insights reports. As in previous years, we remain committed to creating the most in-depth and relevant research available for these domains.

This year, we present our second annual ModelOps Market Study, providing actionable clarity on optimizing the entire analytical model lifecycle. As dependency on predictive models intensifies, effective governance and management become imperative.

Our findings reveal the varying maturity of ModelOps capabilities across regions, industries, and organizations. For many, significant gaps persist between goals and realities. This report aims to empower data leaders across sectors with evidence-based insights for maximizing value from analytical models in a secure, scalable, and ethical manner.

We thank our clients, colleagues, and community members for their support, which helps us to develop this important research. We look forward to hearing from you after you explore the study findings within.

We hope you enjoy this report!

Best,



Chief Research Officer
Dresner Advisory Services

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Benefits of the Study

This Dresner Advisory Services ModelOps Market Study provides a wealth of information and analysis, offering value to both consumers and producers of business intelligence technology and services.

Consumer Guide

As an objective source of industry research, consumers use the Dresner Advisory Services ModelOps Market Study to understand how their peers leverage and invest in ModelOps technologies.

Using our unique vendor performance measurement system, users glean key insights into BI software supplier performance, which enables:

- Comparisons of current vendor performance to industry norms
- Identification and selection of new vendors.

Supplier Tool

Vendor licensees use the Dresner Advisory Services ModelOps Market Study in several important ways:

External Awareness

- Build awareness for business intelligence markets and supplier brands, citing ModelOps Market Study trends and vendor performance
- Gain lead and demand generation for supplier offerings through association with Dresner Advisory Services ModelOps Market Study brand, findings, webinars, etc.

Internal Planning

- Refine internal product plans and align with market priorities and realities as identified in the Dresner Advisory Services ModelOps Market Study
- Better understand customer priorities, concerns, and issues
- Identify competitive pressures and opportunities.

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About Howard Dresner and Dresner Advisory Services

The Dresner Advisory Services ModelOps Market Study was conceived, designed, and executed by Dresner Advisory Services, LLC—an independent advisory firm—and Howard Dresner, its President, Founder and Chief Research Officer.

Howard Dresner is one of the foremost thought leaders in business intelligence and performance management, having coined the term “Business Intelligence” in 1989. He



has published two books on the subject, *The Performance Management Revolution – Business Results through Insight and Action* (John Wiley & Sons, Nov. 2007) and *Profiles in Performance – Business Intelligence Journeys and the Roadmap for Change* (John Wiley & Sons, Nov. 2009). He lectures at forums around the world and is often cited by the business and trade press.

Prior to Dresner Advisory Services, Howard served as chief strategy officer at Hyperion Solutions and was a research fellow at Gartner, where he led its business intelligence research practice for 13 years.

Howard has conducted and directed numerous in-depth primary research studies over the past two decades and is an expert in analyzing these markets.

Through the Wisdom of Crowds® Business Intelligence market research reports, we engage with a global community to redefine how research is created and shared. Other research reports include:

- Wisdom of Crowds® Flagship BI Market Study
- AI, Data Science and Machine Learning
- Analytical Data Infrastructure
- Analytical Platforms
- Data Catalog
- Data Engineering
- Data Governance
- Embedded Business Intelligence
- Master Data Management

You can find more information about Dresner Advisory Services at www.dresneradvisory.com.

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About Bill Hostmann

Bill Hostmann is a Research Fellow with Dresner Advisory. His area of focus includes trends in Analytic Data Infrastructures (ADI)—integrating and managing the information and information models used by BI, Advanced Analytics, and CPM/PM applications.



Bill has more than 20 years of product management experience at the intersection of business intelligence/analytics and data analytics infrastructure, including positions in product and general management at Gemstone Systems, Informix, and Informatica.

He spent 14 years as a research analyst at Gartner, including several years as a VP and Distinguished Analyst for BI/Analytics. Bill's academic education includes BSEE, MSCS&EE, and MBA degrees.

The Dresner Team

About Elizabeth Espinoza

Elizabeth is Research Director at Dresner Advisory and is responsible for the data preparation, analysis, and creation of charts for Dresner Advisory reports.

About Kathleen Goolsby

Kathleen is Senior Editor at Dresner Advisory ensuring the quality and consistency of all research publications.

About Danielle Guinebertiere

Danielle is the Director of Client Services at Dresner Advisory. She supports the ongoing research process through her work with executives at companies included in Dresner market reports.

About Michelle Whitson-Lorenzi

Michelle is Client Services Manager and is responsible for managing software company survey activity and our internal market research data.

Survey Method and Data Collection

As with all our Wisdom of Crowds® market studies, we constructed a survey instrument to collect data and used social media and crowdsourcing techniques to recruit participants.

Data Quality

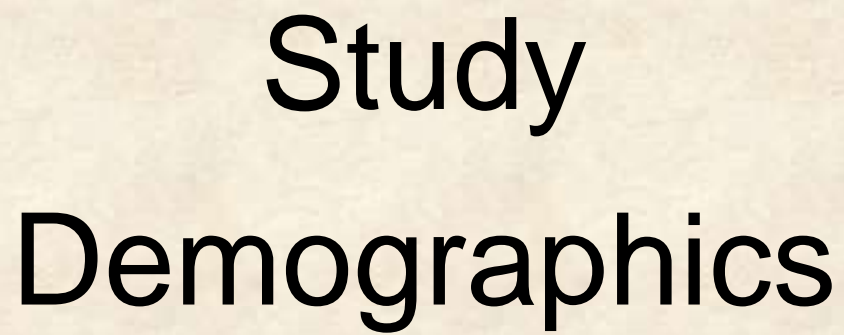
We carefully scrutinized and verified all respondent entries to ensure that only qualified participants were included in the study.

Executive Summary

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Executive Summary

- The 2023 ModelOps Market Survey demographics include *IT* as the largest group of respondents at 32 percent, followed by *executive management* (19 percent), *finance* (16 percent), and *BICC* (7 percent). The study includes respondents from various vertical industries with business services, technology, and manufacturing being the most represented. The sample base includes small (23 percent), midsize (24 percent), and large organizations (54 percent). Overall, the survey data underscores the diverse landscape of model usage across different functions, with variations in the adoption of models in production. Understanding these pattern variations can aid organizations in aligning their resources and strategies to effectively leverage data science and machine learning capabilities.
- Most organizations have 25 or fewer AI, data science, and ML models in production. Additionally, 46 percent of the respondents indicated that they *don't know* how many models are in production. Model usage increases with organization size, with the largest organizations having over 250 models in production.
- The *data science team* and the *IT* department are the primary functions responsible for ModelOps. However, other functions, such as business units and finance, also play significant roles in overseeing these models within an organization.
- The most common model refresh frequency across all regions is *monthly*, with a significant portion of respondents choosing this option. *Daily* and *weekly* model refresh frequencies are also notable, especially in North America and Asia Pacific. Model refresh frequency is shortest overall among respondents in the *consumer services* and *retail and wholesale* industries.
- The importance of ModelOps capabilities varies depending on the organization and the stage of their machine learning projects. Respondents chose *model life-cycle management*, *model version control*, *monitoring and alerting* and *continuous integration, delivery, and training* as the most important. *Integration with Amazon SageMaker* is the lowest-ranked priority, which is somewhat surprising, given its popularity in the market.
- Overall, the survey indicates that many vendors already support essential ModelOps capabilities, such as *model life-cycle management*, *model rollback*, and *model version control*. However, some capabilities, such as *collaborative model co-creation tools* and *continuous integration, delivery and training*, still lack broad adoption. It is promising to see that certain capabilities, like *feature stores* and *model lineage/history*, are expected to gain traction in the next 12 to 24 months. Notably, a significant percentage of vendors have no plans to incorporate certain capabilities, like *automated drift management* and *monitoring/alerting*, which could impact the efficiency and reliability of ModelOps processes.
- ModelOps vendor ratings are on page 42.



Study
Demographics

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Study Demographics

Participants provide a cross-section of data across geographies, functions, organization sizes, and vertical industries. We believe that, unlike other industry research, this supports a more representative sample and better indicator of true market dynamics. We constructed cross-tab analyses using these demographics to identify and illustrate important industry trends.

Geography

Survey respondents represent a span of geographies. North America, which includes the United States, Canada, and Puerto Rico, accounts for about 54 percent of our survey base. EMEA respondents are the next largest group with about 26 percent, followed by Asia Pacific and Latin America (fig. 1).

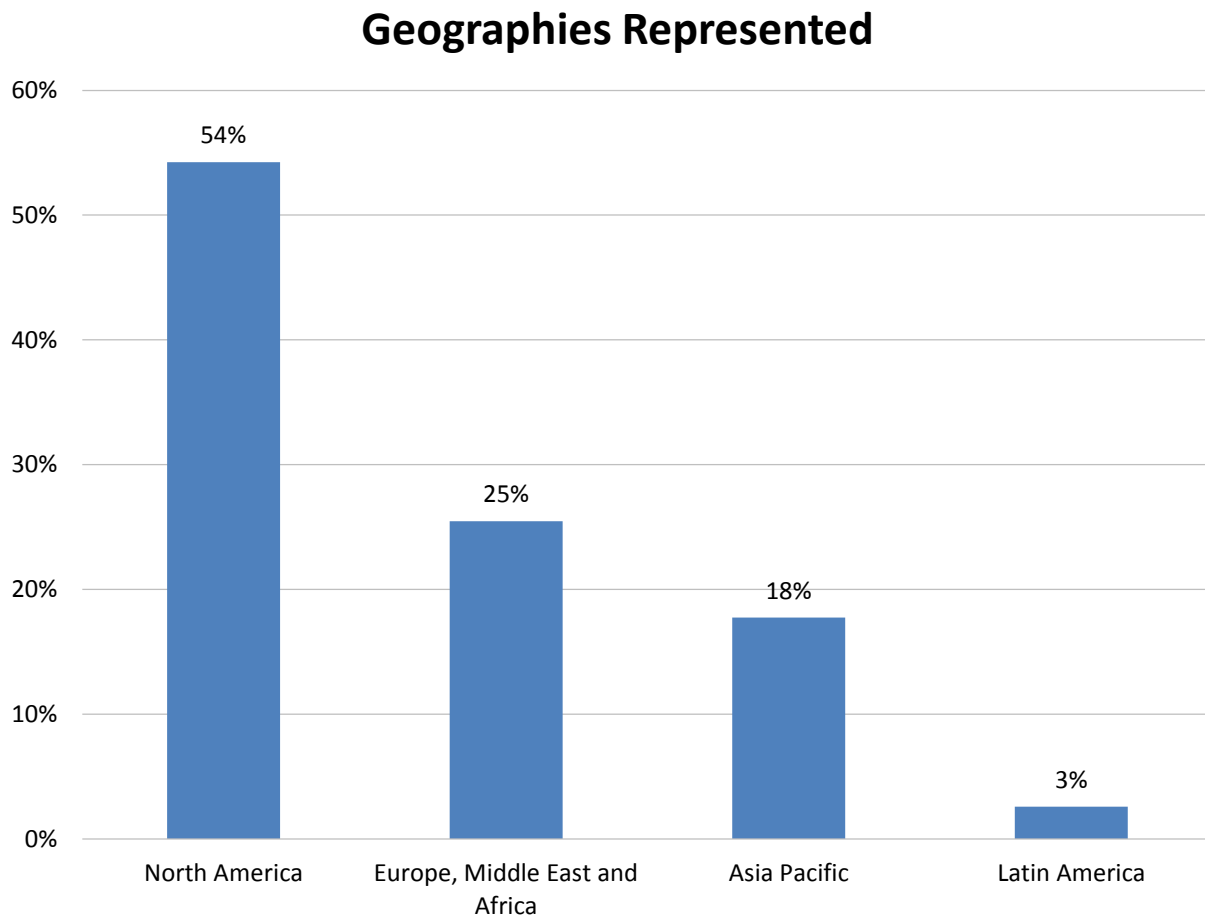


Figure 1 – Geographies represented

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Functions

In our 2023 study, *IT* comprises the largest group by percentage (32 percent) in our sample base (fig. 2). *Executive management* (19 percent), *finance* (16 percent), and *BICC* (7 percent) are the next most represented functions. Tabulating results by function enables us to compare and contrast the plans and priorities of different departments within organizations.

Functions Represented

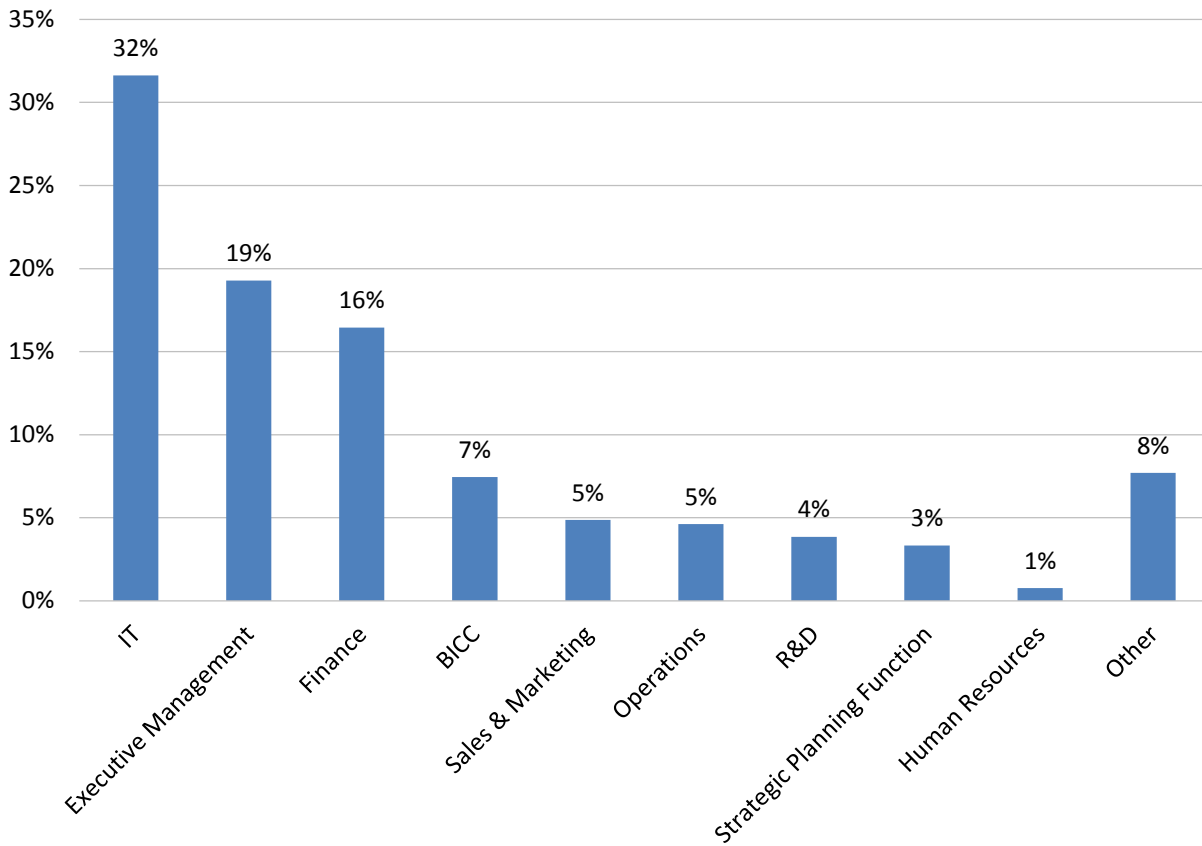


Figure 2 – Functions represented

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Vertical Industries

Our study base includes a cross section of vertical industries. *Business services*, *technology*, and *manufacturing* are the most represented, followed by *financial services* and *healthcare* (fig. 3).

Vertical Industries Represented

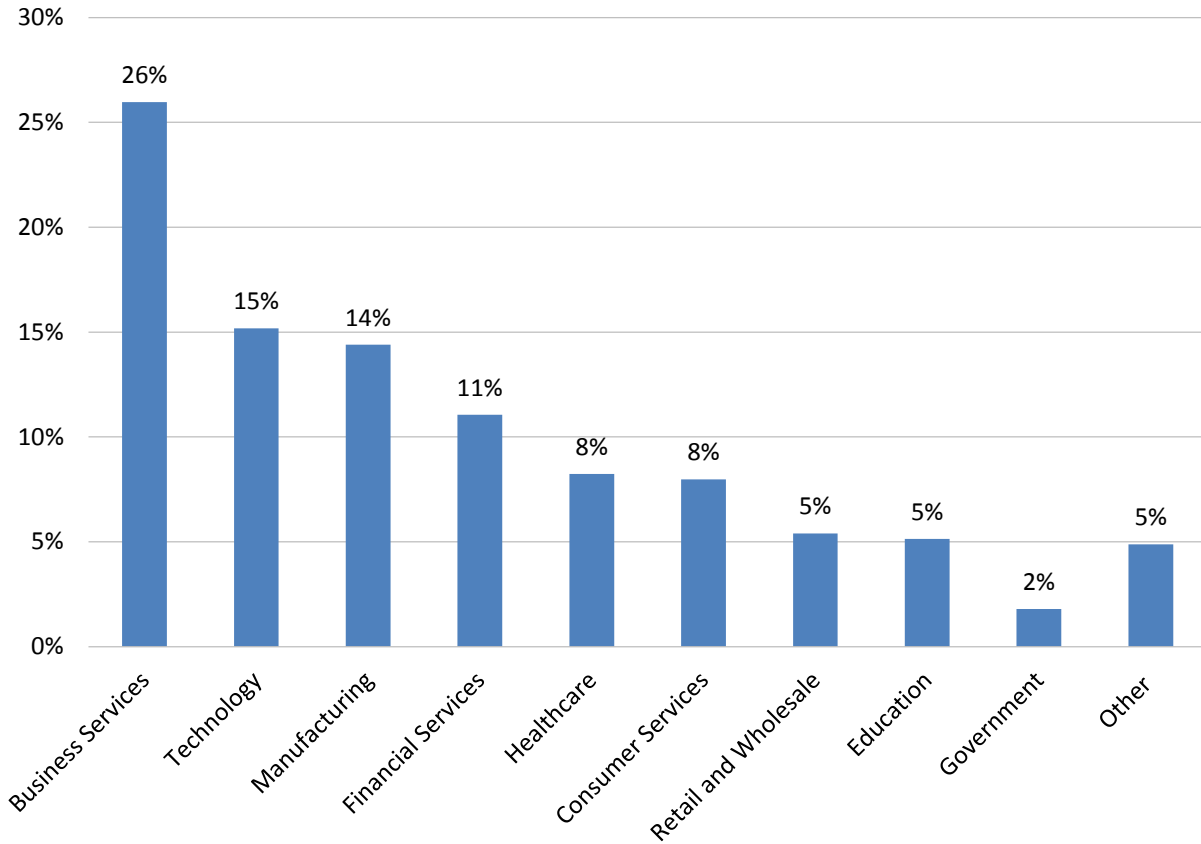


Figure 3 – Vertical industries represented

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Organization Size

In our 2023 study, our survey base reflects a mix of small, midsize, and large organizations (fig. 4). Small organizations (1-100 employees) account for 23 percent of the sample; midsize organizations (101-1,000 employees) account for 24 percent; and the remaining 54 percent are spread across large organizations with more than 1,000 employees. Segmenting respondents by organization size helps us identify differences in behavior, attitudes, and planning often related to headcount.

Organization Sizes Represented

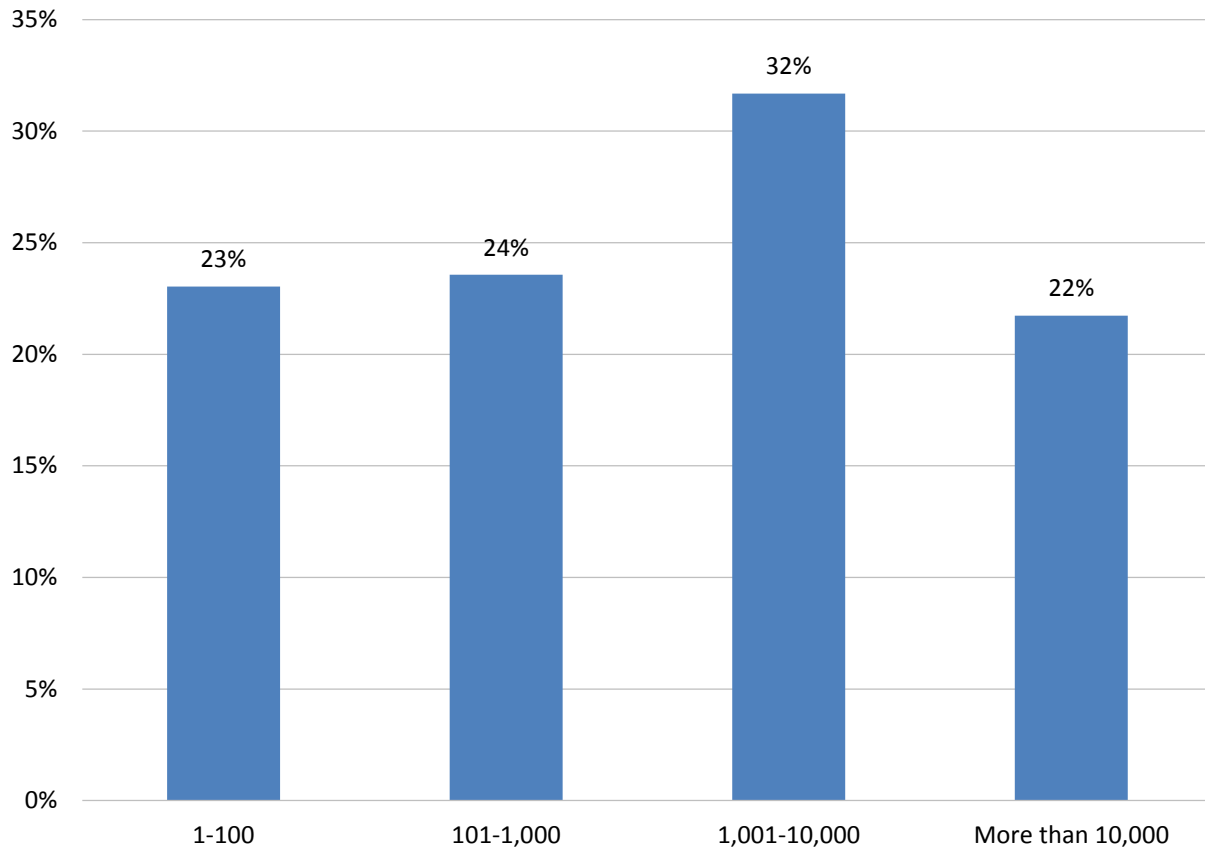


Figure 4 – Organization sizes represented

Analysis and Trends

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Analysis and Trends: ModelOps

Technology Trends

Model operations (ranked 49 out of 59) relates to several technologies and initiatives strategic to business intelligence, including spreadsheets (13th), data science (23rd), cognitive BI (36th), and multiple discrete topics involving analytics.

Technologies and Initiatives Strategic to Business Intelligence

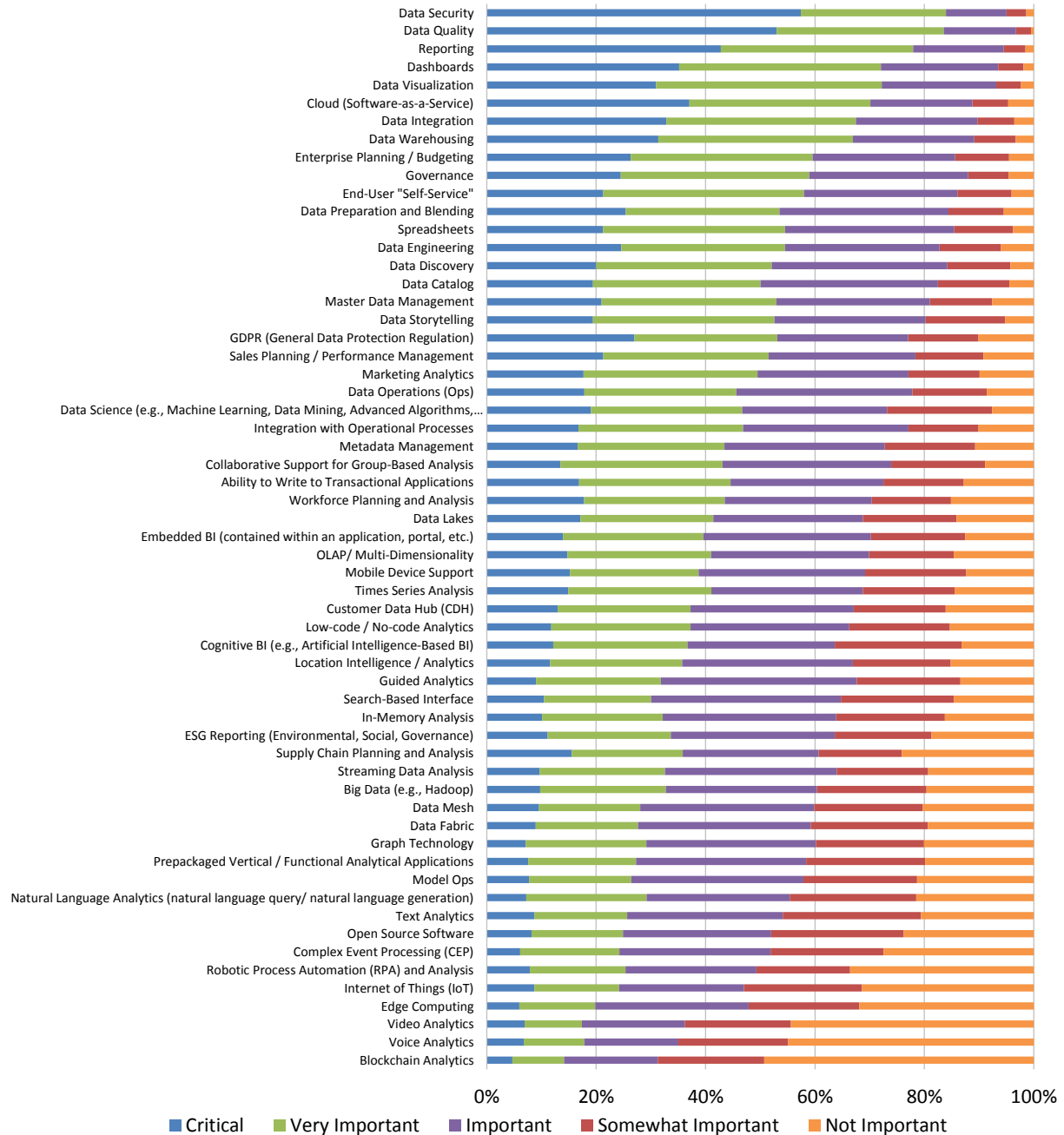


Figure 5 – Technologies and initiatives strategic to business intelligence

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Number of AI, Data Science, and Machine Learning Models in Use

Since 2018, we asked survey respondents about the number of AI, data science, and machine learning models in production in their organizations. Throughout this time span, the great majority of those responding estimate their number at 25 or less. The proportion of organizations using a smaller number of models (1-25 and 26-50 models) fluctuated over the years. However, in 2023, there is a noticeable increase in organizations using 26-50 models (5.84 percent), compared to the previous years.

Interestingly, the "don't know" category remained relatively stable throughout the years, suggesting that some organizations may have limited visibility into the exact number of data science models they use.

Number of AI, Data Science, and Machine Learning Models in Use 2018-2023

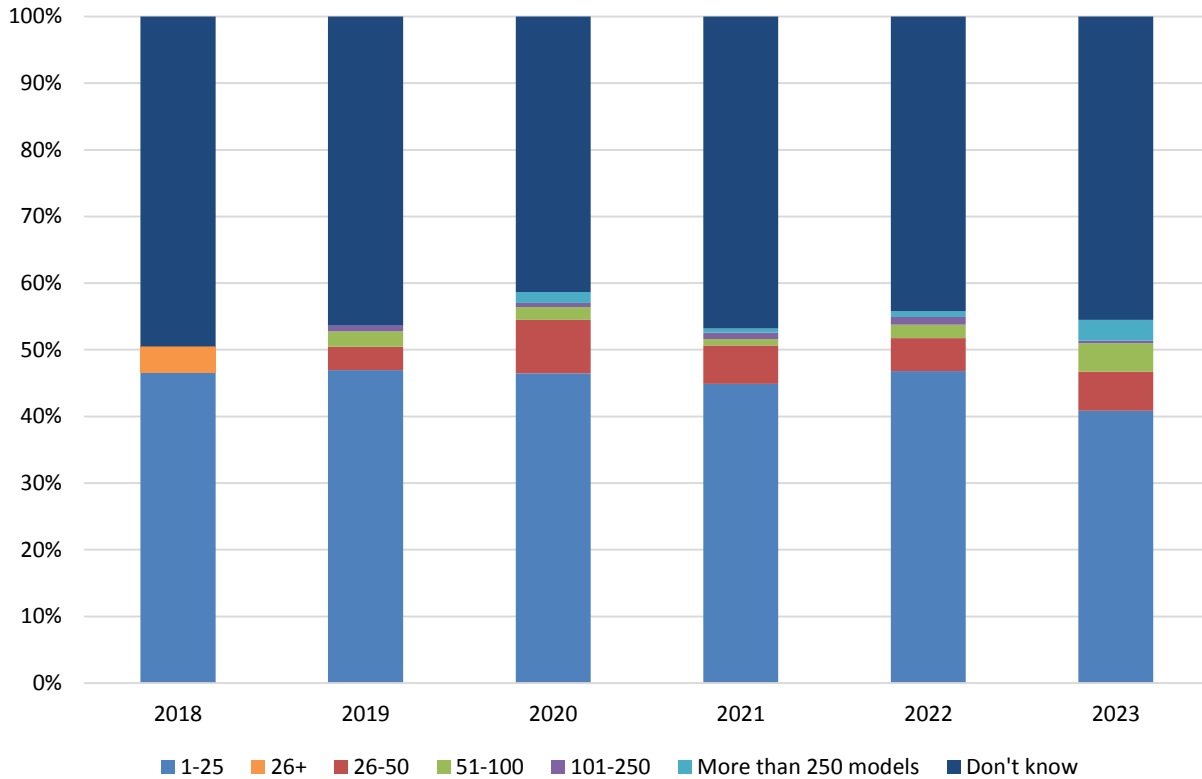


Figure 6 – Number of AI, data science, and machine learning models in use 2018-2023

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The following data and chart represent the distribution of the number of AI, data science, and machine learning models used within different geographic regions. In *North America*, the majority of organizations (51 percent) report not knowing the exact number of models they use. Among those with known numbers, 36 percent use 1-25 models, while smaller proportions use 26-50 models (4 percent), 51-100 models (5 percent), 101-250 models (1 percent), and more than 250 models (4 percent). The average number of models in *North America* is 38.7. In the *Asia Pacific* region, the highest proportion of organizations (52 percent) report using 1-25 models. The next largest group responded *don't know* (29 percent). The average number of models in the *Asia Pacific* region is 33. In the *Europe, Middle East, and Africa* region, the highest proportion of organizations (45 percent) report *don't know*. Among those with known numbers, 44 percent use 1-25 models, 5 percent use 26-50 models, and 3.13 percent use both 51-100 models and 101-250 models. The average number of models in the EMEA region is 32.3.

Number of AI, Data Science, and Machine Learning Models in Use by Geography

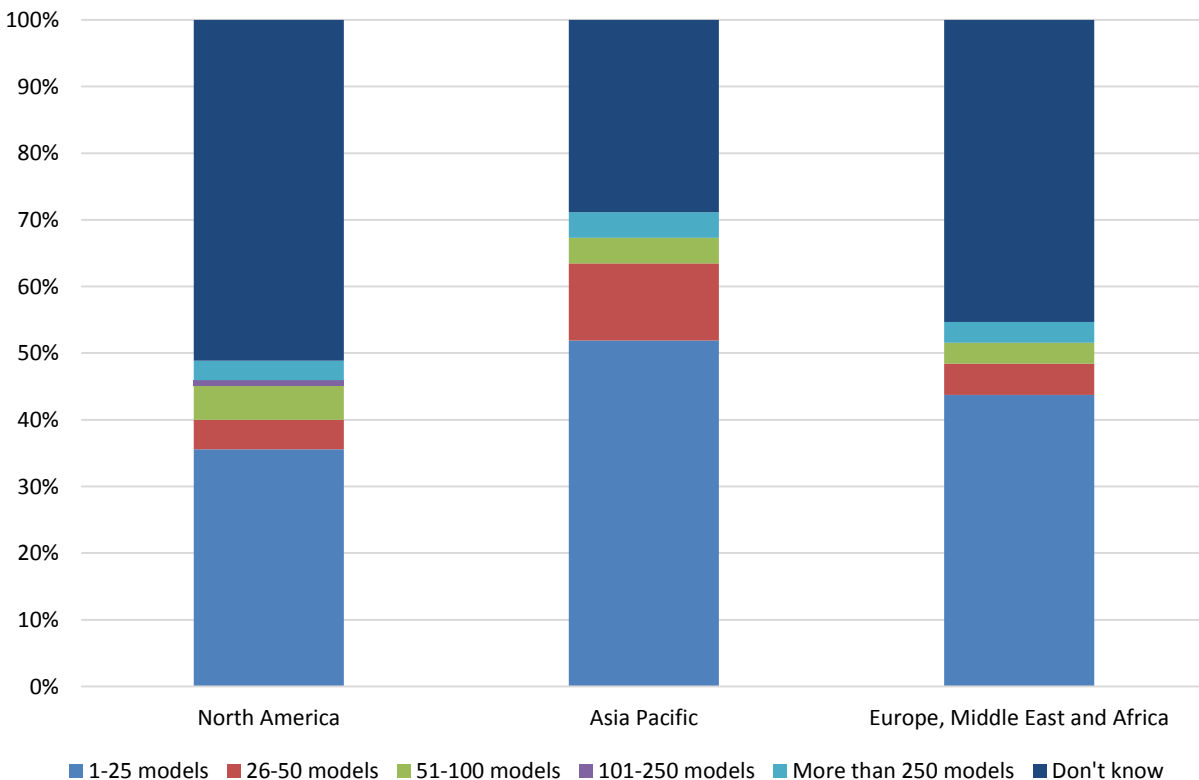


Figure 7 – Number of AI, data science, and machine learning models in use by geography

Overall, the data highlight a few regional variations in the distribution of models, with *North America* having a higher proportion of organizations with an unknown number of

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models, while the *Asia Pacific* and EMEA regions have a higher proportion of organizations using 1-25 models.

The survey data underscore the diverse landscape of model usage across different functions, with variations in the adoption of both moderate (e.g., 1-25) and advanced (>250) numbers of models. Understanding these pattern variations can aid organizations in aligning their resources and strategies to effectively leverage data science and machine learning capabilities within specific functional areas and across functions.

Notably, the "don't know" category is prominent in several functions, including operations, BICC, R&D, executive management, and finance. This suggests that some organizations lack clarity on the exact number of models being used, potentially highlighting a need for improved visibility and tracking of model utilization, effectiveness, and value.

Number of AI, Data Science, and Machine Learning Models in Use by Function

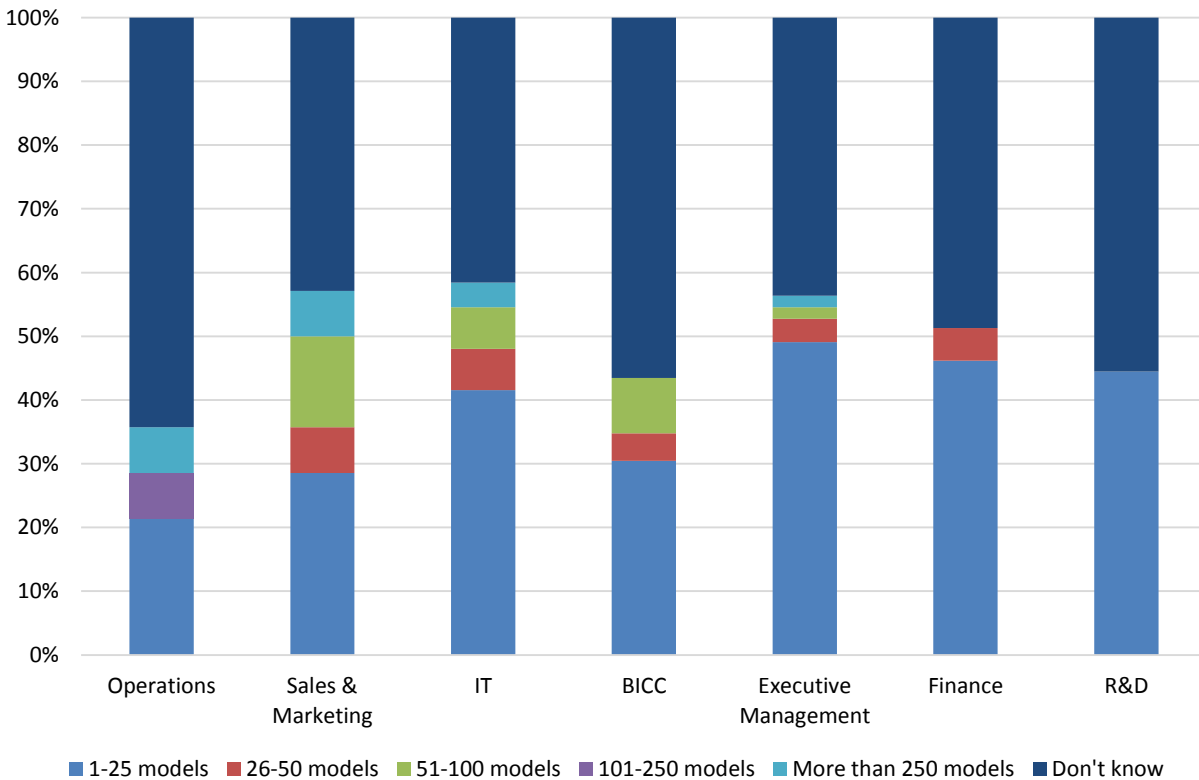


Figure 8 – Number of AI, data science, and machine learning models in use by function

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The data highlight variations in the distribution of models used across different industries, with some industries having a higher proportion of organizations with unknown model counts and others showing a higher usage of specific model ranges.

Financial services: The highest proportion (39 percent) of organizations report using 1-25 models. Additionally, 12 percent use 26-50 models, 6 percent use 51-100 models, and 6 percent use more than 250 models. A significant percentage (36 percent) responded with "don't know."

Business services: The majority (46 percent) of organizations reported "don't know" about the number of models they use. Among those with known numbers, 35 percent use 1-25 models, 7 percent use 26-50 models, 4 percent use 51-100 models, and 6 percent use more than 250 models.

Number of AI, Data Science, and Machine Learning Models in Use by Industry

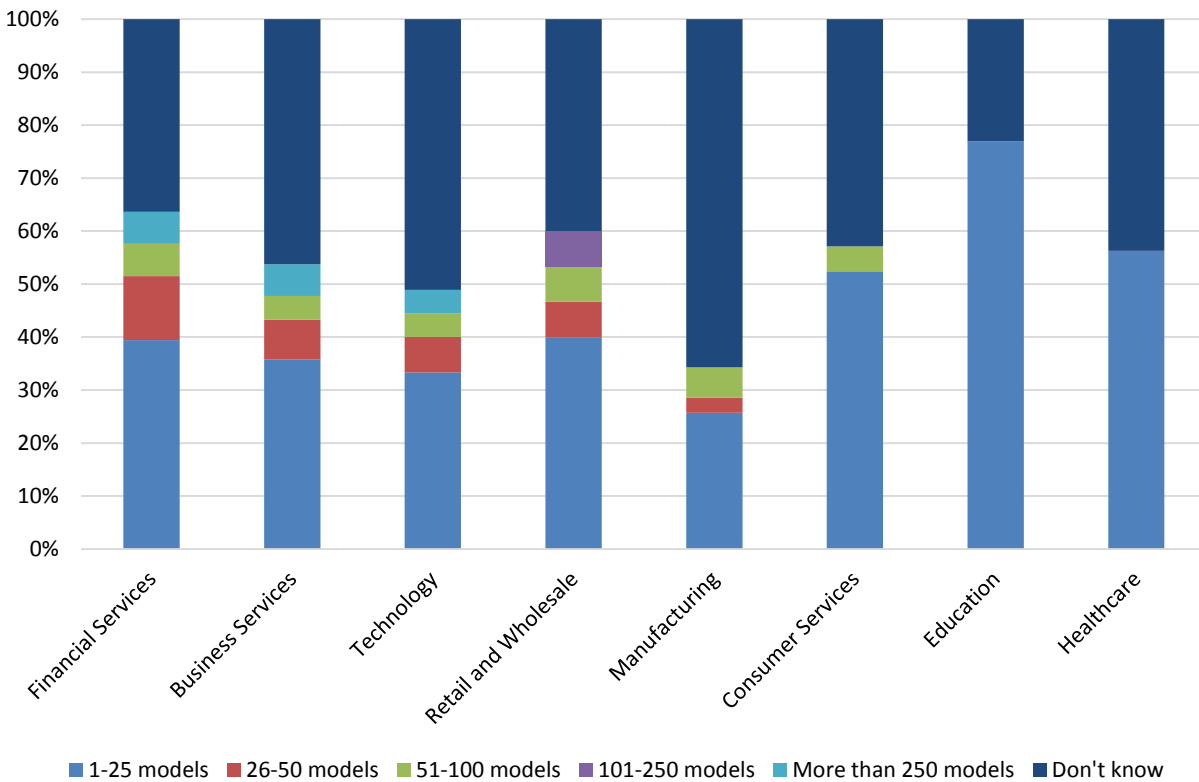


Figure 9 – Number of AI, data science, and machine learning models in use by industry

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The use and number of AI, data science, and machine learning models increases dramatically with organization size, with 15 percent of the largest organizations indicating that they use more than 250 models. The average number of models in use in smaller organizations (below 1,000 employees) is below 20 models.

Number of AI, Data Science, and Machine Learning Models in Use by Organization Size

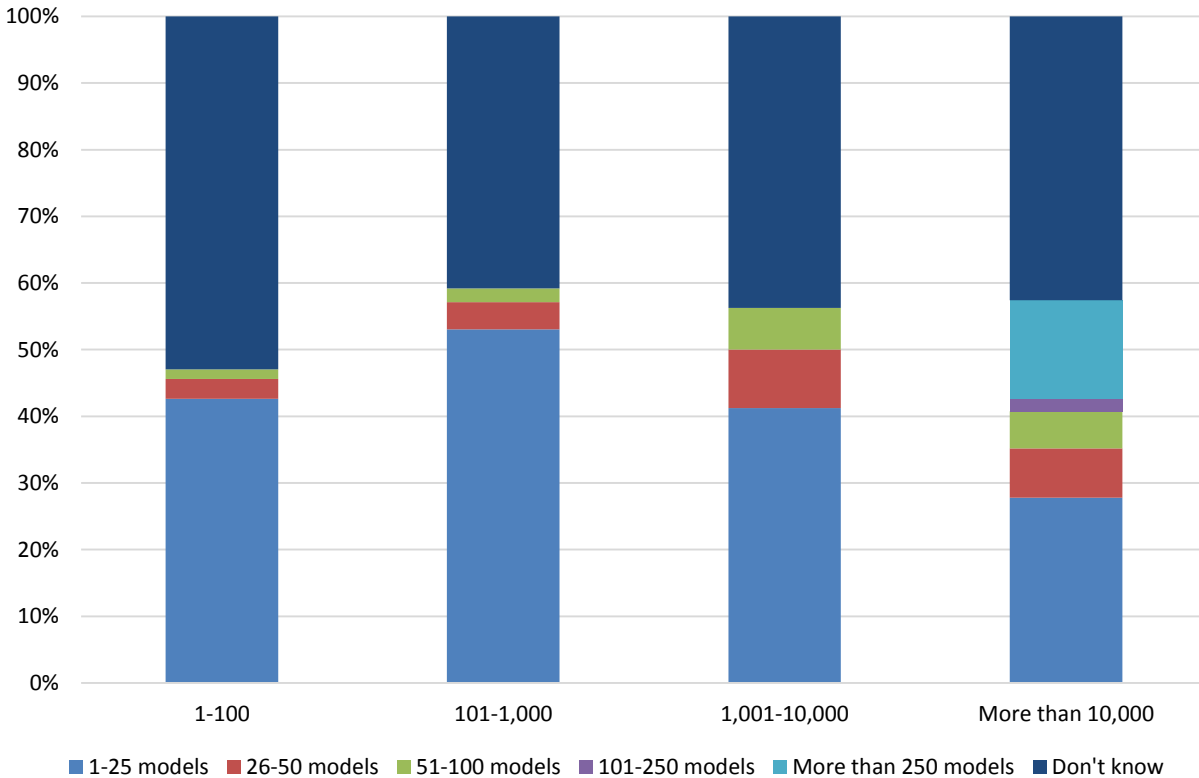


Figure 10 – Number of AI, data science, and machine learning models in use by organization size

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Responsibility for Data Science, and Machine Learning Models

We asked respondents, “Who is responsible for monitoring/managing ML / predictive models (i.e., ModelOps)?” and provided a mix of oversight authority choices by department. Beginning in 2020, we offered the option of selecting *data science team*, which respondents identified as the top or most ascendant department alongside *IT*. In summary, the responses indicate that the *data science team* and the *IT* department are the primary functions responsible for ModelOps. However, other functions, such as business units and finance, also play significant roles in overseeing these models within an organization. The varying involvement of *business units* and the relatively smaller roles of the *finance* department, *BI competency center*, and *R&D* functions may reflect the specific needs and priorities of each organization over time.

Responsibility for AI, Data Science, and Machine Learning Models by Function 2018-2023

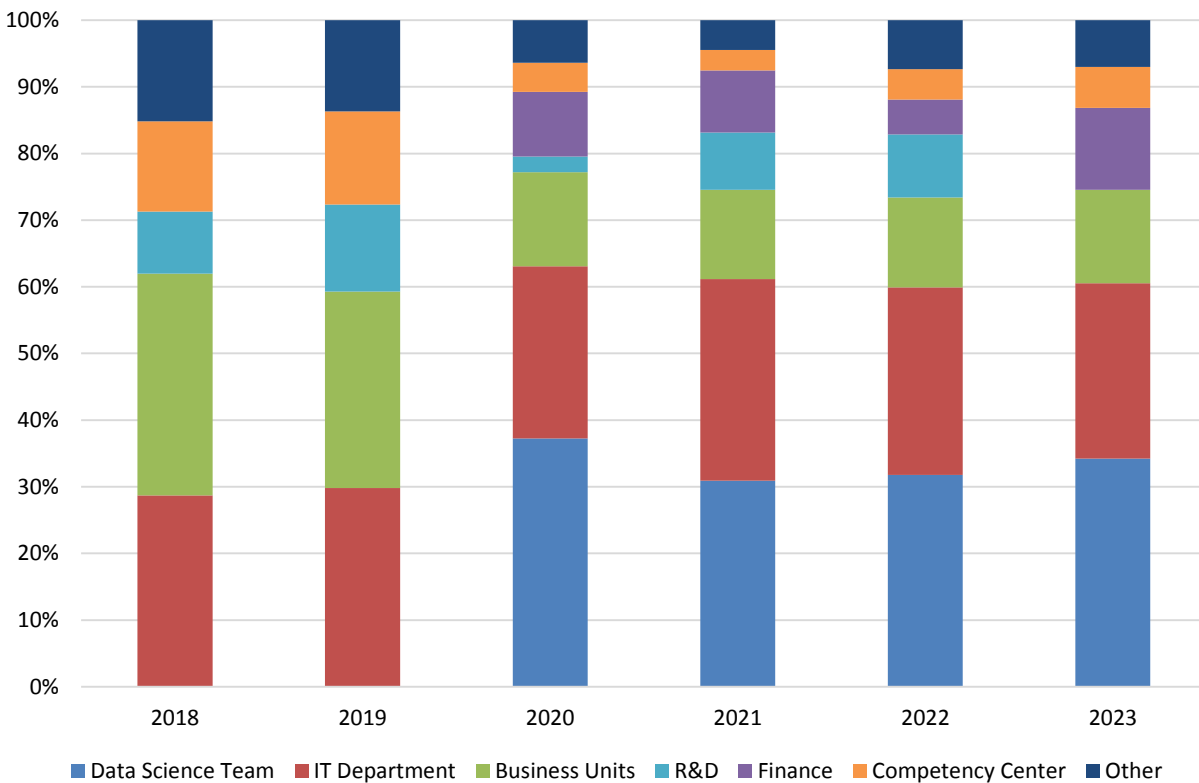


Figure 11 – Oversight responsibility for AI, data science, and machine learning models 2018-2023

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The analysis of the data on oversight responsibility for AI, Data Science, and Machine Learning Models by geography reveals the following key points. Across all geographies, the *data science team* and *IT* functions are the functions most responsible for ModelOps. Overall, the analysis highlights the distribution of ModelOps responsibility across different regions and departments, suggesting opportunities for enhancing and setting cross-functional policies for model monitoring and management practices. Organizations can use these insights to improve model governance and ensure effective oversight of Data Science and ML models within their operations.

Oversight Responsibility for AI, Data Science, and Machine Learning Models by Geography

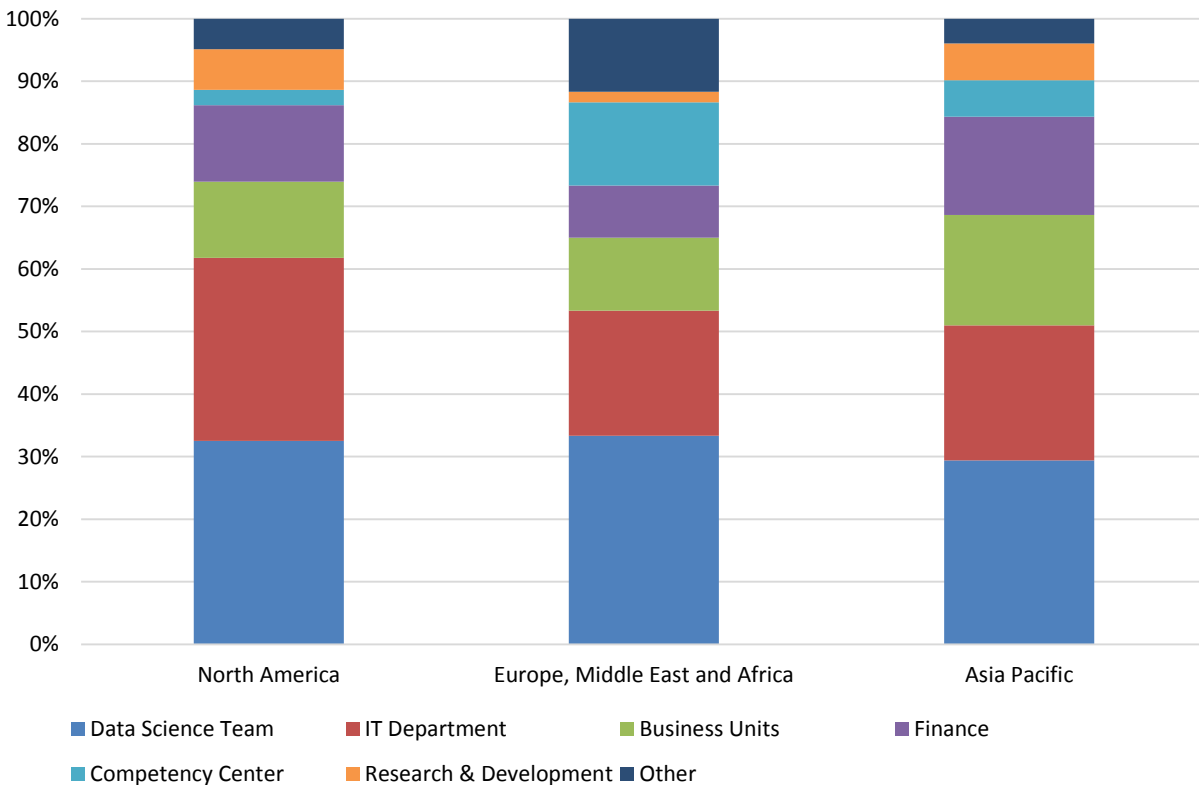


Figure 12 – Oversight responsibility for AI, data science, and machine learning models by geography

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Viewed by vertical industry, more than 50 percent of the oversight for AI, data science, and machine learning models is provided by the *data science team* or *IT*. *Manufacturing* is unique in that IT has the primary role for ModelOps rather than the *data science teams*. In *Education*, business units have comparatively more responsibility for ModelOps than other industries. In *Healthcare*, the finance function has a comparatively higher role in ModelOps than other industries. A number of *technology* industry respondents indicated that ModelOps responsibility can be found in the R&D functions. Overall, the analysis provides valuable insights into the distribution of ModelOps responsibility across different industry sectors and departments. Organizations can use these insights to better understand the current state of model management practices within each sector and potentially identify areas that may require additional focus or improvements.

Oversight Responsibility for AI, Data Science, and Machine Learning Models by Industry

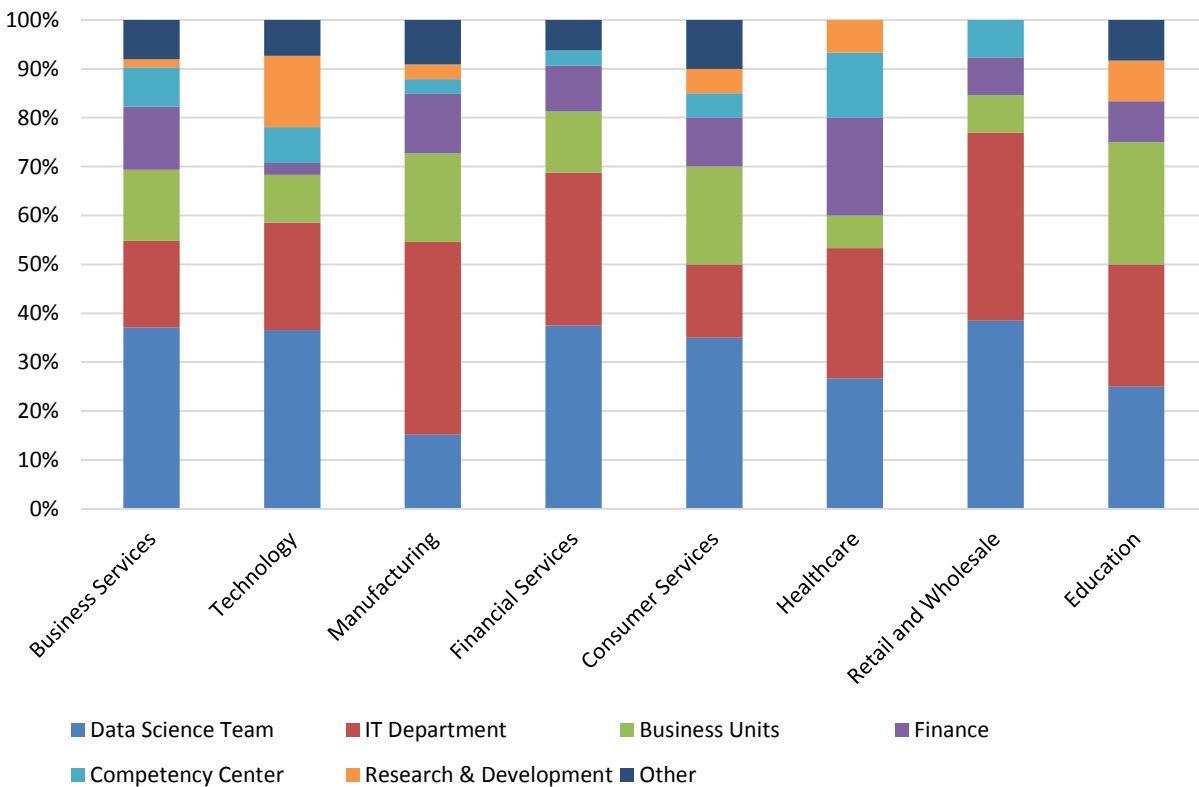


Figure 13 – Oversight responsibility for AI, data science, and machine learning models by industry

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Though scale plays a role, reporting authority for AI, data science, and machine learning does not vary dramatically according to organization size. Most evident, the likelihood of finding a dedicated data science team responsible for ModelOps gradually increases as organization size increases, from 21 percent in small organizations of 100 employees or less, to 36 percent in very large organizations of 10,000 or more. Conversely, 21 percent of small organizations roll up ModelOps reporting to IT, compared to 33 percent in very large organizations. Business unit responsibility for ModelOps also increases as organization size increases, from 15 percent in small organizations to 20 percent in very large organizations. Very large organizations are most likely (13 percent) to identify R&D as reporting authority. In summary, the analysis highlights variations in ModelOps responsibility based on the number of employees in an organization. Organizations can utilize these insights to identify patterns and trends related to model management practices in groups of different sizes and to optimize ModelOps responsibilities accordingly.

Oversight Responsibility for AI, Data Science, and Machine Learning Models by Organization Size

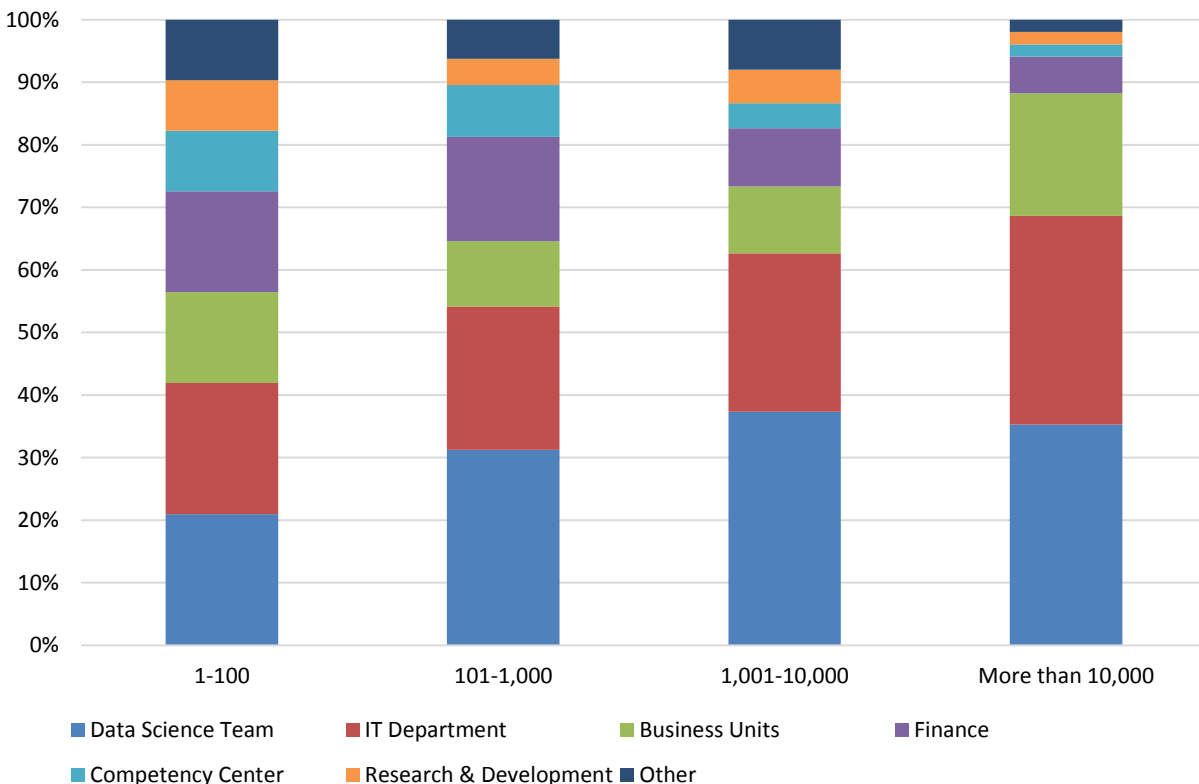


Figure 14 – Oversight responsibility for AI, data science, and machine learning models by organization size

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Refresh Frequency for Data Science and Machine Learning Models

Beginning in 2018, we asked respondents how often organizations refresh models. The most common refresh rates are daily, weekly, and monthly. Over time, we observe a slowly decreasing latency in refresh rates that somewhat reversed in 2023. For example, *combined daily and weekly* model refresh rates increased from 43 percent in 2018 to 53 percent in 2021 but declined to less than 40 percent in our latest study. In the same period, *monthly* refresh rates increased to 26 percent in 2023, compared to 19 percent in 2021. The data make it hard to demonstrate a longer-term latency trend in refresh cycles for ModelOps.

Refresh Frequency for AI, Data Science, and Machine Learning Models 2018-2023

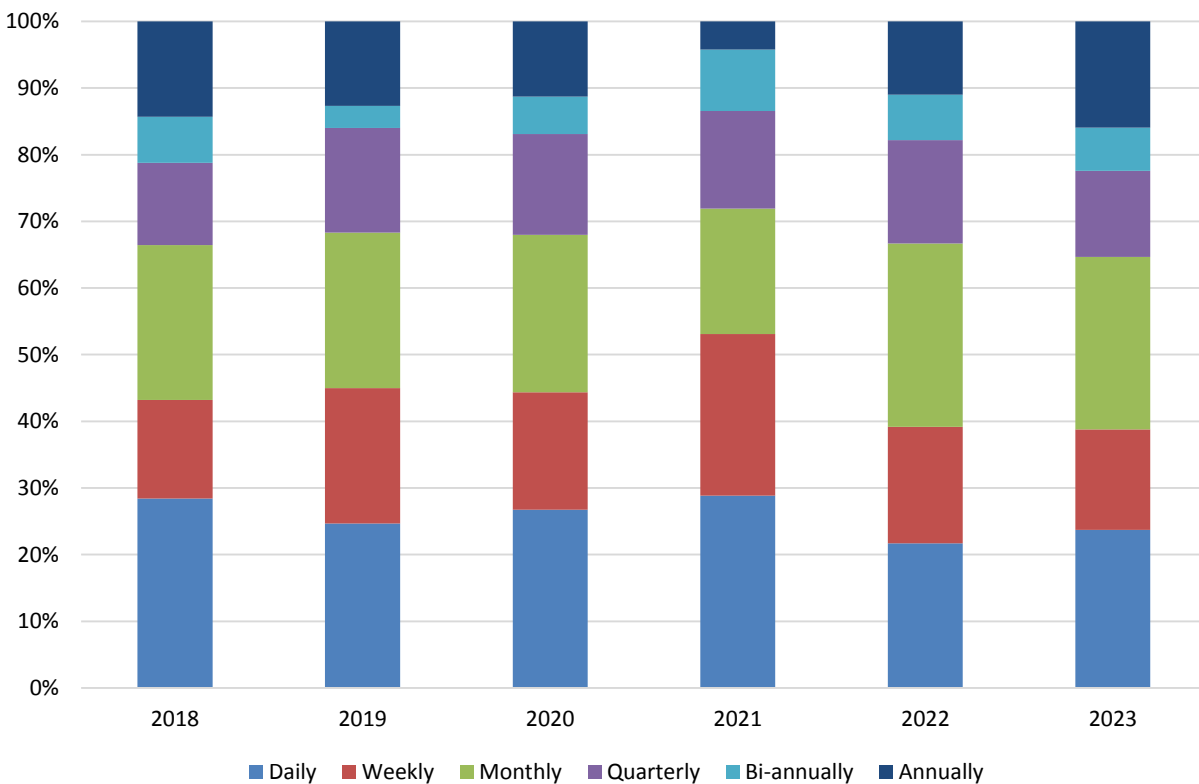


Figure 15 – Refresh frequency for AI, data science and machine learning models 2018-2023

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In summary, the data reveal the predominant model refresh frequencies across different geographic regions. The most common model refresh frequency across all regions is *monthly*, with a significant portion of respondents choosing this option. *Daily* and *weekly* model refresh frequencies are also notable, especially in North America and Asia Pacific. Quarterly, *bi-annually*, and *annual* model refresh frequencies are less commonly chosen by respondents, with Europe, Middle East, and Africa (EMEA) having a relatively higher percentage of respondents selecting annual refresh. Organizations can use these insights to benchmark their own model refresh practices against industry norms and identify potential areas for improvement in their model management processes.

Refresh Frequency for AI, Data Science, and Machine Learning Models by Geography

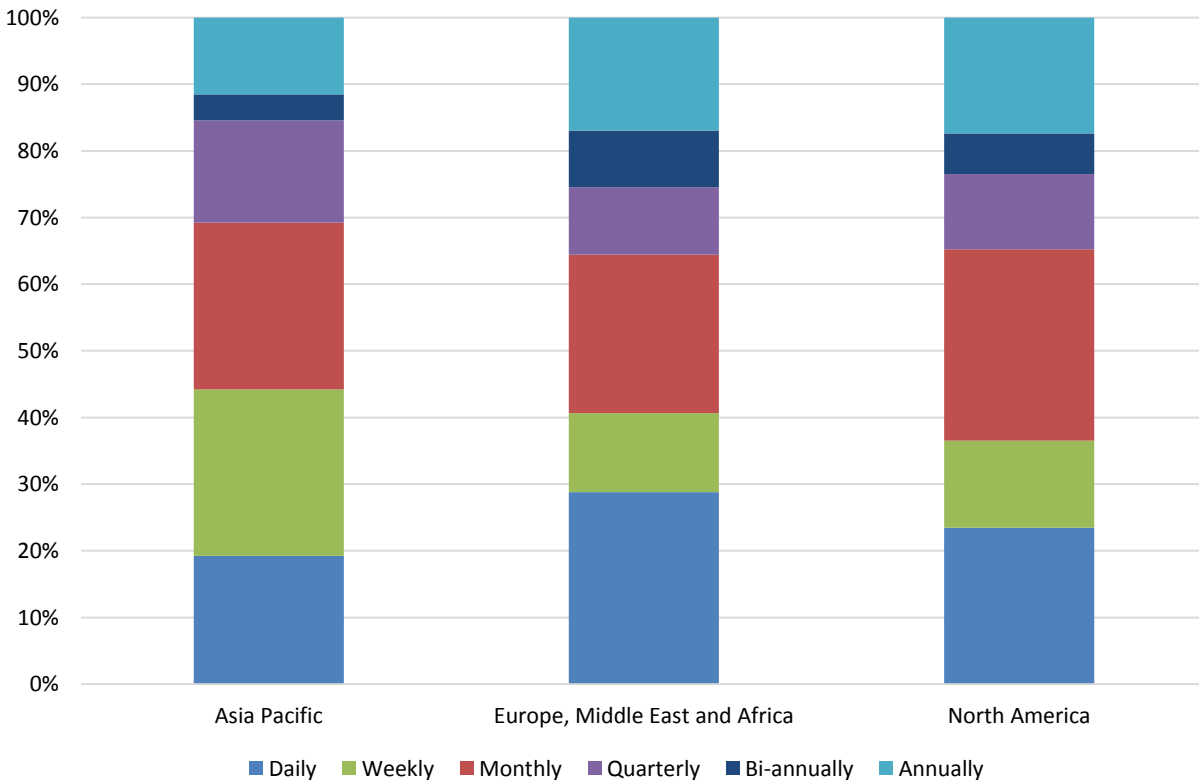


Figure 16 – Refresh frequency for AI, data science, and machine learning models by geography

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Viewed by function, refresh frequency for AI, data science, and machine learning models is shortest overall among *Sales and marketing* and *BICC* function respondents and thereafter flattens across most other functions. This year, *IT* also reports the highest percent of models refreshed monthly (31 percent). All other functions' refresh rates vary in detail. Twenty one percent of respondents in *finance* functions prefer a monthly refresh, indicating a focus on periodic updates for financial analytics.

Refresh Frequency for AI, Data Science, and Machine Learning Models by Function

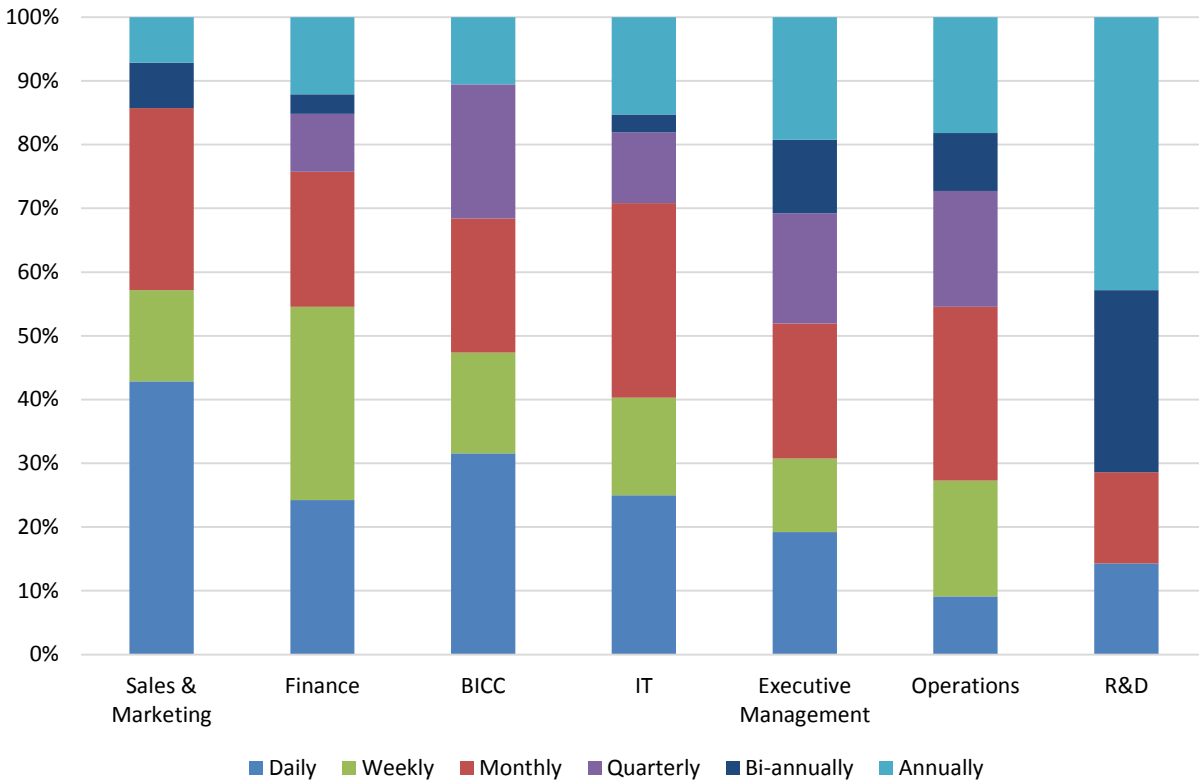


Figure 17 – Refresh frequency for AI, data science, and machine learning models by function

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Viewed by industry, refresh frequency for AI, data science, and machine learning models varies by industry. Some possible reasons for the variation in refresh frequency by industry: Industries that change rapidly may need to refresh their models more frequently in order to keep them accurate. Industries with more data may be able to refresh their models more frequently without sacrificing accuracy. Industries that have higher costs associated with refreshing their models may choose to refresh them less frequently.

Model refresh frequency is shortest overall among respondents in *consumer services and retail and wholesale*. *Consumer services* respondents provide the highest percent (37 percent) of respondents with daily refresh rates and *retail and wholesale* at 31 percent, indicating daily refresh of models.

Refresh Frequency for AI, Data Science, and Machine Learning Models by Industry

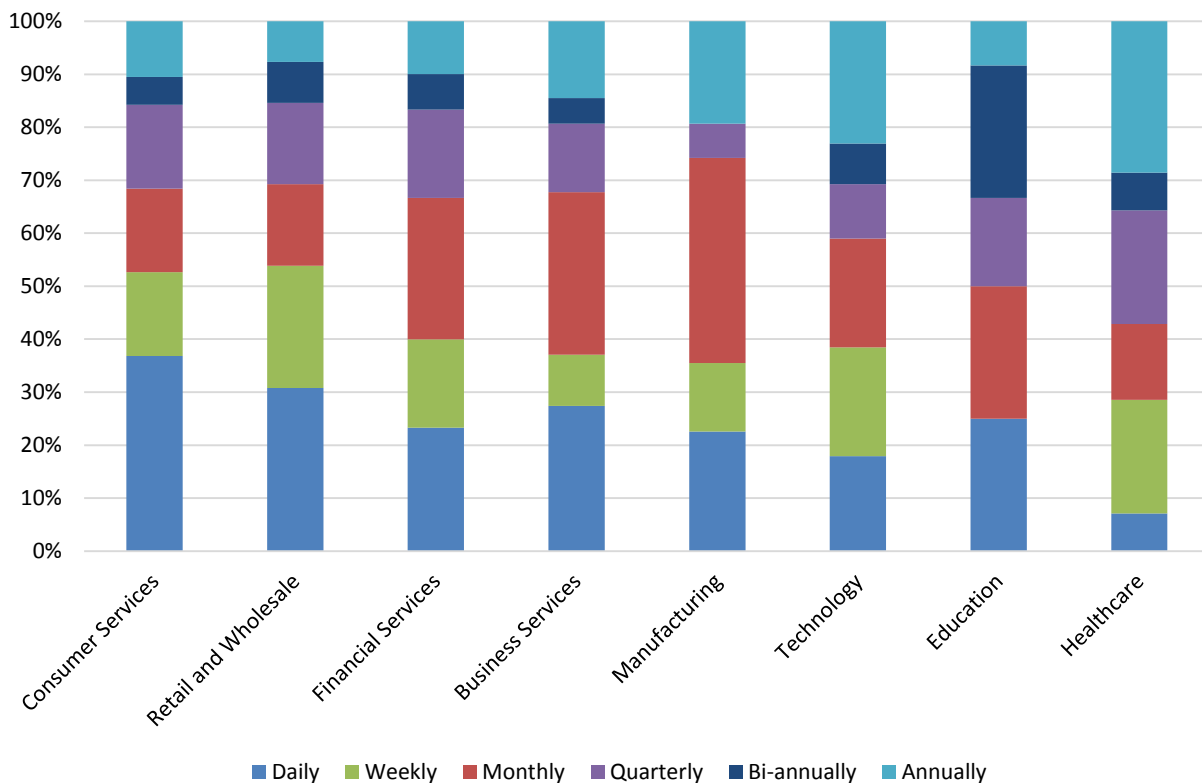


Figure 18 – Refresh frequency for AI, data science, and machine learning models by industry

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The frequency with which companies refresh AI, data science, and machine learning models varies by company size. Companies with fewer than 100 employees are more likely to refresh their models less frequently, while companies with more than 10,000 employees are more likely to refresh their models more frequently.

There are a few reasons why the refresh rate for smaller companies might be longer than larger organizations. Data availability: Smaller companies may have less data to work with, so they may not need to or be able to refresh their models as frequently. Larger organizations, on the other hand, may have more data; so they may need to refresh their models more frequently in order to keep them accurate. Resources: Smaller companies may have fewer resources to dedicate to AI, data science, and machine learning; so they may not be able to refresh their models as frequently. Larger organizations, on the other hand, may have more resources; so they may be able to refresh their models more frequently.

Refresh Frequency for AI, Data Science, and Machine Learning Models by Organization Size

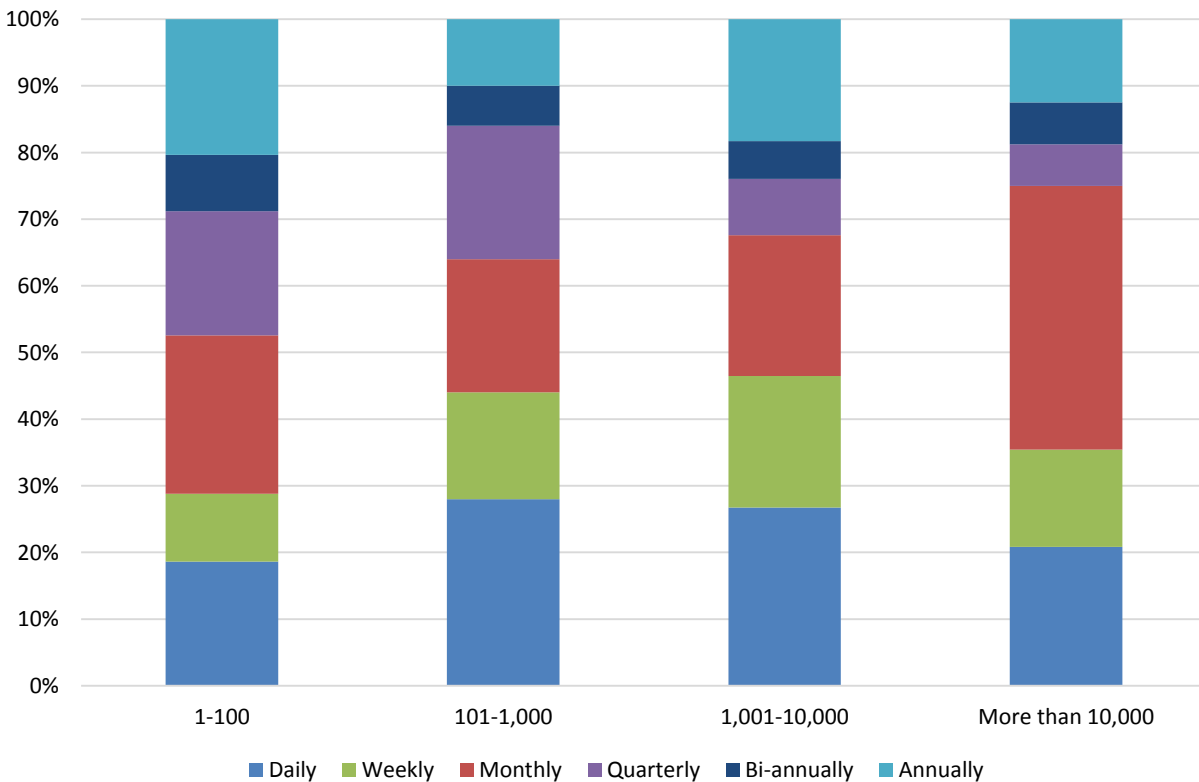


Figure 19 – Refresh frequency for AI, data science, and machine learning models by organization size

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Model Operations Feature Priorities

We asked respondents which model operations (ModelOps) features are important for AI, data science, and machine learning. The importance of ModelOps capabilities varies depending on the organization and the stage of its projects. From this list of 13 non-exclusive choices, respondents chose *model life-cycle management* as the most important, with more than 59 percent combined *critical and very important* scores. *Integration with Amazon SageMaker* is the lowest-ranked priority, which is somewhat surprising, given its popularity in the market. Organizations should carefully consider which ModelOps capabilities are most important for their specific needs and where they are in the maturity and scale of use of models in their organization.

Model Operation Feature Priorities

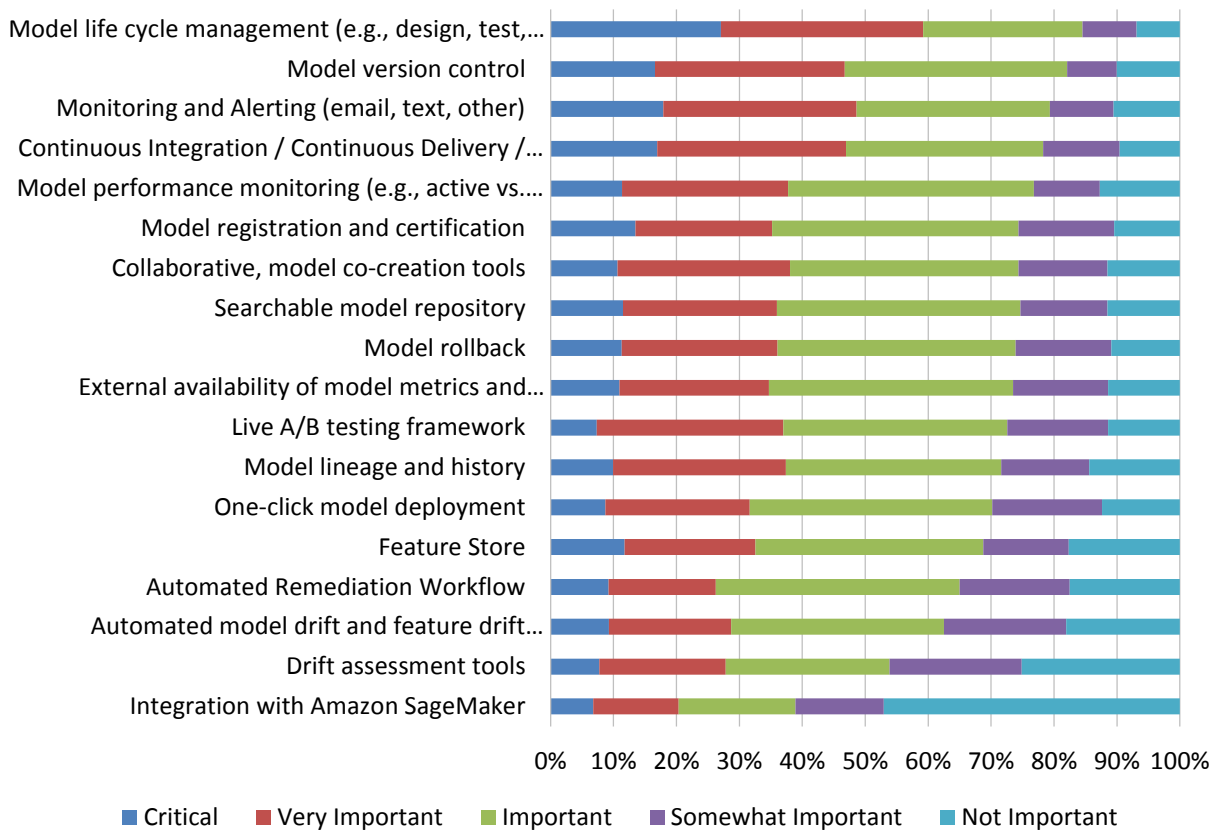


Figure 20 – Model operations feature priorities

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The survey data on ModelOps capabilities importance by geographic region provides valuable insights into the varying priorities and needs across different regions. Overall, *Asia Pacific* emerges as the region with the highest importance placed on ModelOps capabilities, consistently obtaining the highest ratings across most categories. This could be attributed to the region's fast-growing tech industry and increasing adoption of AI and ML technologies. On the other hand, *EMEA* lags *Asia Pacific* in terms of the importance of ModelOps capabilities. While it maintains moderate scores for some capabilities, it generally falls behind both *Asia Pacific* and *North America*. This suggests a potential need for increased awareness and investment in optimizing model operations in EMEA to keep up with global trends. *North America*, being a well-established tech hub, demonstrates relatively competitive ratings but still lags behind *Asia Pacific* in most categories. It ranks second across several capabilities, reflecting its focus on efficient model management.

Model Operations Model Operation Feature Priorities by Geography

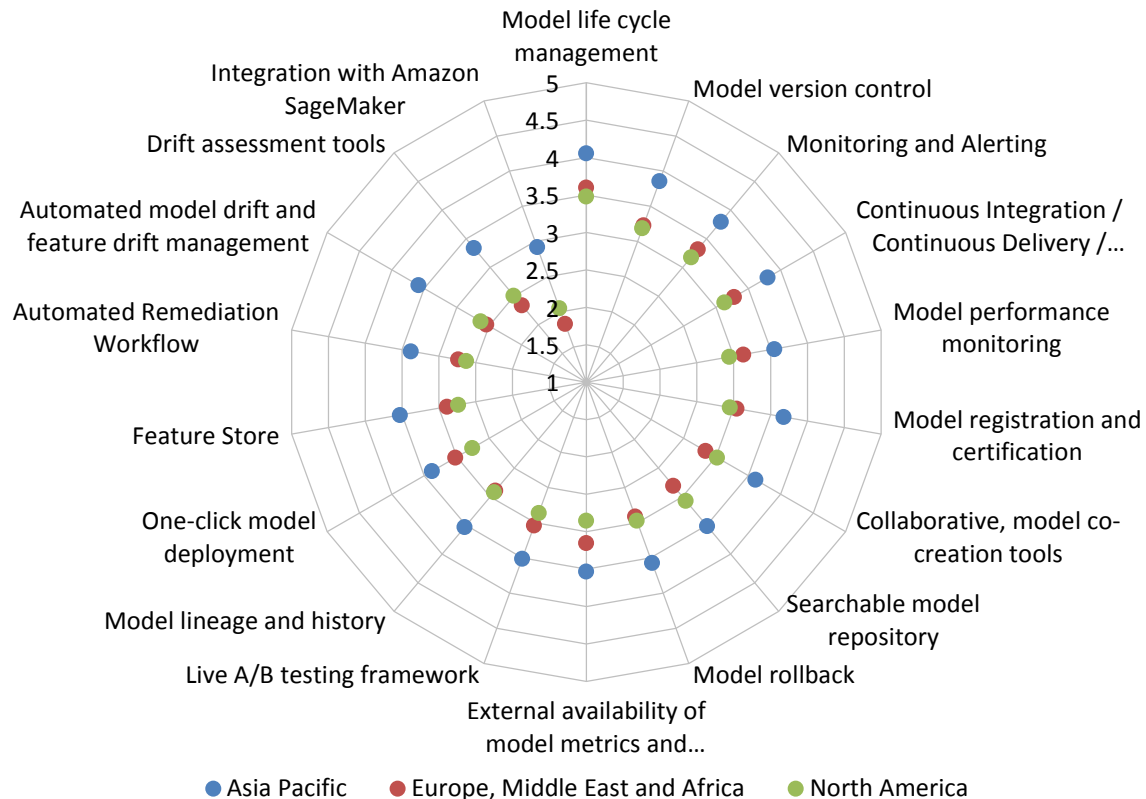


Figure 21 – Model operations feature priorities by geography

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The survey data on ModelOps capabilities importance by business function provides valuable insights into the diverse priorities and requirements of different departments within an organization. Respondents consistently rank *model life-cycle management* and *model version control* as highly important capabilities across all business functions. This indicates a widespread recognition of the significance of efficient model development, testing, and version control to ensure model accuracy and reliability. The *BICC* emerges as the function that places the highest importance on most ModelOps capabilities. This suggests that the *BICC* is at the forefront of model management and operations, emphasizing the need for comprehensive governance and oversight of models. *IT* and *R&D* also rate several capabilities with relatively high importance. This aligns with their roles in implementing and developing models, respectively, and underscores their focus on robust model deployment and performance monitoring.

Model Operation Feature Priorities by Function

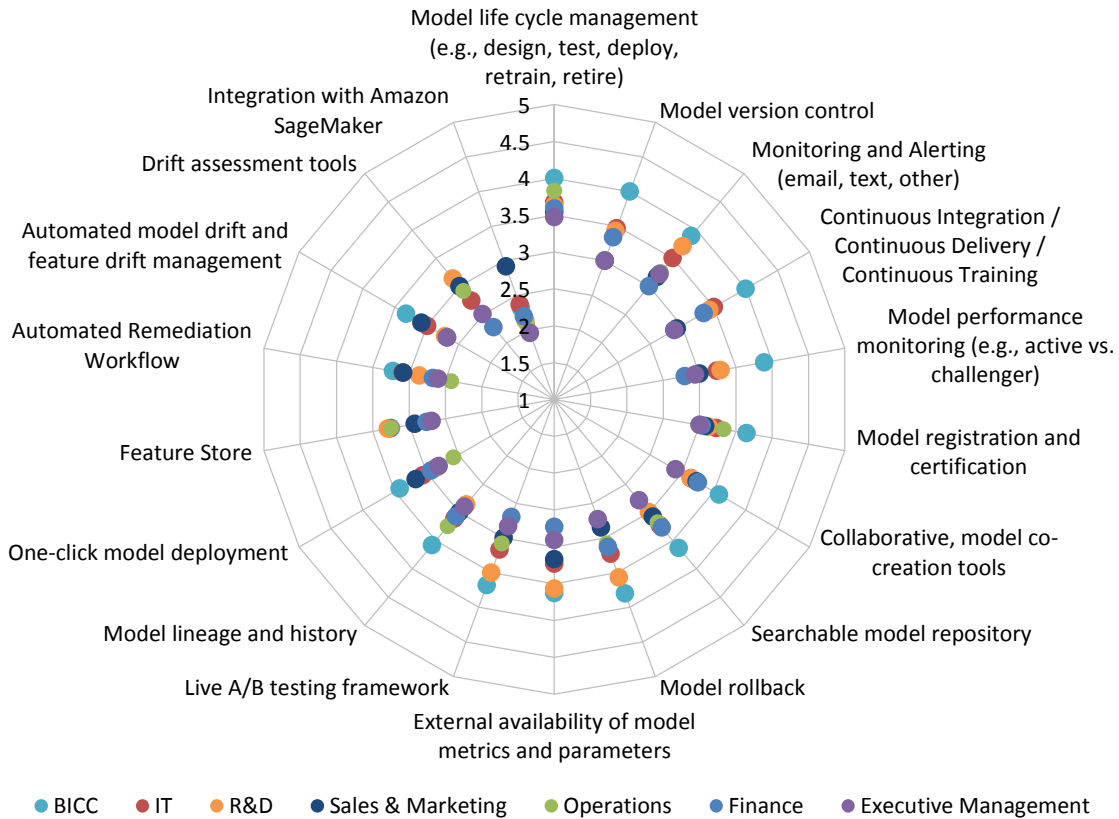


Figure 22 – Model operations feature priorities by function

The data underscores the need for organizations to adopt a tailored approach to ModelOps capabilities based on the specific requirements and objectives of each business function. It highlights the varying degrees of awareness and emphasis on

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advanced ModelOps practices, presenting opportunities for targeted training and development.

The survey data on ModelOps capabilities importance by industry provides valuable insights into the varying priorities and needs of different industries. The *retail and wholesale* industry stands out as the sector that places the highest importance on ModelOps capabilities, with consistently high ratings across most capabilities. This indicates the industry's strong emphasis on model development, management, and continuous improvement to optimize business operations and customer experiences. Financial services and business services industries also rate ModelOps capabilities as highly important, with notable focus on model life-cycle management, model version control, and monitoring and alerting. The technology industry respondents rate most ModelOps capabilities with moderate importance.

Model Operation Feature Priorities by Industry

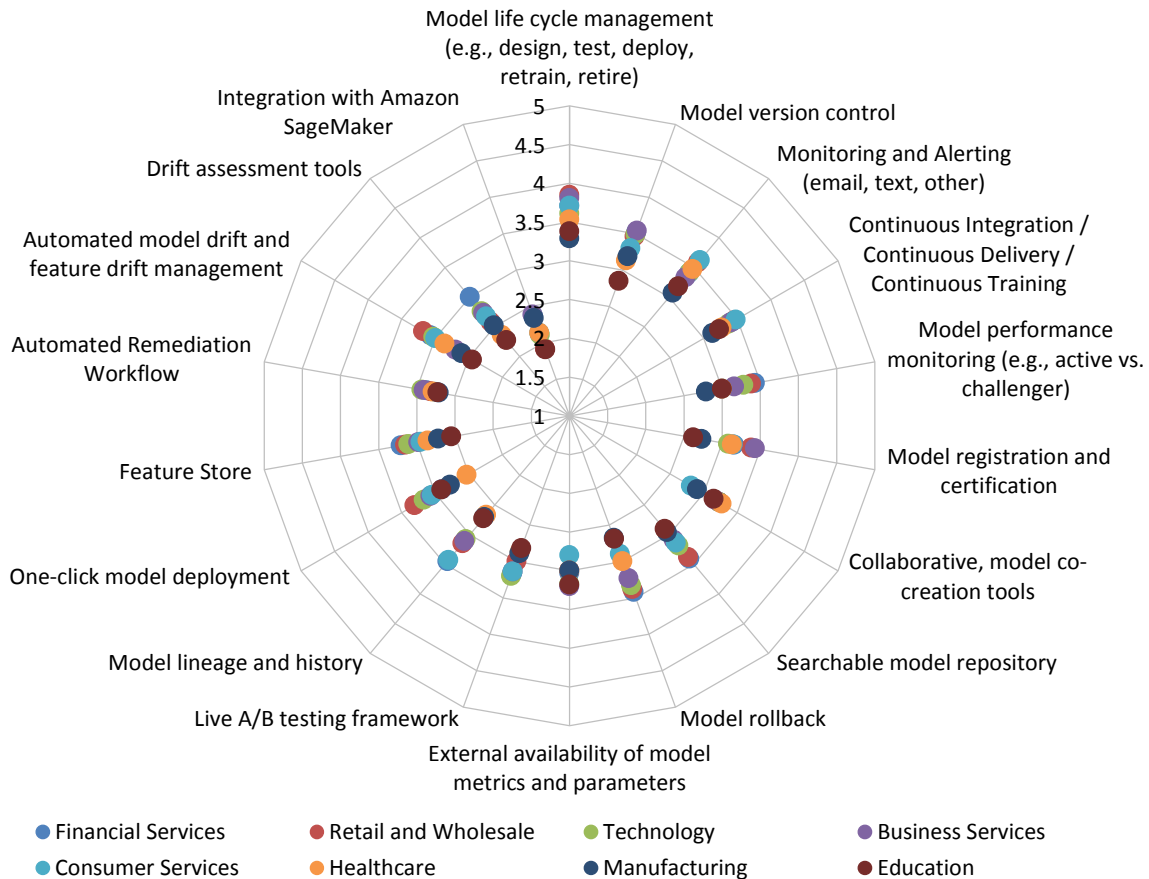


Figure 23 – Model operations feature priorities by industry

While they recognize the significance of various capabilities, they may have more room for improvement in terms of actively integrating advanced ModelOps practices into their workflows. Consumer services, healthcare, and education industries generally rate

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ModelOps capabilities with moderate importance. This suggests that they see the value in model management and monitoring, but there might be opportunities to enhance their model development and deployment processes.

The survey data on ModelOps capabilities importance by organization size offers valuable insights into how the significance of these capabilities varies based on the number of employees in an organization. Organizations of all sizes consider *model life-cycle management* and *model version control* important, indicating their universal importance in the AI / ML development process. Proper management and version control are essential to ensure model accuracy and reliability. Larger organizations, particularly those with more than 10,000 employees, consistently rate ModelOps capabilities higher. This could be attributed to their greater scale of AI / ML operations, necessitating more advanced and comprehensive model management practices. Larger organizations regard *monitoring and alerting*, *continuous integration / continuous delivery / continuous training*, and *model performance monitoring* with higher importance.

Model Operation Feature Priorities by Organization Size

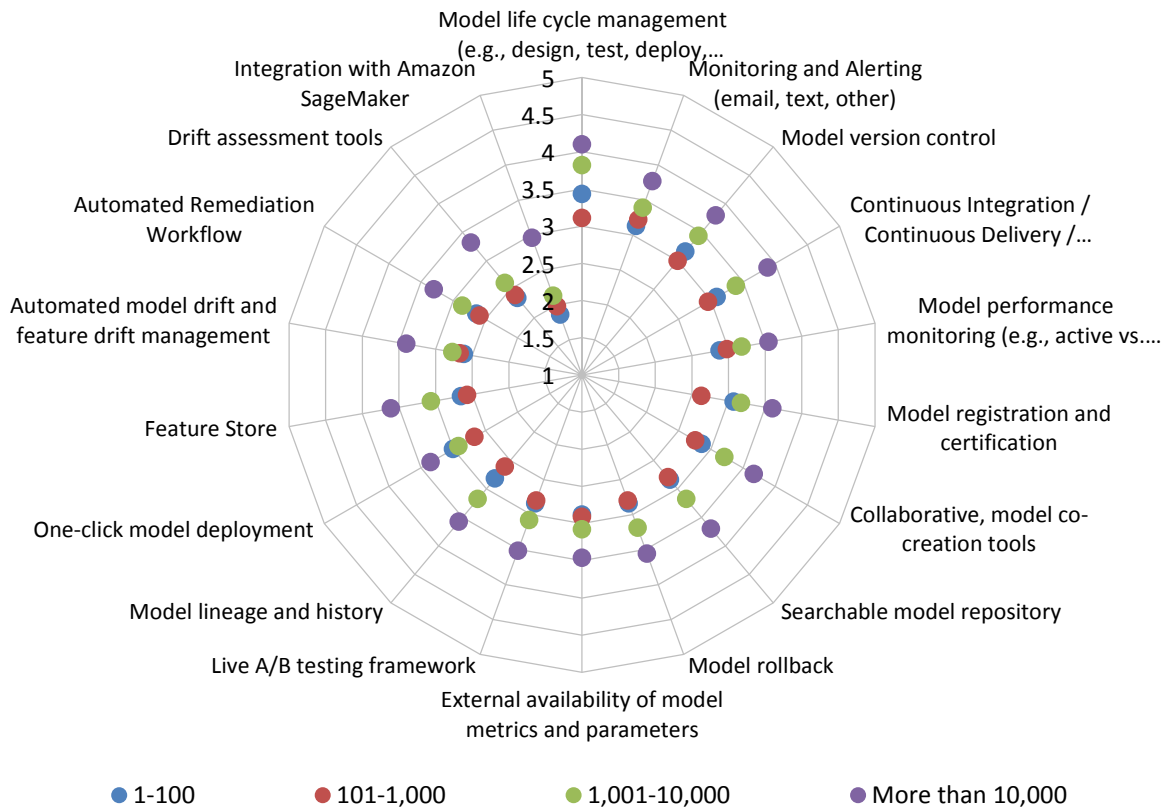


Figure 24 – Model operations feature priorities by organization size

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This underscores their focus on real-time model performance assessment and continuous improvement. Smaller organizations (1-100 employees) generally rate ModelOps capabilities lower, possibly due to limited resources and less complex AI / ML workflows.

Industry and Vendor Analysis

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Industry and Vendor Analysis

Overall, the survey indicates that many vendors already support essential ModelOps capabilities, such as *model life-cycle management*, *model rollback*, and *model version control*. However, some capabilities, such as *collaborative model co-creation tools* and *continuous integration, delivery and training*, still lack broad adoption. It is promising to see that vendors expect certain capabilities, like feature stores and model lineage/history to gain traction in the next 12 to 24 months. However, there are some critical aspects, like *integration with Amazon SageMaker* and *live A/B testing frameworks*, that still have relatively low support. Notably, a significant percentage of vendors have no plans to incorporate certain capabilities, like automated drift management and monitoring/alerting, which could impact the efficiency and reliability of ModelOps processes.

Industry Support for ModelOps Capabilities

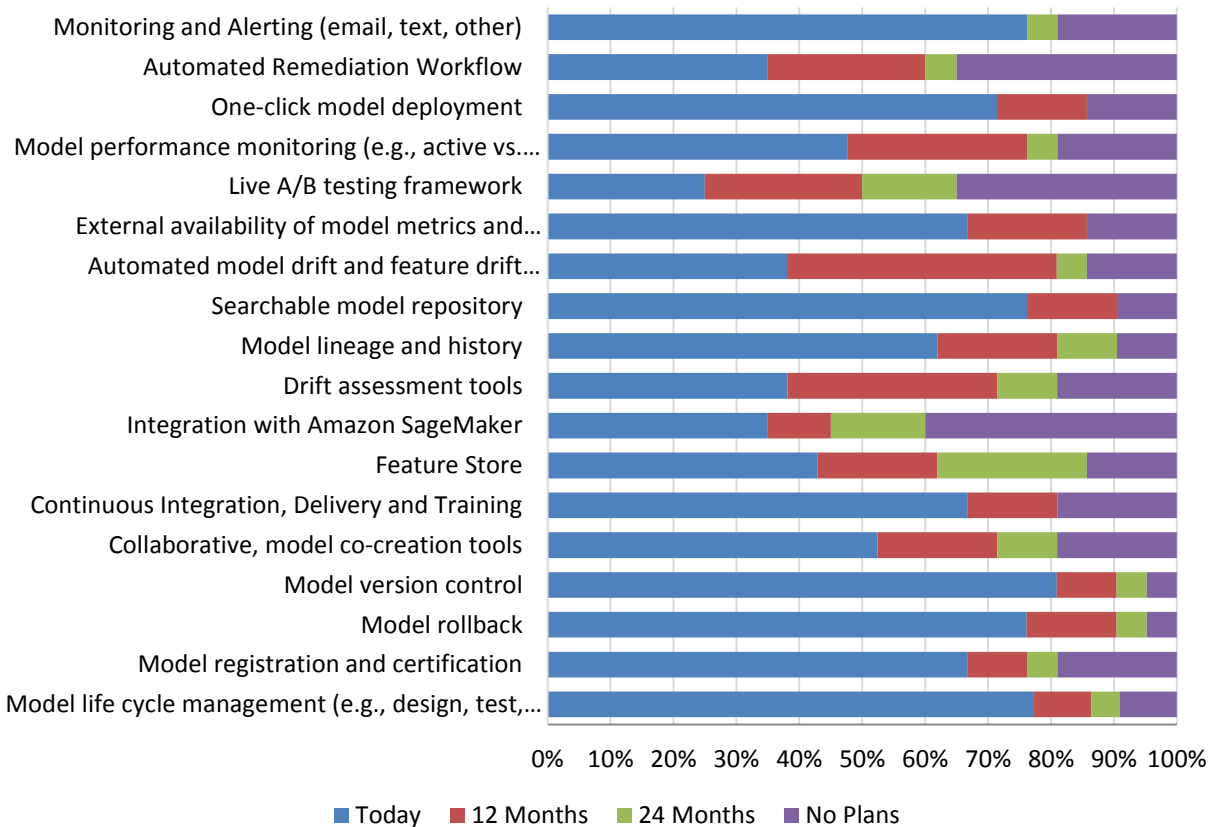


Figure 25 – Industry support for ModelOps capabilities

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As the field of machine learning and ModelOps continues to evolve, it is essential that vendors focus on providing comprehensive support for the entire model life cycle, including robust monitoring, collaboration tools, and continuous integration and delivery processes. This will be crucial for organizations seeking to scale and deploy machine learning models effectively and reliably.

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ModelOps Vendor Ratings

In rating the vendors, we consider features surrounding life-cycle management, development, governance, operations, and monitoring (fig. 26).

To be ranked, we require a minimum score of 50 percent. It is important to scrutinize all rating categories and match vendor strengths to use cases and requirements.

Top rated vendors include Dataiku (1st), DataRobot (1st), Domino Data Lab (1st), Palantir (1st), Altair (2nd), ModelOp (2nd), Google (3rd), and SAS (3rd).

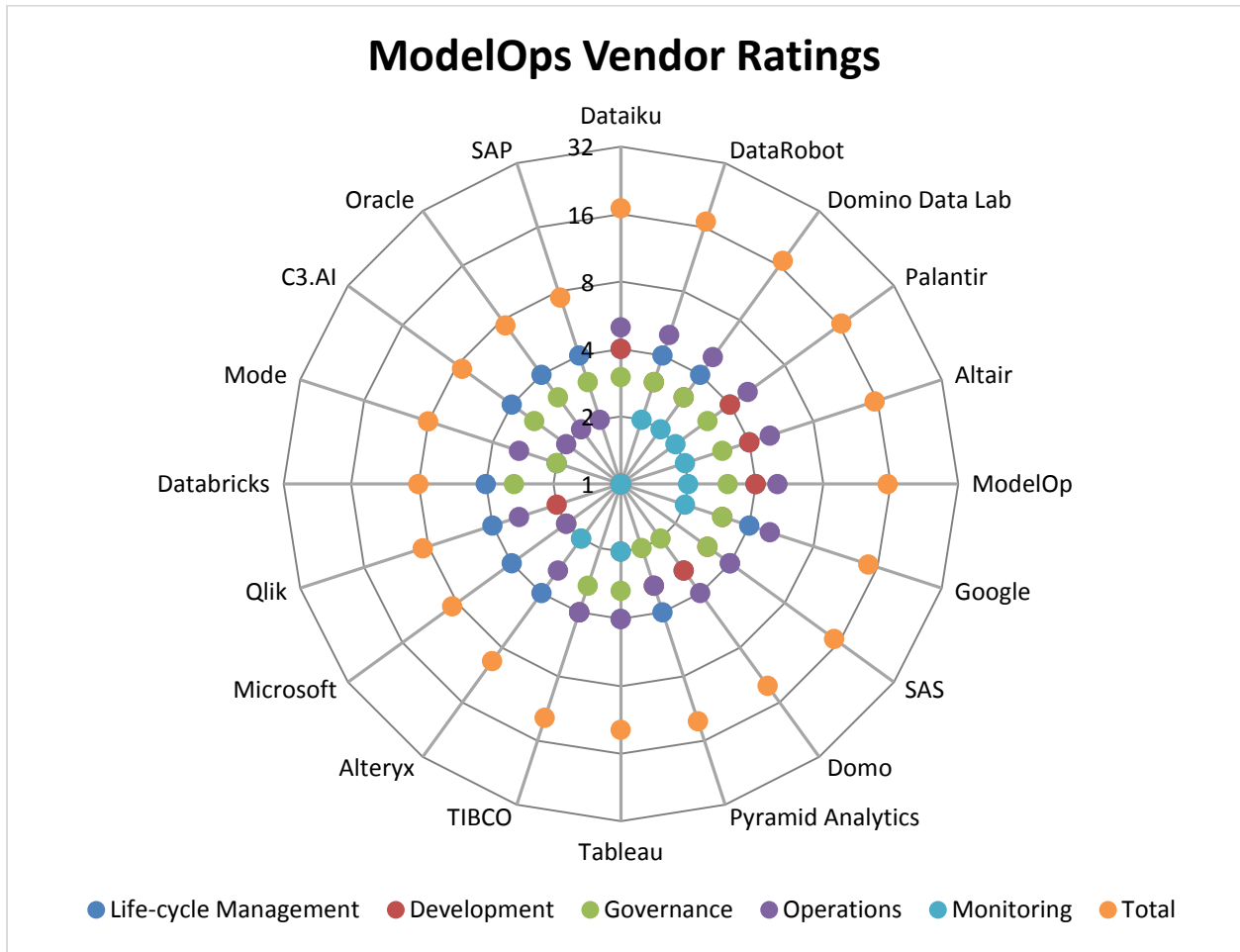


Figure 26 – ModelOps vendor ratings

Other Dresner Advisory Services Research Reports

- Wisdom of Crowds® “Flagship” Business Intelligence Market Study
- Analytical Data Infrastructure
- Analytical Platforms
- BI Competency Center
- Cloud Computing and Business Intelligence
- Data Engineering
- Data Governance
- Data Science and Machine Learning
- Embedded Business Intelligence
- Enterprise Performance Management
- ESG Reporting
- Financial Consolidations, Close Management, and Financial Reporting
- Guided Analytics
- Master Data Management (MDM)
- Sales Performance Management
- Self-Service Business Intelligence
- Small and Mid-Sized Enterprise Business Intelligence
- Small and Mid-Sized Enterprise Performance Management
- Supply Chain Planning and Analysis
- Workforce Planning and Analysis

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Appendix: ModelOps User Survey Instrument

Please enter your contact information below

First Name*: _____

Last Name*: _____

Title: _____

Company Name*: _____

Street Address: _____

City: _____

State: _____

Zip: _____

Country: _____

Email Address*: _____

Phone Number: _____

URL: _____

What major geography do you reside in?*

- North America
- Europe, Middle East and Africa
- Latin America
- Asia Pacific

Please identify your primary industry*

- Advertising

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- () Aerospace
- () Agriculture
- () Apparel & Accessories
- () Automotive
- () Aviation
- () Biotechnology
- () Broadcasting
- () Business Services
- () Chemical
- () Construction
- () Consulting
- () Consumer Products
- () Defense
- () Distribution & Logistics
- () Education (Higher Ed)
- () Education (K-12)
- () Energy
- () Entertainment and Leisure
- () Executive search
- () Federal Government
- () Financial Services
- () Food, Beverage and Tobacco
- () Healthcare
- () Hospitality
- () Insurance

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- Legal
- Manufacturing
- Mining
- Motion Picture and Video
- Not for Profit
- Pharmaceuticals
- Publishing
- Real estate
- Retail and Wholesale
- Sports
- State and Local Government
- Technology
- Telecommunications
- Transportation
- Utilities
- Other - Please specify below

How many employees does your company employ worldwide?

- 1-100
- 101-1,000
- 1,001-2,000
- 2,001-5,000
- 5,001-10,000
- More than 10,000

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What function do you report into?*

- Business Intelligence Competency Center
- Executive Management
- Finance
- Human Resources
- Information Technology (IT)
- Marketing
- Operations (e.g., Manufacturing, Supply Chain, Services)
- Research and Development (R&D)
- Sales
- Strategic Planning Function
- Other - Write In

How many predictive models are currently in production?

- Don't know
- 1-25 models
- 26-50 models
- 51-100 models
- 101-250 models
- More than 250 models

How often are predictive models refreshed?

- Daily
- Weekly
- Monthly

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Quarterly

Bi-annually

Annually

145) Who is responsible for monitoring/managing ML / predictive models (ModelOps)?

IT Department

Business Units

Finance

Competency Center

Data Science Team

Research & Development

Other - Write In: _____

Which of the following model operations (model ops) features are important for data science and machine learning?

	Critical	Very Important	Important	Somewhat Important	Not Important
Model life cycle management (e.g., design, test, deploy, retrain, retire)	()	()	()	()	()
Model registration and certification	()	()	()	()	()
Model version control	()	()	()	()	()

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Model lineage and history	()	()	()	()	()
Model rollback	()	()	()	()	()
One-click model deployment	()	()	()	()	()
Searchable model repository	()	()	()	()	()
Collaborative, model co-creation tools	()	()	()	()	()
Model performance monitoring (e.g., active vs. challenger)	()	()	()	()	()
Drift assessment tools	()	()	()	()	()
Model explain-ability	()	()	()	()	()
Live A/B testing framework	()	()	()	()	()
Feature store	()	()	()	()	()