



AI, DATA, AND THE CLOUD

CONNECTIVITY, INNOVATION, AND GENERATING VALUE IN FINANCIAL SERVICES

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AI, Data, and the Cloud – Connectivity, Innovation, and Generating Value in Financial Services

EXECUTIVE SUMMARY

Artificial Intelligence (AI), data, and cloud are inexorably intertwined and together they are delivering significant value across the financial services ecosystem.

AI relies on the availability of quality data at scale to be trained and to operate. At the same time, AI models produce new data from these inputs which can then feed into other models or business processes. AI is creating a new data ecosystem—data has become a core input to business processes, much like capital or raw materials, which AI can leverage in new ways, elevating its importance. Financial services is an industry with data at its core so it is essential to keep pace with developments in data use, generation, and storage.

Cloud is a critical tool for developing and deploying AI because AI requires both significant compute power, as well as vast pools of good quality data for training and development. The economics of AI, and particularly Generative AI (GenAI), reinforce cloud as its delivery infrastructure. This provides benefits across the economy as cloud hosted models have allowed smaller firms to purchase access to the sophisticated computing resources needed to employ AI. GenAI may be the first mass-launch technology of the 21st century, accessible to all via cloud and existing computer hardware.

The advent of GenAI has challenged existing practices created for governance and oversight of classic predictive AI in financial services firms. This in turn has limited the uptake and ability to deploy GenAI driven tools in external and client facing roles.

The significant step up in scale of resources required to develop GenAI means few organizations in the world have the ability to build them. As a result, they are primarily provided to financial service firms by third parties. AI governance and oversight techniques developed by financial services firms for classical / predictive AI over the last decade or longer may evolve to capture these increasingly complex relationships. Established practices rely on knowing the methods used to create and train the model, including the source data, as well as direct model validation, bias testing, monitoring, and evaluation testing. Financial Institution (FI) regulation, supervision, and internal risk frameworks require third-party models to have the same level of validation required for internally developed models. But many financial firms feel as though their visibility across an increasingly complex AI value chain is poor. The 2024 IIF-EY survey revealed the impact of this disconnect. Only 3% of firms surveyed reported confidence in obtaining the requisite information on GenAI models to perform that same level of validation as they do on internal models. 78% of institutions reporting restrictions around the use of GenAI and 81% of institutions reported limiting GenAI use to internal non-customer-facing applications in 2024.

The financial industry has extensive experience managing the sorts of third-party risks presented by complex AI services, though AI continues to grow increasingly complex. Technology solutions have been explored to address the issues in classical AI and might illustrate pathways for GenAI in financial services.

Financial service firms must be able to answer questions about data management and access, transparency and understandability, and security for each stage of development, deployment, and use of AI tools. Multiple system and source integration into models hosted on the cloud can facilitate compliance with privacy rules and security frameworks and, at the same time, allow models to be fed relevant data for a specific group of tasks. Directed data environments for model training, as opposed to the entire data set of the open internet, can help to refine model applications for financial use cases, while also acting as quality control. Deploying third party created AI in this manner can also enable firms to potentially leverage their own data without feeding it into a model or externally sharing it as a model training input. These arrangements permit importing a model that leverages an external logic chain while keeping its own data internal.

The underlying infrastructure and supply chains for AI are important to understand for business and policy considerations in financial services.

The AI supply chain includes compute provision, AI service providers, application providers, algorithm development, model hubs and machine learning (ML) operators, foundation models, cloud platforms, chips, and other hardware providers. Supporting infrastructure—including cloud, where many of the models are trained, developed, tested, and deployed—plays a central role. Some of their key capabilities are data structures, processing, and real-time access. The business and technological complexities of this ecosystem also need to be overlaid with the regulatory and policy discussions that have come into focus.

AI has delivered value across many use cases in financial services for years and GenAI holds great promise if governance and validation challenges can be overcome.

FIs are leveraging classical predictive AI/ML, and GenAI and Large Language Models (LLMs) to release more of the potential they already hold in the data they have. The expanding AI toolkit offers the possibility of gaining productivity enhancements or creating even more value for their customers whether via enhancing capacity or creating efficiencies that can then be passed on to customers, or via directly creating more value or a better customer experience through new product development or streamlining customer support and authentication. This translates to applications that drive:

- **Efficiency:** Tools that can be deployed in operational use cases like programming assistance, note-taking, translations, and document summarization.
- **Accuracy:** Improving internal processes and capabilities in risk assessment and model risk management.
- **Increased revenue:** AI generating personalized offerings, marketing programs, and reaching new segments at sustainable conditions.
- **Customer experience:** Powering better digital assistants, chatbots and voicebots to interact directly with customers.
- **Data qualification:** GenAI has potential uses for improving unstructured data or making it usable which, in turn, would enhance the data availability for following uses in connection with more traditional AI models.

The public sector has as much opportunity to use AI—to transform their operations, efficiency, and added value in the financial services ecosystem—as does the financial industry.

A recent Bulletin from the Bank for International Settlements (BIS) stated that central banks have used AI/ML techniques “for statistics, macro analysis, payment systems oversight, and supervision” including a strong focus on AML and credit risk. Financial authorities have experience in studying and using AI/ML models for these varying purposes. New areas such as suptech (leveraging AI for supervisory exercises) hold the promise of great impact. A recent study found that 59% of financial authorities are currently utilizing one or more suptech applications. And

out of those that are already using AI for suptech, 69% use it for prudential regulation; and 62% of those institutions use suptech applications for consumer protection and market conduct supervision.

Policy considerations and impacts remain numerous and will require sustained focus for the use of AI in financial services to keep pace. This work will also require increased engagement with government entities that are not frequently in the center of financial services technology governance work, including national security bodies, technology standard setters, and data governance authorities.

Since the mass-launch of Chat GPT in November 2022, FIs and policymakers have redoubled efforts to understand the complex development, deployment, and governance of AI. This was true before the arrival of GenAI tools, but the attention spike has been dramatic and included the apex executives and officials over the past year.

While comprehensive AI/ML regulations are rare, the common principles of safety, transparency, fairness, and accountability have appeared in policymakers' work around the world. These same principles are being adopted internally across firms. Further, AI/ML models are frequently developed and deployed across multiple markets, necessitating interoperability of policies governing their use and adding importance to the cross-border flow of information. Effective regulation of AI in one market is dependent on effective regulation of AI in multiple markets elevating the importance of multistakeholder participation in its development. Policymakers are in a position of needing to figure out how to manage both inputs and outputs, consumer protection and financial stability, and the economic transformation offered in AI/ML application edge cases. The national security implications of widespread AI use are also bringing those policymakers into the conversation while other policy goals, such as defending human rights, consumer protection, soundness, and stability of the economy, limiting market concentration, and avoiding anti-competitive acts, also figure prominently in the debate. This policy landscape highlights a challenge for FIs and their regulators as they might not be at the center of the regulatory response. Multiple existing policies for consumer protection, data privacy, and data sharing are already shaping AI's use, and effective future regulation will likely take these existing statutes into consideration when shaping dedicated AI rules.

AI/ML tools have made significant progress in financial services over the last decade with increasingly advanced algorithms with predictive capabilities; however, surveys done by the IIF and other organizations show the importance of finding an effective policy approach for GenAI. While there is increasing integration of all AI tools for internal uses and first-pass screenings, there is lagging adoption of GenAI in client-facing roles and for business strategy analysis and decision making. Varying adoption rates between firms, across lines of business, and between AI applications has led to a jagged technological frontier in terms of efficiency and output gains. Financial service regulators and firms have relevant experience which is being extended into the work on GenAI. Responsible AI policymaking for finance is likely going to combine third-party risk management approaches with technology, data, and application dynamics unique to AI.

As long-time steward of sensitive personal data and a user of cloud technology, the financial services industry is well placed to inform the development of transparency and trust building in the new age of generally applied AI. The industry has much to offer the broad policy effort and much at stake.

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Current landscape - AI in finance

AI terminology

AI system: “A machine-based system, that for explicit or implicit objectives, infers, from the input it receives, how to generate outputs such as predictions, content, recommendations, or decisions.” In addition, once used for its outputs, these outputs, “can influence physical or virtual environments”.

GenAI: Generative AI (GenAI) is a subset of AI models that can create new content in response to prompts, based on their training data, encompassing text, visual imagery, sound, code, etc. depending on the type of model. “GenAI models are able to process and learn from massive amounts of unstructured datasets on which they are trained, including feedback received by users. They can create instantly new content as output based on various algorithms and mathematical architecture models.”

LLM: Large Language Models (LLMs) are a type of GenAI that can recognize and analyze text data and prompts, enabling their acquisition of advanced or complex concepts in multiple contexts, and that have the ability to learn from existing text sources, such as an encyclopedia, without needing extensive data preparation.

Foundation Model: This class of AI models consists of large, deep-learning, neural networks that form the basis of a variety of AI tools and applications. Foundation models are trained on broad spectrum of data, frequently in an unstructured and unlabeled format. Massive, multidiscipline foundation models can be used to quickly develop and deploy other AI models for specific use cases or be instructed to only perform domain specific functions after development.

Neural Networks: A connected circuit of nodes, mimicking the neural map of a brain, that “teaches” a computer to complete tasks by analyzing training examples, approximating the way the human brain processes data and performs tasks.

AI at scale

The financial industry has been developing and deploying Artificial Intelligence and Machine Learning (AI/ML) in their operations and service offerings since the widespread adoption of computers in the financial industry. Recent advancements in the applicability of AI tools to new types on content, along with wider access to these tools, have made this technology one of the most promising areas of financial services innovation. This interest and its potential has also drawn the focus of regulators. Financial Institutions (FIs) and policymakers alike are making concentrated efforts to understand the complex development, deployment, and governance needs of these tools. This was true before the arrival of generative AI (GenAI) tools and is doubly true now. Across multiple elements of the lifecycle and value chain of AI/ML, recent technological advancements, new policy concerns, and associated issues like data frameworks and management of supporting infrastructure combine to present a complex risk and application environment for FIs, and urgent policy questions for governments.

AI models have grown in complexity and sophistication, and access has gotten easier. GenAI tools frequently, in contrast to other AI model types, offer user-friendly interfaces that require little or no computer or statistical knowledge to use and produce output understandable by the general public.¹ Formerly unthinkable, the ordinary person can now access some of the most sophisticated analysis and predictive tools from the comfort of their laptop or cellphone. On occasion, these tools are even accessible without paying a user fee.

AI may be the first mass-launch technology of the 21st century, accessible to all via existing hardware. GenAI has democratized access to some types of AI, contributing to its rapid adoption. A trend toward development of the largest models that can be applied across a variety of industries, so called foundation models, by a few large AI-focused technology firms who then offer access via one-off purchases or subscriptions over cloud hosts has allowed small firms to access cutting edge technology in a way that has not been possible with earlier inventions. Widespread access combined with limited developers raises new dynamics of development, risks, and competition policy for the financial industry to consider.²

From a policy standpoint, such widespread accessibility has brought national security and technology officials into the conversation, adding a new dimension of policymaking beyond the usual set of financial regulators that FIs have worked with for decades.

All AI is a function of its inputs, and therefore inexorably linked to data. Further adoption and integration of AI tools will require upgrading data quality and capacity of the financial services industry. Many AI experts build AI processes mindful of the principle “garbage in, garbage out”, centering data quality in business development conversations. Firms can use AI to leverage data and its effective management into a source of business growth across industries, particularly in finance.³ FIs already maintain massive stores of data, including large stores of currently unused or unstructured data. Using this data to improve AI requires careful consideration of the privacy, permission, and applicability of this data for individual use cases. Firms will need to consider their obligations as responsible custodians of data, as well as the potential new offerings AI tools can help them create. Increasing use of GenAI lowers the barriers between AI application and data, as this class of models can interpret inputs in unstructured formats, removing some of the need to format and input data in a specific way to apply AI tools. The scale of data needed to train AI models correspondingly increases with their mass launch, integration into business processes, and widespread scaling.

AI model life cycles involve multiple actors, creating multiple entry points for data into the development environment. Models are first developed and tested, then deployed and refined, and then used and validated. To illustrate one of the possibilities, a hyperscale technology firm may develop a foundation model, which could be then purchased by a financial services-focused AI service provider (let us call this firm deployer one) who can customize the model tools to suit financial services use cases; these services could then be purchased by an FI who could further refine the tool to suit its internal environment and client

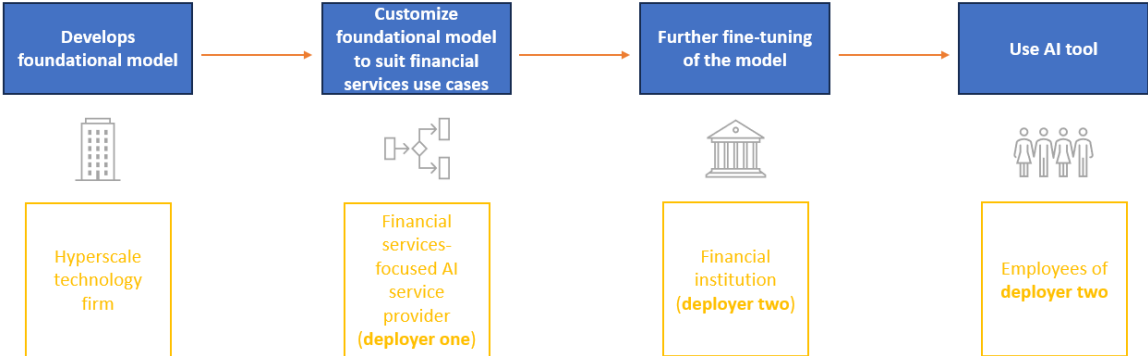
¹ Generative Artificial Intelligence in Finance – OECD Artificial Intelligence Papers No. 9. OECD. December 2023. Available at: <https://www.oecd-ilibrary.org/docserver/ac7149cc-en.pdf?expires=1715958497&id=id&accname=guest&checksum=84772B17FB95D99053CE01BA5E97D747>

² BIS Bulletin 84, Artificial intelligence in central banking. Douglas Araujo, Sebastian Doerr, Leonardo Gambacorta and Bruno Tissot. January 2024. Available at: <https://www.bis.org/publ/bisbull84.htm>

³ How Do Businesses Use Artificial Intelligence? Wharton Online – Wharton University of Pennsylvania. January 2022. Available at: <https://online.wharton.upenn.edu/blog/how-do-businesses-use-artificial-intelligence/>

base—frequently by building an API—(deployer two), finally, the employees of the FI (deployer two) would be able to use the tool to improve their business processes, feeding information back to the developer and deployers about its utility (see figure 1). These multiple layers raise questions about data management and access, transparency and understandability, and security for each stage of development, deployment, and use.

Figure 1: High level view of the AI model development life cycle



Source: Authors

The rationale for greater use of AI/ML tools by financial institutions is manifold. For one, AI offers new tools for FIs to test application prototypes quickly and cost-effectively, in addition to the ability to scale those prototypes from the test environment to the real world into existing operational and security environments.⁴ Tools are being developed for three main levels of deployment: 1) to augment analysis by layering AI/ML onto existing information analysis paradigms within a firm; 2) to assist business intelligence by extracting signals and using sophisticated statistical analysis to assist organizations to make data-driven business decisions; and 3) to automate or suggest decisions where AI systems can triage tasks and determine the appropriate course of action based on its derived intelligence.⁵ FIs have been deploying AI at level one for decades, have increasingly adopted level two in recent years, and are actively working to improve these capabilities, and are experimenting with level three, particularly regarding customer service interfaces and customized service design.⁶

Across FIs, we observe an increasing trend of purchasing AI/ML models built by third parties and customizing them for financial services. This customization is either being done in-house by the FI or via a financial services-focused second-stage developer. However, internally developing some AI/ML models

⁴ Top 10 artificial intelligence (AI) cloud platforms in 2022. Venture Beat. August 2022. Available at: <https://venturebeat.com/ai/10-top-artificial-intelligence-solutions-in-2022/>

⁵ AI-fueled organizations - Reaching AI's full potential in the enterprise. Deloitte Insights. January 2019. Available at: <https://www2.deloitte.com/us/en/insights/focus/tech-trends/2019/driving-ai-potential-organizations.html>

⁶ OECD Business and Finance Outlook 2021: AI in Business and Finance. OECD Books. Available at: <https://www.oecd-ilibrary.org/sites/39b6299a-en/index.html?itemId=/content/component/39b6299a-en#section-d1e3120>

AI's reverberations across finance. Jeff Kearns, IMF. 2023. Available at: <https://www.imf.org/en/Publications/fandd/issues/2023/12/AI-reverberations-across-finance-Kearns>

2023 IIF-EY Annual Survey Report on AI/ML Use in Financial Services – Detailed Survey Report. December 2023. A public and more concise version of this report is available at: <https://www.iif.com/Publications/ID/5601/IIF-EY-2023-Public-Survey-Report-on-AIML-Use-in-Financial-Services>

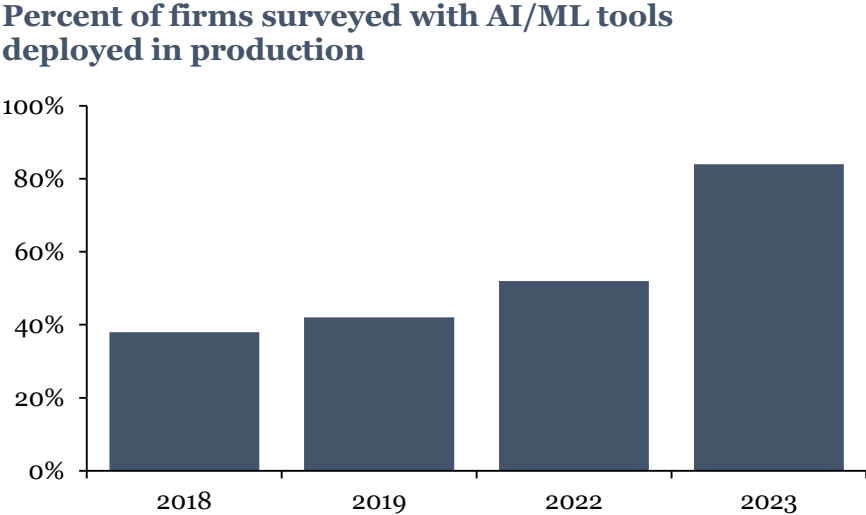
to perform very precise tasks remains popular, particularly for tasks that require access to sensitive data to train.⁷

These trends, combined with the desired level of deployment noted earlier, have led to a variety of approaches by FIs. Firms are: 1) developing models internally and storing both the compute power and interface access on-premise; 2) working with cloud service providers to put existing models on the cloud to both enable remote access and enhance their computing power or data utilization; 3) utilizing an open algorithm model where multiple solutions have been developed to then be customized internally (to fine-tune the model); and 4) developing or purchasing access (from third parties) to models native to the cloud and utilized within the cloud—known as AI as a Service (AIaaS).⁸

Looking into a future in which FIs interact increasingly with third-party providers for a variety of AI model needs, whether to store, connect, or access data, or to access models themselves, FIs will carefully evaluate their third-party provider relationships. AI raises new questions about monitoring, validation, and risk management practices across multiple layers of complex model development and multiple model deployments.

Various approaches to developing, adopting, and using AI are consistent with the state of AI in the financial sector. Indeed, in 2023, an IIF-EY survey found that 84% of FIs are already applying AI/ML techniques in production, and an additional 11% are either applying those techniques in pilot projects or plan to do so in the foreseeable future, a notable increase from the previous year.⁹

Figure 2. Survey responses to adoption of AI



Source: IIF-EY Annual Survey Report on AI/ML Use in Financial Services. Detailed Survey Report. December 2023.

⁷ Information taken from multiple interactions with chief executives and senior leaders (i.e., Chief Data Officer, Global Head of AI, Global Head of Advanced Analytics, Managing Director for Generative AI, Head of Model Risk Management, etc.) at firms that are members of the Institute of International Finance (IIF).

⁸ This option opens the possibility, if it continues to gain popularity, of AIaaS as a future core operating system across multiple firms.

⁹ 2023 IIF-EY Annual Survey Report on AI/ML Use in Financial Services – Detailed Survey Report. December 2023. A public and more concise version of this report is available at: <https://www.iif.com/Publications/ID/5601/IIF-EY-2023-Public-Survey-Report-on-AI/ML-Use-in-Financial-Services>

The advance in AI/ML use seen globally is consistent with country-specific surveys in countries like Malaysia, where 84% of FIs surveyed by Bank Negara Malaysia in 2022 reported to have “at least one AI/ML project in active use”.¹⁰ While the trend is consistent across countries, not all countries have the same level of preparedness for AI adoption, particularly in regard to policy; Malaysia, Singapore, and Thailand are found to score highly on their readiness for AI, while the rest of Southeast Asia are some of the least prepared markets. This readiness is based on privacy and cybersecurity rules, data governance, and AI skills.¹¹

Adopting and managing AI/ML

The adoption of AI tools is occurring at different paces for different financial use cases. Surveys done by the IIF and other organizations show an increasing integration of AI tools for internal uses and first-pass screenings, but lagging adoption in client-facing roles and for business strategy analysis and decision making.¹² Some of the established focus areas for AI use in the financial industry have been Anti-Money Laundering (AML), fraud detection, and credit risk analysis. In more recent years, other use cases have gained significant attention, including marketing, operations (e.g., code assisting, meeting transcripts, translations, document analysis, Know-Your-Customer (KYC), client onboarding, etc.), compliance, and reporting.

¹⁰ Survey – AI in the Malaysian Financial System: Opportunities, Risks, and the Way Forward. Bank Negara Malaysia. 2022. Available at: https://www.bnm.gov.my/documents/20124/10150236/fsr22h2_en_box1.pdf

¹¹ AI Policy Readiness Index. Kati Suominen, Nextrade Group. 2023. Available at: https://www.nextrade-groupllc.com/files/ugd/478c1a_bd7c51417cef4ce790c084c6d3eec1b5.docx?dn=eTrade%20policy%20index%20-%20AI%20policies.docx

¹² Navigating the Jagged Technological Frontier. Digital Data Design Institute – Harvard Business School. September 2023. Available at: <https://d3.harvard.edu/navigating-the-jagged-technological-frontier/>

Objectives set by organizations when deploying AI models

Depending on its size, geographical scope, and institution type, FIs across the board have different objectives for utilizing AI models. Some notable ones include^{1*}:

- **Efficiency:** FIs see AI and GenAI as tools that can be deployed in operational areas to complete frequent tasks in use cases with defined outputs, like note-taking, translations, document summarization, programming assistance, etc. leading to immediate improvements in efficiency.
- **Accuracy:** Risk assessment and model risk management are key areas of interest for practitioners looking to enhance their internal capabilities through enhanced data processing and precision from more complex modeling efforts. Data quality and data availability play a fundamental role in these and other objectives set by FIs.
- **Increase revenue:** Using AI for personalized offerings, marketing purposes, and reaching new segments with sustainable economics is top of the agenda, especially in the medium term.
- **Customer experience:** Driving better digital assistants, chatbots, and voicebots to interact directly with customers are considered by some FIs to be the next deployment use cases to improve customer experiences.
- **Data qualification:** GenAI has demonstrated promising applications in improving unstructured data or making it usable which, in turn, would enhance the data availability for posterior uses in connection with more traditional AI models.

* Information taken from multiple interactions with chief executives and senior leaders (i.e., Chief Data Officer, Global Head of AI, Global Head of Advanced Analytics, Managing Director for Generative AI, Head of Model Risk Management, etc.) at firms that are members of the Institute of International Finance (IIF).

Governance of data is increasingly important to facilitate its use with AI tools. Having stores of high-quality data is important, but using it appropriately and in a way that maintains customer trust is vital for successful AI adoption. The increasing adoption of AI/ML tools is prompting many FIs to reconsider the best management and governance strategies for their data.

This strategic approach is being driven by both the data potential unlocked by AI and an increasing regulatory focus on FIs' use of data in AI.¹³ Such a dynamic will necessitate greater interaction between FIs and regulators as AI models evolve quickly and data will move between these entities. Part of the approach by FIs is being shaped by earlier regulation around data. We observe this dynamic across jurisdictions and types of AI. Entry points for policy application are likely to be found in both the inputs to and outputs of AI models, necessitating careful scoping of applications by FIs and creating multifaceted consideration of policy costs and benefits for policymakers. One precursor to the intensifying focus from

¹³ Simplifying Data Governance in AI-driven Financial Services. Databricks – Antoine Amend, Robin Sutara, Anna Cuisia. April 2024. Available at: <https://www.databricks.com/blog/simplifying-data-governance-ai-driven-financial-services>

regulators on data in AI contexts was the development of the European Union’s General Data Privacy Regulation (GDPR). While this regulation did not envision setting standards for AI applications, it did establish one core principle that many firms are using to develop their internal data governance procedures to further their deployment of AI tools. This principle—only people in the right roles with a need to access data and a legitimate purpose to do so are able to access a given data set—is being carried forth in a variety of AI regulatory approaches, both industry-developed and officially mandated.¹⁴ Specifics of data and its treatment in this context are discussed later, but it is important to note that its governance will be a crucial determinant of AI adoption and management.

The nature of algorithm development complicates data protection, necessitating enhanced governance from the data collectors and AI users. In particular, the right to be forgotten, a feature of many privacy-focused consumer data regulations, may prove troublesome for models. Once trained, it is unclear if a model can ever be de-trained or forget the data used to train it.¹⁵ Therefore, managing access to data in the first instance is of utmost importance. In response, firms will likely devote additional resources to data gathering, labeling, monitoring, and curation ahead of AI/ML model integration, elevating the importance of data governance for firms. This dynamic elevates the importance of data for both FIs that are seeking to use AI in more places and regulators that are looking to both take advantage of AI’s potential at the society level and simultaneously manage risks associated with greater adoption. It also will bring existing data governance rules, and privacy regulations, to the forefront in the consideration of risk management.

Using data

AI enables firms to draw connections and make better use of existing data. By continuing to use AI tools, FIs are increasingly embedding data into all decisions. Given the importance of data in both training AI models and in deploying them successfully—to yield a result, AI must consume new data to model conclusions—firms are finding having large quantities of high quality, well managed data to be a competitive advantage. Data is becoming a core input to business processes, much like capital or raw materials, much more so than it has ever been. At the same time AI models produce new data from these inputs which can then feed into other models or business processes, establishing a continual loop of data use and creation. In this way, AI is creating a new data ecosystem.

FIs are leveraging many types of AI, particularly GenAI, to release more of the potential of data they already hold. Deploying AI applies these tools to existing data. Data unification, or putting existing and generated data together, is enabling new synergies across business lines. Formerly, data generated and consumed by disparate entities rarely crossed business lines. AI tools are helping to bridge that gap and leveraging existing data in new ways. As data gets pooled and is machine-accessible and machine-readable, the number of applications of AI tools rises.¹⁶ Some uses are in enhanced efficiency in AML screening,

¹⁴ Data trends 2024 - First-Mover Advantage: How Leading Enterprises Are Building the Foundation for Advanced AI. Snowflake. 2024. Available at: https://www.snowflake.com/data-trends-report/?utm_campaign=na-us-en-nb-artificialintelligence-phrase&utm_source=google&utm_term=c-g-artificial-intelligence-p-661293166011&utm_medium=paidsearch&utm_content=go-rsa-evg-eb-data-trends-report#download

¹⁵ The right to be forgotten in the age of AI. TechXplore – Alice Trend, David Zhang, Thierry Rakotoarivelo, CSIRO. September 2023. Available at: <https://techxplore.com/news/2023-09-forgotten-age-ai.html>

¹⁶ Illustrative examples of FIs using AI include (taken from the 2023 IIF-EY Annual Survey Report on AI/ML Use in Financial Services – Detailed Survey Report):

consistency in needed information between businesses, management of tasks, and content. The now broader AI toolkit offers FIs the possibility of new product development or streamlining customer support and authentication.¹⁷ These applications potentially enhance productivity, create efficiencies that can then be passed on to customers, increase capacity in certain services, or directly create more value or a better customer experience.

Realizing these benefits will probably require launching and evaluating smaller-scale or precise use cases to better understand the shortcomings and actual potential of the technology, including how AI tools suit the strategic priorities and the risk tolerance of the firm.¹⁸ This process is two-fold; first, specific use cases are tested in a controlled environment (e.g., pilots), and second, those developments gain scale and evolve to fully deployed use cases (which, in turn, could either have no direct interaction with the customer or be directly customer-facing).

“A European G-SIB utilizes AI/ML techniques to “look at a much larger database of patterns and customer preferences enabling holistic analysis and better-informed decision making”. Which provides “an improved understanding of data interaction amongst features/parameters to draw conclusive insights and identify correlative effects that weren’t directly apparent in the existing process. Drawing a specific example, incorporating new data feeds has enabled us to get a better perspective on customers’ activities from [an] anti-money laundering perspective.”

A national Bank in the Middle East and Africa leverages AI to facilitate “consistency and accuracy in the risk assessment due diligence process”.

A different European G-SIB is developing a new use case “to test out patterns of inbound content management, anomaly and pattern detection, queue management, and content generation”.

¹⁷ Generative Artificial Intelligence in Finance – OECD Artificial Intelligence Papers No. 9. OECD. December 2023. Available at: <https://www.oecd-ilibrary.org/docserver/ac7149cc-en.pdf?expires=1715958497&id=id&accname=guest&checksum=84772B17FB95D99053CE01BA5E97D747>

¹⁸ A Generative AI Roadmap for Financial Institutions. Boston Consulting Group (BCG). November 2023. Available at: <https://www.bcg.com/publications/2023/a-genai-roadmap-for-fis>

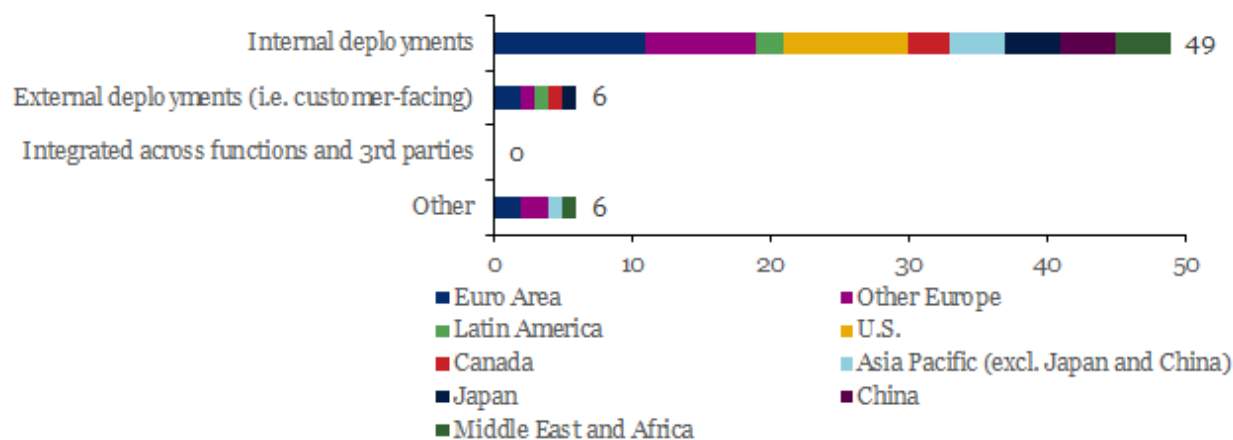
A cautious approach to the newest tools

The impact of frontier AI models, such as GenAI models, on financial businesses is expected to be significant. FIs are carefully testing the appropriate uses and analyzing the risks these could entail. According to recent data, approximately 78% of institutions have put restrictions around the use of GenAI, ranging from fully banning its use to restricting use cases.* Also, 81% of institutions expect to limit GenAI use to internal non-customer-facing applications in 2024 as noted in figure 3.** For example, a G-SIB headquartered in Europe and with a presence in every continent recently noted that it plans to internally deploy additional LLM and generative AI models over the next year in a managed growth period as it “works on understanding and developing controls around LLMs and generative AI”***. The rapid growth of the GenAI space combined with its newness merits caution, a trend we see with each stage of advancement in AI models as FIs explore adoption.

Figure 3: Likely use cases for generative AI in the next 12 months

Most likely uses for GenAI in the next 12 months

By firm, by region



Source: IIF-EY Annual Survey Report on AI/ML Use in Financial Services. Detailed Survey Report. December 2023.

Public sector experience and use cases for AI/ML

Commercial banks, asset managers, insurers, and brokers are not the only ones using AI/ML. Central banks and financial authorities around the world report work on AI across model types.¹⁹ A recent Bulletin from the Bank for International Settlements (BIS) stated that central banks have used AI/ML techniques “for statistics, macro analysis, payment systems oversight, and supervision”²⁰. Some examples of this utilization of AI include:

¹⁹ BIS Bulletin 84, Artificial intelligence in central banking. Douglas Araujo, Sebastian Doerr, Leonardo Gambacorta and Bruno Tissot. January 2024. Available at: <https://www.bis.org/publ/bisbull84.htm>

²⁰ BIS Bulletin 84, Artificial intelligence in central banking. Douglas Araujo, Sebastian Doerr, Leonardo Gambacorta and Bruno Tissot. January 2024. Available at: <https://www.bis.org/publ/bisbull84.htm>

- In 2022 the Reserve Bank of India (RBI) engaged with consultancy firms “for use of Advanced Analytics, Artificial Intelligence, and Machine Learning for generating Supervisory Inputs”.²¹
- The Bank of Korea combines a neural network and a traditional nowcasting model to perform better forecasting.²²
- Bank Indonesia “uses machine learning models, including random forests and neural networks, to construct real-time indicators from text data to assess policy credibility”.²³
- The Central Bank of Malaysia uses an LLM to “improve the consistency of supervisory communication with banks”.²⁴
- In 2023, the European Central Bank (ECB) announced that it is using AI for applications such as automating data classification from businesses and government entities, scraping websites, and providing insights for posterior analysis of supervisory reports and corporate filings²⁵.

One group of use cases, in particular, that has gained popularity within the official sector is supotech (leveraging AI for supervisory exercises). Indeed, a recent study found that 59% of financial authorities are currently utilizing one or more supotech applications. And out of those that are already using AI for supotech, 69% use it for prudential regulation, and 62% of those institutions use supotech applications for consumer protection and market conduct supervision.²⁶ It is also worth noting that institutions like the BIS Innovation Hub (BIS IH) have also worked on TechSprints that include supotech and regtech (applying AI to regulatory exercises) for various purposes. The G20 TechSprint hosted by the BIS IH and the Reserve Bank of India, explored these use cases.

In sum, financial authorities are studying and using AI/ML models for various purposes, alongside the private sector. These authorities are playing a dual role as they not only leverage the technology, but are also the ones that will be considering regulatory and supervisory approaches to AI in the financial industry. Their gaining familiarity could lead to productive interchanges between supervisors and supervisees as the financial industry continues to adopt AI and works to manage its risks.

Managing the risks of AI/ML and GenAI in the private sector

The financial services industry has established a successful track record of internal risk management practices and governance mechanisms for classical AI models in parallel with deployments.²⁷ Approaches have included utilizing validation techniques, alert systems, performance monitoring, and other tools for

²¹ Expression of Interest for engaging consultants for use of Advanced Analytics, Artificial Intelligence and Machine Learning for generating Supervisory Inputs. Reserve Bank of India. September 2022. Available at: https://rbi.org.in/Scripts/BS_ViewTenders.aspx?Id=6913

²² Dynamic Factor Model and Deep Learning Algorithm for GDP Nowcasting. Bank of Korea - Hyun Chang Yi, Dongkyu Choi, Yonggun Kim. June 2022. Available at: <https://www.bok.or.kr/eng/bbs/E0002726/view.do?nttId=10071381&menuNo=400218&pageIndex=1>

²³ Online annex for “Artificial intelligence in central banking”. Bank for International Settlements (BIS). 2024. Available at: https://www.bis.org/publ/bisbull84_annex.pdf

²⁴ Online annex for “Artificial intelligence in central banking”. Bank for International Settlements (BIS). 2024. Available at: https://www.bis.org/publ/bisbull84_annex.pdf

²⁵ Careful embrace: AI and the ECB. The ECB Blog – Myriam Moufakkir. September 2023. Available at: <https://www.ecb.europa.eu/press/blog/date/2023/html/ecb.blog230928~3f76d57cce.en.html>

²⁶ State of Supotech Report 2023. Cambridge Centre for Alternative Finance (CCAF). 2023. Available at:

<https://www.jbs.cam.ac.uk/faculty-research/centres/alternative-finance/publications/state-of-supotech-report-2023/>

²⁷ 2023 IIF-EY Annual Survey Report on AI/ML Use in Financial Services – Detailed Survey Report. December 2023. A public and more concise version of this report is available at: <https://www.iif.com/Publications/ID/5601/IIF-EY-2023-Public-Survey-Report-on-AIML-Use-in-Financial-Services>

avoiding model drift, bias, and unfairness, including taking models out of circulation if needed.²⁸ As FIs adapted their strategies in reaction to GenAI, they reported adding new governance elements including: appointing C-suite managers; creating executive committees directly responsible for AI/ML ethics and governance; leveraging existing guidelines to guide GenAI adoption; adapting existing model risk management or enterprise risk function frameworks to cover GenAI; and developing dedicated GenAI guidance.²⁹ This iterative approach to governance and oversight is crucial. As models evolve, firms may want to evolve their governance and review processes as well. Developing this approach now may be a crucial strategy to incorporate future AI advancements in a timely manner.

Specifically, to govern GenAI, developers and FI have collaborated to create “Small Language Models” and a category of model development where models can be frozen—where a foundation model stops learning at a certain point in time—creating the offering of “Frozen Foundation Models” in certain AIaaS channels.³⁰ By limiting future modification after a certain point and halting the feeding of new data, developers can freeze the inputs to a universe in which they are relatively confident in the data quality. Fears have emerged that, eventually, AI models will have generated so much data as outputs that models will only be trained on their own outputs now perceived as inputs, degrading the quality of the model. Additional worries exist that given the size of foundation models and their ability to Hoover up data indiscriminately and build all inputs into their processing, foundation models may incorporate internal or sensitive firm data once deployed even if they have not been instructed to use this data.³¹

Freezing a model can limit its ability to incorporate data it does not have permission to use once deployed, adding an extra layer of protection and confidence for FIs. Prompts can be analyzed and results returned without modifying the underlying foundation model or storing the request as the core model is itself frozen.³² Some argue that freezing a model degrades its attractiveness as one of the main draws of foundation models is their ability to continually “learn”. To walk the thin line between these risks and benefits, FIs can add an “adapter layer” to frozen foundation models to incorporate new data and prompts on top of the frozen model. In this scenario, data owned by the FI and its adapter layer are unique to the firm and secured in whatever manner the FI deems appropriate—typically kept within its own cloud environment—and remain accessible to only that FI, not the foundation model developer.³³

Safety, security, and differing approaches

The public sector faces pressure to regulate AI, given rising citizen fears about its power and concerns over the risks it may pose to financial stability, privacy, and security. Authorities, much like the private

²⁸ 2023 IIF-EY Annual Survey Report on AI/ML Use in Financial Services – Detailed Survey Report. December 2023. A public and more concise version of this report is available at: <https://www.iif.com/Publications/ID/5601/IIF-EY-2023-Public-Survey-Report-on-AI/ML-Use-in-Financial-Services>

²⁹ Among other things, these committees are (1) Establishing an overall operating model and risk management framework for emerging AI/ML risks; (2) Overseeing practices to manage AI/ML ethics; (3) Reporting AI/ML risks to senior management; and (4) Establishing the definition of AI/ML.

³⁰ RegionSpot: Unleashing the Power of Frozen Foundation Models for Open-World Region Understanding. Haosen Yang, Chuofan Ma, Bin Wen, Yi Jiang, Zehuan Yuan, Xiatian Zhu. February 2024. Available at: [https://openreview.net/forum?id=9Wy6pLNQcG&referrer=%5Bthe%20profile%20of%20Xiatian%20Zhu%5D\(%2Fprofile%3Fid%3D~Xiatian_Zhu3\)](https://openreview.net/forum?id=9Wy6pLNQcG&referrer=%5Bthe%20profile%20of%20Xiatian%20Zhu%5D(%2Fprofile%3Fid%3D~Xiatian_Zhu3))

³¹ Enabling an Efficient Regulatory Environment for AI – Practical Considerations for Generative AI. ASIFMA. January 2024. Available at: <https://www.asifma.org/wp-content/uploads/2024/01/2024-asifma-gen-ai-paper-final-updated-18012024.pdf>

³² Enabling an Efficient Regulatory Environment for AI – Practical Considerations for Generative AI. ASIFMA. January 2024. Available at: <https://www.asifma.org/wp-content/uploads/2024/01/2024-asifma-gen-ai-paper-final-updated-18012024.pdf>

³³ Enabling an Efficient Regulatory Environment for AI – Practical Considerations for Generative AI. ASIFMA. January 2024. Available at: <https://www.asifma.org/wp-content/uploads/2024/01/2024-asifma-gen-ai-paper-final-updated-18012024.pdf>

sector, will take time to gain familiarity with the technology and its applications. These efforts are ongoing, as discussed earlier. Competition between public and private sectors for the limited pool of AI expertise will remain fierce. In addition to gaining an understanding of the technology and appropriately staffing their efforts, regulators will also need to determine an appropriate entry point for regulation, and time it well. Public sector entities unable to bring onboard talent internally, may want to create frequent opportunities to learn from technical experts in the private sector. The risks of attempting to regulate AI before thoroughly understanding it are manifold and many officials do not want to direct or restrict development of these technologies. Regulating before understanding AI tools could lead to ineffective regulatory approaches or cause domestic industries to avoid the technology all together. These risks are known to the official sector. For example, the UK's Department for Science, Innovation and Technology [stated](#) that “acting before we properly understand the risks and appropriate mitigations would harm our ability to benefit from technological progress while leaving us unable to adapt quickly to emerging risks”.³⁴ This, and additional details on policy developments that impact AI/ML development for the financial industry, are developed in more detail later in this document.

³⁴ Consultation Outcome: A pro-innovation approach to AI regulation: government response. Department for Science, Innovation and Technology of the UK. February 2024. Available at: <https://www.gov.uk/government/consultations/ai-regulation-a-pro-innovation-approach-policy-proposals/outcome/a-pro-innovation-approach-to-ai-regulation-government-response#introduction>

Underlying infrastructure and its effect on the development and deployment of AI/ML in finance

As AI systems become more sophisticated and data-intensive, the underlying technological infrastructure plays a crucial role in enabling their effective development, deployment, and scalability. Use by FIs and financial authorities alike occurs in parallel with incremental growth in demand for support capabilities for data and infrastructure, including cloud computing, which will all see significant upticks with AI. AI can and has been developed and deployed without cloud computing, but the growth in the size of models and cross-border use has driven more of the AI market onto cloud. The automation enabled by cloud services supports more sophisticated models that improve with additional runs of the model, a process facilitated by the automatic connects and processing at the speed offered by the cloud.³⁵ The relationship between AI and cloud services can be thought of as symbiotic. In this context, features such as on-demand access, computational processing power, storage, security, and integration of diverse data sources are centered. For instance, cloud use allows computing resources to be dialed up or down depending on needs without needing to adjust personnel or hardware budgets of IT, crucial for the variable environment of developing and deploying AI where computing needs vary widely across the lifecycle of a model. However, some say this now conventional wisdom has limits in its applicability to newer AI as the baseline threshold of necessary computing power is much higher in recent offerings and the personnel adjustments needed may be a level shift, rather than fluctuating.

Technological capabilities for data intensive models and underlying infrastructure are especially relevant for GenAI, as models of this size are frequently accessed by multiple clients as needed, rather than developed by each firm using them.³⁶ GenAI models can be 10-100x bigger than simpler AI models, which means that maintaining computing power at this scale could turn out to be inefficient if replicated across multiple firms or restrict access to models if housed in one internal data center. To serve the specific needs of different model types (whether predictive AI or GenAI, including LLMs), multiple forms of cloud management have been developed. Some firms maintain their own private networks, restricting access to their models, training data, and results to internal users. Others purchase custom environments on public clouds that offer AI resources as a full-suite product to the company. Many opt for a hybrid model, where a firm's own resources and to an extent, data, are integrated with public cloud provider tools and environments.³⁷ As AI use grows, and FIs see a parallel dependence on external vendors growing, many firms are opting for a hybrid approach and cross-cloud solutions. According to a study by AI provider, Snowflake, "In 2023, the number of organizations with data across all three major public clouds grew by 207%".³⁸ Managing firm data across multiple clouds raises its own set of challenges, making each firms' strategy an individual decision based on a multitude of considerations. Across these infrastructure

³⁵ The Role of AI in Cloud Computing. The Forecast by Nutanix – Michael Brenner. July 2023. Available at: <https://www.nutanix.com/theforecastbynutanix/technology/ai-in-the-cloud>

³⁶ The AI boom is here. The Cloud may not be ready. Wall Street Journal – Isabelle Bousquette. July 2023. Available at: <https://www.wsj.com/articles/the-ai-boom-is-here-the-cloud-may-not-be-ready-1a51724d>

³⁷ What's the difference between public cloud and private cloud? AWS. 2024. Available at: <https://aws.amazon.com/compare/the-difference-between-public-cloud-and-private-cloud/>

³⁸ Data trends 2024 - First-Mover Advantage: How Leading Enterprises Are Building the Foundation for Advanced AI. Snowflake. 2024. Available at: https://www.snowflake.com/data-trends-report/?utm_campaign=na-us-en-nb-artificialintelligence-phrase&utm_source=google&utm_term=c-g-artificial-intelligence-p-661293166011&utm_medium=paidsearch&utm_content=go-rsa-evg-eb-data-trends-report#download

strategies, data access and availability, as well as its integrated management, is of particular concern to firms with a multitude of options for its integrated management.

In examining the tradeoffs between AI via the cloud versus AI warehoused in non-cloud infrastructures, FIs consider firm readiness for running models in the cloud, their own data security—both in what models may have access to in training being imported from the cloud and also their willingness to put firm data into the cloud and the scalability and affordability of the type of infrastructure needed for each of the models the FI would want to run.³⁹

With these security considerations in mind, two trends are emerging in parallel. FIs are: (1) Executing AI/ML models with their own data and infrastructure, and also testing these models with internal data alone to better understand and map what insights and key data points emerge from those exercises; and (2) taking a *cloud by default* approach, where AI/ML tools are run via cloud unless a persuasive argument that the specific model needs to be run within the firm's infrastructure alone is made.⁴⁰

Whether it is through a public cloud or a hybrid approach, FIs that choose to leverage their AI development on cloud services are mainly doing so with four purposes in mind⁴¹:

- **Model training:** Feeding large data sets so that the models can enhance their precision, and can learn patterns and relationships across the information they receive.
- **Model performance monitoring:** Checking the performance of the models so that they maintain appropriate levels of accuracy and reliability over time, which aids in preventing the models from drifting and flags the potential need for re-calibrating or re-training them.
- **Feature selection:** Helping identify the most informative and conclusive variables in the data that is available, thus reducing *noise* or redundancy.
- **Data preparation:** Curating or cleaning the data that is introduced to the models so that the information is as high-quality as possible.

Directed data environments for model training, as opposed to the entire data set of the open internet, can help to refine model applications for financial use cases, while also acting as quality control. Plugging models into the internet where they can consume low-quality or unreliable information without filtering access to gating data processing would alter model outcomes. This dynamic is of particular concern for GenAI, where models are capable of processing unstructured data, enabling the training universe to cover all data ever created. Hence, providing a controlled data environment for AI training, and utilization after deployment, is being facilitated with cloud-based platforms for an increasing number of firms at their request. A hosted model can integrate with existing data structures and be restricted to certain data sets. Multiple system and source integration into models hosted on the cloud using these approaches can

³⁹ Information taken from multiple interactions with chief executives and senior leaders (i.e., Chief Data Officer, Global Head of AI, Global Head of Advanced Analytics, Managing Director for Generative AI, Head of Model Risk Management, etc.) at firms that are members of the Institute of International Finance (IIF).

⁴⁰ What is Hybrid Cloud? Nutanix. April 2023. Available at: <https://www.nutanix.com/info/what-is-hybrid-cloud>

⁴¹ 2023 IIF-EY Annual Survey Report on AI/ML Use in Financial Services – Detailed Survey Report. December 2023. A public and more concise version of this report is available at: <https://www.iif.com/Publications/ID/5601/IIF-EY-2023-Public-Survey-Report-on-AIML-Use-in-Financial-Services>

facilitate compliance with privacy rules and security frameworks and, at the same time, allow models to be fed relevant data for a specific group of tasks.⁴²

Some firms are approaching this challenge by integrating cloud strategies more closely into their AI workflows. Data management, storage, and easy-to-manipulate access format of some cloud offerings can enable some firms to better leverage their data resources for AI. From a governance standpoint, automatic gating of access or controls on data within the firm's cloud architecture offers some additional confidence in deploying AI tools on firm data. Models require integrated data solutions, which many firms are utilizing the cloud to provide, across the two strategies discussed earlier.⁴³

Third parties

The reliance on external development of AI models, or contracting services on the cloud to develop or run AI models, entails additional third-party risks for FIs to consider. The financial industry has extensive experience managing these sorts of third-party risks, though the challenge with AI is of increasing complexity. The chain of developer to deployer, potentially across multiple stages, to user complicates the chain of risk management. While third-party risk management is a familiar concept to the financial services industry, multi-level and multi-stage risk management across several third parties within the AI supply chain merits careful consideration. As more firms look to acquire AI tools from third parties, close scrutiny of these relationships will gain more relevance.⁴⁴

Leaders in the financial industry are requesting that third-party service providers meet the high-security standards that consumers and authorities demand from financial services firms –particularly regarding sensitive data such as income, investment portfolio allocations, tax records, credit utilization, payment habits, etc.

FIs are governing the broader set of risks entailed by AI/ML models from third parties by requiring the same level of validation for external models as for those developed internally.⁴⁵ Yet, visibility into the third-party models, their features, training data, and methodology remain a challenge.⁴⁶ This concern is supported by recent data and also the [AI Risk Management Framework](#) (RMF) published by the National Institute of Science and Technology of the U.S. (NIST) in 2023, where deployers of AI/ML tools expressed

⁴² Streamlining cloud application with AI technology - International Journal Of Innovations In Engineering Research And Technology [IJERT]. Lakshmisri Surya. 2018. Available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3785667

⁴³ Closing the cloud strategy, technology and innovation gap – Future of Cloud Survey Report. Deloitte. September 2023. Available at: https://www2.deloitte.com/us/en/pages/consulting/articles/cloud-strategy-innovation-survey-report.html?id=us:2ps:3gl:cloudps24:eng:cons:011923:em:na:KYBtSsfP:1303381894:645348785265:p:Generic_Cloud:Generic_Cloud-Innovation-Survey_Phrase:nb&gad_source=1

⁴⁴ 2023 IIF-EY Annual Survey Report on AI/ML Use in Financial Services – Detailed Survey Report. December 2023. A public and more concise version of this report is available at: <https://www.iif.com/Publications/ID/5601/IIF-EY-2023-Public-Survey-Report-on-AIML-Use-in-Financial-Services>

⁴⁵ 2023 IIF-EY Annual Survey Report on AI/ML Use in Financial Services – Detailed Survey Report. December 2023. A public and more concise version of this report is available at: <https://www.iif.com/Publications/ID/5601/IIF-EY-2023-Public-Survey-Report-on-AIML-Use-in-Financial-Services>

⁴⁶ 2023 IIF-EY Annual Survey Report on AI/ML Use in Financial Services – Detailed Survey Report. December 2023. A public and more concise version of this report is available at: <https://www.iif.com/Publications/ID/5601/IIF-EY-2023-Public-Survey-Report-on-AIML-Use-in-Financial-Services>

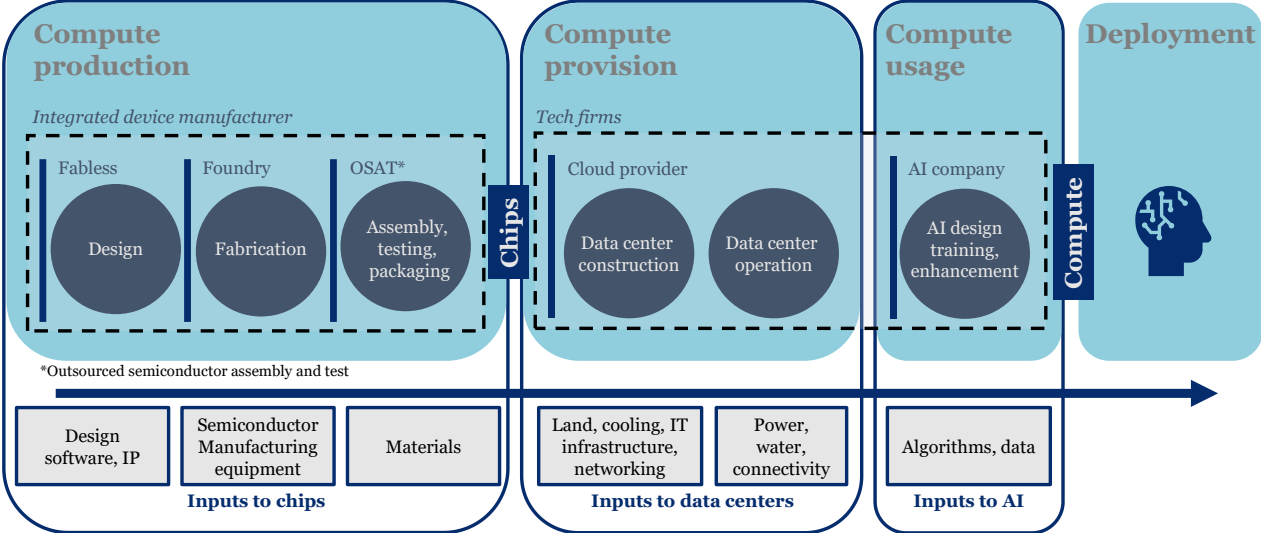
significant concerns about their ability to manage the quality of training data, bias, disinformation, self-replication capacity, and software vulnerabilities in both upstream and downstream cases⁴⁷⁴⁸.

The security standards needed by the financial industry apply to both data management (i.e., data encryption, cyber threat detection, and others) and AI model development and deployment (i.e., transparency, red teaming, benchmarking, and others). Third party risk management in this respect is not a new concept for financial services, and the industry has long pursued an enhanced standard of diligence.⁴⁹ The potential risks fall into several categories, from the security of the input/output data itself, to the risk to privacy in cross-border storage, and cyber security risks.⁵⁰

The AI supply chain and its dynamics

Third parties come into consideration at multiple points in the AI lifecycle. The earlier discussed chain of production from developer to deployers (potentially multiple) to user is a simplified decomposition of the order of tool creation from the cascading line of users. Considering the now-discussed third-party providers and technical infrastructure of the AI value chain yields a more complex decomposition of the compute resources needed to create an AI model, revealing the entities FIs must consider their relationship to as they evaluate deploying an AI tool and the sustainability and resiliency of the AI supply chain.

Figure 4: Compute power, third parties, and the AI value chain



Source: Computing power and the governance of Artificial Intelligence. Sastry et al. February 2024.

⁴⁷ 2023 IIF-EY Annual Survey Report on AI/ML Use in Financial Services – Detailed Survey Report. December 2023. A public and more concise version of this report is available at: <https://www.iif.com/Publications/ID/5601/IIF-EY-2023-Public-Survey-Report-on-AIML-Use-in-Financial-Services>

⁴⁸ AI Risk Management Framework – Section 3. National Institute of Science and Technology (NIST), Department of Commerce of the United States. 2023. Available at: https://airc.nist.gov/AI_RM_Fundamental_Information/3-sec-characteristics

⁴⁹ 13th Annual EY/IIF Global Bank Risk Management Survey. IIF. February 2024. Available at: <https://www.iif.com/Publications/ID/5653/13th-Annual-EYIIF-Global-Bank-Risk-Management-Survey>

⁵⁰ Cloud Computing in Southeast Asia and Digital Competition with China. Center for Strategic & International Studies. August 2023. Available at: <https://www.csis.org/analysis/cloud-computing-southeast-asia-and-digital-competition-china>

Figure 4 presents an overview of the AI compute supply chain, which includes three stages of development that take place before even creating an AI model that is ready to deploy.⁵¹ This figure shows some of the foundations of AI development, including the chips necessary to produce the computer power needed to develop AI algorithms, the provision of data, cloud infrastructure, and the compute power needed to deploy AI, including the design, training, and enhancement of models using the compute power. The popularity of cloud compute to support AI may tap the capacity of existing cloud computing resources.⁵² Most cloud compute capacity is built on standard CPU processing, rather than the GPU or collaborative cluster model optimized for AI/ML, potentially straining compute production.⁵³ New investments from cloud providers are seeking to maintain current excess capacity in storage and processing, but keeping pace with future AI growth is a concern.

While the models undergo their development phase (mainly covered in “compute provision” and “compute usage” in Figure 4) AI developers are considering methods to increase transparency to their clients. Third party providers in this stage will need to gain comfort with FIs’ responsibilities to manage and report risks in AI tools and the expectations of financial services-focused supervisors, as some providers currently offer in a variety of formats. FIs are likely to value transparency on the following aspects highly: the type of data sets used; methods of model development, limits, and testing; the collection and use of personal data; and ownership of data used, particularly if it is firm-specific or proprietary data.⁵⁴ In addition, successful governance of these relationships may call for clear guidelines from governments on the responsibility and method for labeling AI-generated content or results.

Once models move from the development phase to the deployment phase, the connection between deployers and users takes center stage. As with previous steps, this relationship, which may be multi-staged in financial services, calls for a particular focus on transparency in the creation of and when and how AI tools are finally used. Consumer education will be vital. As customers grow more sophisticated, their discernment around interacting with AI and using AI-generated content and recommendations will grow, too. Whether or not firms retain the ability for users to opt out of interacting with AI will become an important policy question, for internal consideration within FIs and for policymakers.

This chain of responsibility extends to inputs, as well. From an internal business standpoint, successfully deploying AI requires a robust internal data environment. For FIs, AI is a technique for turning effective data governance and large data stores into a business accelerator; firms entering the age of AI with both

⁵¹ Computing power and the governance of Artificial Intelligence. Cornell University. February 2024. Girish Sastry, Lennart Heim, Haydn Belfield, Markus Anderljung, Miles Brundage, Julian Hazell, Cullen O’Keefe, Gillian K. Hadfield, Richard Ngo, Konstantin Pilz, George Gor, Emma Bluemke, Sarah Shoker, Janet Egan, Robert F. Trager, Shahar Avin, Adrian Weller, Yoshua Bengio, Diane Coyle. Available at: <https://arxiv.org/pdf/2402.08797.pdf>

⁵² The AI boom is here. The Cloud may not be ready. Wall Street Journal – Isabelle Bousquette. July 2023. Available at: <https://www.wsj.com/articles/the-ai-boom-is-here-the-cloud-may-not-be-ready-1a51724d>

⁵³ As defined by [AWS](#), the difference between these two measures (CPU and GPU) can be put in the following words: “A CPU, or central processing unit, is a hardware component that is the core computational unit in a server. It handles all types of computing tasks required for the operating system and applications to run. A graphics processing unit (GPU) is a similar hardware component but more specialized. It can more efficiently handle complex mathematical operations that run in parallel than a general CPU. While GPUs were initially created to handle graphics rendering tasks in gaming and animation, their uses now extend far beyond that.”

⁵⁴ Information taken from multiple interactions with chief executives and senior leaders (i.e., Chief Data Officer, Global Head of AI, Global Head of Advanced Analytics, Managing Director for Generative AI, Head of Model Risk Management, etc.) at firms that are members of the Institute of International Finance (IIF).

of these conditions in place are poised to adopt AI more rapidly and to leverage its productivity enhancements and innovation potential more effectively than those without.

Layering management of AI/ML

Within the financial services industry, there will likely be multiple layers of developers, deployers, and users. Large foundation models are trending toward becoming the foundation for customized model applications. This could call for multiple policy approaches and layers of oversight. A common principle from financial regulation may be useful here: responsibility for mitigating risk is borne by those best able to mitigate it. For AI/ML tools, different types of responsibilities could belong to those who are able to control the risks. Developers are probably better positioned to apply standards to data inputs and test their model for bias, while deployers might be better positioned to set the parameters on customer interaction to prevent data leakage. Many FIs are already instituting this chain approach by segregating data or pursuing applications featuring frozen models as the foundation.

As observed throughout this section, talking about AI/ML (including some of their subset of models like GenAI and LLMs) means talking about the infrastructure where many of the models are trained, developed, tested, and deployed, like the cloud, and some of their key capabilities, like data. The business and technological complexities of this ecosystem also need to be overlaid with the regulatory and policy discussions that have come into focus.

As a result of these multiple layers, the end user of an AI-linked product may never have full transparency as to the first-level developer's decisions. The uncertainty this dynamic creates could be mitigated through an enhanced standard of care at each level to maintain customer trust throughout the chain. As long-time steward of sensitive personal data, the financial services industry is well placed to guide the development of transparency and trust building in the new age of generally applied AI across multiple complex third-party service providers.

Policy considerations

AI models can be developed with training data from a variety of jurisdictions and applied well beyond their home market, if a “home” can be identified. As a result, effective regulation of AI in one market is dependent on effective regulation of AI in multiple markets. AI, especially GenAI and its unstructured and often undirected data consumption, is global by nature. Models do not intrinsically recognize borders. As the UN put it, “formulating effective policies and governance frameworks [for AI] requires a harmonized, multilateral approach.”⁵⁵ Such a harmonized approach has been difficult to formulate, as the understanding of AI, evaluation of its risks, and regulatory principles vary widely from market to market. Further, applying the risk-based approach central to existing financial regulation to AI will require additional risk evaluation and considerations around its technical, policy, and governance approaches. Managing policies for a cross-industry technology and its varied applications across and within several jurisdictions presents a unique set of policy questions. Policymakers are trying to develop strategies to manage inputs and outputs, consumer protection, financial stability, and the economic

⁵⁵ In an AI-driven digital economy, how can developing countries keep up? United Nations, Trade & Development. December 2023. Available at: <https://unctad.org/news/ai-driven-digital-economy-how-can-developing-countries-keep>

transformation offered in AI application edge cases. Given the scope, scale, and jagged innovation and adoption frontier for AI, these are not questions that policymakers can answer alone. Frequent input from the private sector will be required as effective policy necessitates implementable measures that do not unduly restrict innovation. As highlighted earlier, the unique complex value chain for AI means that the appropriate policy approach to AI in finance is likely multifaceted. It will incorporate measures for FIs and other industries alike, and will likely task FIs with implemented regulations written for technology, rather than financial services. It will most certainly introduce a new group of regulatory bodies to FIs, expanding the engagement set for government affairs offices.

Uneven global frontier

AI's adoption and application has not been evenly distributed across geographies. According to the UN's Technology and Innovation Report 2023, China, the United Kingdom, and the United States own almost half of all publications and patents and have the most AI offerings within their jurisdictions. Developing countries, on the other hand, were found to be sources of data for AI model training.⁵⁶ This current dynamic shapes the way that many nations, particularly the least developed countries, view cutting-edge tools and data policy, and complicates the development of "global" standards.

A path forward to coordinate international cooperation may be drawn from previous examples. The 2021 Prague Proposal—a set of recommendations for countries as they construct 5G wireless networks—offers one framework for a tiered understanding of risks and collaboration with industry, grounded in technological feasibility and likely applications across markets.

⁵⁶ Technology and Innovation Report 2023. United Nations, Trade & Development. 2023. Available at: <https://unctad.org/tir2023>

Figure 5: Common features of international AI commitments

General components of AI commitments made in international fora <i>Drawn from the G7 AI Declaration, G77 AI Pledge, G20 AI statements, Digital Economic Partnership Agreements, Trade Agreements in 2021-present</i>	
Combating discrimination and bias	- implement privacy regulations for citizen data as appropriate
	- promote ethical AI*
	- include anti-discrimination clauses in government procurement
	- incorporate bias mitigation into domestic regulation of AI
Enhancing security	- share best practices on data governance measures
	- incorporate OECD principles on government access to personal data into trade commitments
	- promote best practices in IT environments
	- revisit and revise risk management frameworks for security as needed
Promoting accountability	- incorporate privacy guidelines into domestic standards
	- incorporate the U.S.'s NIST AI RMF into trade commitments
	- use the G7 AI Code of Conduct to develop bilateral agreements on AI
Explainable and interpretable results	- be transparent about the standards used to evaluate AI models in enforcement actions
	- collaborate on technical standards and transparency requirements
	- utilize G7 principles as the foundation for commitments
Creating AI opportunity	- work toward mutual recognition of audit practices and assessment methodologies
	- reduce barriers to trade in AI goods and services
	- create experts networks of AI talent
	- cooperate in developing international AI standards
	- share best practices in data governance
<i>*Ethical AI has not been universally defined</i>	

Source: Authors; *Toward international cooperation on foundation AI models*, Brookings – Joshua P. Meltzer. November 2023.; G20, G7 Statements; ASEAN Negotiation Text 2023; Singapore-New Zealand Digital Economic Partnership Agreement.

Global coordination efforts

Given the cross-border nature of AI/ML, multiple cross-border efforts to coordinate policy have emerged.

Free trade agreements and digital economy agreements are increasingly including commitments around AI and its governance. Many of these agreements focus specifically on data flows, a necessary component of AI (as discussed throughout this paper). The G7 Data Free Flow with Trust (DFFT) initiative and related work at the OECD are good examples. Further, the exceptions to these agreements have been narrowed to allow governments the domestic policy space to deal with specific harms to privacy and consumer protection from AI.* ASEAN's Agreement on Electronic Commerce contains measures to reduce barriers to information flow, specifically to support cross-border electronic commerce and trade, while permitting flexibility for local interpretation around promoting "security and confidentiality of information."** Some agreements have dedicated AI commitments, like the New Zealand-UK free trade agreement inked in 2023, that develop cooperation protocols for AI standards and mutual recognition agreements.

AI-specific organizations have emerged, such as the Global Partnership for AI, as have dedicated AI workstreams in multilateral bodies. Global coordination of AI policy is the priority of many multi-lateral groups, such as the G7, G20, and G77. These groups each have recommendations for AI development and applications they plan to finalize this year, setting up a complex compliance landscape for FIs. Recent developments from some of these groups reveal differences in focus and stance, perhaps owing in part to the cross-industry nature of the questions they face with AI. All of these moving parts are likely to require that FIs increasingly engage with regulators across the technology spectrum. Encouragingly, many multilateral groups have already stated their intent to broaden stakeholder engagement through their processes, giving firms multiple opportunities to discuss over-lapping principles directly with policymakers outside their home jurisdictions. Further, multilateral bodies are increasingly emphasizing the importance of inclusion of a diverse set of countries in terms of technology readiness and economic development, particularly to ensure developing countries are represented in these efforts.***

See Figure 5 for common principles drawn from trade agreements and multilateral commitments

* Toward international cooperation on foundation AI models – an expanded role for trade agreements and international economic policy. Brookings – Joshua P. Meltzer. November 2023. Available at: <https://www.brookings.edu/articles/toward-international-cooperation-on-foundational-ai-models/>

** Cloud Computing in Southeast Asia and Digital Competition with China. Center for Strategic & International Studies. August 2023. Available at: <https://www.csis.org/analysis/cloud-computing-southeast-asia-and-digital-competition-china>

*** In an AI-driven digital economy, how can developing countries keep up? United Nations, Trade & Development. December 2023. Available at: <https://unctad.org/news/ai-driven-digital-economy-how-can-developing-countries-keep>

In the national realm, one of the most difficult questions confronting policymakers is defining the core purpose of AI policies. Common goals in multiple jurisdictions seem to be defending human rights, consumer protection, soundness and stability of the economy, limiting market concentration, and avoiding anti-competitive acts. At the same time, the national security implications of widespread AI use are bringing a new set of policymakers into the conversation. Such multifaceted considerations are unlikely to be addressed by one single set of laws, not to mention policies to support sector-specific goals like fostering

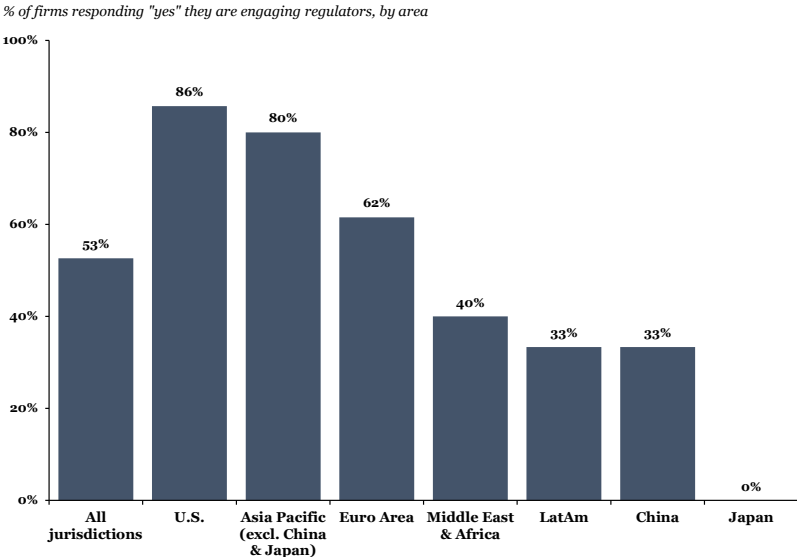
investment for AI/ML research in medicine, enhancing risk assessments in finance, protecting intellectual property in the entertainment industry, among others.

The speed of technology innovation further complicates the policy environment. Policymakers also need to contend with the rapid evolution of AI; by the time laws are written, the technology has likely evolved into new areas. European lawmakers recently faced this challenge as the EU AI Act was released for a round of comments just ahead of the launch of ChatGPT, necessitating a later rewrite and comment period. The OECD also experienced this situation. After updating its definition of AI in November 2023, the international body felt the need to publish an explanatory memorandum in early 2024 to further clarify some of the characteristics included in its definition, reflecting the technology developments since its first re-definition of AI.⁵⁷

Regulatory approaches

Notwithstanding the challenges mentioned above, policy work is underway at the national level and FIs are already working with the extended set of relevant regulators. A 2023 IIF-EY survey indicated that 53% of firms globally are in active discussions with their home government about AI regulation.⁵⁸ U.S.-based firms were the most engaged (86%), closely followed by Asia-Pacific FIs (excluding China and Japan).

Figure 6: Levels of engagement with local regulators



Source: IIF-EY Annual Survey Report on AI/ML Use in Financial Services. Detailed Survey Report. December 2023.

⁵⁷ OECD Artificial Intelligence Papers No. 8 – Explanatory memorandum on the updated OECD definition of an AI system. March 2024. Available at: <https://www.oecd-ilibrary.org/docserver/623da898-en.pdf?expires=1711655482&id=id&ac-cname=guest&checksum=BDB99B35E907DA04792906CFBAA25CD1>

⁵⁸ 2023 IIF-EY Annual Survey Report on AI/ML Use in Financial Services – Detailed Survey Report. December 2023. A public and more concise version of this report is available at: <https://www.iif.com/Publications/ID/5601/IIF-EY-2023-Public-Survey-Report-on-AI/ML-Use-in-Financial-Services>

Many countries have prioritized understanding AI and developing domestic capabilities over prescriptive regulation. Some have developed AI strategies that incorporate governance principles and safety standards rather than comprehensive written rules. Despite the excitement noted earlier in the financial industry for AI/ML adoption, many governments are still realizing the widespread and transformative impact these tools may have. As a result, many governments are dually concerned with appropriate regulation and establishing AI leadership regionally and globally. National AI strategies, as a result, encompass plans to both protect individuals and support domestic AI industries. Common features of these strategies, highlighted in figure 5, contain measures to increase compute power domestically and access to data, while managing security, privacy, and discrimination risks.⁵⁹

The applicability of these measures to different industries is further complicated by existing regulations around technology and third-party risk management. Some early efforts to regulate AI started from scratch, rather than building on existing efforts that tackle specific risks from an increasingly technology-dependent global economy. We note this trend may be shifting as the regulatory understanding of the AI value chain grows, and AI/ML taskforces in policymaking bodies gain knowledge and experience from interactions with the industry and their own use of the tools. This trend necessitates that FIs increasingly engage with new (to them) sets of policymakers and supervisory units. These officials may be experts in components of AI/ML (such as data, resiliency, security, and AI technology), but may not be familiar with or interested in the specifics of financial services businesses, which could cause them to underestimate the impact of their measures in a specific sector or to overlook some of the risks that are singular to the financial industry. While many AI applications are new, technology risk management and third-party service provider relationships are not—especially to FIs, their regulators, and supervisors. Technology and financial regulations are likely to receive equal emphasis across governance approaches. Combining the AI specific regulations with existing rules around supervision, technology and third-party risk management yields a complex policy mix. These rules are likely to be additive rather than to replace current guidance. To comply, FIs will likely need to add compliance staff and deepen their expertise in technology spheres.

National approaches and policy tools: Regulation, standards, practices or codes

In addition to different national strategies for AI, a multitude of policy tools have emerged: regulation, standard-setting efforts, industry practices and initiatives, and codes of conduct are all playing a role in governing how FIs adopt and deploy AI tools. Some jurisdictions, like the EU, have written AI laws meant to govern its application and development by applying different rules for different risk levels. The EU's AI Act created four risk categories: low or minimal risk, limited, high, and unacceptable. And depending on where a specific model may fall, that triggers transparency obligations, compliance with ex-ante requirements (e.g., ex-ante conformity evaluation), or outright prohibition.⁶⁰

⁵⁹Policies, data and analysis for trustworthy artificial intelligence. OECD.AI Policy Observatory. 2024. Available at: <https://oecd.ai/en/>

Listed agreements;

Toward international cooperation on foundation AI models – an expanded role for trade agreements and international economic policy. Brookings – Joshua P. Meltzer. November 2023. Available at: <https://www.brookings.edu/articles/toward-international-cooperation-on-foundational-ai-models/>

⁶⁰ Official Briefing – EU Legislation in Progress: Artificial Intelligence Act. European Parliament. March 2024. Available at: [https://www.europarl.europa.eu/RegData/etudes/BRIE/2021/698792/EPRS_BRI\(2021\)698792_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/BRIE/2021/698792/EPRS_BRI(2021)698792_EN.pdf)

Other jurisdictions have taken the standards development approach. Firms in these markets are required to adhere to these standards as they adopt AI/ML tools, though some standards are voluntary at present with the intent of making them mandatory in due course. Hong Kong and Singapore authorities, for example, have issued guidance on testing for fairness and safety. Hong Kong’s “Reshaping Banking with AI” guidance is intended to help firms adopt AI tools in compliance with existing regulations. Singapore established the Veritas consortium to test the trustworthiness of tools and to enable firms to demonstrate they were following best practices. It should not escape notice that these major financial centers have approached the space by developing standards for AI’s adoption by FIs, rather than for developing safe AI. Most of the hyperscale AI developers are domiciled outside Southeast Asia, limiting the effect of developer guidance targeted at foundation models. Guiding those developers will require cross-cutting global standards.

Similar in guidance over dedicated laws, the U.S. approach has been to view dedicated/prescriptive AI laws as premature and to develop standards for AI development, while providing voluntary risk management frameworks for AI users. The U.S. houses several of the AI landscape’s largest developers, meaning its policies will have outsized global impact. A U.S. framework to manage risks related to AI was issued in January 2023 by the National Institute of Standards and Technology (NIST). The AI Risk Management Framework (RMF) includes guidance for adopters⁶¹:

- Measure the risks posed by AI tools used by the organization (e.g., risks related to third parties, software, hardware, and data);
- Understand and apply different measures according to the stage of the AI value chain they participate in;
- Define the risk tolerance, understood as the firm’s “readiness to bear the risk in order to achieve its objectives”, keeping in mind that “the level of risk that is acceptable to organizations or society are highly contextual and application and use-case specific”;
- Prioritize attention to AI/ML use cases that could pose greater risks, which could end up with an organization ceasing the exploration, development or deployment of a model “in a safe manner until risks can be sufficiently managed”;
- Establish and maintain “the appropriate accountability mechanisms, roles and responsibilities, culture, and incentive structures for risk management to be effective”;
- Track emerging and potential risks.

These and other measures in the U.S. approach will be further complemented by updating the AI RMF and by developing more specific guidance on specific types of models such as LLMs and GenAI.⁶² Though

This year will likely bring further guidance on GenAI specifically. Currently, in addition to the high-risk categorization approach in the EU AI Act, China is the only country with dedicated GenAI rules. The Cybersecurity Administration of China (CAC) published the “Interim Measures for the Management of Generative AI Services” in July of last year. These measures include post-deployment testing for accuracy and discourage using GenAI in any public-facing AI offerings.

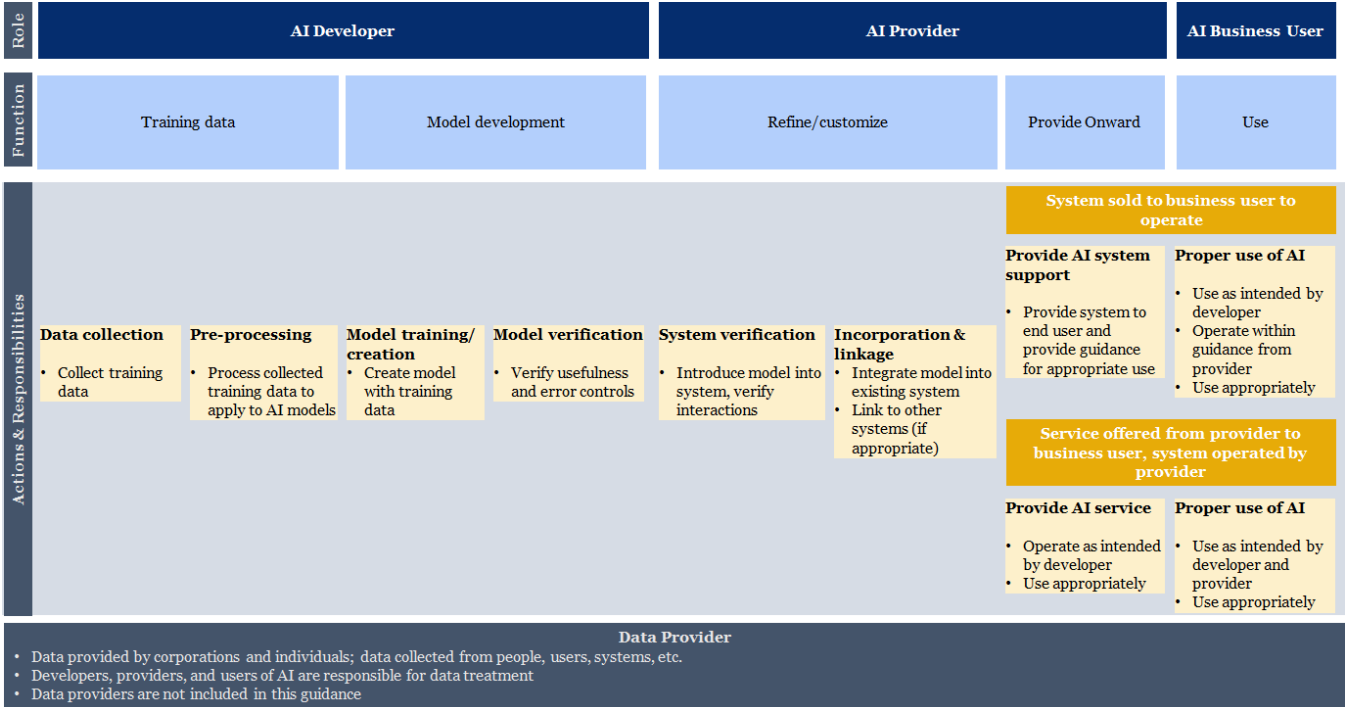
⁶¹ AI Risk Management Framework. National Institute of Science and Technology (NIST), Department of Commerce of the United States. 2023. Available at: https://airc.nist.gov/AI_RMF_Knowledge_Base/AI_RMF/Foundational_Information/3-sec-characteristics

⁶² A similar view is supported by MIT’s project Responsible AI, which recommends three strategies for addressing third-party risks when it comes to AI that we already see financial services firms adopting: (1) have a clear view and inventory of uses of AI within the organization; (2) extend third-party risk mitigation measures across AI uses, regardless if they are internally or

these measures are voluntary, required compliance seems a likely eventual step for the U.S., Singapore, and Hong Kong.

Most recently, Japan’s Ministry of Economy, Trade and Industry of Japan, published [AI Guidelines for Business](#) in April 2024.⁶³ This voluntary framework offers a principles and risk-based approach to the development and use of AI systems. Some of the guiding principles included in this voluntary framework are safety, fairness, privacy protection, accountability, and fair competition as reflected in other markets’ standards. It aims to “actively and cooperatively develop a framework that achieves both promotion of innovation and reduction of risks across the lifecycle through mutual cooperation among interested parties in implementing the common guiding principles, important matters for each AI business actor, and AI governance”.

Figure 7: Principles and responsibilities within the AI development ecosystem



Source: AI Guidelines for Business Ver1.0. (Provisional translation). Ministry of Internal Affairs and Communications – Ministry of Economy, Trade and Industry. April 2024.

While similar to guidance proffered by the U.S. in many aspects, the Japanese guidelines identify various actors involved in the AI value chain (see Figure 4) and assigns detailed actions to each reflecting each

externally built or developed; and (3) “continually update and iterate to address new risks”. For more information about this project, see Responsible AI at Risk: Understanding and Overcoming the Risks of Third-Party AI, Elizabeth M. Renieris, David Kiron, Steven Mills, and Abhishek Gupta, April 20, 2023

⁶³ AI Guidelines for Business Ver1.0. (Provisional translation). Ministry of Internal Affairs and Communications – Ministry of Economy, Trade and Industry. April 2024. Available at: https://www.meti.go.jp/shingikai/mono_info_ser-vice/ai_shakai_jisso/pdf/20240419_9.pdf

stakeholder's perspective and capacity to treat these risks, in light of each of the principles identified. As an example, when referring to fairness and privacy protection, the guidelines expect the following:

Figure 8: Division of responsibilities for fairness and privacy protection

	AI Developer	AI Provider	AI Business User
Fairness	Consider bias in data Consider bias in algorithms of AI models	Consider bias in the configuration and data of AI systems and services	Consider bias in input data or prompt
Privacy protection	Proper data training	Deploy mechanisms and measures to protect privacy Countermeasures against privacy violation	Countermeasures against inappropriate input of personal data and privacy violation

Source: AI Guidelines for Business Ver1.0. Ministry of Internal Affairs and Communications – Ministry of Economy, Trade and Industry. April 2024. Adapted by authors.

Tracing the evolution of guidance from the U.S. 2023 standards to Japan’s 2024 detailed guidance highlights the increased nuance with which policymakers are approaching AI roles and responsibilities, a notable advancement in just over one year. The U.S. and Japan are close collaborators on AI, frequently advocating the same approach in multilateral venues, like the G20. Complementary approaches to AI governance, including furthering the detail with which guidance is offered in each’s publications, suggests there is some general agreement on principles for AI governance to be attained at the global level—or at least among groups of countries.

While some countries opt for new rules to tackle issues around AI (like the EU), others seek to leverage existing regulations and propose voluntary frameworks (like Japan and the US). Industry bodies have also launched efforts to develop principles for AI regulation that reflect the way AI is used in financial services, along with practitioner understanding of risks and applications. Other bodies have advanced codes of conduct. At present, those choosing to advance codes of conduct are still evaluating a question about whether such codes can have much effect on the nature of AI/ML if only applied to some parts of the value chain (e.g., final users or deployers of systems).

In addition to these efforts, many authorities have taken the position that they can use existing laws around consumer protection to deal with clear violations using AI. U.S. Consumer Financial Protection

Bureau Director Rohit Chopra told the National Fair Housing Alliance in January, “We have laws on the books we should use now. And let’s use them...There is no fancy technology exemption to the Equal Credit Opportunity Act, the Fair Credit Reporting Act and others.”⁶⁴

This policy mix creates a complex compliance environment where firms must meet their statutory obligations, but also will want to demonstrate their adherence to voluntary codes of conduct. Looking to stocktake the various efforts currently underway, the OECD built the AI Policy Observatory to collect policies pertaining to AI from around the world⁶⁵. Measures tracked range from research grants to mandatory codes of conduct, to national strategies to support AI leadership. A Deloitte analysis of this data found that policies tend to follow a sequence of understand → grow → shape in their regulatory efforts.⁶⁶ As governments progress in their familiarity and start to form goals for the future of AI, industry participants can expect further guidance as reflected in the increasing degree of specificity between the 2023 U.S. and 2024 Japan risk management standards.

All the policy tools available (regulation, standards, industry practices, and codes of conduct) share one common application challenge: the AI/ML value chain involves multiple actors with different levels of comprehension of the tools, control over the algorithms, influence over the data used to train the models, robustness, technological and scientific expertise, and cybersecurity, among others⁶⁷.

Sharing responsibility

As a result of these dynamics, policy tools will likely adopt a shared responsibility model between developers, deployers, and users. For this purpose, it would be reasonable to leverage the experience and lessons learned in sectors like finance, which has extensive experience governing its own data stores, customer interactions, and third-party technology vendors. Codifying this approach in law is not in the immediate future, but is not a distant possibility either, particularly given the level of attention paid to AI at the most senior levels of policymaking.

In our view, the effective official sector approach to responsible AI policymaking for financial services is likely going to combine third-party risk management approaches with technology, data, and application dynamics unique to AI/ML. Given the integration of cloud and AI, and cloud computing’s increasing recognition as an operational model, particularly for financial services firms operating massive sensitive

⁶⁴ Remarks said during the National Fair Housing Alliance (NFHA) National Conference. Agenda available at: <https://nationalfairhousing.org/2023nationalconference/>

It is also worth noting that, in a similar line, some jurisdictions have components of national AI/ML strategies already developed through existing rules for either the provider or end user of sector-specific services. AI’s widespread applicability creates the potential case where each of these types of existing regulations could apply to one AI/ML vendor depending on the use cases for its core AI tool.

⁶⁵ Policies, data and analysis for trustworthy artificial intelligence. OECD.AI Policy Observatory. 2024. Available at: <https://oecd.ai/en/>

⁶⁶ The AI regulations that aren’t being talked about. Deloitte. 2024. Available at: Policies, data and analysis for trustworthy artificial intelligence. OECD.AI Policy Observatory. 2024. Available at: <https://oecd.ai/en/>

⁶⁷ The policy tools available will face a challenge when looking at practical applications of the tool. For example, transparency and visibility challenges in some AI/ML models could create a gap in governance between the developer of the model and the deployer of the model, and ensuring the model is trained only on high-quality data is more difficult the larger a model becomes, and all but impossible for downstream developers.

data sets, triaging reporting and risk management obligations will become increasingly critical for simultaneous compliance and effective use of AI/ML tools.

Data policy

The need for data for AI is affecting both the business dynamics as well as the policy landscape for AI. Preexisting policies regarding data usage, security, and trade are now, effectively, AI policies. Many data measures were formulated well before the advent of AI, complicating their now resulting application. Firms with access to better data can build better AI. Countries with large stores of data and responsible sharing frameworks permitting its use may be positioned to accelerate AI development. By the same coin, overly restrictive data policies can limit AI's development. Divisions in cross-border data sharing or data localization policies could lead to the balkanization of AI—where different groupings of markets develop and can apply fundamentally different AI tools based on common treatment of data and permissions for sharing it. At the same time, the mass data consumption by AI tools, including more recent generative tools' undirected consumption, challenges the enforcement of data policies, particularly regarding privacy and localization measures. Tackling this dynamic is of particularly urgency for FIs within Asia where data localization measures are among the strictest. While FIs have figured out how to navigate this policy landscape, maintaining the same level of compliance with opaque AI model creation relationships will require enhanced compliance offerings from third party service providers.

Concurrently with cloud, data plays a crucial role in AI/ML development. As put by the OECD recently “the quality of the output of the model will be only as good as the data used to train the model, and the risk of ‘garbage in, garbage out’ exists across all types of models.”⁶⁸ True for all types, but an especially high profile risk for large foundational models that utilize tremendous volumes of data.

Data is a necessity

AI does not exist without data. The best data can lead to the best AI if it is managed effectively. As a result, both sovereign and firm data policies will significantly influence the direction of AI development. Firms with well maintained and organized data architectures have a potential advantage when it comes to adopting AI. Further, efficient data management will grow in importance, potentially leading more firms to take advantage of cloud strategies for data storage and organization. Cloud structures may also ease compliance with preexisting data policies from easier control over AI access to firm data. That is, if firms have carefully controlled permission structures and data governance.

Organizations with modern data infrastructures will have an advantage in AI adoption. Examples abound across financial services. Intuit has been highly transparent about its AI/ML adoption journey, including how it retooled its data management strategies to integrate AI⁶⁹. Traditional FIs have been on similar journeys, such as leading Australian bank, NatWest. NatWest has taken the public along with them by publishing a 4 part series on their ML adoption, as well as an overview case study of their 1st year on the

⁶⁸ Generative Artificial Intelligence in Finance – OECD Artificial Intelligence Papers No. 9. OECD. December 2023. Available at: <https://www.oecd-ilibrary.org/docserver/ac7149cc-en.pdf?expires=1715958497&id=id&accname=guest&checksum=84772B17FB95D99053CE01BA5E97D747>

⁶⁹ Designing a data transformation that delivers value right from the start. McKinsey & Company. October 2018. Available at: <https://www.mckinsey.com/industries/financial-services/our-insights/designing-a-data-transformation-that-delivers-value-right-from-the-start>

journey to transform their data⁷⁰. This sort of transparency into FI processes will facilitate the consumer education journey discussed earlier as part of the AI supply chain.

Given the importance of data in both training AI models and in deploying them successfully—to yield a result, AI must consume new data to model conclusions—firms are finding having large quantities of high quality, well managed data to be a competitive advantage.

Connecting policy and its impacts on AI/ML development

Financial services firms face a challenge balancing experimentation in new applications for AI with productive engagement as the public sector sets standards for acceptable uses. As with any technological innovation, a successful invention requires multiple trials and a few failures. At the same time, financial services firms and governments will want to mitigate the potential for bad outcomes that could lead to customer dissatisfaction or consumer harm. As highlighted throughout this paper, risks are multidimensional, covering everything from application context, design of models, quality and accessibility to data, staff capabilities, the quality and capacity of computational resources, and customer awareness and informed consent⁷¹.

Financial services firms are likely to pursue a balanced approach through the application of codes of conduct and voluntary standards, while governments are likely to seek a balance of innovation promotion and risk management through a combination of regulations and mandatory standard setting. As both sectors simultaneously pursue this goal, financial services firms will encounter a multitude of operating environments across markets, necessitating an agile approach to governance. Predating GenAI's entrance on the scene, common themes in AI regulation were accuracy, anti-discrimination and bias measures, reliable data sets for training, model drift prevention, and assigning responsibility for risk mitigation. These themes are reflected in the guidance documents many leading jurisdictions and international bodies have already released and we foresee their continued relevance.

While comprehensive AI/ML regulations are rare, the common principles of safety, transparency, fairness, and accountability have appeared in policymakers' work around the world. These same principles have been adopted internally across firms. Working together to codify these principles could yield a better result for both FIs and the official sector. FIs are already closely supervised and carefully regulated given their importance in the economy. AI use by finance will likely be just as regulated, especially given the likelihood of governments pursuing both jurisdiction-wide AI regulation and finance specific regulation. Increasingly widespread use of AI seems likely to add momentum to these efforts, adding urgency to the financial industry's efforts to continue to demonstrate good AI/ML governance and practices, guiding policy development in a workable direction.

⁷⁰ Case Study - Accelerate Time to Business Value Using Amazon SageMaker at Scale with NatWest Group. AWS. 2023. Available at: <https://aws.amazon.com/solutions/case-studies/natwest-group-case-study/>

⁷¹ Generative AI in EU Law: Liability, Privacy, Intellectual Property, and Cybersecurity Working Paper. Claudio Novelli, Federico Casolari, Philipp Hacker, Giorgio Spedicato, Luciano Floridi. January 2024. Available at: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4694565

Ensuring that AI tools are fit for purpose over time is essential for this purpose. To maintain a supportive operating environment for AI, developers need to test their tools extensively before deployment. Making changes to a model is significantly easier with a few users in a test environment than with a tool integrated into the workflows of thousands. The adage measure twice, cut once, comes to mind. In this area, supportive infrastructure, such as walled test environments and private clouds can enable a variety of testers to simulate uses and confront hypothetical challenges in a virtual world. This strategy also enables firms to build off of the tools they already have or test their internally developed models against lightly customized versions they could purchase from a third-party service provider. The responsibility for fit-for-purpose tools will likely continue to be shared across the AI value chain, beginning with the development of foundational models.

Observed trends in financial services approach to AI

Successful product design in financial services requires understanding customers and meeting their needs. One of the most important trends for AI/ML in 2024 is identifying where it can be an accelerator for more productive offerings, rather than a “let’s throw AI at the problem” approach, as one industry analyst put it.¹ While there certainly seems to be a trend toward using AI/ML in every facet of financial services, and a dynamic encouraging firms to be the first to use AI in a particular area, a more focused approach may be taking hold with a focus on generating value.* Analyzing a problem or new service to see if AI integration really makes sense in context is one of the top recommendations across multiple studies, particularly for GenAI. Additionally, firms are considering the cost of developing an application versus the potential cost savings. Recent studies have shown the investment required to build an AI application do not always pay off—with the associated capital, time, and staff resources needed to train and govern a new application, when the business need may have been better met by upgrading data management and investing in upskilling staff.¹ Just because AI could be applied to a situation, does not mean it would return the best value.

As firms develop their own codes of conduct for AI use, and governments pursue principles for AI development, FIs naturally have an incentive to demonstrate how their tools respect and incorporate these provisions. While many FIs state that effective data policies and anti-bias frameworks are a precondition to deploy AI by the firm, compliance with eventual government-mandated standards will be necessary. To prepare for such an eventuality, firms are continuing to invest in developing governance toolkits, or leveraging those offered by their AI suppliers, to demonstrate the ways they apply AI—and the model results—to meet the standards they say they do. Many entities are developing testing frameworks for AI systems, and active participation could help FIs understand what risks governments are the most concerned about as well as share their insights into what is feasible to test. One such effort, AI Verify, takes an open-source approach to “validate the performance of AI systems against a set of internationally recognized principles through standardized tests, and is consistent with international AI governance frameworks such as those from European Union, OECD and Singapore.”** While this is one example, with acknowledged gaps, the collaborative efforts between multiple developers and users of AI suggest that building compliance tools that satisfy both public and private sectors is workable.

* Rethinking AI's impact: MIT CSAIL study reveals economic limits to job automation. MIT CSAIL, MIT Sloan, The Productivity Institute, and IBM's Institute for Business Value. January 2024. <https://www.csail.mit.edu/news/re-thinking-ais-impact-mit-csail-study-reveals-economic-limits-job-automation>

** What is AI Verify?. AI Verify Foundation. 2024. Available at: <https://aiverifyfoundation.sg/what-is-ai-verify/>

Conclusion

Data, cloud, and AI are essential tools for financial services to deliver value and intermediate critical transactions as the economy continues a digital transformation. Financial services firms have been at the forefront of AI use with classical predictive AI/ML already well established in many different use cases across the full span of the industry and at the different layers of internal and external facing operations including credit risk, AML monitoring, fraud prevention, and information management. During this period, financial services firms have also led the way in developing governance and oversight techniques to develop trustworthy models with testing, validation, and oversight, building on known data sources.

The rapid emergence of GenAI transformed views on how AI is developed, employed, and governed by society. Much of the recent regulatory activity is driven by GenAI and focused at a strategic national level, with the overarching mandate held by non-financial services regulators. FIs have much at stake and much to offer in these policy debates and standards efforts; however, the finance industry, and its regulators, will need to extend beyond familiar institutions and usual venues to participate in policy debates, inform standards, and shape outcomes, particularly given the complexity of the AI value chain.

Data and AI are inexorably intertwined, and data is now solidified as a core input to business processes. Society entrusts FIs to be responsible custodians of data. The interaction of data and AI within a new class of models that can interpret inputs in unstructured format, apply machine learning cognition, and transform outputs introduces new challenges. GenAI is accessible to all via existing hardware and cloud infrastructure. This democratized access, and global mass launch, have allowed smaller firms to purchase access to the sophisticated computing resources and developer talent needed to deploy AI themselves. This widespread access combined with limited developers raises new dynamics of development, risks, and competition policy for the financial industry to consider.

Financial services are held to higher standards than most sectors of the economy and this includes in data management, technology oversight, and risk controls. Against this backdrop, approaches need to be updated for society and the economy to gain the full potential of AI innovation in financial services. Data policy, cloud policy, AI safety policy, and responsible governance and oversight approaches need to be better connected, informed, and possibly aligned as they move forward. Otherwise, we risk leaving an important economic activity on the side as new tools define the future of value intermediation.

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