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AI in Finance: A Decade of Progress and Pathways for Growth

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About

The Global Finance & Technology Network (GFTN) is a Singapore-headquartered organisation that leverages technology and innovation to create more efficient, resilient, and inclusive financial systems through global collaboration. GFTN hosts a worldwide network of forums (including its flagship event, the Singapore FinTech Festival); advises governments and companies on policies and the development of digital ecosystems and innovation within the financial sector; offers digital infrastructure solutions; and plans to invest in financial technology startups through its upcoming venture fund, with a focus on inclusion and sustainability.

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The Singapore FinTech Festival is a global nexus where policy, finance, and technology communities converge. Designed to foster impactful connections and collaborations, SFF is a platform to explore the intersections of cutting-edge financial solutions, evolving regulatory landscapes, and the latest technological innovations.

Through insightful sessions, roundtables, workshops, exhibitions and much more, SFF is an immersive discovery and dialogue of the future trajectories of financial services and the overarching digital transformation reshaping global economies.

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Contents

Executive Summary

The decade from 2016 to 2025 has been transformational for the global financial sector. Artificial Intelligence (AI) has evolved from experimental automation projects to becoming a systemic enabler of efficiency, innovation, and resilience in finance. Across banking, insurance, capital markets, and payments, AI is now embedded in customer engagement, compliance, investment decisions, and infrastructure operations.

This report, the first in a series covering AI, Digital Asset and Quantum, traces the arc of this transformation through the lens of the **Singapore FinTech Festival's (SFF) 10-year journey**, highlighting both the achievements and persistent challenges of AI adoption in finance. Key foresight takeaways include:

1. **From pilots to platforms**: AI applications shifted from niche tools (chatbots, robo-advisors) to core operating systems powering underwriting, trading, fraud detection, and regulatory compliance.
2. **Infrastructure maturity**: The decade saw significant advances in model architectures, cloud compute, data governance, and developer ecosystems, enabling scalability and resilience.
3. **Regulatory leadership**: Jurisdictions such as Singapore, the European Union (EU), the United States (US), and the United Kingdom (UK) pioneered different principles-based and risk-based AI governance frameworks, shaping global discourse.
4. **Emerging risks**: Despite progress, systemic vulnerabilities remain. These include model concentration risk, algorithmic bias, regulatory fragmentation, and energy intensity of AI systems.
5. **Strategic horizon**: The next decade will demand foresight, balancing innovation with responsibility, and enabling global coordination in AI governance.

1 Celebrating a Decade of Progress

1.1 Introduction

A Decade in Review: From Experimentation to Infrastructure

Since its inaugural edition in 2016, the Singapore FinTech Festival (SFF) has been a global convening point for financial innovation and has become the world's largest premier platform for dialogue on policy, finance, and technology shaping global financial architecture and economic growth. Over the past decade, SFF has not only showcased cutting-edge technologies but also mirrored the evolution of Artificial Intelligence (AI) in finance: from early enthusiasm about automation to current debates around Generative AI (GenAI), systemic risk, and the future of financial institutions.

When SFF launched, AI in finance was still largely in its proof-of-concept phase. Use cases were confined to specific functions like chatbot deployment and basic anomaly detection. AI use cases subsequently extended into fraud detection, credit scoring, and Regtech amongst others. By mid-decade, GenAI and large language models (LLMs) introduced new capabilities in research, compliance, and customer engagement, but also raising questions about trust, accountability, and governance.

Global financial institutions increasingly rely on deep learning systems for fraud detection, underwriting, asset management, regulatory reporting, and customer support. Financial regulators such as the United Kingdom's Financial Conduct Authority (UK FCA)[1] and Monetary Authority of Singapore (MAS)[2] have explored AI for market abuse surveillance, model risk management, and policy analysis.

This report comes at a moment of strategic inflection. On one hand, the promise of AI in improving access, reducing costs, and enhancing productivity is undeniable. On the other, the systems being built today will determine not only who benefits – but also who bears the risks, and how financial markets evolve.

1.2 10 Years of Artificial Intelligence in Finance: A Global Review

Over the past decade, AI has moved from the periphery to the forefront of financial services. From 2016 to 2025, financial institutions, regulators, and technology providers made significant strides in embedding AI into core financial infrastructure and operations. This transformation has not only redefined workflows and customer interfaces but has also influenced how trust, risk, and value are understood in modern finance.

Evolution of AI Use Cases in Financial Services

2016 – 2018: Automation and Early Analytics

The initial foray of financial institutions into AI was driven by the clear and pragmatic goal of efficiency. The technologies of this era were predominantly focused on Robotic Process Automation (RPA) and early machine learning (ML) models designed to handle repetitive, rules-based tasks.

Banking: The most visible innovation was the advent of the chatbot. Early versions were simple, decision-tree-based bots capable of answering basic questions with Bank of America's Erica becoming one of the earliest large-scale deployments in 2018. In the back office, RPA was deployed to automate data entry, reconciliation, and report generation, with market estimates suggesting potential cost savings of between 40-75%.[3]

Wealth Management: Industry saw democratisation of wealth management services with the launch of algorithmic robo-advisory investment platforms such as Schwab Intelligent and Vanguard Personal with basic portfolio management and limited personalisation.[4]

Insurance: Insurers began using machine learning models for basic claims processing, flagging simple, low-value claims for straight-through processing while routing more complex ones to human adjusters. This improved turnaround times and customer satisfaction for minor incidents.

1. Norton Rose Fulbright (2025) AI Regulation in Financial Services: FCA Developments and Emerging Enforcement Risks | Global Regulation Tomorrow
2. MAS (2023), Written reply to Parliamentary Question on use of artificial intelligence in supervision of financial institutions
3. KPMG (2016), Rise of the robots
4. Loanch (2024), The Evolution of Robo-Advisors: What Investors Need to Know?

Payments: The primary application was in fraud detection. Early ML models became adept at pattern recognition, flagging transactions that deviated from a user's typical spending behaviour. This was a significant improvement over static, rules-based fraud detection systems. Paypal improved their fraud detection models using automated ML platforms, like H2O Driverless AI, to achieve 6% increase in model accuracy.[5]

However, adoption was fragmented, hindered by limited explainability, immature data infrastructure, and confidence levels for model-driven decision-making.

2018–2022: Advanced Analytics and Prediction

As institutions grew more familiar with AI and the underlying data infrastructure improved, the focus shifted from simple automation to prediction and personalisation. More powerful ML techniques, such as gradient boosting and neural networks, became widespread driving proliferation of use cases.

Banking: Credit scoring was transformed with AI models analysing thousands of data points to create more nuanced and accurate risk assessments, allowing for the access of credit to millions of individuals who had little traditional credit history.[6]

Wealth Management: This period also saw the scale up of more sophisticated robo-advisory platforms like Betterment and Wealthfront, which moved beyond simple portfolio allocations to offer dynamic rebalancing and tax-loss harvesting.

Capital Markets: Algorithmic trading became increasingly dominated by AI. By 2021, estimates suggest that approximately 70% of the total trading volume on the United States (US) stock market was executed through AI algorithmic trading.[7] Natural Language Processing (NLP) models were used to analyse news sentiment and earnings calls to generate trading signals.

Regulatory Technology (Regtech): AI-powered solutions emerged to help firms navigate the increasingly complex regulatory landscape. ML systems were deployed for Anti-Money Laundering (AML) and Know Your Customer (KYC) checks, identifying suspicious activity patterns more effectively. Using advanced, long short-term memory (LSTM) AI models, American Express reported improvements in fraud detection by 6% and PayPal by 10%.[8]

Notably, regulators began articulating principles for AI use, such as the MAS' Fairness, Ethics, Accountability, and Transparency (FEAT) principles launched in 2018[9] which was co-created with the financial industry to guide institutions in their responsible and ethical use of artificial intelligence and data analytics. The OECD AI Principles launched in 2019[10] was the first intergovernmental standard on AI, promoting innovative and trustworthy AI that respects human rights, democratic values, and emphasises transparency, accountability and security. It has since been adopted by over 45 countries including G20 members.

2022–2025: The Phase of Strategic AI Integration

The public release of powerful Large Language Models (LLMs) marked the beginning of a new paradigm shift. The launch of ChatGPT in late 2022 propelled AI into the mainstream capturing 100 million users in two months – the fastest adoption of any technology in history.[11] The focus expanded from prediction to generation, with AI now capable of creating human-like text, code, and analysis. McKinsey predicted that Gen AI could add between US$200 billion to US$340 billion in annual value to the banking sector through enhanced productivity.[12] Nonetheless, while strategic intent of AI adoption is strong across the industry, execution is still largely in controlled pilots and governed rollouts. Figure 1 on page 7 lists some of the potential GenAI use cases in financial services.

Banking: The rudimentary chatbots of the previous era are being replaced by highly capable AI assistants. By 2022, the Consumer Financial Protection Bureau found that each of the top 10 largest commercial banks in the US have deployed chatbots as a component of their customer service and estimated that 37% of the US population had interacted with a bank's chatbot.[13]

Wealth Management: Wealth managers such as JPMorgan announced IndexGPT in 2023 to provide AI-driven investment advice.[14] The technology is also being used to dramatically accelerate software development, with AI co-pilots writing and debugging code.

Insurance: GenAI is being used to summarise complex claims files and draft initial damage assessment reports, significantly speeding up the work of human adjusters, improving productivity by up to 20% to 30%.[15]

Capital Markets: Analysts are using LLMs to instantly summarise dense financial reports and earnings calls, allowing them to focus on higher-level analysis. A Mercer study found more than half of investment managers surveyed are using AI for investment strategies or asset-class research currently and up to 90% would do so in the future.[16] BlackRock piloted its Aladdin Copilot in 2023 using LLMs to processes terabytes of data from market trends, economic signals, credit risk, currency volatility to broader risk management insights and assist portfolio managers to optimise strategies and assess exposure for portfolio allocation.[17] RBC's Aiden GenAI global research platform uses an orchestration agent working with other agents, such as the SEC filing agent, earnings agent and a real-time news agent to enhance trading efficiency by automating workflows, improve risk management by predicting market shifts and stress-test portfolios in real time to boost customer service by offering personalised insights through AI-driven avatars and advisory tools.[18]

5. H2O.AI (2018), H20 Customer Case Study PayPal
6. FinRegLab (2021), The-Use-of-Machine-Learning-for-Credit-Underwriting_Market-and-Data-Science-Context
7. Michigan Journal of Economics (2025), The Use of AI and AI Algorithms in Financial Markets
8. IBM (2025), AI Fraud Detection in Banking
9. MAS (2018), FEAT Principles to promote responsible use of AI and data analytics
10. OECD (n.d), AI principles
11. Reuters (2023), ChatGPT sets record for fastest-growing user base - analyst note
12. McKinsey (2023), Economic potential of generative AI
13. CFPB (2023), Chatbots in consumer finance
14. CNBC (2023), JPMorgan developing ChatGPT-like A.I. investment advisor
15. BCG (2023), Insurance Claims Process is Changing due to GenAI
16. Mercer Investments (2024), AI in investment management survey 2024
17. Nvidia (2025), How Financial Services Companies Use Agentic AI to Enhance Productivity, Efficiency and Security
18. Ainvest (2025), RBC's AI Revolution: The New Benchmark for Institutional Banking Leadership

AI's potential benefits include enhanced accuracy, efficiency, and market insights through multidimensional analysis from unstructured data sources, delivering customized, and actionable outputs. Some of the potential use cases are listed in Figure 2 below.

Supervisory technology (**Suptech) integration**: Regulators are also exploring AI tools for supervisory data analysis, early warning signals, and regulatory reporting automation such as through the Bank for International Settlements (BIS) and MAS Project Ellipse[19] and BIS Project AISE (Artificial Intelligence Supervisory Enhancer).

Fig. 1: Potential GenAI use cases in financial services

Value and ease of implementation

Marketing and sales	Onboarding	Product development	Financial advice	Advisor and customer support	Risk and compliance	Supporting corporate functions
Identifying and acquiring new customers	Customer document and information validation	Creation of a unique financial services product	Generating recommendations with research and analysis	Relationship service and customer service	Identification and management of potential risks	Additional reporting corporate functions (e.g., human resources)
Creative content and collateral development, including personalization	Intelligent document processing and digitization	Supportive programming, developing and documentation	Investment reports and research synthesis	Support in the drafting of memos, analytics, etc.	Knowledge database for legal teams	Code review and auditing, codebase modernization, integration and documentation
Customer segmentation and sentiment analysis	Document synthesis for financial product approval and review	Synthetic data for customer profiles and model training	Support RMS or FAS for client interactions with memos, analytics, performance monitoring	Customer service support interface and chatbot	KYC checks and synthesis creation	IT: synthetic data generation and use for test cases
Web or app landing page personaliza-tion (content, visual assets)	Suggest tailored product offerings based on uploaded data	Helping users discover financial products tailored to their needs	Synthesized, tailored reports for customer distribution based on individual interests	Policy or contract monitoring and synthesis	AML monitoring and document creation	Knowledge management and analysis
Client acquisition chatbots for warming leads, engagement	Initial fact find for a new clients	Pricing and fee optimization	Performance monitoring and optimization across client portfolios with automated notifications	Knowledge base search	Compliance monitoring and documentation creation	Memo writing
Sales training for simulating client conversations	Chatbot assistance during onboarding	Identification of emerging product trends to support product teams	Product recommendation LLM tuning with corpus of enterprise- wide investment research	Chat or email monitoring to suggest course of action for "toxic" conversations	Data privacy and transaction monitoring	Optimization of risk weighted assets
Customer retention	Customer lifetime value modeling	Scanning data to influence creation of innovative and hyper-personalized financial products and features		Call transcript analysis and insights mining	Early warning credit risk monitoring	HR: AI-powered talent acquisition
Cross-selling and acquisition	Personalized onboarding	Analytical banking offerings			Data privacy and transaction monitoring	Optimal allocation of resources
Pricing and fee optimization	Streamlined onboarding (including KYC)	Automated product updates for specific segments, clients			Collateral risk assessment	HR: talent retention and employee sentiment analysis
Omnichannel engagement	Initial fact finding for a new client	Adaptive product management			Automated credit decision- making	HR: synthetic data for employee engagement and performance management LLM
Hyper-personaliza-tion of text content (e.g., email)					Suspicious activity report pre-population	
Hyper-personaliza-tion of image content					Ongoing customer due diligence	Finance: drafting and reports and planning
					Document synthesis for lending reviews	

Source: EY (2024), Unlocking the future of banking: the transformative power of generative AI

Use cases currently targeted by GenAI startups

Fig. 2: Recent and Potential Use Cases for Artificial Intelligence and Machine Learning in Capital Market Activities

Key Processes	Client/Institution Profiling	Asset Allocation			Trading	Risk Management	
	Identification of Needs and Constraints	Asset Class Allocation	Sectoral Allocation	Security Selection	Orders Placement and Execution	Risk Monitoring	Reporting
Potential Benefits from Adopting AI	**Enhance client's Profile assessment** • Analyse unstructured or alternative clients' data to understand unique objectives, idiosyncratic needs, and risk preference • Generate simulated scenarios and visualization of potential outcomes of di fferent asset mix	**Enhance optimisation and forecast techniques** for strategic allocation • High dimensional forecasting and predictor selections • Deep learning methodologies for dynamic multiperiod portfolio optimization • Clustering/network analysis to analyze multidimensional interactions/ correlations		**Improve analysis precision** • Feature extraction (beta, momentum, and so on) • Network/ multidimension analysis for relative value analysis and identify price dislocation	**Minimize market impact** • Structured trade execution algorithms to minimize market impact • Analyzing unstructured data and cross-market indicators to identify prevailing liquidity conditions **Assist price discovery** • Modelling executable prices for illiquid secu-rities through multiple market indicators **Improve liquidity management efficiency** • Forecast liquidity needs (margin management, collateral, etc.) through clustering/network analysis	**Dynamic risk sensing** • Generate risk hypothesis • To identify performance drivers and anomalies through multidimensional analysis **Generate risk scenario** • Value-at-risk estimation through generative adversarial networks to capture temporal dynamics in time-series data	**Customize insights** • Customized content generation, reports, and dashboards • Chatbot **Ease compliance monitoring** • Screening, flagging & reporting of anomalies
		Derive signals from unstructured and alternative data • Natural language processing models for sentiment analysis to identify thematic opportunities • Polarity detection, microtext analysis, aspect extraction, or sarcasm detection to improve signal quality					

Source: IMF (2024), Global Financial Stability Report: Steadying the course: Uncertainty, Artificial Intelligence, and Financial Stability

[19] BIS (2025), Ellipse: regulatory reporting and data analytics platform

Spotlight: AI Milestones in SFF's journey:

2016–2017: Among the first showcases of robo-advisory and digital assistants.

2018–2019: Rise of Regtech and AI for compliance. The first-ever "Artificial Intelligence in Finance Summit" was launched in 2018 to discuss the future of AI.[20] The MAS also introduced principles for the responsible use of AI in finance, focusing on Fairness, Ethics, Accountability, and Transparency (FEAT).

Singapore's National AI Strategy was launched at SFF 2019 by then Deputy Prime Minister Heng Swee Keat.[21]

2020–2021: COVID-19 accelerated AI adoption in digital banking and insurance claims automation. The "National AI Programme in Finance" was launched in 2021 by MAS and the National AI Office to strengthen Singapore's AI capabilities in the financial sector.[22] New initiatives like the Global Veritas Challenge were also introduced to address validating AI solutions for banking.

2022–2023: Generative AI dominated discussions, with MAS initiating Project MindForge[23] to develop a risk framework on the responsible use of GenAI.

2024–2025: Launch of MAS's AI Model Risk Management (MRM) framework[24] and the PathFin.ai programme[25], providing systemic infrastructure for responsible AI in finance. As part of SFF's 10th anniversary, the FinTech Excellence Awards included a new thematic category for "Artificial Intelligence Champion," with a global call for nominations.[26]

This ten-year journey from simple RPA bots to sophisticated generative agents illustrates a profound deepening of AI's integration into finance. Each stage built upon the last, creating a cumulative effect that has moved AI from a cost-saving tool to a strategic, revenue-generating, and industry-defining force.

Yet, the transition to the next phase - where AI systems become more autonomous, systemic, and critical - will demand new safeguards, global coordination, and innovation in governance. These forward-looking challenges are explored in the following sections.

1.3 The Maturing of AI Infrastructure

The decade's progress was underpinned by parallel advances in **technical, data, and institutional infrastructure**.

Model architectures

As AI technology developed, it transitioned from decision trees and gradient boosting models to deep learning, transformers, and large language models capable of handling large volumes of unstructured financial data.

- **Transition from training to inference**: As foundation models increase, enterprises are focusing less on training new models and more on optimising them for inference - running the models to generate outputs. This has increased demand for more cost-efficient hardware and platforms designed for inference workloads.
- **Rise of multi-agent and hybrid architectures**: A single large model is often insufficient for complex tasks. Developers are now orchestrating multi-agent systems, where different AI agents collaborate to solve problems. Hybrid architectures, which combine large models with smaller, specialised ones, are also gaining traction.

Data governance

Financial institutions increasingly invest in data quality, lineage, and bias detection, guided by principles such as Singapore's FEAT.

- **Data fabric architectures**: To handle the velocity and volume of AI data, organisations are adopting data fabric architectures. This approach creates a unified, consistent data layer across diverse storage and processing systems, enabling more reliable and scalable AI workloads.[27]
- **Open data standards**: The industry is moving toward open data formats to enable seamless, efficient data management across platforms and reduce vendor lock-in.
- **Ethical and regulatory compliance**: The rapid advancement of AI is outpacing regulation. Governments are catching up by enforcing new rules, such as the EU's AI Act, that require greater transparency in data collection and model behaviour.[28] This is driving the development of new governance tools and practices.

20. MAS (2018), Singapore FinTech Festival up-sized with richer content and focus on ASEAN
21. Singapore Prime Minister Office (2019), DPM Heng Swee Keat at the Singapore FinTech Festival X Singapore Week of Innovation and Technology 2019
22. MAS (2021), National programme to deepen AI capabilities in financial services
23. MAS (2023), Project MindForge
24. MAS (2024), Information-paper-on-ai-risk-management-final.pdf
25. MAS (2025), MAS Pathfinder Programme - PathFin.ai
26. MAS (2025), MAS and SFA invite nominations for 2025 Singapore FinTech Festival FinTech Excellence Awards
27. IBM (2025), What Is a Data Fabric
28. European Parliament (2025), EU AI Act: first regulation on artificial intelligence

Cloud computing

Hybrid and multi-cloud strategies had enabled scalable AI workloads, while cloud providers have democratised access to the immense computational power required to train large-scale AI models. They offer a suite of services specifically tailored for AI development, including scalable compute, managed MLOps platforms, and pre-trained model Application Programming Interface (APIs).

Alphabet, Amazon, and Microsoft are each projected to spend between US$75 billion to than US$100 billion on AI-related capital expenditures in 2025, driven by cloud data centre expansions and custom silicon development.[29]

Developer ecosystems

Open-source frameworks such as TensorFlow and PyTorch combined with FinTech developer APIs had enabled faster innovation, while financial institutions established global AI competency centres.

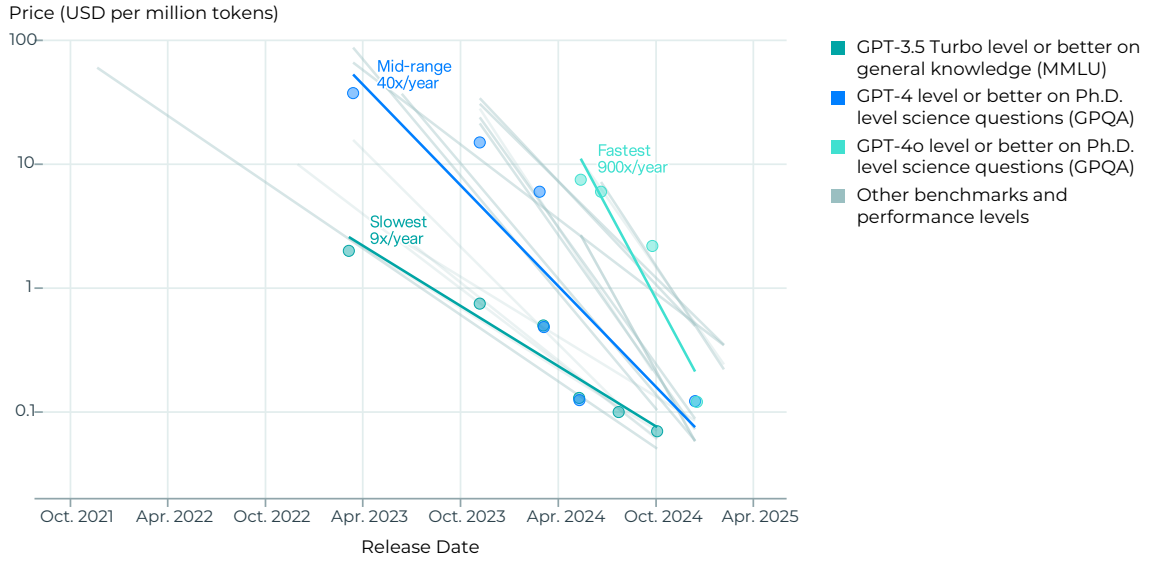
- **AI-as-a-service platforms**: Platforms like Amazon AWS AI and Google Cloud AI offer developers fully managed services for building, training, and deploying AI models. This "no heavy lifting" approach has significantly lowered the barrier to entry.

- **Generative AI blueprints**: Cloud providers are offering architectural blueprints for common generative AI use cases, providing developers with practical starting points for new projects.

Cost reductions

In spite of the AI inference costs are decreasing rapidly due to advancements in model optimization, hardware efficiency, and cloud infrastructure, though they remain a significant factor for AI model adoption. Epoch AI found inference costs are declining between nine times and 900 times a year, with a median of 50 times annually[30] (see Figure 3). Lower prices from proprietary model providers, combined with ongoing innovation among open-source alternatives, increase availability for developers and businesses.

Fig. 3: LLM inference prices



Source: Ben Cottier et al. (2025), LLM inference prices have fallen rapidly but unequally across tasks

Infrastructure maturity enabled AI to move from tactical use-cases to platformisation where AI systems are integrated across enterprise functions, rather than siloed pilots.

1.4 Policy Leadership and Regulatory Innovation

AI in finance required not only technological evolution but also policy foresight.

The rapid integration of AI into finance has presented a formidable challenge for regulators. Over the past decade, the global regulatory approach has evolved from cautious observation to the development of concrete frameworks.

Singapore: MAS pioneered the Fairness, Ethics, Accountability, and Transparency (FEAT) principles in 2018 and the Veritas initiative[31] which aims to create assessment methodologies for validating the fairness and transparency of AI systems in 2019 and expanded in 2023. In 2024, MAS issued the AI Model Risk Management Paper[32], outlining best practices for governance, explainability, validation, and third-party oversight. In 2025, MAS launched PathFin.ai[33], a

29. CNBC (2025), Tech megacaps to spend more than $300 billion in 2025 to win in AI
30. Epoch (2025), LLM inference prices have fallen rapidly but unequally across tasks
31. MAS (2023), Veritas Initiative
32. MAS (2024), Artificial Intelligence (AI) Model Risk Management
33. MAS (2025), MAS Pathfinder Programme - PathFin.ai

platform for AI governance knowledge-sharing across financial institutions.

European Union: The EU has taken a comprehensive, legally binding approach with its AI Act.[34] This risk-based regulation categorises AI systems into tiers, with many financial applications, such as credit scoring, falling into the high-risk category, subjecting them to stringent requirements on risk management, data quality, and human oversight.

United Kingdom: The UK, through bodies like the Financial Conduct Authority (FCA), has adopted a "pro-innovation" stance with emphasis on explainability and proportionality, relying on empowering existing regulators to apply a set of cross-cutting principles. The FCA has been a pioneer in using regulatory sandboxes[35] and "AI Live Testing"[36] to allow firms to test innovative AI products in a controlled environment and support its safe and responsible deployment.

United States: The US has pursued a more decentralised approach, guided by its AI Action Plan[37] launched in July 2025 and a series of Executive Orders on AI safety and trustworthiness. The AI Action Plan focuses on reinforcing American AI innovation through deregulation, the promotion of ideologically neutral AI systems, infrastructure investment, and global influence through export of American AI Technology Stack[38]. While sectoral regulators such as Securities and Exchange Commission (SEC), Consumer Financial Protection Bureau (CFPB) explored AI guidance in trading, lending, and consumer protection.

Global forums: At the multilateral level, groups like the G7,G20 and OECD have worked to establish high-level principles. The OECD AI Principles (2019), G7 Hiroshima AI principles (2023)[39], Bletchley Declaration (2023)[40], and UN Resolution on AI (2024)[41] to promote safe, secure and trustworthy artificial intelligence systems to accelerate progress towards the full realisation of the 2030 Agenda for Sustainable Development highlighted multilateral concern, though enforceable global coordination remains elusive.

1.5 What Worked: Short Case Studies

Case study: Upstart's AI-driven inclusive lending

The lending platform Upstart uses AI to assess credit risk by analysing a broader range of variables beyond traditional credit scores, including education and employment history. This approach addresses the shortcomings of traditional scoring models, which often disadvantage millions of individuals with "thin" or "no" credit files.

Upstart's AI model provides a more comprehensive view of an applicant's creditworthiness, allowing lenders to extend credit to a broader range of people without significantly increasing default risk. By integrating explainability, institutions build trust with customers by transparently explaining loan decisions. Upstart claims that its approach has allowed it to approve 27% more borrowers while simultaneously cutting losses by 75%.[42]

Case study: Explainability for transparent credit risk assessment

To enhance transparency and fairness, major banks such as JPMorgan Chase and Goldman Sachs are leveraging Explainable AI (XAI) techniques like SHapley Additive exPlanations (SHAP) and Local Interpretable Model-agnostic Explanations (LIME) to interpret their credit risk models[43]. In general, this provides lenders and regulators with insights into how decisions are made, promoting compliance and trust. A Zendesk CX Trends Report highlighted that 75% of their surveyed businesses believe a lack of transparency could lead to increased customer churn.[44]

SHAP method is rooted in game theory, it attributes the outcome of an AI model to its input features, providing both local (individual prediction) and global (overall model behaviour) explanations. LIME focuses on explaining individual predictions by creating simpler, interpretable models that approximate the complex AI model's behaviour locally around the specific prediction.

Case study: UK Financial Conduct Authority (FCA) sandbox

The UK FCA launched one of the first FinTech regulatory digital sandboxes to allow firms to test new products and services in a controlled environment. FCA's Digital Sandbox was upgraded to Supercharged Sandbox[45] in June 2025 as part of the FCA AI Lab's to provide participants with high-performance infrastructure, enterprise-grade tooling, and access to comprehensive synthetic datasets to test their AI models rigorously and safely. This is further supported by AI Live Testing to support the safe and responsible deployment of AI.

34. European Commission (n.d), AI Act | Shaping Europe's digital future
35. FCA (2024), Regulatory Sandbox
36. FCA (2025), Engagement Paper: Proposal for AI Live Testing | FCA
37. White House (2025), America's AI Action Plan
38. White House (2025), Promoting The Export of the American AI Technology Stack
39. G7 Digital & Tech Ministers' Meeting (2023), G7 Hiroshima AI Process
40. UK Gov (2023), The Bletchley Declaration
41. UN (2024), General Assembly adopts landmark resolution on artificial intelligence
42. Vangwe (2025), Fintech + AI: Real-World Examples of How Companies Are Revolutionizing Finance
43. SuperAGI (2025), Case Studies in Explainable AI: How Transparency is Transforming Industries Like Finance and Healthcare in 2025
44. Zendesk (2025), What is AI transparency? A comprehensive guide
45. FCA (2025), FCA allows firms to experiment with AI alongside NVIDIA | FCA

2 Building Pathways for Growth

2.1 Mega-Trends in AI and Finance

Artificial Intelligence (AI) is increasingly embedded across the financial services value chain, from retail banking to risk oversight. As we enter the second half of the 2020s, structural mega-trends are poised to redefine the architecture, operations, and oversight of financial systems. These developments require coordinated policy, regulatory, and institutional responses to balance innovation with resilience and trust.

The Emergence of AI-Native Financial and FinTech Firms

A new wave of "AI-native" financial institutions and FinTechs are emerging, defined not by digital channels or data analytics, but by core operations powered by AI, machine learning, reinforcement learning, and autonomous decision-making systems. Unlike traditional firms that retrofit AI into legacy infrastructure, AI-native institutions are built around continuous learning loops, real-time model orchestration, and minimal human-in-the-loop dependencies.

In Asia, this trend is particularly pronounced in credit, insurance, and trading platforms. Earlier examples of AI-natives include India's ZestMoney and Indonesia's Kredivo which have deployed AI-based risk models to extend credit access at scale to users without conventional credit histories. In China, Ping An's AI underwriting solutions process millions of claims per year with limited human intervention. The company estimates that 93% of its insurance policies could be underwritten within seconds, and the average claim processing time is under 8 minutes.[46] OffDeal is a "AI-native investment bank" startup that aims to transform M&A services for small businesses with AI first software stack, workflow design, and rapid feedback loops.[47] These firms leverage vertically integrated data and proprietary AI infrastructure, yielding cost efficiencies and greater agility.

Licensing and supervisory frameworks may need to evolve to assess algorithmic governance, data provenance, and the accountability structures of firms operating at high levels of automation.

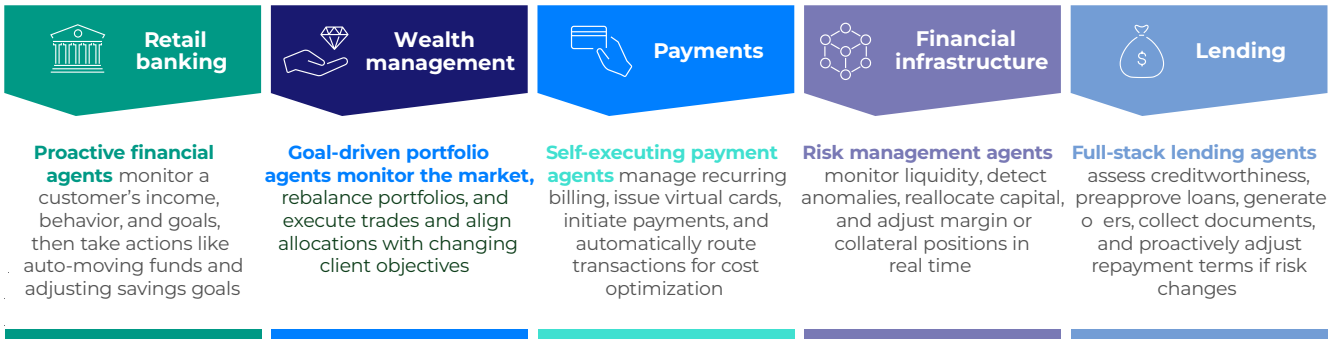
Agentic Finance: The Shift Toward Autonomous Financial

The deployment of LLMs such as OpenAI's GPT-5, Google's Gemini, and open-source alternatives like Meta's LLaMA has accelerated the development of conversational agents capable of executing complex financial tasks. This is giving rise to "agentic finance" – a paradigm where AI systems not only assist but act independently on behalf of users or institutions. Unlike traditional AI or even GenAI, which operate within predefined parameters or require regular human input, agentic AI dynamically adapts to changing environments, learns from interactions, and proactively solves complex problems.[48]

BlackRock uses its Aladdin Copilot with agentic AI to help portfolio managers with strategies and research.[49] The system uses a multi-agent structure to analyse documents like SEC filings and market news in real-time. Wealthfront, a robo-advisor platform, uses agentic AI to autonomously manage portfolios for its customers. It can automatically rebalance portfolios, perform tax-loss harvesting, and adjust risk profiles based on market changes.

Beyond client facing tools, agentic systems are being piloted for internal functions including trade execution, policy compliance, and liquidity management.

Fig. 4: Agentic AI Use Cases in Financial Services



Source: BCG (2025), Global FinTech Report: FinTech's Next Chapter Scaled Winners and Emerging Disruptors

46. Ping An (2025), Ping An's Approach to ESG Practices in China and Global ESG
47. Radical (2025), Building the First AI-Native Investment Bank
48. WEF (2024), How Agentic AI will transform financial services
49. Microsoft (2024), Elevating investment management tech: AI-powered leadership from BlackRock and Microsoft

These developments challenge traditional definitions of fiduciary duty. Financial conduct and consumer protection regulations will need to adapt to define liability, transparency, and oversight of autonomous financial agents.

AI in Regulatory Oversight: From Suptech to Autonomous Supervision

AI is also transforming financial supervision. Suptech is enabling real-time surveillance, anomaly detection, and policy enforcement at scale. Regulators are increasingly leveraging AI to assess model risks, detect misconduct, and simulate systemic contagion.

Cambridge Suptech Lab survey (2024) showed that 60% of national financial authorities out of 127 surveyed are exploring and piloting AI tools to enhance supervisory processes, with 33% prioritising initial research and 27% pilot projects. GenAI usage has also doubled to 19%.[50]

Singapore's MAS has used machine learning models to analyse market trading data to flag market collusion or manipulation for investigation. MAS has also used natural language processing (NLP) to extract insights from regulatory submissions and streamline supervisory workflows.[51]

On a broader level, the United Arab Emirates' Cabinet have launched world's first AI-powered Regulatory Intelligence Office in April 2025 to officially use AI to help draft, review, and update its laws. It plans to connect federal and local laws in the UAE, with judicial rulings, government procedures, and public services data through artificial intelligence to track the real-time impact of its laws on society and the economy to inform updates to its legislations.[52]

Regardless of the policy approach taken, cross-sectoral AI-specific guidance continues to cover common themes and highlight additional ones such as reliability/soundness, accountability, transparency, fairness and ethics[53] and security, safety, explainability and data privacy

Synthetic Data as a Strategic Enabler for Financial AI

The increasing sensitivity of financial data, combined with cross-border data flow restrictions and privacy obligations such as EU's General Data Protection Regulation (GDPR), Singapore's Personal Data Protection Act (PDPA), is making synthetic data a viable alternative to real-world datasets for training and testing AI models. Synthetic data, generated algorithmically to mirror the statistical properties of original data, reduces risks of re-identification while enhancing model generalization. The synthetic data market predicted to grow at revenue CAGR of 70%.[54]

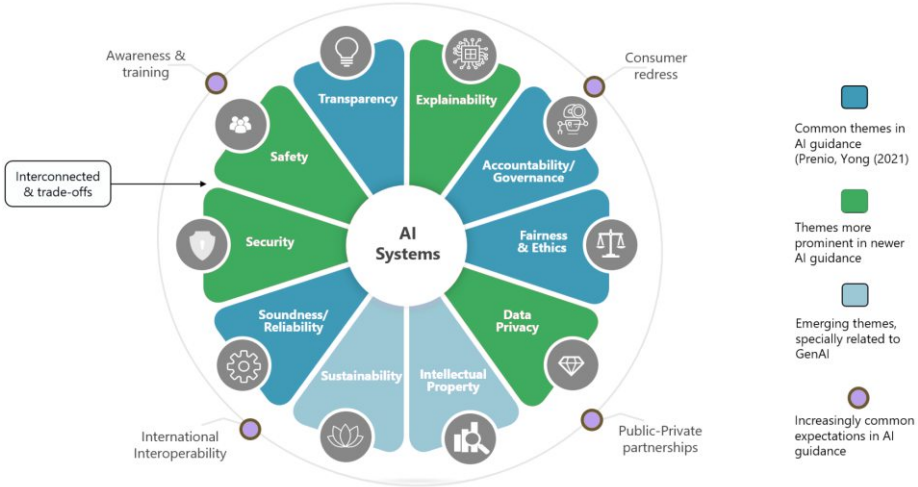
Institutions such as JP Morgan are piloting synthetic data solutions to test fraud detection models without exposing real transaction histories.[55]

Adoption of synthetic data will necessitate robust standards on data fidelity, bias mitigation, and auditability to ensure regulatory acceptance and interoperability.

AI, Financial Inclusion, and Algorithmic Fairness

AI has the potential to revolutionise product design, allowing financial service providers to better cater to customer needs, including those in underserved, remote areas. By lowering costs, customising products, and closing information gaps, AI can overcome significant obstacles to financial inclusion. Tala, the FinTech startup for the underserved in emerging markets like Kenya, Mexico, and the Philippines, uses its AI algorithms to analyse over thousands of data points on a user's mobile phone to assess

Fig. 5: AI guidance themes



Source: Financial Stability Institute (2024), Regulating AI in the financial sector: recent developments and main challenges

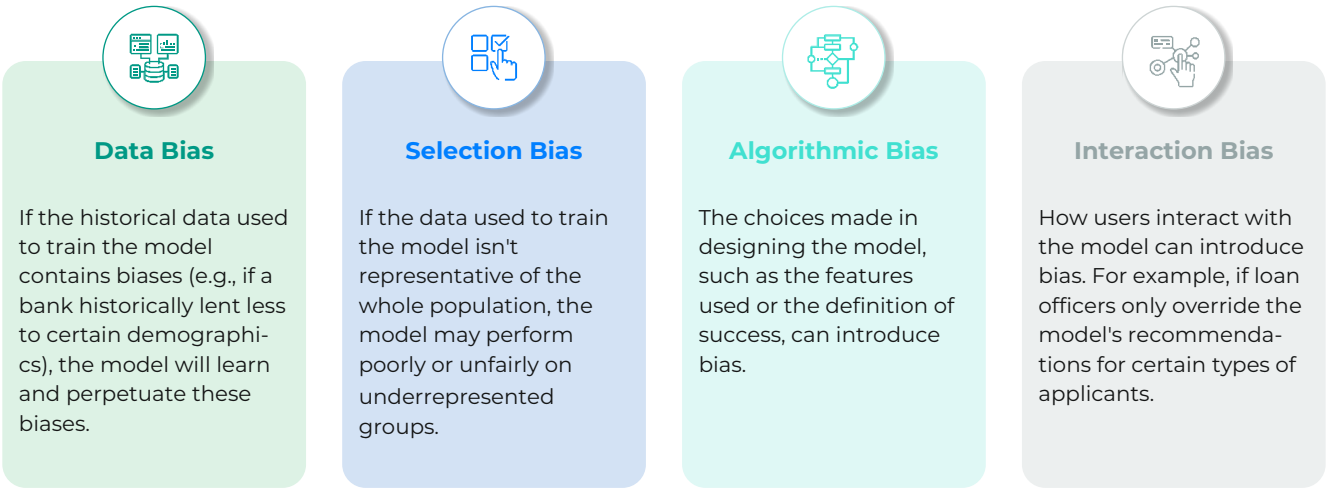
50. Cambridge SupTech Lab (2024), Cambridge SupTech Lab - State of SupTech 2024 - Exec Summary
51. MAS (2023), Written reply to Parliamentary Question on use of artificial intelligence in supervision of financial institutions
52. Emirates News Agency (2025), UAE Cabinet, chaired by Mohammed bin Rashid, approves launch of first integrated regulatory intelligence ecosystem in UAE Government
53. Prenio and Yong (2021), Humans keeping AI in check emerging regulatory expectations in the financial sector
54. S&P Global (2024), AI and society: Implications for global equality and quality of life
55. JPMorgan Chase (n.d), Synthetic Data for Real Insights

their creditworthiness and has disbursed over US$5 billion in credit and served over 9 million customers who were previously considered "unbankable" by traditional institutions.[56] AI-informed embedded finance and tailored loans can also help reduce the US$ 5 trillion finance gap for micro, small, and medium enterprises (MSMEs).[57]

AI can broaden access to finance, but it can also reproduce structural exclusion if not designed inclusively. In data-poor environments, AI credit models may amplify biases such as those seen in Figure 6, due to proxy variables or insufficient demographic representation.

AI-based credit scoring improves access for micro-enterprises and the unbanked or underbanked segments of society, but also demonstrates disparities when models are insufficiently localised or monitored for fairness. Open-source models, explainability protocols, and participatory design are some of the emerging safeguards against algorithmic discrimination.

Fig. 6: Types of Bias in Financial AI Models



Source: Corporate Finance Institute (n.d), AI Ethics in Finance: How to Detect and Prevent Bias

2.2 Frontier Technologies and Enablers

The advancement of AI in finance is increasingly interdependent with breakthroughs in adjacent frontier technologies. These enablers – ranging from next-generation computing architectures to privacy-enhancing technologies – are crucial in shaping the scalability, security, and sophistication of AI use cases.

Quantum-AI Convergence: A Long-Term Strategic Inflection Point

Quantum computing could supercharge artificial intelligence. It achieves this via two ways.

- **Data complexity and processing speed** – Traditional AI models face limitations when working with massive datasets containing millions or billions of entries. Quantum systems, however, are exponentially more effective at handling such high-dimensional data with numerous variables.

- **Parallelism** – Thanks to quantum superposition, computations can be carried out across countless states at once. This level of parallel processing, far beyond the reach of classical hardware, enables significant acceleration of AI training and inference.

Quantum computing when combined with AI, could solve intractable problems in portfolio optimization, risk simulation, fraud detection, and encryption. While general-purpose quantum systems remain several years away, hybrid models combining quantum algorithms with classical AI systems are beginning to emerge in financial research labs.

Institutions such as HSBC, Goldman Sachs, and JP Morgan Chase have partnered with quantum hardware companies such as Quantinuum and Quantum Motion to explore quantum technology and post-quantum cryptography.[58] In Singapore, the Centre for Quantum Technologies and A*STAR through the National Quantum Computing Hub are studying quantum algorithms for financial applications.[59]

Edge AI and Neuromorphic Computing: Enabling Real-Time, Localised Intelligence

Edge AI refers to running AI inference directly on devices or local infrastructure, reducing latency and dependence on centralised cloud systems. In finance, this has implications for real-time fraud detection, biometric authentication, and mobile-first financial services in bandwidth-constrained environments.

[56] CNBC (2024), Tala: 2024 CNBC Disruptor 50
[57] CGAP (2025), AI's Promise: A New Era for Financial Inclusion
[58] Fstech (2025) JP Morgan, HSBC and Goldman Sachs named top quantum innovators in finance
[59] National Quantum Computing Hub (n.d), Applications

Meanwhile, neuromorphic research chips, such as Intel's Loihi 2, model the brain's neural networks through neuromorphic architectures with potential for orders-of-magnitude improvements in energy efficiency, speed, and adaptability of small-scale edge workloads.[60]

Interoperable Digital Infrastructure Enablers: APIs, Digital IDs, and Trust Frameworks

The effectiveness of AI in finance is closely tied to the underlying digital public infrastructure (DPI). Digital IDs, interoperable APIs, open finance frameworks, and data-sharing protocols enable safe, scalable AI deployment. Singapore's SGFinDex and India's Account Aggregator (AA) framework are global exemplars of secure, consent-driven personal data mobility. Personal data mobility allows individuals to control and transfer their personal data, including the insights generated by AI systems, between different services in a secure and transparent manner.

Governments are beginning to incorporate AI-readiness into their DPI strategies, ensuring data minimisation, secure logging, and AI explainability at the infrastructure layer. AI regulation is also intersecting with data governance regimes such as Singapore's PDPA, the EU's GDPR, and the OECD AI Principles.

2.3 Regulatory Foresight for the Next Decade

As AI systems become more autonomous, adaptive, and deeply integrated into financial systems, conventional regulatory paradigms have to evolve to keep pace. The challenge for regulators is not only to mitigate existing risks but also to anticipate emerging ones such as model drift, algorithmic collusion, or systemic fragility in agentic finance. This calls for a proactive, agile, and globally coherent regulatory approach.

Global Regulatory Landscape

Multiple jurisdictions are advancing distinct but increasingly convergent AI regulatory frameworks. The European Union's AI Act, provisionally adopted in 2024, introduces a risk-based approach that designates AI in credit scoring and insurance pricing as “high-risk” applications subject to mandatory transparency, human oversight, and quality controls.

The United States' Executive Order on AI, while not sector-specific, mandates federal agencies (including the SEC and CFPB) to report on AI safety, fairness, and innovation. In Asia, Singapore's AI Verify Foundation, launched in 2023, has helped the city-state advance in verifiable, industry aligned AI testing and governance.

Financial regulators should look to integrate AI-specific supervisory toolkits and coordinate cross-border alignment on AI classifications, impact assessments, and third-party model audits.

Regulating Models, Not Just Firms

Traditional financial regulation focuses on licensing entities and reviewing processes. However, AI systems, especially foundation models and generative AI, require model-level governance including evaluation of training data, intended use cases, and latent risks such as hallucinations or adversarial attacks.

The UK's FCA, for example, has begun evaluating AI models submitted by FinTechs under a “model passporting” framework. Meanwhile, the Financial Stability Board (FSB) has proposed a taxonomy of AI model risks in systemic institutions, including concentration risk from over-reliance on third-party models.[61]

From Ex-Post Compliance to Ex-Ante Assurance

Current regulatory practices often assess AI systems after deployment. However, the fast-evolving and adaptive nature of AI necessitates ex-ante assurance mechanisms. These include pre-market audits, regulatory sandboxes, and real-time explainability tools embedded into models.

Singapore's AI Verify testing framework allows developers to demonstrate alignment with responsible AI principles across fairness, robustness, and transparency. The city-state's AI assurance pilots such as Global AI Assurance Sandbox launched in July 2025 are pioneering ex-ante approaches pairing deployers with third-party testers to evaluate risks before deployment.[62] Singapore also published the first LLM Testing Starter Kit to guide practitioners in responsible deployment.[63] Similarly, India's Digital India Act (draft 2025) proposes algorithmic accountability which requires firms to design and implement algorithms openly and responsibly. [64]

Global Coordination and Regulatory Interoperability

Given the borderless nature of data, capital, and algorithms, regulatory fragmentation poses a systemic risk. Disparate AI rules could limit innovation, encourage regulatory arbitrage, or create compliance barriers for cross-border FinTechs.

In October 2023, Singapore's Infocomm Media Development Authority (IMDA) and US National Institute of Standards and Technology (NIST) completed a joint mapping exercise between IMDA's AI Verify and NIST's AI Risk Management Framework,[65] which is an important step towards harmonisation of international AI governance requirements to reduce industry's cost to meet multiple requirements.

60. Intel (n.d) Neuromorphic Computing and Engineering with AI
61. FSB (2024), The Financial Stability Implications of Artificial Intelligence
62. AI Verify Foundation, Global AI Assurance Sandbox
63. IMDA (2025), large-language-model-starter-kit
64. Journal of Legal Research and Juridical Sciences (2025), The Digital India Act and AI Governance by Sapna Kumari
65. IMDA (2023), Joint Exercise: IMDA and US NIST Mapping

Multilateral platforms such as the Global Partnership on AI (GPAI), OECD and FSB AI Roundtable are exploring AI interoperability standards and joint supervisory colleges for AI in financial institutions.

2.4 Investor Outlook

Investment Momentum and Strategy

Venture capital (VC) investment in AI grew in first half 2025, reaching US$114.6 billion, surpassing the full-year total of US$95.8 billion for 2023.[66] Meanwhile, VC investment in GenAI exploded in H1 2025, reaching US$49.2 billion, surpassing the full-year total for 2024 with deal values more than doubled compared to 2023, and average deal sizes increased threefold to around US$1.5 billion, with the US dominating deal value (97%) and volume (62%) globally.[67] AI-focused FinTechs drew US$7.2 billion for first half 2025 closing in towards US$8.9 billion for full year of 2024.[68]

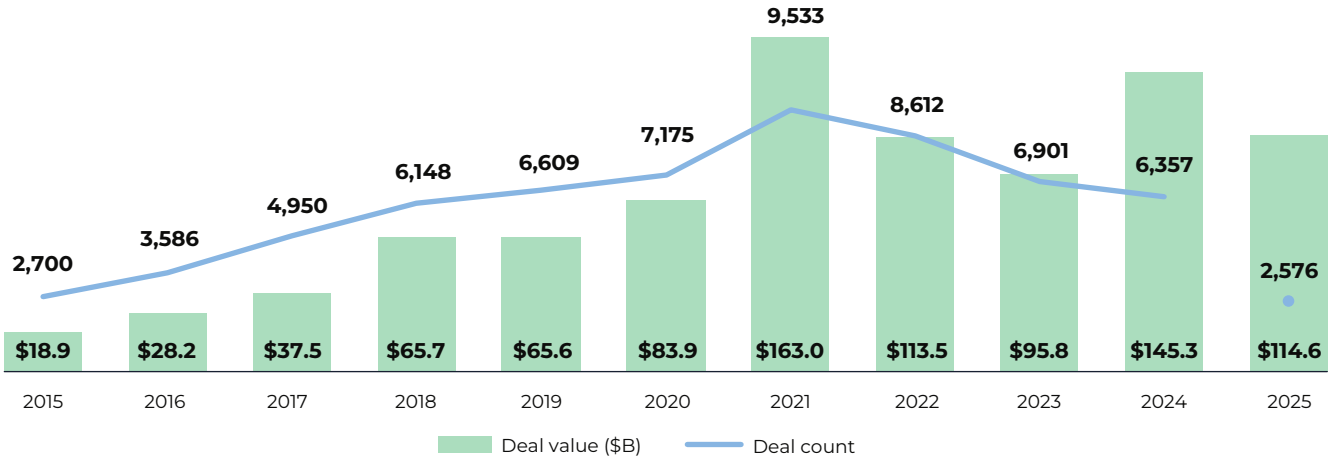
Hedge funds focused on AI have also rapidly emerged. A notable example is Situational Awareness, raising US$1.5 billion under management and posing substantial returns, signalling investor belief in AI's disruptive potential across sectors.[69]

Investors are shifting focus to AI-native firms with strong revenue fundamentals and revenue predictability. The balance between mid-term profitability and long-horizon prospects is a central theme in 2025 investment discourse.[70]

AI is seen as a core portfolio sector alongside cloud and edge computing, with the AI market projected to grow at a compound annual growth rate (CAGR) of 35.9% from 2025 to 2030 to reach US$1.8 trillion by 2030.[71]

A KPMG survey of 1,800 companies shows that a majority of companies using AI in finance reported returns on investment are meeting or exceeding expectations with most value from technologies, such as machine learning, deep learning, and Gen AI as seen in Figure 8 on page 16.[72]

Fig. 7: Venture capital investment in AI



Source: PitchBook (2025), Q2_2025_AI_VC_Trends

2.5 AI for the Financial Institution of the Future

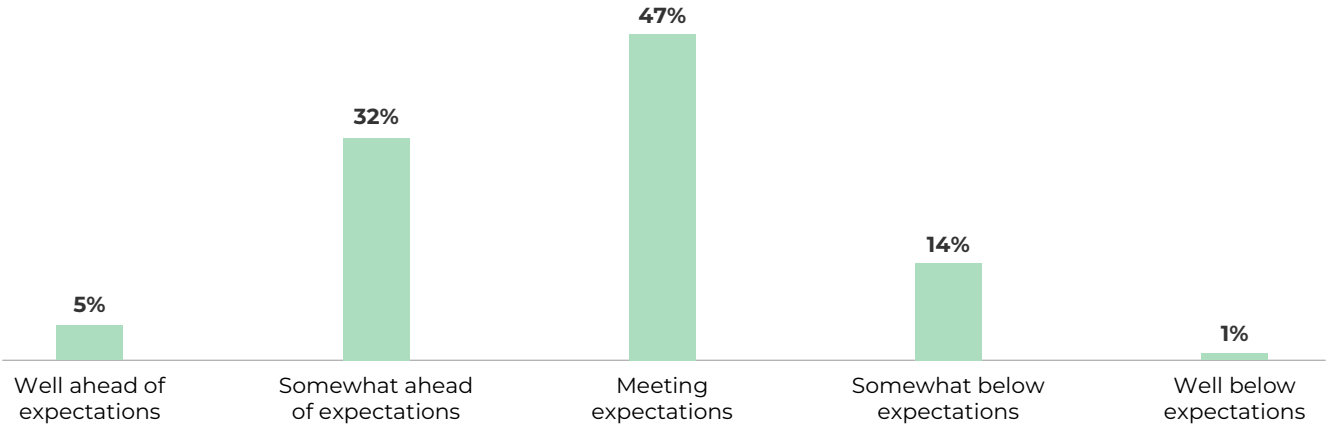
Vision for fully AI-enabled financial services organisations by 2030

AI-enabled financial institutions are envisioned as adaptive, data-driven organizations where AI agents and generative models underpin most functions, enhancing operational efficiency, customer engagement, compliance, portfolio management, and real-time risk monitoring. Generative AI models like LLM-powered co-pilots are increasingly embedded in workflows for task automation and decision support.[73] According to EY, reimagining the conventional financial institution with GenAI playing a central role could produce an estimated US$200 to US$400 billion in value by the year 2030.[74]

Banking: AI agents will automate processes such as client onboarding, credit assessments, fraud detection, and regulatory reporting.[75] Banks that prioritise real-time data integration, intelligent automation, and explainable decision frameworks will reap sizeable gains in efficiency, cost, and customer value.[76]

66. Pitchbook (2025), Q2_2025_AI_VC_Trends
67. EY (2025), How late-stage deals are driving rapid growth in VC investment in GenAI
68. KPMG (2025), Pulse of Fintech H1 2025
69. Wall Street Journal (2025), Billions Flow to New Hedge Funds Focused on AI-Related Bets
70. FTI Consulting (2025), AI Investment 2025: Opportunities in a Volatile Market
71. Investopedia (2025), What the Data Tells Us: 3 High-Growth Tech Areas To Target for Client Portfolios
72. KPMG (2024), KPMG Global AI in Finance Report
73. B Saha et al (2025), Generative AI in Financial Institution: A Global Survey of Opportunities, Threats, and Regulation
74. EY (2024), Unlocking the future of banking: the transformative power of generative AI
75. EY (2024), Unlocking the future of banking: the transformative power of generative AI
76. Roland Berger (2024), Artificial Intelligence in Banking

Fig. 8: Returns on AI Investment in Finance



Source: KPMG (2024), KPMG Global AI in Finance Report

Wealth management: Is seeing accelerated integration of AI, forming strategic partnerships and investing in AI-based advisory capabilities to support customisable, scalable financial guidance. Over 80% of Wealthtech vendors say advisor AI agents/copilots are of "high importance" in wealth management.[77]

Insurance: Underwriting, pricing, and claims will transition to highly automated processes, driven by machine learning models that analyse vast amounts of structured and unstructured data for risk profiling and fraud detection.

More than half of the respondents in a McKinsey survey of 50 largest European insurers indicated that GenAI could lead to productivity gains of 10% to 20% and premium growth of 1.5% to 3%.[78]

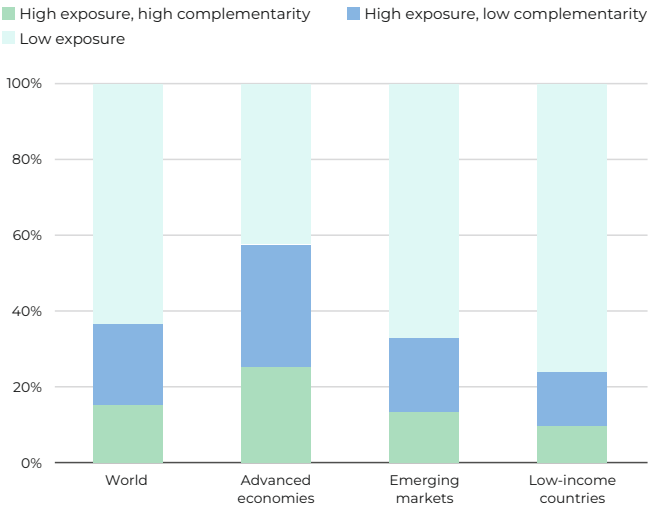
Capital markets: AI agents are transforming investment research, portfolio construction, and trading, driving faster, smarter decisions across buy- and sell-side operations. Use cases include sentiment analysis, high frequency/ algorithmic trading, risk modelling, and regulatory compliance automation.[79]

2.6 Talent, Skills, and Institutions

The transformation of financial institutions necessitates a profound transformation of their workforce. According to Goldman Sachs projections, globally AI could replace the equivalent of 300 million full-time jobs and potentially affecting a quarter of work tasks in the US.[80]

The World Economic Forum's "Future of Jobs" report highlights the critical need for reskilling in the face of AI-driven automation.[81]

Fig. 9: AI Impact on jobs by stage of economic development



Source: IMF (2024) AI Will Transform the Global Economy. Let's Make Sure It Benefits Humanity

The Great Reskilling and Upskilling Imperative

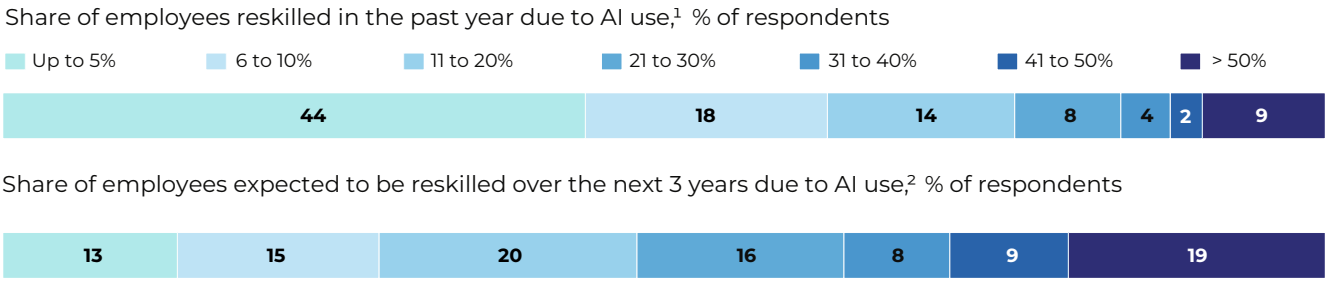
From Specialists to "Versatilists": A premium on employees who blend deep domain knowledge with a strong understanding of data and the ability to work effectively with AI. Many organisations have started to reskill portions of their workforces as part of their AI deployment over the past year and that they expect to undertake more reskilling in the years ahead.[82]

The Rise of New Roles: AI/ML Engineers, AI Product Managers, AI Governance Officers, and AI Agent Trainers will become commonplace.

Building AI Governance Teams: A critical evolution is the creation of dedicated, cross-functional AI governance teams that include representatives from technology, business, risk, compliance, ethics, and audit to oversee the entire AI lifecycle.

77. Celent (2025), WealthTech Trends in 2025: AI, Partnerships, and Strategic Fintech Moves
78. McKinsey (2024), The potential of generative AI in insurance
79. S&P global (2025), Beyond automation: Agentic AI and scaling fragmented financial markets
80. Goldman Sachs (2023), Generative AI could raise global GDP by 7%
81. World Economic Forum (2023), The Future of Jobs Report 2023
82. McKinsey (2025), The State of AI: Global survey

Fig. 10: Reskilling of employees due to AI use



[1] Only asked of respondents whose organizations use AI in at least 1 function. Figures were calculated after removing respondents who said "don't know." The question asked, "What share of employees in your organization's workforce have been reskilled in the past year as a result of AI adoption?"
[2] Only asked of respondents whose organizations use AI in at least 1 function. Figures were calculated after removing respondents who said "don't know." The questions asked, "What share of employees in your organization's workforce do you expect will be reskilled over the next 3 years as a result of AI adoption?"
Source: McKinsey Global Survey on the state of AI, 1,491 participants at all levels of the organization, July 16–31, 2024

Source: McKinsey 2025, The State of AI: Global survey

3 Addressing Unresolved Challenges

3.1 Systemic Risk in an AI-Driven Financial Sector

As AI systems scale across financial markets, the potential for new forms of systemic risk becomes evident. Unlike traditional financial risks, AI-driven risks stem from model concentration, adversarial manipulation, and cascading network effects.

Model Concentration: A handful of foundation models trained and controlled by a small number of global players are increasingly embedded across financial institutions. Concentration risk arises if errors, vulnerabilities, or biases in these models propagate across multiple banks, insurers, or capital markets simultaneously. The Financial Stability Board (FSB) has warned that AI could evolve into systemically important financial infrastructure, necessitating oversight akin to clearing houses or payment systems.[83]

Adversarial AI: AI models can be manipulated through "data poisoning" or "adversarial inputs." In trading, adversarial signals could trigger destabilising cascades. Cybersecurity researchers have shown that even modest perturbations can exploit vulnerabilities in otherwise robust models.[84]

Agentic Network Failures: As agent-based AI systems proliferate - autonomous trading bots, loan negotiation agents, insurance claims processors - failures in one system can cascade through interconnected financial networks, amplifying shocks in unpredictable ways.[85]

3.2 Algorithmic Bias, Inclusion, and Fairness

AI's potential to improve financial inclusion is balanced against risks of structural bias and inequity.

Structural Data Inequality: Populations in emerging markets often lack the rich datasets used to train credit scoring models, leading to exclusion or mispricing.

Bias Audits: Regulators such as the MAS through the Veritas initiative[86], and the US Consumer Financial Protection Bureau (CFPB), are pushing for routine fairness audits of AI systems.

Emerging Standards: Global efforts are converging on model explainability, fairness testing, and independent validation. Yet, developing standards for low-data environments such as rural or informal economies remains a significant gap.

3.3 Interoperability and Fragmentation Risks

The fragmentation of AI regulations risks creating a patchwork that raises compliance costs and stifles innovation.

Regulatory Divergence: The EU AI Act[87] imposes strict ex-ante obligations, while the US remains sector-driven with executive orders and agency-specific rules. Singapore and the UK pursue principles-based approaches. This

[83] FSB (2024), The Financial Stability Implications of Artificial Intelligence
[84] Palo Alto Networks (n.d), What Is Adversarial AI in Machine Learning?
[85] FSB (2024), The Financial Stability Implications of Artificial Intelligence
[86] MAS (2023), Veritas Initiative
[87] European Commission (2024). AI Act | Shaping Europe's digital future

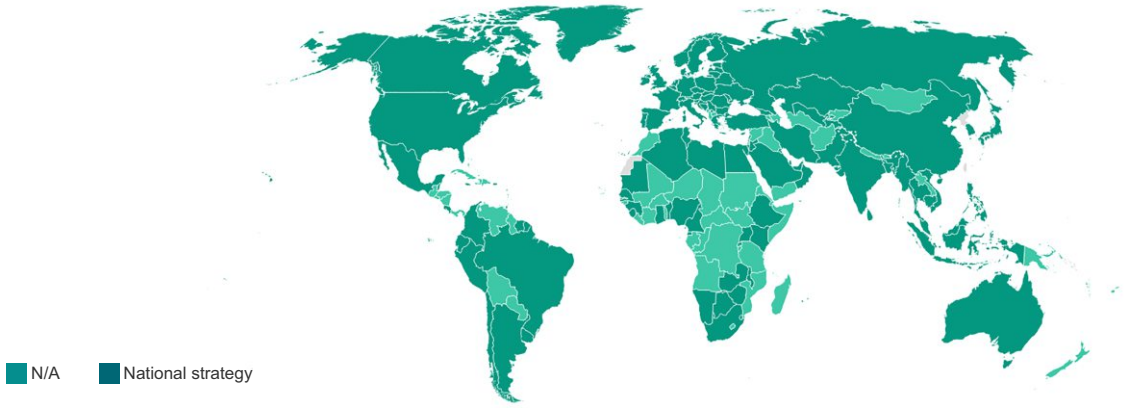
divergence risks "AI model borders" where firms cannot deploy systems across jurisdictions without costly customisation.

Data Sovereignty: Rising data localisation laws such as those in India, China, EU's GDPR complicate the training and deployment of cross-border AI systems. Financial institutions may need to maintain jurisdiction-specific models, fragmenting global operations.[88]

Regulatory Arbitrage Concerns: CGAP found more than 50 countries with varying levels of AI-specific guidelines for financial institutions from ethical principles to consultations to supervisory views and AI-tailored rules.[89] Divergent regulation may encourage "regulatory arbitrage," pushing institutions toward laxer jurisdictions and creating uneven risk accumulation and potential blind spots for global supervisors.

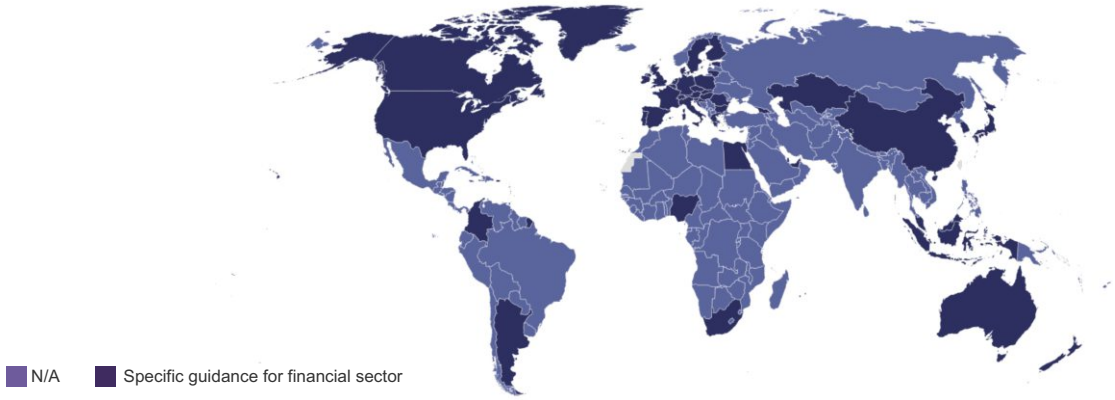
For the responsible development and use of artificial intelligence, it is critical to create common global regulatory

Fig. 11: 116 countries with National AI Strategy



Source: CGAP (2025), Key Regulatory Developments for AI in Finance

Fig. 12: 50 countries with AI-specific guidelines for financial institutions



Source: CGAP (2025), Key Regulatory Developments for AI in Finance

standards, specifically for AI governance and risk evaluation methods. Standardising these rules globally is vital to ensure consistent ethical and safety protocols, stop businesses from seeking out countries with less strict oversight, and encourage international cooperation. By establishing a single set of guidelines, we can increase confidence in AI systems, enable smoother cross-border applications, and effectively tackle global concerns related to privacy, security, and fair access.

3.4 Responsible AI at Scale

When AI operates at a massive scale, making millions of decisions daily and consuming substantial energy, responsible deployment requires careful consideration of both its societal and environmental impacts. Organisations must move beyond basic ethical guidelines to implement robust frameworks for accountability, transparency, and sustainable resource management.

Responsible AI deployment requires scaling ethical principles to environments where millions of AI-driven decisions are made daily.

Bias Detection and Mitigation: AI models trained on biased data will produce and amplify biased outcomes across millions of decisions. Responsible deployment requires ongoing monitoring and rigorous fairness testing to identify and correct biases that may emerge, particularly as the system interacts with new data.

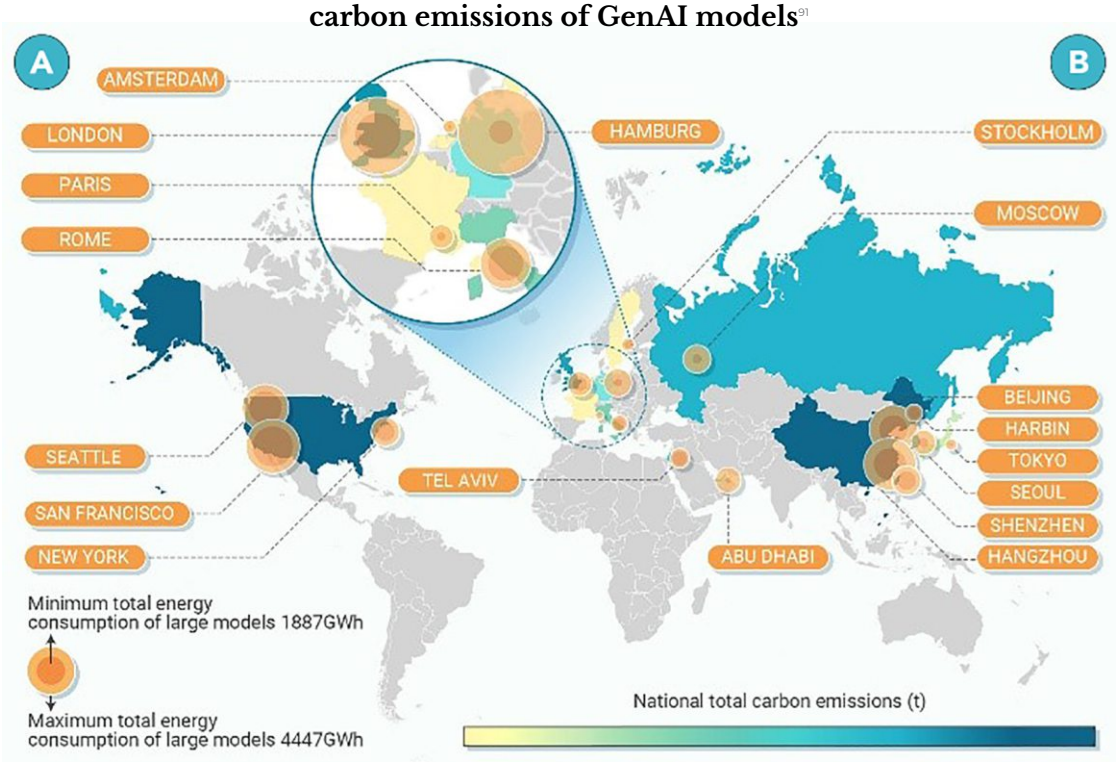
[88] Brookings (2022), The geopolitics of AI and the rise of digital sovereignty
[89] CGAP (2025), Key Regulatory Developments for AI in Finance

Accountability: As AI takes on more complex tasks, the line of accountability can become blurred. Deployers must establish clear governance frameworks for high-risk systems, defining who is responsible when an AI makes a harmful or incorrect decision. In some cases, human-in-the-loop oversight is required to approve or review AI actions.

Decision Velocity: Credit approvals, algorithmic trades, fraud detection alerts - each involves decisions in seconds. Embedding fairness, accountability, and transparency in high-frequency systems is far more complex than in low-frequency human-mediated ones.

Energy Intensity: Training and deploying large AI models is highly resource intensive. Financial institutions seeking sustainability alignment face a paradox: AI enables efficiency but consumes significant compute energy. Currently, AI's environmental footprint is roughly split between training phase which is responsible for about 20% of energy consumption and inference making up the bulk at 80%.[90]

Fig. 13: Global distributions of the energy consumption and carbon emissions of GenAI models[91]



Source: Z Ding et al. (2025), Tracking the carbon footprint of global generative artificial intelligence

To enhance the environmental sustainability of AI initiatives, a two-pronged approach is necessary. From the supply side, this involves powering AI operations with clean or renewable energy source and building energy-efficient infrastructure whilst from the demand side this means optimising AI systems to reduce their energy consumption. The European Commission has proposed the "twin transition," which views progress toward clean energy and AI as parallel and mutually reinforcing.[92]

Responsible-by-Design: Government bodies like MAS and the UK FCA are emphasising "responsible-by-design" frameworks requiring AI governance structures to be embedded at the design phase rather than bolted on post-deployment.

Trust frameworks and AI governance initiatives, like Singapore's AI Verify and the US NIST AI Risk Management Framework (RMF), provide the guardrails for ethical and responsible AI development and deployment.

4.1 Global Coordination: What's Missing

Despite progress, the absence of multilateral rulebooks remains a critical gap.

Accountability Gaps: No global mechanism currently governs AI failures that spill across borders - for example, if a trading model in New York triggers contagion in Singapore.

Fragmented Standards: While the OECD, G7, and G20 have published AI principles, these remain high-level and voluntary. Binding coordination, akin to Basel III in banking, is still absent.

Possible Pathways Forward: Develop mutual recognition frameworks for AI model audits across jurisdictions. Expand Digital Public Infrastructure (DPI) frameworks to include interoperable AI governance layers.

90. WEF (2024), How to manage AI's energy demand today and in the future
91. Z Ding et al. (2025), Tracking the carbon footprint of global generative artificial intelligence
92. European Commission (2025), The twin green & digital transition: How sustainable digital technologies could enable a carbon-neutral EU by 2050

4 Conclusion

The decade from 2016 to 2025 has been defined by the rapid integration of Artificial Intelligence into global finance. What began as narrow experiments in automation has matured into a foundational infrastructure shaping banking, insurance, capital markets, and regulatory oversight. The Singapore FinTech Festival has mirrored this journey, from early showcases of robo-advisors and Regtech tools to today's debates over generative AI, agentic systems, and systemic risk.

Looking Ahead: Strategic Priorities for the Next Decade

To ensure AI enhances stability and inclusion while mitigating systemic risks, policymakers, regulators, and industry leaders should prioritise:

- **Embedding responsibility into design:** Move from principles to operational standards, requiring "responsible-by-design" approaches to model development, validation, and deployment.
- **Strengthening systemic oversight:** Treat key AI models as "systemically important" financial infrastructure, subject to monitoring akin to clearing houses or payment systems.
- **Advancing interoperability:** Harmonise AI governance through bilateral, mapping exercises such as IMDA-NIST AI RMF mapping in 2023 and explore multilateral supervisory colleges for AI models.
- **Scaling inclusion and fairness:** Expand explainable AI tools, bias audits, and participatory design processes to ensure equitable access in both developed and emerging markets.
- **Addressing sustainability:** Incorporate the environmental costs of AI training and inference into financial disclosure frameworks, aligning with broader climate and ESG commitments.

The future of finance will be deeply intertwined with the future of AI. The challenge before policymakers and institutions is not whether AI will reshape finance – it already has – but how to govern its trajectory in ways that enhance resilience, inclusion, and trust.

Just as the financial crisis of 2008 spurred global coordination on capital standards, the AI revolution of the 2020s requires a new generation of foresight and collective governance. The next decade presents a unique opportunity - to align technological innovation with financial stability, and to shape a global financial system where AI works for all.

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