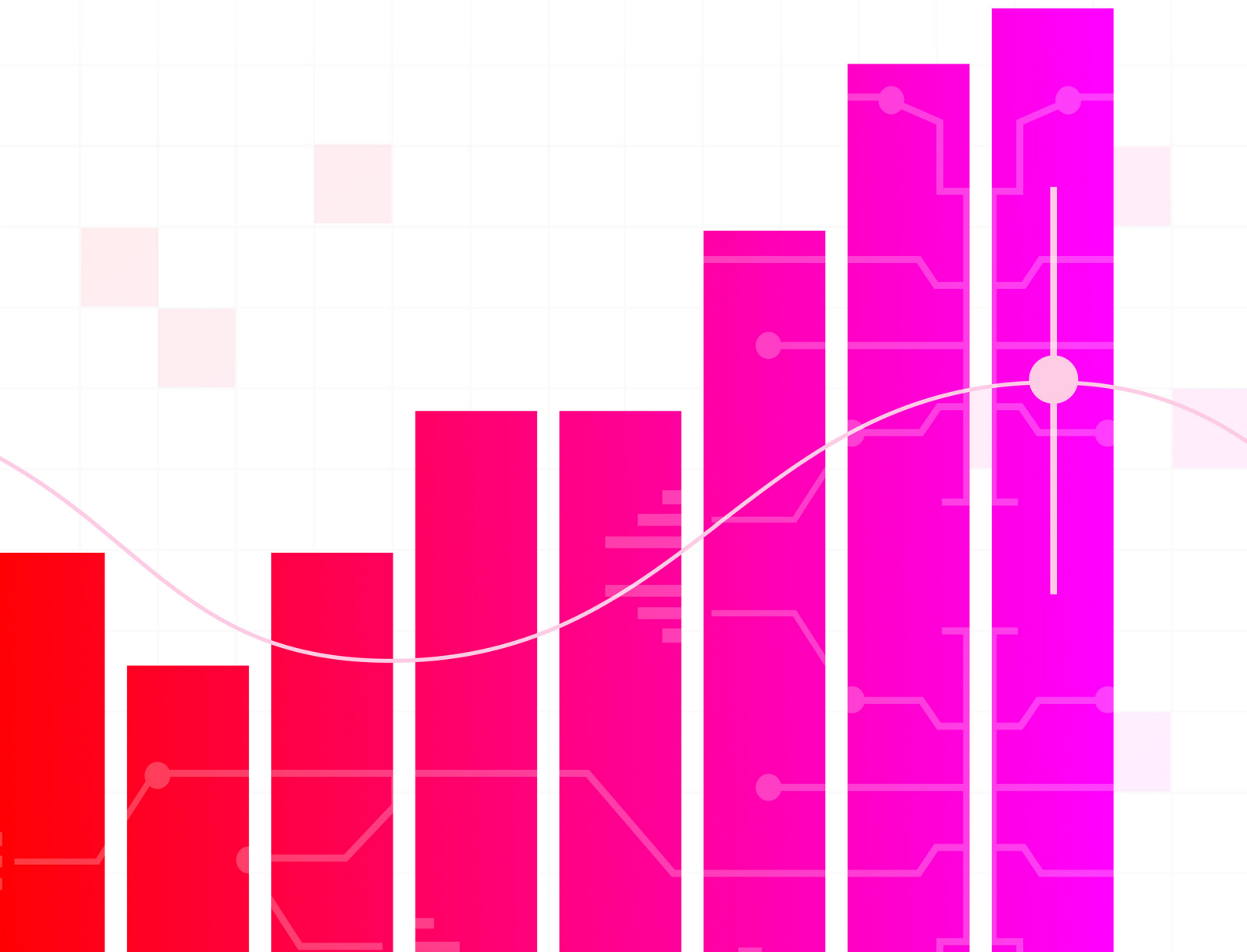


Morningstar's Guide to Artificial Intelligence

The age of AI has arrived.
Make it work to your advantage.

\$38b
AI & BIG DATA



The Rise of Artificial Intelligence

AI is everywhere. In fact, it's unavoidable. It's in the media, our search engines, our phones, our social media, and, increasingly, the scale of AI integration means it's present in our finances, from investment tools and strategies to AI-themed funds.

It's almost certain that everyone has been exposed to AI in one form or another. And this exposure is set to grow, with firms adapting and accelerating their strategies in the heated race to leverage the potential of AI.

In an [EY survey of financial-services leaders](#), 99% of respondents reported that their organisations are already deploying AI. However, in the same survey, one in five respondents expressed scepticism their organisation was well-positioned to use AI to its advantage. They cited concerns around data and technology infrastructure, commitment from leadership, and governance and ethical concerns.

The growing popularity of AI also shows in investment trends, especially in thematic funds, which have long acted as a barometer for the trendiest investment topics.

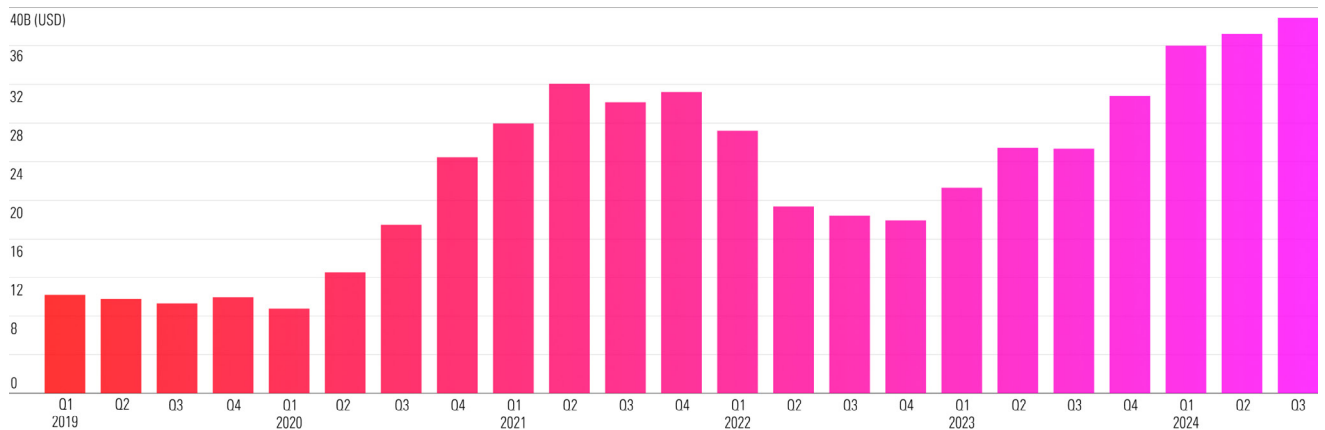
“As of the third quarter of 2024, global investment in AI & Big Data-themed funds reached just over USD 38 billion.”

The boom began around the second quarter of 2020, as the COVID-19 pandemic hit. As of the third quarter of 2024, global investment in AI & Big Data-themed funds reached just over USD 38 billion. AI companies are also seeing their share prices skyrocket as investors rush to capitalise on this exploding sector.

One of the most notable beneficiaries of the AI boom is Nvidia, whose semiconductor chips support AI technologies. The company has seen its [share price surge by over 600%](#) since early 2023.

When it comes to artificial intelligence, it's clear that firms are keen to deploy AI, but challenges and uncertainty persist.

Exhibit 1: Assets in Artificial Intelligence and Big Data-Themed Funds (USD Billions)



Source: Morningstar Direct. Data as of November 2024.

Speak the Language of AI

To successfully use AI, financial market participants need a solid understanding of the underlying technologies that power AI solutions. Specifically, they need to be proficient in the language of AI so they can confidently articulate their strategies to colleagues and clients alike.

Here are the top AI terms you need to know:

Term	Description
Artificial Intelligence	The simulation of human intelligence in machines.
Large Language Model (LLM)	A type of artificial intelligence trained on massive amounts of text data which allows it to understand, generate, and translate human language.
Machine Learning (ML)	The process of training computers to learn and improve from data and previous performance without being explicitly programmed to do so.
Generative AI	A type of artificial intelligence that can create new content, such as text, images, videos, or audio. Sometimes referred to as GenAI, notable examples include ChatGPT and Midjourney.
Natural Language Processing (NLP)	The process of teaching computers to recognise, understand, and generate human language. NLP allows chatbots to provide a more personal and realistic conversational experience.
Retrieval-Augmented Generation (RAG)	A technique that combines the power of AI LLMs with the ability to retrieve and process external information. The result allows LLMs to generate more accurate responses.
Vectors	Mathematic representations of data used in LLMs. Vectors help machine-learning algorithms process and understand information by calculating similarities, distances, and relationships between different pieces of information.
Hallucinations	Used to describe a situation where an AI model generates and presents incorrect or misleading information as factual.
AI Bias	An instance where AI systems show discriminatory behaviour. This can occur due to biases present in the data or algorithm used to train the model. Types of biases include; selection, confirmation, measurement, and algorithm bias.
Responsible AI	Used to describe how organisations strategically approach the development and deployment of artificial intelligence, for example, mitigating biases. Not to be confused with Ethical AI, a broader and more valued-focused concept (though the terms are often used interchangeably).
Open AI	Transparent AI systems that are accessible to the public, allowing users to access the source code and potentially improve the system. Open AI models can be trained on the data you input, so it's important to never provide classified, sensitive, or personal information to prevent privacy, security, and ethical concerns.
Closed AI	The opposite of open AI, these models are proprietary and not publicly accessible. Closed AI models are typically developed by corporations or governments and may be protected by intellectual property rights.

The Impact of AI

The advantages of artificial intelligence will vary by sector, but across the financial-services industry, AI use cases have already started to emerge as financial advisers, asset managers, and wealth managers look to benefit from AI integration.

Artificial Intelligence in Portfolio Management

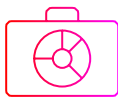
Clients aren't looking to hand over the entire responsibility of portfolio management to AI anytime soon. Instead, portfolio managers should think of AI as powerful digital assistants who are especially effective when tasked with repetitive or data-centric assignments.

You can use AI for:



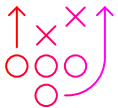
Investment research

AI-driven algorithms, such as neural networks or support vector machines, can collect and analyse vast amounts of data through sentiment analysis, delivering research insights at a glance. With an AI research assistant, managers can accelerate portfolio construction decisions.



Market monitoring

By performing real-time analysis on current market data, AI can paint an accurate picture of what's happening in the market, from major trends to sudden crashes, enabling portfolio managers to react accordingly or to proactively optimise portfolio performance.



Algorithmic trading

By accessing investment research and historical data, AI can generate predictive analytics to execute trades.

Robo-advisors

The rise of robo-advisors signals the growing prominence of AI in portfolio management and construction. Robo-advisors use algorithms and software to provide automated investment advice and management, using data from questionnaires to assess goals and risks.

While they're low cost and require minimal human supervision, robo-advisors have been criticised for a lack of complexity. But it's a rapidly evolving sector. [Statista predicts](#) that AUM in the robo-advisor space will surpass USD 2.3 trillion by 2028, while the number of robo-advisor users will exceed 34 million by the same year.

Artificial Intelligence and Anomaly Detection

With the ability to crawl through large volumes of datasets, AI is well-suited to anomaly detection. By accessing and analysing historical data, AI algorithms can identify potential risk factors and outliers and then model different scenarios.

AI can do all this much more quickly than a manager can. However, while AI can flag anomalies, it's the manager who can then take all this information and proactively navigate and mitigate risks, adjust and diversify portfolios where needed, and deliver a high level of customer service.

The best part? This strategic approach to anomaly detection and risk mitigation is entirely scalable, with AI able to monitor and analyse large universes of investments.

Artificial Intelligence and Personalisation

It may seem contradictory, but when done right, AI can deliver valuable insights that help managers personalise the client experience.

A major advantage of AI is that it can help financial market participants make a strong impression from the offset. With advances in natural language processing, managers and advisers can use chatbots to:

- ▶ Improve client communication.
- ▶ Automate responses to commonly asked questions.
- ▶ Deliver personalised messages.
- ▶ Learn about a client's financial goals and risk tolerance level.
- ▶ Relay important information regarding investment principles or value propositions.

Importantly, this can all be done without the client needing to call or arrange a meeting.

Even without chatbots, asset managers can use the data processing capabilities of AI to identify trends and patterns in the market. They can then create personalised, data-driven investment strategies that are aligned with their client's goals, such as risk tolerance or sustainability objectives.

Wealth managers can use AI to collect and analyse data about a client's finances, risk tolerance, and communication preferences to tailor their strategies, recommend suitable products, and mitigate potential customer churn. More personalised strategies lead to improved client relationships, which can help reduce the likelihood of customer churn.

“As in portfolio management, it's unlikely AI will replace human advisers.”

As in portfolio management, it's unlikely AI will replace human advisers. But if used for repetitive or data-heavy tasks like portfolio construction, appointment scheduling, market analysis, or financial planning, AI could help financial advisers focus on more strategic or client-focused work.

Thanks to AI and predictive models, asset managers, financial advisers, and wealth managers can increase their personalisation efforts, allowing them to prioritise customer outreach, optimise retention strategies, and keep costs low, all at scale.

Improve Operational Efficiency with Artificial Intelligence

Despite the diverse range of AI use cases across different firms and job roles, there's an overarching benefit of AI integration – efficiency.

Perhaps the most obvious and readily deployable capability of AI is the automation of repetitive, manual, data-centric tasks. From using chatbots to triage frequently asked questions or predictive modelling to assess market scenarios, AI empowers financial market participants to dedicate more time to the most meaningful work.

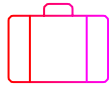
Whether through strengthening client relationships or surfacing actionable investment insights, AI can improve operational efficiency, streamline workflows, and reduce costs.

Research from [Brummer and Yadav \(2017\)](#) found that AI can review more than 12,000 documents in seconds. The time it would take for a human to do this exact same task? 360,000 hours. That's a lot of time that could be better spent elsewhere to deliver impactful results.

The Challenges of AI

For all the advantages of AI, there are many concerns.

Jobs



AI is set to disrupt labour markets across the globe, with 40% of jobs predicted to be affected by AI. While new jobs will emerge because of technological advancements, firms will need to consider the socio-economic implications of AI integration and develop strategies for reskilling employees.

Privacy



AI models are often trained on large amounts of personal data, giving rise to concerns under applicable consumer privacy law, such as the General Data Protection Regulation in the European Union. Data breaches or violations – especially in relation to sensitive or personal data – can have serious consequences, from clients moving to competitors, irreparable brand damage, legal action, and financial penalties.

Security



Robust cybersecurity measures can only succeed if each step of the process plays its part. Firms developing AI systems must ensure security is embedded throughout the process, especially when it comes to the design, development, deployment, and operation of AI technologies.

This could include opting for a closed AI environment, which is not publicly accessible, or prohibiting employees from including personal or sensitive information in instances where AI models may be trained on that data.

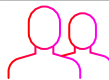
Quality



AI uses data to constantly learn and evolve. But not all data is created equally, especially in the era of misinformation. Occasionally, AI programmes produce incorrect information, which can lead to problems if you're using the data to model different market scenarios or develop investment strategies.

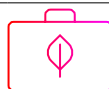
Firms using AI need appropriate quality assurance/due diligence processes to mitigate these risks. This situation shows the need to balance AI capabilities with human oversight.

Bias



Machine learning bias, also known as algorithm bias, means the output of AI models may unfairly disadvantage certain groups of people due to inherent biases in the data the AI model was trained on. Firms need clear AI governance policies and additional validation processes to help combat these biases.

Sustainability



AI technologies pose potential environmental risks by consuming huge amounts of energy, contributing to greenhouse gas emissions.

One notable example is graphics processing units, an essential part of the AI technological infrastructure which become incredibly hot when running and require even more energy for the cooling process. The hardware also contributes to rising global levels of e-waste.

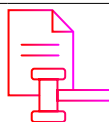
Firms will need to balance AI strategies with sustainability considerations, for example, how they offset emissions or declare AI-related waste in their corporate sustainability reports.

Investor Sentiment



While some have embraced AI, others are more sceptical. The idea of AI gradually becoming more present in their portfolios and workflows can be concerning for professional and retail investors. Firms will need to clearly and concisely articulate their AI strategy so clients have full transparency about how AI will and will not be used.

Regulations



As AI becomes more prominent in our daily lives, new regulations will inevitably come into effect to mitigate the potential risks and establish best practices for AI deployment.

While challenges and concerns around AI persist, firms who want to tap into its potential can mitigate some of the risks by establishing a clear framework for AI governance.

This could include:

- ▶ A clearly defined AI strategy that highlights the objectives, benefits, and risks of AI integration.
- ▶ Board oversight or the creation of an AI committee comprised of cross-functional leaders to implement and monitor AI initiatives.
- ▶ Updating policies around data privacy and security, along with guidance on using AI tools in the workplace.
- ▶ Guidelines around ethical and responsible use.
- ▶ Clear and transparent communications to internal and external stakeholders detailing how and where AI will be deployed, for example, in marketing advertisements or portfolio construction.

On the Horizon: Artificial Intelligence and Regulation

While it's still very early days, some jurisdictions are already implementing AI regulations, while others have issued initial guidance.

Regardless of geographical location, regulators and policymakers are united by a core challenge—agreeing on a definition of AI.

This will undoubtedly have consequences.

For countries planning to adapt existing regulations (as opposed to creating AI-specific legislation), regional regulatory bodies may interpret definitions and frameworks differently, or generally use a definition of AI that's too broad (for example, treating deterministic models and generative AI as the same). This could result in unclear and inconsistent rules across different sectors.

This will affect global businesses. If the definition of AI varies from country to country, then key concepts such as what classifies "high risk" will be interpreted differently, resulting in conflicting legislation.

How will international firms be expected to adapt their own AI policies to comply? What will compliance look like from country to country? How do you navigate regulation when one country's definition of high-risk AI differs from another's?

The answers are still unknown.

“Regardless of geographical location, regulators and policymakers are united by a core challenge – agreeing on a definition of AI.”

Please note that the discussion of regulatory requirements is intended for informational purposes only and should not be considered legal advice. If you have questions about complying with any of the laws discussed here, please consult with a lawyer.

The European Union

In June 2024, lawmakers in the European Union signed the [Artificial Intelligence \(AI\) Act](#), billed as “the world’s first comprehensive AI law”. The law, which came into effect in August 2024 and will be fully applicable within two years, adopts a risk-based approach to determine which AI systems require regulation.

- ▶ **Unacceptable risk**—AI systems that contravene EU values (for example, the violation of fundamental rights) will be banned.
- ▶ **High risk**—systems that may have a negative impact on fundamental risks.
- ▶ **Specific transparency risk**—certain AI applications with a risk of manipulation (for example, chatbots or deepfakes) must be transparent so users are aware they are interacting with AI.
- ▶ **Minimal risk**—systems that can be used based on existing legislation without additional legal requirements.

Meanwhile, the European Securities and Markets Authority has [issued guidance on AI deployment](#) for firms providing investment services to retail clients, noting that in the absence of an AI-specific framework, AI usage should take account of existing MiFID II regulatory requirements.

Some of ESMA’s guidance includes:

Acting in the client’s best interests

- ▶ Firms should be transparent about how and when AI is used, from investment decision-making processes to client interactions.

Organisational requirements

- ▶ A firm’s management body should have a sufficient understanding and oversight of AI tools and their use, with robust governance structures to monitor the performance and impact of AI tools.
- ▶ Firms should have AI-specific risk management frameworks with regular model testing and monitoring for potential risks and biases.
- ▶ Firms should have rigorous oversight of the processes for creating, training, testing, validating, and analysing data used for AI applications.

Conduct of business requirements

- ▶ Firms using AI technologies should ensure the suitability of services and financial instruments.
- ▶ Firms should have the necessary controls, monitoring, and testing capabilities in place, particularly in the context of product governance and suitability.
- ▶ Firms should implement robust quality assurance processes.

Record keeping

- ▶ Firms should maintain comprehensive records about AI use, along with any complaints to ensure compliance with MiFID II requirements.

As of September 13th, 2024, the [European Commission closed its targeted consultation](#), which invited stakeholders from the financial-services industry to offer their thoughts about the role of AI in finance.

The United Kingdom

The UK government is adopting what it calls a “[pro-innovation approach to AI regulation](#)”. According to the government, the UK will not introduce a new AI regulator. Instead, existing regulators and legislation will be adapted to include AI frameworks and best practices.

The government has outlined five core principles for the existing regulators to interpret and apply.

- ▶ Safety, security and robustness
- ▶ Appropriate transparency and explainability
- ▶ Fairness
- ▶ Accountability and governance
- ▶ Contestability and redress

The UK’s financial regulatory body, the Financial Conduct Authority, [has issued an AI update](#) welcoming the government’s principles-based, sector-led approach.

The regulatory body has committed to furthering its understanding of AI usage in the UK financial markets, and in collaboration with the Bank of England, will continue to run machine-learning surveys.

The United States

While the United States does not currently have any formal AI regulation, the White House has issued an executive order, titled ‘[Safe, Secure, and Trustworthy Development and Use of Artificial Intelligence](#)’.

The order acknowledges AI’s potential for “both promise and peril” and outlines the administration’s eight guiding principles and key priorities for AI.

According to the order, AI integration and adoption must:

- ▶ Be safe and secure, with robust and reliable evaluations of AI systems.
- ▶ Promote responsible innovation, competition, and collaboration.
- ▶ Support American workers through job training and education.
- ▶ Be consistent with policies that advance equity and civil rights.
- ▶ Be consistent with existing consumer protection laws, especially in critical fields like healthcare, education, and financial services.
- ▶ Respect and protect Americans’ privacy and civil liberties.
- ▶ Be used responsibly within the Federal Government. Government workers using AI must be aware of the benefits, risks, and limitations.
- ▶ Promote responsible AI use at a global level, with the federal government working closely with other nations to ensure AI benefits the whole world.

In the aftermath of the executive order, the U.S. Department of the Treasury published a report on ‘[Managing Artificial Intelligence-Specific Cybersecurity Risks in the Financial Services Sector](#)’.

While the report highlights the benefits of deploying AI to combat fraud (one firm was able to reduce fraudulent activity by 50%), it notes that risks are still incredibly high.

Experts believe AI will enable cybersecurity threats and attacks to become more sophisticated across the financial-services sector. Threats include social engineering (for example, phishing attacks), malware generation, vulnerability discovery, misinformation, identity impersonation, and data poisoning.

To combat these threats, the US Treasury advises that firms develop a robust framework for identifying and mitigating AI-related risks. Enhanced security controls, such as multi-factor authentication can go a long way as a first line of defence.

The Treasury also notes the importance of mapping the data supply chain so firms can adopt a proactive approach to data acquisition, curation, privacy, security, and monetisation.

Additionally, the Treasury has issued a [Request for Information on Uses, Opportunities, and Risks of Artificial Intelligence in the Financial Services Sector](#). While this won't have any immediate impact, it does shed light on how US regulators and the federal government are thinking about AI.

In direct response to this request, Morningstar noted that the definition of AI used is overly broad, with possible consequences including stifling innovation and increasing compliance costs. Instead, the federal government should look to other jurisdictions when defining AI, with the EU AI Act providing a clearer, more restrictive definition.

Canada

In Canada, there is proposed legislation to regulate AI. The [Artificial Intelligence and Data Act](#), which is part of Bill C-27, was first introduced in 2022, but to date this legislation has not yet passed.

AIDA would specifically enable the regulation of what it deems to be 'high impact' AI systems, for example, those that pose the most risk.

Under AIDA, businesses would be held responsible for their approach to AI integration.

The act highlights three core considerations:

- ▶ **Design** – what are the risks of a business' AI system and how can they be addressed?
- ▶ **Development** – what are the uses and limitations of an AI system and do users understand them?
- ▶ **Deployment** – does a business have appropriate risk mitigation strategies and will AI systems be continually monitored?

Separately, the Autorité des Marchés Financiers, or in English, Financial Markets Authority, which is the financial regulatory body for Quebec, [published a report detailing best practices](#) for responsible AI use in the financial sector.

Among the many recommendations, the AMF advises that:

- ▶ AI use should not harm consumers through, for example, unjustified discriminatory biases or increasing economic and social inequalities.
- ▶ AI use must be justifiable and relevant to the objective of a financial market participant.
- ▶ AI systems must still be subject to human controls and reviews to mitigate risks.
- ▶ Firms create a code of ethics.
- ▶ AI systems have an appropriate level of security to combat cyberattacks.

Australia

Australia's Department of Industry, Science, and Resources has published a paper titled '[Proposed Guardrails for the Mandatory Use of AI in High-Risk Settings](#)'.

The paper proposes that the government implements 10 mandatory guardrails which organisations developing or deploying AI must comply with in 'high-risk settings', adopting a risk-based ex-ante approach to AI regulation.

Proposed guardrails include:

- ▶ Enable human control or intervention in an AI system to achieve meaningful human oversight.
- ▶ Inform end-users about AI-enabled decisions, interactions with AI, and AI-generated content.
- ▶ Establish processes for people affected by AI systems to challenge use or outcomes.

The proposal also explores three routes the government could take to introduce these protections:

- ▶ A domain-specific approach where existing regulatory frameworks are adapted.
- ▶ A framework approach introducing new legislation, alongside changes to existing legislation.
- ▶ A whole-economy approach introducing an overarching cross-economy AI Act following the EU's approach.

The Department of Industry, Science, and Resources also introduced the [Voluntary AI Safety Standards](#), practical guidelines outlining 10 guardrails for AI developers and deployers. Although these standards are voluntary, nine overlap with the proposals outlined in the mandatory guardrails for AI paper.

This is a clear signal from the Australian government that it expects AI developers and deployers to implement appropriate AI governance processes without waiting for the mandatory guardrails to become law.

Japan

Japan does not currently have specific regulations when it comes to AI, but like many other nations, existing laws and regulations will affect how AI can be deployed.

Japan's financial regulatory body, the Financial Services Agency, oversees the [Financial Instruments and Exchange Act](#), which requires high-speed algorithmic traders to:

- ▶ Register with the government.
- ▶ Ensure they have the appropriate governance structures to mitigate risks.
- ▶ Take appropriate measures to combat unfair trades (for example, trades based on insider information or market manipulation).

Additionally, Japan has published the [Hiroshima Process International Guiding Principles for Organizations Developing Advanced AI Systems](#), which G7 leaders have welcomed.

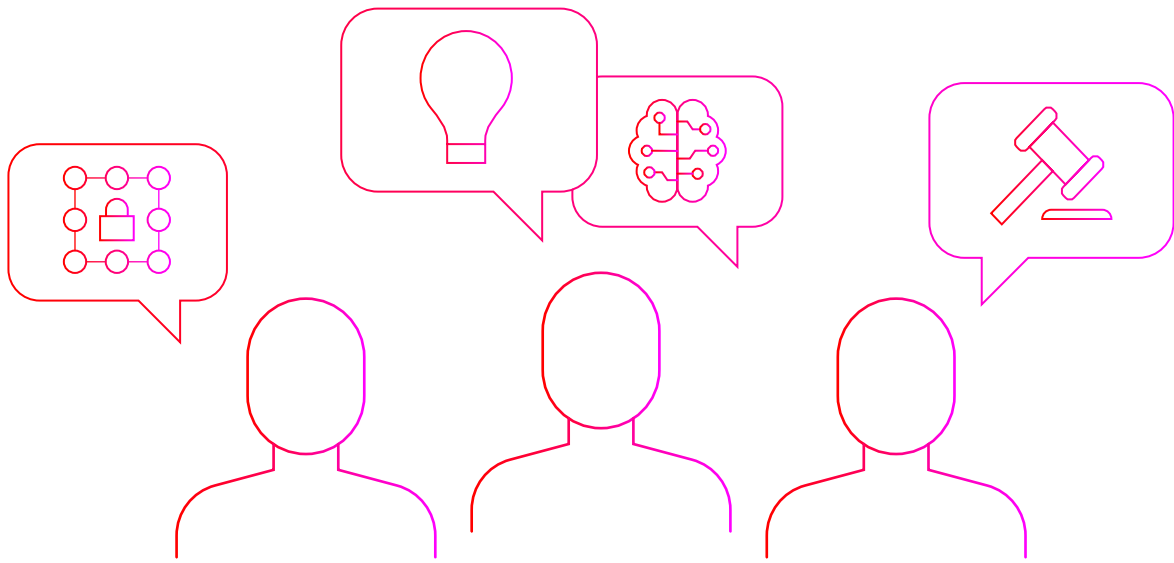
Using AI the Morningstar Way

Here at Morningstar, AI isn't just integrated into our products; it's embedded in our philosophies.

We believe the future of AI is responsible AI. That's why we've established our own Responsible AI Council to advise all parts of our business as we continue our mission to empower investor success.

As of October 2024, the Council is comprised of Morningstar leadership from various functions responsible for managing AI risks and developing AI-powered products, including leaders from our Direct Platform, data, communications, central technology, information security, and legal functions.

As part of our commitment to responsible AI, the council has established five core principles:



Responsible AI Council



Fair and Safe

We want investors and colleagues to receive the benefits of AI without propagating avoidable harm or biases against individuals, communities, or groups.



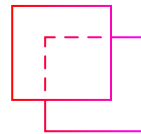
Secure

We protect and routinely test our AI systems for bad actors or adverse events.



Trustworthy

We expect systems to perform accurately, reliably, and as intended.



Transparent

We clearly explain how we use AI systems, their capabilities, and their limitations.



Accountable

We embed AI systems with mechanisms for human oversight, regular auditing, and risk management.

Morningstar's AI Solutions

Artificial intelligence is revolutionising the financial-services sector. From portfolio construction and management to investment research and client experiences, AI's impact is reverberating across the industry.

Firms are striving to navigate the complex world of AI. From the underlying technologies and infrastructure to compliance and cybersecurity concerns, they need comprehensive, cutting-edge solutions to rapidly evolve their AI strategies.

That's where Morningstar comes in.

Morningstar Data

In the age of AI, everything comes down to high-quality data. Here at Morningstar, high-quality data and independent research has been our speciality for more than 40 years.

Our data universe covers around 800,000 managed investments, 55,000 public companies, and 4.2 million privately held companies, covering almost nearly every investment vehicle in the financial landscape. Our expansive archive of analyst research, editorial pieces, and other investment-focused content consists of approximately 1.2 million publications, 2.4 billion words, and many languages.

AI models are accelerating, and our technological infrastructure is evolving to meet the demand, processing an average of 23,000 data points each minute. That's a lot of data.

With Morningstar as your trusted data provider, you'll partner with a world-leading enterprise that truly understands the power of data.

Data Coverage by Universe

304,700 Open-End Funds	11,550 Separate Accounts	2,500 Hedge Funds	6,700 Model Portfolios	5,700 529 Plan Portfolios
54,500 Public Companies	11,250 Unit Investment Trusts	2,000* Listed Closed-End Funds	9,100* Unlisted Closed-End Funds	77,550 Insurance and Pension
26,200 Exchange-Traded Funds	8,700 Collective Investment Trusts	2,500 Variable Annuity Policies		

Source: Morningstar

Morningstar Intelligence Engine

Our Intelligence Engine is made for investors and built on three core principles: customisability, flexibility, and expertise.

Available in select regions, this API-based AI platform uses natural language processors to empower asset managers, wealth managers, and other financial-services firms to conduct investment research at scale in a flexible environment where they can create, test, and deliver generative AI-powered capabilities.

The market moves fast, but with Morningstar's AI solutions, you can move faster.

With Intelligence Engine you can build your own platform tailored to your unique needs, without starting from scratch. At every stage of your journey, Morningstar will be your forward-thinking partner dedicated to providing world-class coverage and the most up-to-date data solutions.

Meet Mo, Your Digital AI Research Assistant

Want to see our Intelligence Engine in action? Then look no further than Mo, our generative AI interactive chatbot.

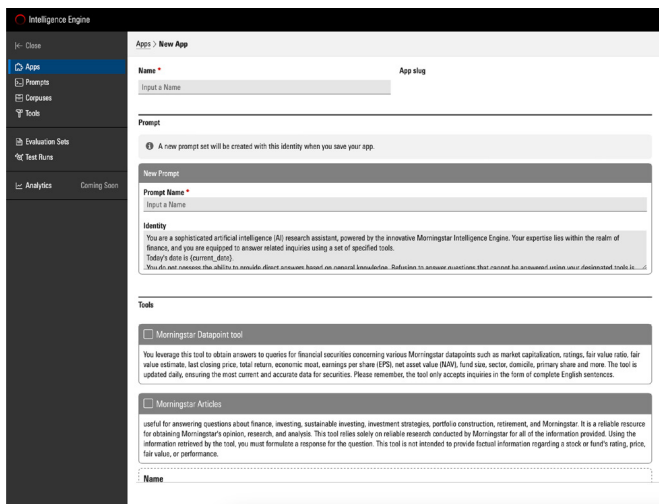
Equipped with Morningstar's comprehensive data and research, Mo is the perfect companion to support you with a wide range of day-to-day tasks, from fund screening and product support to in-depth investment research.

Mo has been a valued colleague here at [Morningstar for over a year](#), and it's already embedded in some of our most popular features, like Direct Compass. Simply ask Mo a question, and through natural language processing, you'll be provided with succinct information and insights based on Morningstar's high-quality data and research.

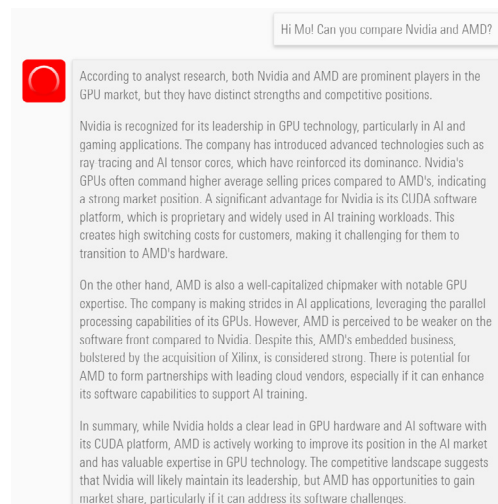
It's like having your own digital research assistant.

Discover how Morningstar's AI solutions can help prepare your business for the future of AI today. [Learn more.](#)

Morningstar Intelligence Engine



See Mo in action



At Morningstar, we're committed to the responsible development and deployment of trustworthy AI systems. That's why we've created Mo using three non-negotiable principles.

Privacy

When a user asks Mo a question, we don't use the data to train foundational models.

Security

Our application and API security measures meet a high standard, from using a secure cloud infrastructure to security testing with every version release of our product.

Quality

Our Intelligence Engine responses are continually evaluated for accuracy and helpfulness by Morningstar's experts.

Enhancing the Morningstar Medalist Rating with Machine Learning

Machine learning may seem new, but we've been enriching our data with the latest technological advances for a while now.

[Take a free tour of Morningstar Direct to learn more.](#)

Take the Morningstar Medalist Rating for example, available in our flagship platform Morningstar Direct. The result of our work? We empower investors with broader fund coverage by scaling our analysts' ratings from just over 23,000 share classes to more than 180,000 total – an almost 700% increase.

But how do we do it?

Our forward-looking algorithmic ratings use the same framework as our analysts to assign funds a rating of Gold, Silver, Bronze, Neutral, and Negative. It will inherit analyst pillar ratings where possible, for example, if an uncovered vehicle is managed by the same team as an analyst-covered vehicle.

However, where there's no overlap, the algorithm seeks to emulate the way an analyst might rate the fund by using a "random forest" model to flag data points in Morningstar's database that are historically correlated with positive and negative People, Process, and Parent Pillar scores assigned by analysts.

The Morningstar Medalist Rating™ for funds

Gold

Top 15% of classes with positive net-of-fee alpha relative to category median.

Silver

Next 35% of classes with positive net-of-fee alpha relative to category median.

Bronze

50% of remaining classes with positive net-of-fee alpha relative to category median.

Neutral

Top 70% of classes with zero or negative net-of-fee alpha relative to category median.

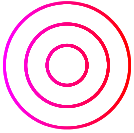
Negative

Bottom 30% of classes with negative net-of-fee alpha relative to category median.

Morningstar. Where Data Speaks Investor Success

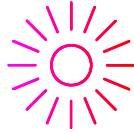
Data. It's built into the DNA of Morningstar. It's our foundation. As portfolios evolve, our datasets evolve to deliver more meaningful insights. From the portfolio and fund level through to underlying securities, from fixed-income funds and ETFs to private market and ESG data. Enriched by cutting-edge investment research and proprietary analytics, our expansive data empowers informed decision-making.

The Power of Morningstar Data + Analytics



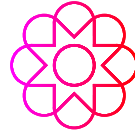
Coverage

Our comprehensive datasets cover more than one million investment vehicles across asset classes, so you'll have a world of data at your fingertips, from equities, funds, ETFs, and alternative investments to region-specific data.



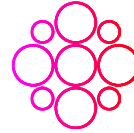
Access

Our data, your way. Plug our insights into your workflows and accelerate your time to market. From portfolio construction and product creation to reporting and compliance, maximise your return on investment.



Quality

Our extensive datasets undergo rigorous quality control processes, so you can be confident your platform is built on a foundation of high-quality, transparent data trusted by financial market professionals worldwide.



Enrichment

Our data is enriched by industry-leading research and proprietary analytics. Power your workflows with data-driven, actionable insights. From the Morningstar Medalist Rating to interactive research notebooks.

Ready to Embrace the Future with AI?

Take an in-depth tour of our data capabilities. Morningstar Direct – our investment analysis platform – unites our global data, institutional research, rigorous analytics, and productivity tools. The platform offers high-quality, timely data, paired with our independent research and advanced analysis tools.

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Ready to dive into our more than 800,000 investment offerings across managed investments, equities, indexes, and more? Unlock Morningstar's suite of data tools, data feeds, and APIs to get the data you need, the way you need it.

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