

How AI is transforming retirement solutions

From the Field
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Key Insights

- In financial services, generative artificial intelligence (AI) is redefining how companies approach everything from fraud assessment to client interactions to portfolio management.
- Secure oversight is essential to ensure that data and options are comprehensively and thoughtfully analyzed to enhance the decision-making process.
- We encourage clients to engage with potential partners in your ecosystem, educate yourself and your organization about AI opportunities and risks, and develop your own perspective on AI.



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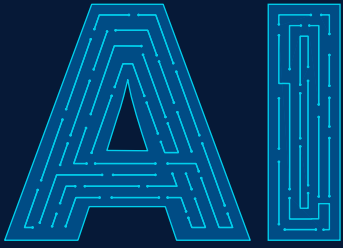
When you've streamed movies, ordered takeout from your phone, or gotten the weather from a voice assistant, you've used artificial intelligence (AI). AI has become part of the fabric of how we interact with an electronically forward world.

But the emergence of generative AI (GenAI) through the advanced capabilities of large language models (LLMs) like ChatGPT represents a revolutionary shift. While traditional AI applications operated within well-defined parameters, generative AI transcends decision-making to enable the creation of original content and ideas. The capability to generate new information from existing data is transformative and is shifting the landscape across industries.

In financial services, generative AI is redefining how a company approaches everything from fraud assessment to client interactions to portfolio management. Used correctly, it can be an indispensable tool for developing more responsive, secure,

and strategic financial solutions. Generative AI holds particular promise for retirement planners and portfolio managers. By leveraging its capabilities in comprehensive data analysis, this technology significantly enhances decision-making efficiency and quality to secure sustainable, long-term investment returns. Additionally, generative AI makes possible a new level of client personalization, allowing advisors to tailor communication and automate routine tasks, enriching the client experience while optimizing portfolio management.

At T. Rowe Price, we recognize the opportunities that generative AI holds for our clients across their financial portfolios, enabling more strategic and personalized investment solutions. In response, we established a Technology Development Center in New York City in 2017 and have been experimenting with data-driven insights for the past seven years. With increased computational capabilities, we're better positioned to analyze vast amounts of data, bolstering our infrastructure and refining our day-to-day business processes.



The Path to Generative AI

Machine learning has been around for decades, but generative AI represents a giant leap forward.

Machine Learning vs. Deep Learning and Generative AI



Machine learning dates to 1952, when an IBM researcher developed a program that analyzed annotated games in F.J. Lee's "The Complete Chess-guide" to discover which moves worked best. In 1997, IBM's Deep Blue demonstrated how far machine learning had advanced by beating grandmaster Garry Kasparov in chess. But Deep Blue still required significant human guidance, and it was built for the single purpose of analyzing millions of possible chess moves.



Today, AI is capable of deep learning through neural networks, which mimic the way the human brain works. In 2017, DeepMind's AlphaZero trained itself to become the world's best player of the enormously more complex game of "Go"—the number of variations of allowed moves in a game of chess is 1,040, compared with the number of moves in the game of "Go," which is 10,360—by playing 44 million games against itself over nine hours.

Through careful experimentation and analysis, we're setting new standards in how technology can augment human intelligence and creativity. And we're building guardrails to ensure that data security and privacy are held to the highest standards, especially when it comes to protecting client information.

Empowering decision-makers through "intelligent augmentation"

AI has been part of the framework of client experiences at T. Rowe Price for some time. It augments routine back-office transactions and accelerates software development to bring new products to market more quickly for our clients.

As generative AI transforms the landscape, we have teams of technologists building prototypes that will continue to help our clients manage and invest their money. This experimentation has arrived at the concept of "intelligent augmentation": AI that is designed to help deepen the insights of our investment professionals.

Rather than automating decision-making, we seek to empower decision-makers with additional data and insights, bringing new perspectives within the existing investment process. We've classified this multi-use approach through the lens of the three Cs:

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— **Consumption:** This involves how data and insights are retrieved for analysis. Consumption offers the biggest potential productivity gains in the near to medium term and has the power to help analysts strategize retirement portfolios. For example, an investment analyst can leverage an LLM to help learn more about a potential investment. The LLM facilitates this by rapidly analyzing and summarizing an aggregate set of information sources, from academic reports to social media posts, that is far more comprehensive than an analyst could develop on their own.

The analyst can then conduct a back-and-forth conversation with the LLM to refine the request, asking specific questions that can help assess unique factors of companies that would present attractive long-term opportunities in a retirement portfolio.

Leveraging these advanced analytical tools can help our team present detailed, data-driven insights to clients.

- **Characterization:** This refers to the ability of AI to analyze text and/or images to uncover complex but useful patterns that might otherwise be hard to identify. For example, academics in data science have analyzed years of the language used in 10-K reports and discovered a correlation between subtle changes in the presence of negative or positive words in those reports and subsequent stock returns. We see huge potential in AI's ability to review how sentiment on a stock has changed over time and to compare that with multiple data sources. This comprehensive analysis can allow portfolio managers and analysts to detect negative trends early, mitigating risks and presenting an opportunity for proactive retirement portfolio management.
- **Creation:** This refers to the way an LLM might be used to draft content, including insights, investment updates, meeting notes, and other written materials so analysts can focus on more value-added analysis. GenAI can also generate customized content addressing specific client needs, offering clients more insight into their investments and their retirement goals, helping keep them informed and engaged while analysts have more time for in-depth analysis and strategic decision-making.

Human oversight and governance are critical in crafting retirement plans

AI architectures can be intricate and lack transparency, which complicates the identification and motivation of a response. For example, bias presents a significant concern. While certain AI systems are prone to producing “hallucinations,” or false information, even accurate responses may not always be appropriate. For instance, if an advisor uses an AI model to identify optimal investment opportunities for a 65-year-old nearing retirement, the very nature of the prompt will skew the information returned.

Mentioning an age might cause the AI program to be overly conservative, overriding contextual factors like personal circumstance and market conditions, and ignore the potential long-term benefits that certain equities might hold in this scenario.

As these technologies advance, they will undoubtedly attract increased regulatory focus. As pioneers in the retirement planning business, we have a long history managing client data and transactions. We prioritize creating secure and engaging participant experiences, ensuring that our technological adoption aligns with our long-standing values of trust and transparency. We have implemented structured architectures, fortified with security

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policies and safeguards, to protect client data to the greatest extent possible. Additionally, we’re aware of the heightened risks related to privacy and security as substantial data models are used in the development and operation of AI models. While our teams work to unlock its potential, we’re using a thoughtful approach in adopting AI and applying its outputs. Ultimately, we believe investment processes augmented by AI will require human oversight and governance for successful active management.

Approaching GenAI’s potential for retirement portfolios with caution and transparency

As advisors consider how they and their clients interact with AI in the near future, we recommend creating your own learning agenda. Some considerations:

- Engage with potential partners in your ecosystem. Learn about the ways AI is impacting their efforts and how they’re balancing potential with data privacy and protections.
- Educate yourself and your organization. And consider forming your own internal team tasked with learning, governing, and championing AI going forward.
- Develop your own perspective on GenAI. This includes areas your organization is comfortable leaning into AI and where you prefer a wait-and-see approach. And determine, for now, which attributes are nonstarters for your organization. For instance, you may not be ready to delve into GenAI chatbots, which could create participant privacy concerns.

Finally, encourage your clients to be curious and active. GenAI is here and, when used correctly, it can be tremendously useful in efficiently managing retirement goals in a dynamic financial landscape. We all understand its potential and its pitfalls, the more prepared you’ll be to engage it in ways that benefit your organization and your clients.

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