

AI: Augmenting investment insights with Simona Paravani-Mellinghoff

By Sander Nooij

We had the opportunity to engage in a discussion with Simona Paravani-Mellinghoff, Global Chief Investment Officer of Solutions at BlackRock Multi-Asset Strategies & Solutions, and Assistant Professor at the Faculty of Economics at Cambridge University where she teaches a course in AI applied to Finance. She spoke with us from BlackRock's London office, delving into the integration of AI throughout investment management and its impact on the investment landscape.¹

Our conversation encompassed the potential of AI in generating investment opportunities and enhancing investment management tools. Simona Paravani-Mellinghoff articulated the catalysts behind the current surge in AI despite its longstanding presence in academia. She offered insights in how AI drives productivity enhancements and refines investment tools by analyzing alternative data and automating various tasks. The dialogue concluded with an exploration of the alignment between academia and practitioners, shedding light on the pivotal skills for the growth of financial professionals.

AI Landscape – History, Progress, and Public Perception

With all the media frenzy on AI, there is a lot of confusion. Public understanding is often distorted by sci-fi stereotypes or unrealistic expectations of human-like "general" AI. What is AI really and what is changing?

The origins of AI as an academic discipline trace back to pioneering work in the 1950s. As an example of early AI, she highlighted a famous Bell Labs experiment that trained a neural network to navigate a maze.²

Paravani-Mellinghoff broadly defines AI as systems designed to mimic human cognitive capabilities, whether winning chess matches, analyzing MRI scans or composing poetry. However, specialized, narrow AI that focuses on specific tasks are likely more viable than "general" AI, i.e. the AI that can do anything a human can.

Within AI, she distinguishes a sub-field called generative AI that creates content like text, images, audio and video, rather than analyzing existing data. Generative AI has powered recent advances like chatbots and auto-generated images. Simona emphasizes that practical applications of AI only recently became possible through a combination of effects:

1. Increases in computational power;
2. The ongoing increase in data availability. As an example, she notes estimates that just two autonomous vehicles generate an amount of data equivalent to approximately 8,000 internet users; and
3. Increase in adoption of AI tools. Which in turn follows from algorithmic advances like transformer architectures that allow



Simona Paravani-Mellinghoff is the Global CIO of Multi-Asset Strategies & Solutions (MASS) at BlackRock. She has held senior positions at HSBC and was previously a quantitative strategist at Julius Baer Asset Management. She started her career as a quantitative analyst at Orbis in 1998. Paravani-Mellinghoff is an Assistant Professor at Cambridge University where she teaches Financial Analytics and Machine Learning. She has received industry awards including Role Model and Investment Woman of the Year in 2022. Paravani-Mellinghoff sits on the board of the financial education charity MyBnk and was awarded the Italian title of Commendatore OMRI for her professional achievements and commitment to education.

modeling language context, not just individual words. This significantly improves the fluency and coherence of generated text.

Paravani-Mellinghoff notes these trends enable models to mimic a broader range of human cognitive capabilities with higher fidelity. Whereas AI previously focused narrowly on logical tasks like chess, now the generation of prose, art and media are capturing the public's attention.

Importantly, she argues growth in data and computing shows no signs of slowing. The proliferation of smartphones, digital lifestyles, IoT sensors and more will continue to generate trainable data.

The availability of custom AI chips and cloud infrastructure make leveraging this data at scale even more accessible.

Likewise, Paravani-Mellinghoff suggests faster public adoption will further drive generative AI's progress and potential applications.

Younger and emerging market country demographics tend to more readily embrace AI.³ Capabilities such as speech and image generation resonate universally.

ARTIFICIAL INTELLIGENCE EMERGES AS A PRODUCTIVITY ENHANCING MEASURE

Given the sustained trajectory, Paravani-Mellinghoff expects interest and development in generative AI models to continue accelerating.⁴

AI's Investment Implications – Opportunities and Tools

When examining AI's impact on investing, Paravani-Mellinghoff divides developments into two categories:

- Investment Opportunities: At a macro level, AI is transforming sectors and companies, creating winners and losers. This has investment implications as productivity and growth shift.
- Investment Tools: Within asset management firms, AI is augmenting processes ranging from data analysis to operations.

AI is generating Investment Opportunities

When examining AI's investment opportunities, Paravani-Mellinghoff outlines two key framework pillars to assess where opportunities may emerge:

- AI is not an island – It should be evaluated within the context of a broader technology ecosystem including innovations like blockchain, robotics and 3D printing. The interplay between AI and these other technologies will shape overall economic impact.
- Adoption matters as much as innovation – The benefits depend on companies effectively incorporating AI into business processes and models, not just disruptive startups. Leaders will combine AI with other emerging tech and upskill their workforces.

Elaborating on the first pillar, Paravani-Mellinghoff notes AI's productivity impacts and investment prospects are mediated through the technology ecosystem. For instance, AI, sensors and

blockchain may intersect to transform supply chains. This magnifies AI's benefit relative to assessing it in isolation.

Regarding the second pillar, she cautions that investors overly focus on AI startups as the primary beneficiaries. She suggests that established companies which flexibly integrate AI across their operations, despite legacy constraints, may also make significant gains. How they execute their strategies to absorb AI into their business matters more than innovation alone.

As an example, she cited an MIT study showing AI augmented workers improved productivity on analytical tasks by up to 40% while also enhancing quality, especially for poorer performers.⁵ This suggests that competitiveness of corporations will partly be driven by the optimal use of AI.

This framework suggests assessing investment potential through a wider technology lens, while evaluating the nitty-gritty of adoption and implementation, not just high-level disruption narratives. Companies which successfully combine AI with related innovations and real-world integration will drive economic shifts and create investment opportunities.

AI is improving Investment Management Tools

Beyond broader investment opportunities, Paravani-Mellinghoff explains AI is already transforming tools and processes within asset management firms:

- Data synthesis – AI techniques help condense vast amounts of alternative data sources like satellites, credit card transactions, etc. into usable insights. This expands the scope for analysis and represents one of the most significant changes that AI is bringing forward.
- Sentiment analysis – The emergence of large language models (LLMs) have made sentiment analysis better and more accurate versus simpler existing natural language processing (NLP) models used in the past such as 'bag-of-words.' These newer models can parse textual data like news, speeches and transcripts to generate sharper signals on market sentiment shifts. Paravani-Mellinghoff explained how NLP algorithms parse text to generate sentiment dashboards, potentially driving tactical asset allocations, converting qualitative data into quantitative signals. However, she stressed these AI tools should act as "co-pilots", augmenting rather than replacing traditional financial analysis and human judgment.

AI IS NOT AN ISLAND – THE INTERPLAY WITH OTHER TECHNOLOGIES WILL SHAPE OVERALL ECONOMIC IMPACT

- New data sources – She emphasizes the tremendous potential of AI techniques to synthesize vast amounts of alternative data beyond just textual sources. The ability to condense and extract signals from the explosion of alternative data sources like satellites, credit card transactions, social media feeds, etc. represents one of the most significant transformations that AI enables. By leveraging AI to turn these new and exponentially

growing alternative data sources into usable insights, the breadth of information available for investment decisions can expand dramatically.⁶

- Idea generation – By scanning large datasets, AI can identify non-obvious relationships and clusters around factors like momentum, value, quality, etc. This allows fresh approaches to multifactor and smart beta strategies. Investment teams can then explore these algorithmically generated ideas further.
- Operations – Paravani-Mellinghoff explains AI is transforming a wide range of back-office tasks including automated report writing through natural language processing, reconciling complex datasets via machine learning, flagging suspicious trading patterns using anomaly detection algorithms, extracting key details from legal documents and regulations via text analysis. This ties in to the improved quality of the work done by humans aided by AI mentioned earlier.

INVESTMENT OPPORTUNITIES DEPEND ON THE INTERPLAY BETWEEN AI AND OTHER TECHNOLOGIES AS WELL AS THE RATE OF ADOPTION

Paravani-Mellinghoff emphasized the role of synthesizing alternative data. She explains that AI techniques can help condense and extract signals from the vast and growing array of alternative data sources mentioned above. Though AI unlocks these new data sources, human critical thinking remains vital to separate signal from noise and thus AI should augment, not replace, human portfolio managers' expertise and judgement.

Looking ahead, she expects AI's application in investment processes to continue expanding.

Connecting Academic Research and Business Applications

When asked about the relationship between academia and current business practice, Simona noted that large language models like GPT-3 are still new for both academia and industry. Her position in academia allowed her to interface with these models earlier than industry, giving her some advance insight into their potential. While she had earlier access to such models, she swears not to have used them to write her published children's books. Regarding the skills and talent needed going forward, Simona emphasized the complexity of models makes it harder to rely on standard approaches to verify outputs. She noted that as an academic, in her opinion, there are two main skillsets which are needed.

First, critical thinking, because the more complex the models, the less you can rely on standard approaches to verify outputs. The ability to determine if something makes sense will become

even more crucial. Adoption of AI by businesses matters more than innovation alone

Second, the ability to work well with others, since no one person may have all the skills to critically evaluate complex model outputs on their own. Gaining others' perspectives on machine output will be important.

In response to an article suggesting interpersonal skills will become more important than traditional quant skills, Simona didn't see it as an either/or proposition. She believes critical thinking requires an understanding of probability and statistics, traditionally quant skills. But that it is also about combining different perspectives to analyze challenges.

Simona pointed to the recent 100+ page Executive Order on AI from the Biden administration,⁷ highlighting its focus on training and skills development. She believes this underlines the need for education and training to focus on evaluating model outputs regardless of job function rather than just teaching coding skills.

We concluded the interview with one final question. We asked her what next breakthroughs we could expect next with her one foot in academia. Unfortunately, she wanted to keep that a secret for now.

Notes

- 1 Artificial intelligence – beyond the buzz, A roadmap to help assess the investment implications of artificial intelligence, <https://www.blackrock.com/corporate/literature/whitepaper/bii-megaforces-november-2023.pdf>
- 2 Claude Shannon, known as the "father of information theory", demonstrating a mechanical mouse he built that could learn to navigate a maze. By adjusting electrical circuits and relay switches, Shannon was able to train the mouse to successfully traverse the maze on its own through a form of primitive machine learning. <https://www.youtube.com/watch?v=vPKkXibQXGA>
- 3 Zhang, Baobao and Dafoe, Allan, Artificial Intelligence: American Attitudes and Trends (January 9, 2019). Available at SSRN: <https://ssrn.com/abstract=3312874> or <http://dx.doi.org/10.2139/ssrn.3312874>
- 4 <https://www.weforum.org/agenda/2021/07/this-is-a-visualization-of-the-history-of-innovation-cycles/>
- 5 Study finds ChatGPT boosts worker productivity for some writing tasks, Zach Winn | MIT News Office, July 14, 2023, <https://news.mit.edu/2023/study-finds-chatgpt-boosts-worker-productivity-writing-0714>
- 6 Speaking at the *Environmental Finance* Future of ESG Data event, BlackRock's Head of Factors, Sustainable and Solutions Andrew Ang said the \$237 billion data-driven investment unit of BlackRock was "underweight" Silicon Valley Bank after analyzing customer complaints data provided by the US Consumer Finance Protection Bureau.
- 7 FACT SHEET: President Biden Issues Executive Order on Safe, Secure, and Trustworthy Artificial Intelligence <https://www.whitehouse.gov/briefing-room/statements-releases/2023/10/30/fact-sheet-president-biden-issues-executive-order-on-safe-secure-and-trustworthy-artificial-intelligence/> and <https://www.whitehouse.gov/briefing-room/presidential-actions/2023/10/30/executive-order-on-the-safe-secure-and-trustworthy-development-and-use-of-artificial-intelligence/>