

# The Impact of **Technology** and **AI** on Investment Manage

by | **Peter Muldowney**

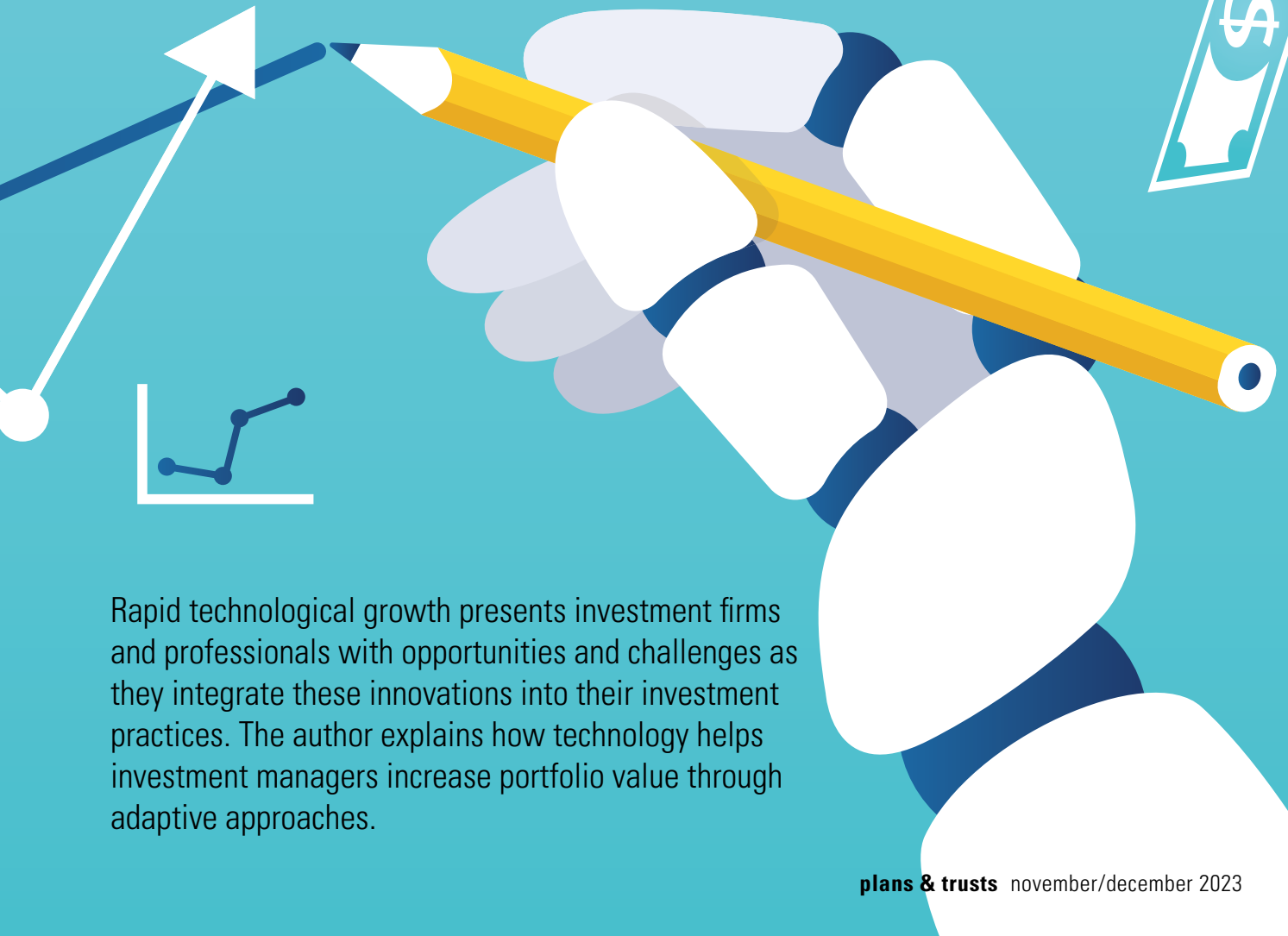
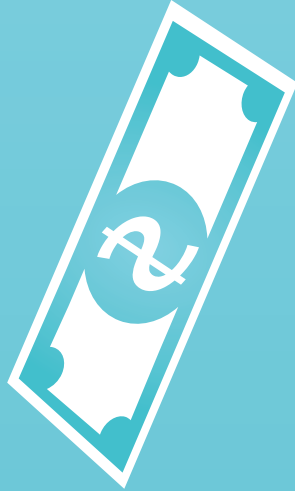


# benefits

MAGAZINE

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Rapid technological growth presents investment firms and professionals with opportunities and challenges as they integrate these innovations into their investment practices. The author explains how technology helps investment managers increase portfolio value through adaptive approaches.

In a time when global communication depended on face-to-face meetings and the technology we now take for granted was in its infancy, I was working in the U.K. at a leading investment consulting firm. My colleagues from multiple other countries and I spent a week together in the New York office reviewing business practices and proprietary investment research—a task that then required considerable time and effort. Fast forward to the present, and the landscape is unrecognizable. Technology and artificial intelligence (AI) have revolutionized information flows, whether it is allowing ideas to cross oceans in mere seconds, or the volume of information that investment managers can access and analyze.

This article examines the utilization of technology within the equity investment management industry, especially among those that employ systematic (quantitative) strategies, and delves into the potential implications of these innovations for the future of investment management.

## Technology Reliance

Humans generally love the efficiency and convenience brought about by technology and how it has impacted both our personal and working lives. We have become reliant on our smartphones and tablets to navigate our daily tasks and for our entertainment. The current wave of technological ad-

vances is increasingly making headlines, and the companies associated with these innovations have benefited investment portfolios by providing strong returns relative to general market indices.

When the media refers to the different forms of technological advances, it often assumes that we have an understanding of these innovations. However, this level of familiarity is not always the case, so some background may be helpful.

AI is typically viewed as the umbrella term to describe the latest evolution in technological advances that enable machines to mimic the cognitive functions associated with human minds. You have interacted with basic AI when using voice assistants like Apple's Siri and Amazon's Alexa, which use vast amounts of data and sophisticated statistical methods to understand and respond to a user's speech input.

*Machine learning (ML)* is a form of AI based on algorithms trained on data. These algorithms can detect patterns and learn how to make predictions and recommendations by processing related data rather than relying on explicit programming instructions. One example of this is Netflix offering personalized movie recommendations upon log in.

*Natural language processing (NLP)* is perhaps the most topical subset of ML today, with ChatGPT already a household name in a relatively brief period since being launched in November 2022. While it may be better known for tasks such as its ability to write homework for students, its genuine business application lies in turning unorganized and disparate data into a structured model of the information within that data. This enables users to query the model to extract (relatively) precise information from the various sources it has received.

*Cloud computing* is the on-demand availability of external computing resources (i.e., "for rent"), including storage and infrastructure. It eliminates the need for businesses to have physical resources on their premises—They only pay for what they use while enabling access to far greater resources than most organizations could build or maintain in-house.

*Parallel computing* refers to the process of breaking down larger, complex problems into smaller, independent parts that can be executed simultaneously by multiple CPUs.

*Big data* is the terminology that denotes extremely large data sets that are brought about by advances in technology and require modern infrastructure (such as cloud computing) to access and analyze.

### Takeaways

- Most organizations are impacted by the use of new technology, which also has the potential to increase a company's effectiveness, profitability and success. The value of technological advancements ultimately lies not in the related systems themselves but rather in how businesses employ them to help individuals and convey their functionality in a manner that fosters confidence in their practical use.
- Public market equity investment managers fall under two types of broad styles: fundamental and systematic (quantitative).
- Artificial intelligence, machine learning and natural language processing are three closely related technological forms often used together to develop advanced AI systems capable of processing and generating natural language, text and speech.
- The vast amount of data available poses a significant challenge for investment managers. They must sift through numerous data sets, reducing, and meticulously verifying and cleaning the data for consistency before determining if it can provide valuable and distinctive insights.

The application of technological advances impacts most businesses and has the potential to make a business more efficient, profitable and successful. Ultimately, the value of the advances is not in the associated systems themselves but in how companies use them to assist people as well as explain their role in a way that builds confidence in their application.

## Investment Management and Technology

Technology continues to play a critical role in enabling efficiencies and value creation in the investment management industry. Most investment management firms have taken advantage of technological advances to enhance their operational efficiency, whether it is to update their past heavy reliance on manual spreadsheets to generate performance reports, to assist in trade allocation and risk management analysis, or to automate certain other back-office functions.

The extent to which investment managers have embraced technology in the investment process depends on the type of investment firm. Public market equity investment managers fall under two types of broad styles: fundamental and systematic (quantitative). *Fundamental managers* can be considered as actively undertaking deep research on individual companies, determining which stocks to include or exclude in a portfolio. *Systematic managers*, on the other hand, have long been proponents of technology. They use computer-driven models based on fundamental factors to obtain a breadth of understanding of a large universe of stocks. For both investment management styles, key components of the investment process include the following.

- *Idea generation*: Exploring how the investment manager generates ideas to contribute to the added value relative to an index
- *Portfolio construction*: Evaluating how effectively the ideas are introduced into the portfolio through weights in individual securities
- *Implementation*: Assessing the impact of transaction costs on the potential added value

Systematic managers have taken advantage of enhanced technology in each of the key areas of the investment process and particularly in the idea generation component. While there are examples of fundamental managers using AI tools to review security opportunities in parallel to their traditional research idea generation approach, they are currently in the minority.

The increased sophistication within the key components of the investment process, particularly as it relates to systematic investment managers, has been driven by two interrelated areas: significantly increased computing power and the availability of data, which have allowed the analysis of vastly greater volumes and types of data to support new investment ideas.

## Increased Computing Power

Computers are a regular part of our working lives, and these machines are getting smarter, faster and more complex. For example, the experience of Connor, Clark & Lunn (CC&L) Investment Management's systematic equity team has seen the evolution from several fast single machines to a large internal grid for parallel computing located on the office premises or on the cloud. Today, the team utilizes both internal and cloud computing infrastructure, depending on the application. The current cloud-based approach allows the CC&L team access to thousands of CPUs on demand, as well as the ability for parallel computation to support the research analysis. But it is not just about more powerful computation. Technology advances have also made it possible to obtain significantly more data to analyze and consider when searching for individual security ideas to generate added value for portfolios.

## Greater Availability of Data

Data has always been at the core of investment management. In the past, it involved a review of regulatory filings and company financial statements. But much has changed over the years and goes hand in hand with the greater computing power and the increased sophistication of algorithms that have allowed investment managers to make use of significantly more data, often referred to as big data. The CC&L systematic equity team perhaps more aptly refers to the greater influx of data as *complex data*, since size is just one of the many hurdles and complexities related to utilizing these datasets.

AI-related technologies allow for faster, more efficient analysis of these larger volumes of data. However, the increased availability of data and faster analysis augment the existing idea generation component of the investment process rather than transform it.

## Challenges and Considerations in Data Use

While the volume of available data is immense, it does not come ready for immediate use by the investment managers.

Instead, the challenge for the managers is to narrow down the thousands of potential data set candidates to hundreds, then verify or “clean” the data by checking for consistency before being able to determine whether it offers any unique and helpful insights. Data sets are often eliminated due to a lack of consistent coverage or insufficient added-value potential.

A more extensive assessment of the smaller universe of data sets is undertaken to determine the viability of the data source and the likelihood of continuing to receive consistent data to benefit the idea generation analysis. Having access to more data is not always as straightforward as it sounds. For example, sometimes data providers will subtly change the format of the data such that it creates risks for the validity of any forecasts. Therefore, careful attention is required to review how the data from vendors evolves over time.

### Leveraging Machine Learning

Data comes in many forms. It can be unstructured, such as the raw text from a newspaper, or semistructured data that contains tags and keywords to facilitate analysis. Some data sources may have incomplete coverage, while others allow for detailed, under-the-microscope analysis, such as data relating to container ship movements and airline activities. How each investment manager approaches the benefits and pitfalls of complex data will differentiate those who are successful or not.

When reviewing certain types of data, ML comes into its own realm of importance by being able to capture non-linear relationships in data to tease out helpful information, such as filling in gaps in a fundamental data set or bringing structure to unstructured and semistructured data relating to individual securities. ML enables the investment managers to find patterns in the data and identify a unique signal that could contribute to the added value.

A more recent consideration of ML relies on the use of text from various articles to identify emerging themes related to the market and economic environment that historically have been difficult for systematic managers due to their focus on historical data. The ability to better capture information about the potential future market environment and how it is expected to develop over time could further enhance the success of the investment process.

### Where to From Here?

While AI has already impacted the equity investment management industry to varying extents, its adoption is still in its initial stages. The level of disruption remains unclear and falls under the category of the known unknowns, like the rise of Netflix and bankruptcy of Blockbuster. The outdated business of Blockbuster was ripe for change, but the speed at which the change would occur was not obvious. Technological advances saw Netflix (and others) completely replace the concept of going to a Blockbuster store to rent a video, with the ability to simply access movies via the internet.

Today, success depends on optimizing the relative strengths of both human judgment and technology. As captured in a *Harvard Business Review* article: “The bottom line is that while machine learning can greatly improve the quality of data analysis, it cannot replace human judgment. To

#### BIO

**Peter Muldowney** has over 25 years of experience in the investment industry, during which time he has worked in Canada, the United States and the United Kingdom. He spent his initial years in consulting, which included leading two major



Canadian investment consulting firms. Muldowney then joined one of the leading Canadian insurance companies to start up a new business venture that led to his pioneering the first buy-in annuity in Canada. For the past 12 years, he has worked for the multi-boutique asset management firm Connor, Clark & Lunn Financial Group as senior vice president, head of institutional and multi-asset strategy, working collaboratively with institutional investors and consultants to find more effective ways to develop and execute investment and risk management strategies. Muldowney is also a member of the teaching faculty for the International Foundation of Employee Benefit Plans Master of Trust Management Standards (MTMS) credential program.

utilize these new tools effectively, asset management firms will need computers and humans to play complementary roles.”<sup>1</sup> However, the question remains: Will the next level of augmentation be at the expense of humans, with AI eventually becoming generally superior to humans in almost all cognitive areas?

### Future Committee Meetings

There is never a dull moment in the investment management business and always a lot to discuss at committee meetings outside of the latest quarterly report and the return outlook over the next year. AI and general technological advances continue to evolve at a rapid pace. Staying current with the latest developments can be both a challenge and an opportunity for investment managers.

At a future committee meeting, consider adding a discussion on the role of technology and AI from two perspectives to the agenda. First, consider how your equity portfolio is taking advantage of AI-related opportunities

**References**

- “What is AI?” McKinsey & Company, April 2023.
- “Using Machine Learning Overlays to Implement AI in Institutional Investment,” Boosted.ai, 2022.
- “AI and the Investment Management Industry,” The Investment Association, November 2021.

by investing in companies that could be the leading stock performers over the next decade, as well as the risks associated with the valuation of such companies. Second, consider the extent to which your investment managers are incorporating technology and AI into their investment process. ☎

### Endnote

1. <https://hbr.org/2019/12/what-machine-learning-will-mean-for-asst-managers>.

