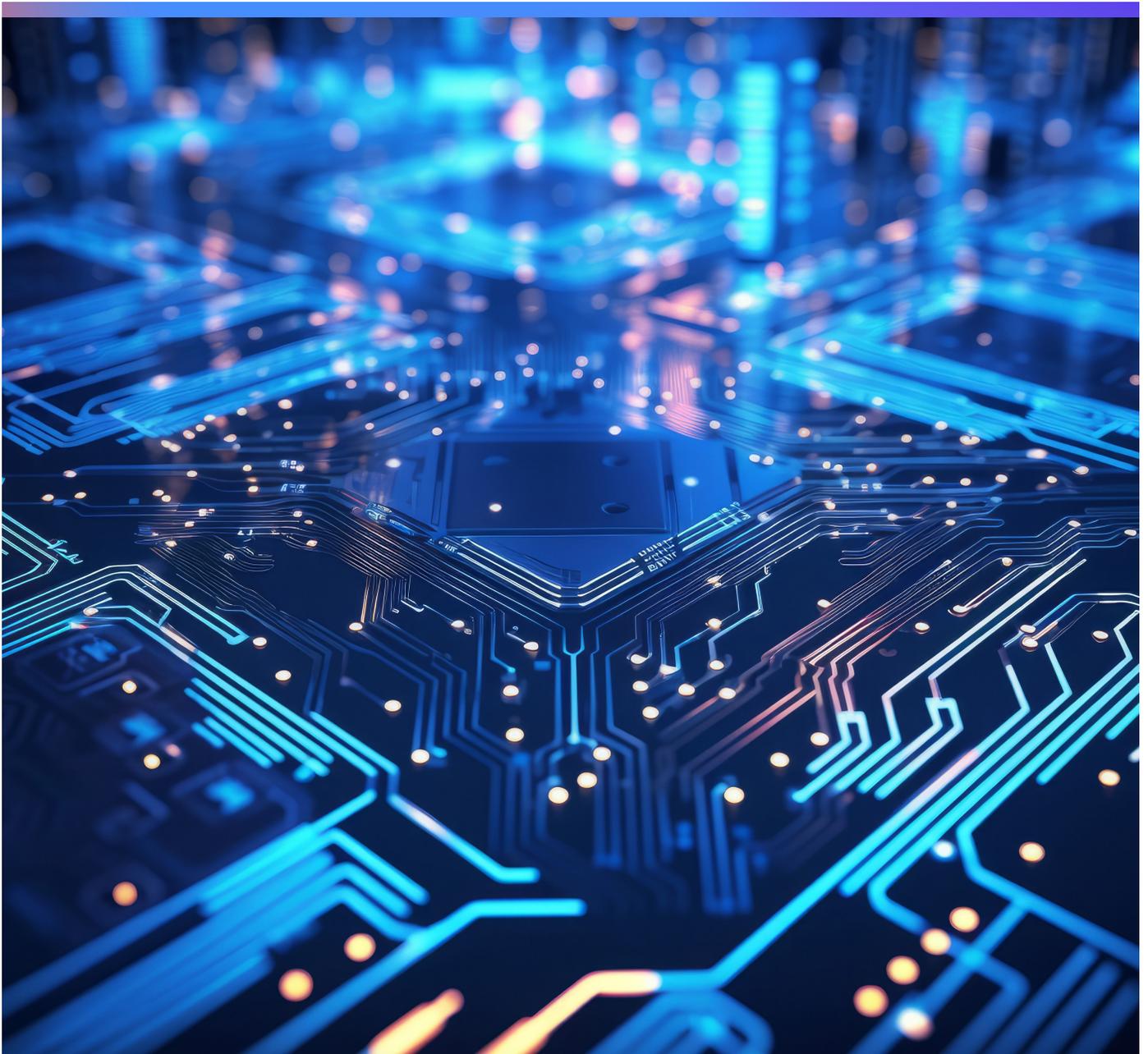


# Disruptive Technology Views

Achieving better investment outcomes with AI



## Introduction

Will it rain today in my city—or on my portfolio? Since the 1970s, artificial intelligence (AI) has assisted investors with trading strategies and meteorologists with weather forecasts. Defined as machines that mimic the cognitive functions of the human brain, AI seeks and compiles information, helps sift through data, and analyzes it to improve decision-making used in our day-to-day living. AI powers the sensors that collect data on weather, carbon emissions, traffic patterns and countless other items.

The development and deployment of AI tools continue to embed themselves into nearly all aspects of daily life. AI platforms can allow individual users to use facial recognition on their phones, get new streaming recommendations based on personal viewing patterns, ask Siri for directions while driving, and even allow cars to drive without a human at the helm. The challenge of providing such customization cost-effectively and at scale requires AI deployment to understand the interests of clients and prospects as well as the context surrounding them. Automating selections of the next “best” offer for a customer requires real-time database connections, machine-learning and orchestration.

AI can boost most investors’ scale, speed and sophistication. Wealth management profiling systems can dynamically monitor clients’ behaviors and those of their family and associates to help inform their portfolio needs using AI’s ongoing flow of information. Portfolio managers can utilize AI to monitor sentiment across analysts’ reports, earnings calls, stock-price movements, news articles and social media activities. With AI tools, a portfolio manager can identify incongruencies that may lead to large price moves or behavioral biases in trade executions, and they can also decipher in real time whether a company’s practices meet targets for pay equity or carbon footprint reduction. The quality of AI results depend on the human to submit quality queries for better usage and outcomes.

With well-designed AI algorithms, investors can produce better outcomes. However, we still need professionals to operate AI tools to both guide and gut-check their recommendations. In this issue, we provide more on the transformative power of AI in investment management, with **“Copilot, not autopilot: How generative AI augments, but doesn’t replace active management,”** written by Max Gokhman, Head of MosaiQ Investment Strategy; **“Durable passive thematic strategies—A solution unlocked by artificial intelligence,”** by Ralph Corasaniti, Strategic Accounts & Innovation Director, Retirement & Insurance; and **“The ripe opportunity for AI in the workplace,”** by Josh Anderson, Strategic Accounts & Innovation Director, Retirement & Insurance.

# Copilot, not autopilot: How generative AI augments, but doesn't replace active management



**Max Gokhman, CFA**  
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Artificial intelligence (AI) is commonly defined as machines that mimic the cognitive functions of the human brain. For some cases, like playing checkers, where the rulebook is simple, this is a relatively low bar. Indeed, this was one of the first use cases of AI by Arthur Lee Samuel in 1952.<sup>1</sup> However, the bar rises exponentially with every notch of complexity. It wasn't until 1997 that Gary Kasparov would lose a full match to Deep Blue.<sup>2</sup> It took nearly two more decades, even with all the exponential strides in computing power over that time, before AlphaGo beat Go grandmaster Lee Sedol in 2016.<sup>3</sup> Thus, while advances in AI, including the ones we'll discuss in this article, are expanding Earth's collective cognitive ability, it is premature to seek shelter from sentient robot overlords or even fear that they'll fully replace many knowledge workers, such as investment professionals.

Instead, with the advent of large language models (LLMs), which are deep learning algorithms trained on gigantic datasets, AI's output can range from concise summaries to detailed insights. What may first come to mind is OpenAI's GPT-3, of which ChatGPT is the result.<sup>4</sup> GPT-3 was trained

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**With terabytes of training data, extensive power amplified by distributed computing, and some old-school human ingenuity, the applications of AI to many fields, including investing, will continue to rapidly advance.**

on nearly the entirety of the internet and most books.<sup>5</sup> This gave its neural network 175 billion parameters,<sup>6</sup> which it uses to opine on topics ranging from banal to sublime. With terabytes of training data, extensive power amplified by distributed computing, and some old-school human ingenuity, the applications of AI to many fields, including investing, will continue to rapidly advance. While many of these are beyond the scope of this introductory article, we present use cases of how AI can be harnessed by different investors to potentially improve their desired outcomes and workflows.

## AI capabilities: Data analysis and predictive power

Distilling investing to an extreme, we could say it is determining the fair value of assets—based on analyzing as much public information as can be gathered—and then, if prevailing market prices differ from the results, buying or selling them. The sheer amount of relevant data is vast—financial documents, earnings transcripts, regulatory filings, news articles, day-long congressional testimonies, and nowadays even Reddit conversations and tweets. This data is noisy, non-normal and increasingly unstructured (that is, inherently difficult to analyze). LLMs can both consume and, critically, understand this data at rates eclipsing any analyst team.

A basic output of this task is the ability to summarize information for human consumption—whether it's thousands of social media threads written in zoomer vernacular (no cap)<sup>7</sup> or the dense legalese of a corporate deposition (veritably).<sup>8</sup> Taking it a step further, AI can combine different data sets to extract insights not immediately apparent to even a seasoned human investor.

So, should we all retire and let the machines take over? Not so fast. When properly prompted, LLMs are quick to offer answers with the confidence of an economist spouting talking points on TV. This is because LLMs are trained, on a Pavlovian level, to offer responses humans will trust. There is a reward function in most algorithms for providing acceptable answers. But is their confidence justified? This depends on many factors, and even if fed high-quality data, deep learning algorithms are

fallible. For example, transformer models (which construe most LLMs) can easily veer off track, or hallucinate, because they work by sequentially predicting the next most probable word in a sentence. This is an autoregressive process, where words the LLM generated itself are used to predict the next ones. While at first it sounds similar to how humans think—after all the words we say next are predicated on the ones that just left our mouths—LLMs have a much harder time realizing if they are talking nonsense. Recognizing when content-sounding AI is abjectly wrong, phrasing questions for it with precision, fine-tuning its training, and feeding it the most nutritional data are all reasons for why humans remain a crucial part of the process. We offer practical examples in the world of investing below.

## Use cases for asset management, wealth management, traders and retail investors

Investors of all stripes can potentially benefit from using AI. The technology will not put retail traders on equal footing with institutional investors because they do not have access to the disproportionately expensive and often proprietary data on which to train an AI system that institutional investors have been cultivating for decades; nor would they typically know how to fine-tune deep learning algorithms to maximize their potential. Still AI can boost most investors' scale, speed and sophistication.

### Asset management use cases

Portfolio managers can train LLMs on earnings calls, stock price movements, news articles and social media chatter. They can further input information on behavioral biases (the theory that inefficiencies in the market exist due to human irrationality), their own research notes, security ratings and trade executions. After training, this data can be piped into the LLM in real-time. That, in turn, leads to several novel applications such as:

- Combining the sentiment expressed via unstructured information (tweets, subreddits, analyst reports, news, etc.) with structured data (company fundamentals, consensus forecasts, macro indicators) to identify incongruencies that may lead to large price moves.
- AI can help risk managers by providing early warnings of market shocks inferred from secondary and tertiary effects. For example, imagine a fixed income portfolio where some positions' credit spreads begin rapidly widening. A human manager would immediately understand the increased risk to those underlying positions but what about the rest of the

portfolio? An AI with billions of optimized synapses could predict which issuers could be the next domino based on a multitude of data points—from time series correlations to news articles to 10-Ks (company annual reports). A recent, though tragic, example would be the invasion of Ukraine leading to a sudden contraction in neon gas exports, a key component of automotive semiconductors affecting chipmakers, which then impacted carmakers. A well-trained neural network could find this complex linkage the moment the first mortar hit Mariupol, something few humans did.

- AI can alert portfolio managers if their desired trades exhibit behavioral biases. For instance, according to the disposition effect, some investors are reluctant to sell losing positions, yet happy to shed assets that just had big price pops. Differentiating between a prudent decision supported by valuations and one driven by emotions, like regret avoidance, is where an AI trained on previous trades and behavioral finance can take the role of an unbiased coach.
- Because LLMs can process conversational queries, the knowledge moats for doing complex investment tasks—like multiperiod optimization, strategy simulation and factor decomposition—are drying up. In a way, generative AI is democratizing some of the superpowers quantitative (or quant) investors previously hoarded. Soon a multi-asset portfolio manager could ask their AI copilot to “construct a portfolio that is most resilient to a US Federal Reserve pivot, but could still offer 4% yield, is not overweight the growth factor, and wouldn't have had annualized risk greater than 17% over the last five years” and get a model back. Provided, of course, that one could be constructed with those hurdles. While we know there are no guarantees to achieving these outcomes, we are working on building such a tool at Franklin Templeton Investment Solutions.

### Limitation example

Predicting sentiment from audio and video, as some modern natural learning processing (NLP) engines purport to, is far more complex. If 90% of communication is non-verbal, there are inherent limitations in the ability of AI to glean insights from human interaction. Varying intonations and body language may be subtle and can greatly change the meaning of what is meant in an exchange. Humans have a remarkable ability to pick up on these cues, based on thousands of years of evolution; AI is not capable of this yet.

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**Understandably, there is both fear and excitement around the advent of AI, and as with most breakthroughs, the nuanced truth should evoke some of both.**

### Sustainable investing use cases

Environmental, social and corporate governance (ESG) analysts could train their AI system on the sustainability disclosures of public companies, quantifiable ESG metrics and press releases about a company's ESG declarations.

- The AI could then attempt deciphering whether popular beliefs about a company's ESG practices match reality, or whether companies practice what they preach on any number of sustainability metrics, such as equal pay, carbon footprint reduction and board independence.
- By analyzing data that has not yet flowed into disclosures, AI can identify which companies are making improvements in their ESG practices. Identifying such ESG improvers early may yield better investment results. For example, what if a company plagued by controversy over its treatment of minority employees started putting in diversity, equity and inclusion (DE&I) language into its newest job postings? AI can generate inferences from data points like this nearly in real-time when properly tuned and trained.

### Wealth management use cases

Financial advisors can use AI systems to maximize their clients' ability to meet the goals most important to them—a task that often involves more than just maximizing return for a given level of risk.

- Determining client investment objectives and risk tolerance is often done through straightforward questions. But how well do clients know themselves, especially under duress? Advisors often receive panicked phone calls from clients after small market drops, demanding “corrective” action, even from those who say they can tolerate large market swings. These requests are often against the clients' interests. AI trained on past interactions can look beyond surveys and better predict client behavior to suggest portfolios most likely to keep them invested through volatility and even recommend opportunities to proactively reach out, before panic sets in.

- Just as self-reported risk tolerance may not match reality, client financial goals are often not appropriately prioritized. AI can analyze client consumption patterns, needs and desires to chart a dynamic path most likely to maximize the chance of achieving their highest priority goals, while minimizing the chance of running out of money. This is an area where we have been pioneering AI use since 2020, by creating a solution that makes personalized asset allocation and consumption recommendations.

### Retail investor use cases

Most examples above require extensive proprietary data and the knowledge to train and tune models. It bears repeating that while AI is a step toward democratization of investing, it is not an equalizer. Without terabytes of quality data, real-time feeds and superlative computing power, even sophisticated retail investors will be at a disadvantage compared to institutions. Nonetheless, commercially available AI models can still benefit them.

- Even more so than institutional portfolio managers who generally have risk managers looking over their shoulder, AI may alert retail investors to behavioral biases they may be exhibiting based on the context surrounding their trading. For example, are they entering an option position where risk could far exceed the equity trades they're used to?
- AI may help create insightful charts, with topical overlays to give visual context to earnings announcements, economic regimes, sector profit margins and possible payouts for a trading strategy.
- LLMs can extract key concepts from lengthy documents—like management commentary or central banker speeches—to help retail investors grasp key concepts.

### Conclusion

Understandably, there is both fear and excitement around the advent of AI, and as with most breakthroughs, the nuanced truth should evoke some of both. While AI may create negative externalities, eradicating humankind is unlikely to become its agenda; and though it will augment our lives, it won't create utopia. For now, in the world of investing, it can fill the role of a tireless junior analyst or unbiased coach, as illustrated by the case studies above. By partnering with algorithms, investors may produce better returns, mitigate risk, reduce their irrational impulses and may come closer to achieving their financial goals.

# Durable passive thematic strategies—A solution unlocked by artificial intelligence



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Few investment styles are as polarizing among professional investors and financial industry observers as thematic investing. Proponents evangelize the unique ability of thematic funds to facilitate participation in structural changes of generational significance, while critics aren't shy in questioning higher relative fees<sup>9</sup> and lower relative performance.<sup>10</sup> Given the intensity of the debate, one might be surprised to learn that thematic investing is far from a recent development, with many considering the 1948 launch of Chester Tripp's "Television Fund," an open-end investment trust "specializing in securities of television, electronics and radio companies,"<sup>11</sup> as the advent of modern thematic investing. Some 75 years later, the traditional definition of a thematic strategy remains a portfolio that offers exposure to an emerging trend with the potential to disrupt an industry, if not society as a whole. The results for fund sponsors in separating trend from fad have predictably been mixed, with the Television Fund's initial thesis being a fair example of success as TV ownership did in fact explode from 1% of households in the United States at the time of the fund's inception to 75% by the time *The Honeyymooners* debuted seven years later in 1955.<sup>12</sup>

However, for every vindicated prediction, there are cases of misplaced optimism. The ill-fated Steadman Oceanographic Fund is perhaps the best example, as it captured the imaginations of those inspired by Jacques Cousteau's undersea exploits of the early 1960s, with the fund's intention "to profit from companies that were farming and building communities at the bottom of the sea."<sup>13</sup> Investment returns in that case unfortunately rode Cousteau's damp coattails to the bottom.

Investors for their part seem decidedly undeterred by the raging debate and the wide dispersion of returns, as thematic investment strategies have experienced incredible growth in recent years. Thematic strategies saw their share of the global equity fund market triple to 2.7% by the end of 2021, with over US\$800 billion in assets under management (AUM).<sup>14</sup> While a few well-known strategies have driven the lion's share of that AUM growth, the category's rise has also coincided with a proliferation of thematic fund options—1,952 according to Morningstar, which the research firm classifies using 200 thematic labels as varied as Cloud Computing, Automated Driving, mRNA and Baby Boomers.<sup>15</sup> On one hand, the explosive growth of investable themes has itself been an empowering and democratizing trend that offers the retail investor another way to test, express and evaluate their own investment theses. However, the fear from a fiduciary perspective is that the aggregate effect of this increased optionality may exacerbate a traditional behavioral finance challenge by introducing additional opportunities for investors to make poor decisions around timing. For years, DALBAR has published a study that uses long-term mutual fund flow data to assess and compare average investor returns to various investment categories—recently showcasing a return of 3.1% for investors vs 9.8% for US equities over the 2003–2022 timeframe.<sup>16</sup> "The explanation for why retail investors lagged the broader market to such

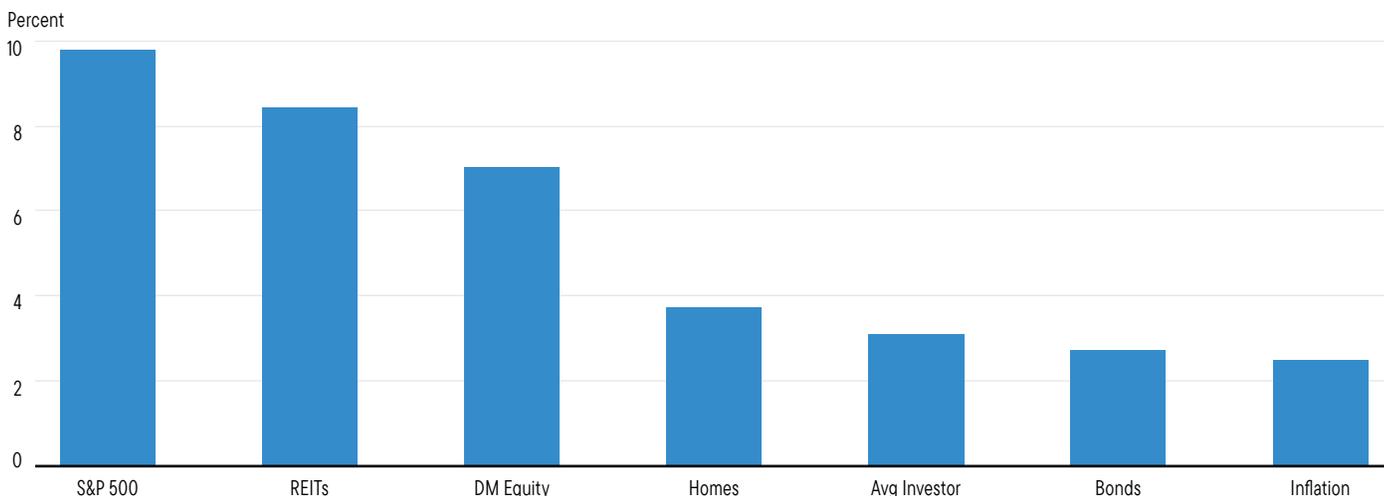
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**“The explanation for why retail investors lagged the broader market to such a devastating degree over the course of an epic two-decade run in the stock market comes down to fear and volatility. Too often investors get sucked into the news cycle and end up selling at the worst time.”**

**Jeff Schulze**  
Head of Economic and Market Strategy  
ClearBridge Investments

## Effects of Panic Attacks on Average Investors

**Exhibit 1: 20-Year Annualized Returns by Asset Class (2003–2022)**



Source: Bloomberg. June 30, 2023. Indexes and data used—S&P 500 Index, FTSET NAREIT All Equity REITS Index, MSCI EAFE Index, US Existing Home Sales Median Price YOY %, Bloomberg Global Aggregate TR Index, US CPI Urban Consumers YOY. Indexes are unmanaged and one cannot directly invest in them. They do not include fees, expenses, or sales charges. Important data provider notices and terms available at [www.franklintempletondatasources.com](http://www.franklintempletondatasources.com). **Past performance is not an indicator or guarantee of future results.**

a devastating degree over the course of an epic two-decade run in the stock market comes down to fear and volatility. Too often investors get sucked into the news cycle and end up selling at the worst time,” Jeff Schulze, Head of Economic and Market Strategy at ClearBridge Investments, a leading global equity manager with US\$165.4 billion in AUM as of June 30, 2023.

As startling as the 6%+ annualized lag is, it’s prudent to wonder whether net returns might be even worse for investors buying into thematic funds vs the broader US mutual fund universe that DALBAR analyzed, which predominantly skews toward long-term buy-and-hold type strategies. By contrast, many of today’s thematic strategies, particularly in the passive category, are built to capture growth from impermanent trends—leaving investors that are already struggling to steel themselves against volatility the additional challenge of identifying when an investment theme has run its course. Let’s take another look at some of the thematic labels listed above.

Automated driving carries promise of societal change, but the theme has a destination at which point the technology/ infrastructure would become commonplace and no longer carry outsize growth expectations. mRNA applications including rapid vaccine development are at the bleeding edge of biotech innovation today, but how long until that approach matures or is supplanted? Finally, cloud computing

technology has unquestionably driven both structural change and investment performance in related strategies, but the technology is now in the late stages of mass adoption. Each of these examples showcase the four phases of the technology lifecycle: research and development (R&D), growth, maturation and decline, visually expressed by the traditional “S-Curve” pattern seen in the below exhibit.

## Cloud Computing Appears to Be Reaching Maturation

**Exhibit 2: Growth of US\$10,000 of Morningstar Global Cloud Computing Fund Composite**



Source: Morningstar Direct. As of July 2023. **Past performance is not an indicator or a guarantee of future results.**

Simply put, a major challenge with thematic investing today is that a large proportion of strategies focus on singular, static themes with finite windows of growth, rendering them as most appropriate for tactical exposures and not as long-term holdings.

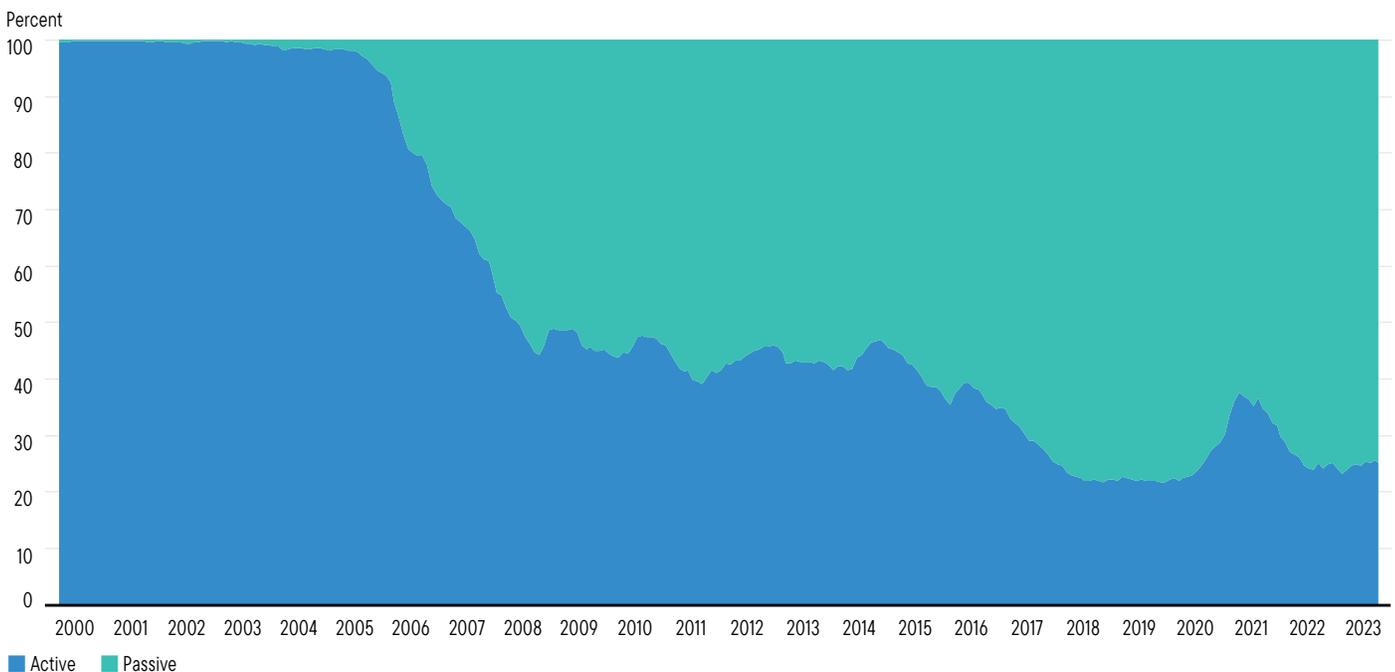
One solution for the static problem in thematic investing already exists: actively managed thematic strategies that target multiple themes with mandates broad enough to allow for manager discretion in navigating transitions from declining to emerging growth opportunities. Certainly not a panacea, as ultimate success will vary based on manager skill, but an active approach effectively removes the structural limitation inherent in a passive portfolio constructed based on insights from a single point in time. For the larger passive thematic category, which Morningstar estimated to represent 75% in the United States as of August 2023, there may be two solutions worth pursuing: a) the industry can offer improved educational content and tools at the point of sale that clearly identify narrowly focused thematic strategies as tactical vehicles vs long-term holdings (and advise on prudent usage); and/or b) with the help of AI, passive thematic strategies can expand beyond tactical concepts by implementing durable evergreen investment theses.

Within the world of AI, recent advancements in NLP and the related ability for sophisticated LLMs to interact with verified Knowledge Graphs offer the potential for a fundamental evolution in thematic investing. This progress may also unlock a new investment style—durable passive thematic strategies. By harnessing these new innovations, an asset manager can effectively design an evergreen passive strategy that builds, monitors and calibrates portfolios comprised of companies with verified connections to desired themes. To explain, let's first examine how the AI-driven approach works, and then we'll compare that to a legacy passive approach.

ChatGPT, the generative AI solution that OpenAI developed with funding from Microsoft, has demonstrated for the AI-curious masses in 2023 that LLMs have an impressive ability to respond instantly to complex questions or prompts with seemingly well-reasoned rationales. While it's clearly a powerful tool, when it comes to accuracy, even OpenAI's CEO Sam Altman cautions that ChatGPT has the ability to "hallucinate" and "confidently state things as if they were facts that are entirely made up,"<sup>17</sup> which illuminates the reality that language models on their own do not equal knowledge models. According to Shankar Vaidyanathan, Founder and CEO of Noonum (an AI-powered service for building

### Passive Strategies Now Dominate Thematic Investing

**Exhibit 3: Passive Market Share of US Thematic Funds**



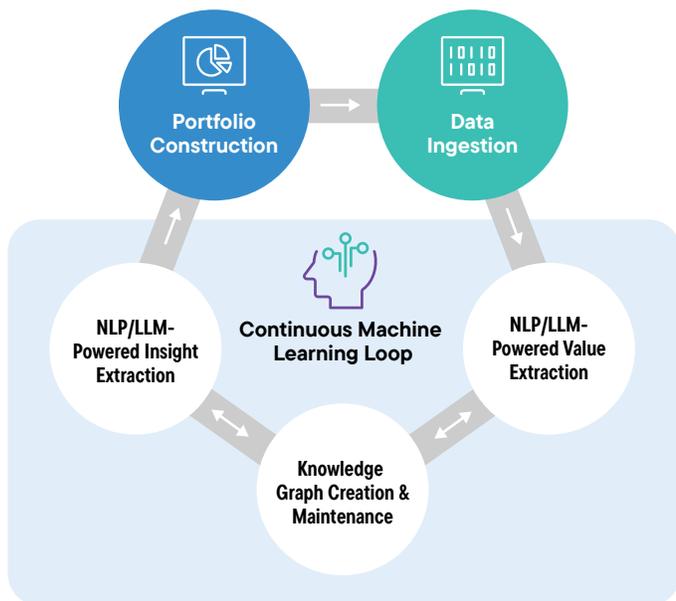
Source: Morningstar Direct. As of August 30, 2023.

customized thematic portfolios and indexes), in order for AI to effectively generate investable insights that are trustworthy, a language model must be paired with a knowledge model or graph that converts billions of ingested data points into a fact-based temporal network.

The three hallmark components of a knowledge graph are nodes (e.g., a person, company, industry, place, etc.), edges (the relationships between and among nodes), and labels that identify the nature of those relationships. For illustrative purposes, the AI-driven portfolio construction process for a thematic portfolio might break out as follows: 1) market-focused data ingestion (earnings call transcripts, Securities and Exchange Commission filings, patent applications, financial industry news, etc.); 2) NLP/LLM powered value extraction (what is implied in the text, is the sentiment positive or negative, etc.); 3) knowledge graph creation and maintenance (verifiable and auditable relationship network); 4) NLP/LLM powered insight extraction (what themes are inherent from the captured data and relationships and how are companies quantifiably connected to each theme); and 5) based on the strategy design, an allocated portfolio can then be created and continuously updated without the day-to-day involvement of a human portfolio manager.

### How Might an AI-Driven Portfolio Construction Process for a Thematic Portfolio Breakout?

**Exhibit 4: Continuous Machine-Learning Loop**



Source: Franklin Templeton Industry Advisory Services. For illustrative purposes only.

**According to Shankar Vaidyanathan, Founder and CEO of Noonum (an AI-powered service for building customized thematic portfolios and indexes), in order for AI to effectively generate investable insights that are trustworthy, a language model must be paired with a knowledge model or graph that converts billions of ingested data points into a fact-based temporal network.**

To highlight the potential magnitude of improvement here, let's compare a static passive thematic approach to a durable passive thematic approach using two FinTech themes as our focus: blockchain and mobile payments. The simple legacy passive approach would be to create separate portfolios tied to each theme, using only the insights available at a singular point in time to define the theme and desired exposure methodologies (e.g., basing weights on market-capitalization and/or relative revenue percentages tied to the theme are two common approaches).

For a sophisticated active trader that values flexibility and control, the legacy approach likely works fine as the trader can tactically determine when they want to shift their allocation out of a maturing theme and into a developing theme in order to both avoid declines and capture periods of rapid growth. However, for long-term investors that are ill-equipped or uninterested in running a tactical portfolio, or for financial products that require minimum duration investment periods, e.g., index-linked insurance solutions with typical contract terms of 7–10 years, the static approach is suboptimal or even non-viable. This claim is accentuated by the fact that these two themes in particular find themselves on opposite ends of the technology life cycle, with mobile payments arguably approaching the maturation phase, while blockchain technology is very much in the early R&D phase.

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**While static passive thematic strategies will likely persist as a desired solution for day traders and tactical allocators, AI-powered durable passive thematic portfolios can offer investors access to robust long-term investment strategies that optimize allocations to existing and perhaps yet-to-emerge themes, in a manner that will hopefully improve both strategy returns and realized investor outcomes.**

Revisiting the AI-powered process detailed prior, a durable passive approach would offer a few advantages. First, the AI strategy could be designed to take an empirical approach to implementing the shift from a maturing theme like mobile payments to an emerging theme like blockchain. At the discretion of a portfolio manager informed by powerful AI-based insights, perhaps a blended multi-theme portfolio would be programmed to maintain a low allocation to a theme like blockchain while capital expenditures on R&D relative to revenue are proportionally greater than a theme like mobile payments, while being poised to quickly invert allocations based on momentum shifts in the underlying data. Beyond that, perhaps in generation 2.0 of these strategies, an effective knowledge graph and language model pairing might detect when a thematically related but entirely new investment category emerges that promises to supplant the current category, e.g., blockchain is replaced by some yet to be invented galactic-chain protocol that disburses transaction records across an interstellar network of nano-satellites (one day!). Then not only is AI handling the shift from a maturing S-curve to an emerging S-curve for known technologies, it's then also eventually identifying a third technology that didn't exist when the fund launched, determining its thematic relevance to the strategy, and implementing an allocation transition. By automating allocations to companies at the vanguard of innovation within a chosen sector or category, the strategy is ensuring long-term, durable relevance for the consumer—a significant improvement over the buy- (and sell) at-your-own-risk static thematic funds of today.

As investors have indicated with their dollars, the targeted exposures thematic investing strategies have offered since 1948—active or passive—are attractive in spite of their inherent limitations. Albeit gradually, the asset-management industry fortunately seems eager to better understand or even embrace emerging AI capabilities, which should ultimately usher in a new generation of solutions that address some of the enduring challenges. While static passive thematic strategies will likely persist as a desired solution for day traders and tactical allocators, AI-powered durable passive thematic portfolios can offer investors access to robust long-term investment strategies that optimize allocations to existing and perhaps yet-to-emerge themes, in a manner that will hopefully improve both strategy returns and realized investor outcomes.

# The ripe opportunity for AI in the workplace



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## Two imperfect plans

The way Americans have saved for retirement has changed and evolved over time. Until the 1970s, the primary retirement vehicle corporations offered to their employees was a defined benefit (DB) plan, or pension. This type of plan provides a pre-determined benefit typically calculated via a combination of salary, years of employment and other factors. When an employee retired, they had the benefit of knowing they would have a consistent source of income. The downside for the employer was that pensions carry a large cost and sit as a balance-sheet liability, potentially impacting the company's stock price or credit rating.

Then came the Revenue Act of 1978, which created the defined contribution (DC) plan. This type of plan allows the employee to contribute a percentage of their salary, often with an employer match, with the ability to invest it on their own. The benefit to the employer is that it no longer carries pension liability, has more consistent plan funding costs, and shifts the responsibility of investment returns to the employee. The benefit to the employee is that they have more control over the accounts and how much they save.

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**The next-generation chatbots that financial services will deploy will have the knowledge of a top financial advisor with the power of financial calculators at the speed of milliseconds.**

Since the 1980s, there has been a trend of replacing DB plans with DC plans, which has contributed to a retirement income shortfall; this is partly due to the knowledge gap in the average employees' investing and financial planning skills versus the professionals who manage DB plans. The average person lacks the skill to effectively determine the nuances of a financial plan, including how much to save, what account type to use, what *and* how much to invest in.

## Putting AI to work

Conversational AI can significantly enhance the employee/participant experience with their work benefits. Think of today's online chatbots used for customer service on websites for cable, phone and other service providers where simple conversations or tasks are taking place. The next-generation chatbots that financial services will deploy will have the knowledge of a top financial advisor with the power of financial calculators at the speed of milliseconds. In addition, the advice given via these AI chatbots will be hyper-personalized to the user engaging with it. How? With integrations, conversational AI will have connections to payroll systems, recordkeepers, wealth platforms and custodians, which will unleash not only operational tasks such as changing contributions or getting a statement emailed through the chatbots, but also provide answers to questions like: "Will I be able to retire at age 60?" The power of AI, along with these integrations, will allow the chatbots not only to provide a simple yes/no answer to that burning question on everyone's minds, but also provide personalized advice.

In addition, AI will be able to generate personalized financial reports and videos either monthly, quarterly or even ad hoc for one's entire workplace benefit picture.

When it comes to what one should do next financially, AI will provide the "next best action" tailored to an individual. How does Amazon know what you want to buy next, or Netflix know what you should binge next, or Spotify what you want to listen to next? As creepy as it sometimes is, these "can't do without" services all leverage AI to create a better user experience and huge brand loyalty. This is exactly what companies in the financial services sector are building with AI—what should you do *next*?

## The changing workplace

A more recent development than the DB-to-DC shift is the generational change in the way people work, and therefore how they receive employer benefits like health insurance and retirement plans. Over the past 10–15 years, technology has enabled millions of Americans to find alternative ways of making money through the gig economy. The “gig economy” is a term used to describe a system that connects workers with temporary jobs, typically on demand, and is credited with disrupting multiple large industries. One notable example is Uber, which competes with taxis and allows users to call a ride on demand via a mobile app. In 2014, a New York City taxi medallion had a peak value of US\$1.32 million, but in 2022 that value had dropped to an average of US\$137,000.<sup>18</sup> Over this same period, Uber has increased its revenue from less than US\$500 million to over US\$31 billion in 2022.<sup>19</sup> There are many other gig economy services like renting a house (Airbnb), a car (Turo), a recreational vehicle (RVshare), or having someone grocery shop for you (Instacart) or deliver your takeout (DoorDash). The gig economy has also proliferated into skilled labor as well, with platforms like Upwork and Fiverr matching coders, designers, writers and more with customers who need specific projects done.

It is estimated that by 2027, over half the American workforce will be in the gig economy if growth trends persist.<sup>20</sup> This poses both a challenge and opportunity. As workers leave the employee/W-2 world for the gig economy/10-99 world, they will need to replace the corporate benefits they were receiving. When leaving the corporate world, access to quality advice will be a challenge. Most will lose access to the financial wellness programs their employers had offered. Typically, financial advisors target those with investable assets over US\$1 million. Roughly 98% of the US population falls beneath this threshold, and therefore will need to receive advice in an alternative way.

## AI for the big picture

There are digital services for individual retirement savers that exist, but most are fragmented and non-integrated—they look at an individual's financial picture in silos based on account type. In the real-world, people don't view themselves as only a 401k or IRA investor. They also have other planning needs like health savings, emergency savings, college planning, budgeting and debt management, to name a few. Legacy services haven't had particularly engaging user experiences that might spur an investor to take action on a recommendation.

One of the primary advantages of AI in retirement investing is its ability to offer a comprehensive overview of an individual's financial situation. AI-powered platforms can consolidate information from various sources, including bank accounts, investment portfolios, real estate holdings, and more. By analyzing this data, AI can provide investors with a clear, real-time picture of their financial health. This holistic view enables better decision-making, as investors can see how different aspects of their finances interconnect and impact their retirement goals.

One company addressing this challenge is TIFIN, a Colorado-based fintech. TIFIN has built a fully integrated workplace platform utilizing AI-assistants to provide personalized, intelligent and actionable advice. In addition to providing advice on major goals like saving for retirement, the platform

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## Imagine a not-too-distant future where workers will receive an email from human resources, or gig workers will sign up via app. These individuals will then go through a discussion about their goals and current finances with an avatar of their choice. It could be someone they admire or feel more comfortable with—or even an aged version of themselves.

can advise on smaller goals like: “How much car can I afford?” This is done within the context of the individual’s holistic picture and long-term plans, thus helping to balance both long-term and short-term goals. TIFIN is using conversational AI to increase engagement by having a more human-like experience throughout the entire process.

Where will this take us? Imagine a not-too-distant future where workers will receive an email from human resources, or gig workers will sign up via app. These individuals will then go through a discussion about their goals and current finances with an avatar of their choice. It could be someone they admire or feel more comfortable with—or even an aged version of themselves. The AI will be able to combine information from the previously discussed sources (i.e., payroll, recordkeeping, custody) and fill in the blanks via the discussion with the avatar. The worker will then receive a holistic and personalized plan to achieve their goals across all of their accounts, including insurance. With one step, they can take action—account paperwork is automatically filled and opened.

To the worker, this entire experience happens within a human-like discussion with conversational AI. Accounts are monitored over time and suggestions periodically provided to help optimize goal achievement. They can get answers in the context of their entire personalized picture to questions such as: “How much house can I afford in Tampa?” AI will help increase access to high-quality personalized advice and over time, should lead to better outcomes.

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### Endnotes

1. Source: Samuel, A.L. “Some Studies in Machine Learning Using the Game of Checkers,” IBM Journal of Research and Development, July 1959.
2. Source: IBM, Icons of Progress, “Deep Blue,” Featured September 13, 2011.
3. Source: Borowiec, S. “AlphaGo seals 4-1 victory over Go grandmaster Lee Sedol,” The Guardian, March 15, 2016.
4. Companies referenced are for illustrative purposes only. Discussions should not be regarded as any type of trading recommendation, or as a signal about any past, current or future trading activity in any fund or strategy, by Franklin Templeton and its affiliates.
5. Source: Brown, T., B. Mann, N. Ryder, et al., “Language Models are Few-Shot Learners,” Cornell University arXiv, 2020.
6. A trainable parameter within a neural network is the weight given to each connection between neurons that is adjusted during training to optimize the model’s accuracy in making predictions on data it hasn’t seen yet. The more parameters, the more complex the neural pathways, and thus the overall model.
7. “No cap” is a slang phrase... It means “no lie” or “I’m not lying” and is often used to emphasize the truthfulness or sincerity of a statement. OpenAI’s ChatGPT.
8. “Veritably” is an adverb that means in a manner that is unquestionably true, accurately, or genuinely. It is used to emphasize the truth or accuracy of a statement... OpenAI’s ChatGPT.
9. Source: Lee, Isabelle and Bloomberg. “The \$115 billion thematic ETF boom is still going strong despite a brutal year: ‘We are narrative creatures.’” Fortune. December 10, 2022.
10. Source: “Thematic funds triple share of global investments in a decade.” Financial Times. April 10, 2022.
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14. Source: “Thematic Fund Handbook: Answering the key questions asked by investors considering an allocation to thematic investments.” Morningstar. September 13, 2022.
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17. Source: Reed, Betsy. “‘We are a little bit scared’: OpenAI CEO warns of risks of artificial intelligence.” The Guardian. March 17, 2023.
18. Source: “NYC Yellow Taxicabs—The Road Ahead!” Black Car News. July 1, 2022.
19. Sources: “Global net revenue of Uber from 2013 to 2022.” Statista. August 29, 2023; Uber 2022 Annual Report.
20. Source: “Number of freelancers in the United States from 2017 to 2028.” Statista. November 3, 2023.

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**All investments involve risks, including possible loss of principal.**

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