Spectrum

No robots were harmed in the making of this report

1. Is AI investable?
2. How should asset managers use AI?
3. The second-order effects of AI for society

Q3 2023

Federated Hermes Limited

www.hermes-investment.com
For professional investors only

Introduction

In a 1962 collection of short stories, sci-fi sage Arthur C Clarke postulated his third law, that "any sufficiently advanced technology is indistinguishable from magic".

Now, as we push through the second decade of the 21st century and into a future seemingly set up for AI, Clarke's law appears more apt than ever.

Through the 'magic' of machines we now have the ability to communicate more or less instantly in any language we choose.[1] Our cars have become self-steering. Our students' essays write themselves. Code is self-correcting. AI maps the stars, spots cancers, zaps weeds.

In the world of entertainment and leisure, AI determines our viewing preferences, chooses our music for us and helps decide our holiday destinations and how much we pay for them. It even translates ancient Akkadian cuneiform tablets for us.

Whether in the field of academia, medicine, agriculture, the arts or travel – and whether we're aware of it or not – we already live in a brave new world of AI augmentation.

Truly, our abilities as humans have been elevated beyond the wildest dreams of even the most forward-thinking of the sci-fi writers of yesteryear.

But what of the world of finance? What of the elusive search for alpha, balanced portfolios, and minimal drawdown? Has this world, too, been enveloped in the warm embrace of the algorithm?

In this report we aim to answer three core questions that could determine the fate of our species (or at least our performance as asset managers):

1) Is AI investable?

2) How should asset managers use AI?

3) What are the second-order effects of AI for society?

As in previous *Spectrum* reports, our aim has been to tap the expertise from across Federated Hermes, with input from as broad a demographic as possible. Hence, we have included the views of our equity, private markets and credit teams – but we've also asked our technology leads for their input. For the first time, also – and showcasing our global capabilities – we include the views of our US-based investment teams.

We hope you enjoy this report.

Geoff Spiteri

Director of Content, Federated Hermes

[1] In the *HitchHiker's Guide to the Galaxy*, the 'Babelfish', inserted into an ear, was the solution to multilingual complexity. Today, little more than four decades after the book's publication, google translate does the job.

This information does not constitute a solicitation or offer to any person to buy or sell any related securities or financial instruments.

Contents

Part one:
Is AI investable?

How to play the generative AI boom

ChatGPT has helped put 'generative AI' into the mainstream lexicon.

Jordan Stuart
Vice-President, Client Portfolio Manager, Kaufmann small/mid/large cap growth equity

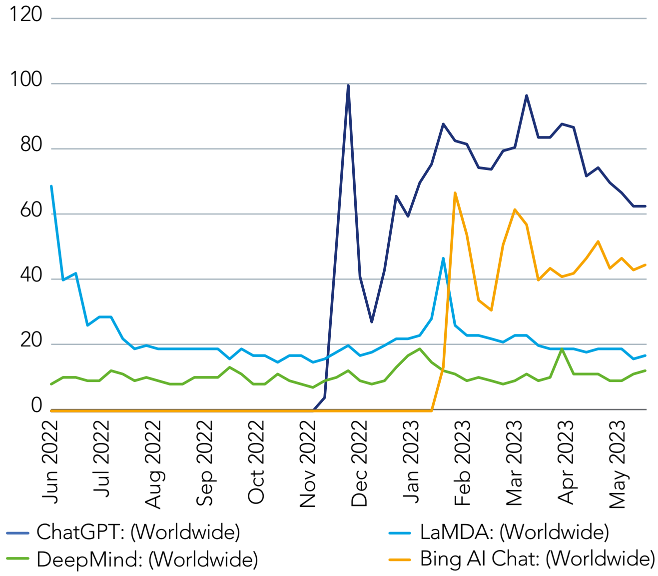
An important lesson we've learned in all our years of investing in innovation is that the most transformative breakthroughs are not always investable right away. Think of the cryptocurrency wave that only just crested decades after the earliest conceptions of digital currency. Go back further to the late nineties and early aughts, when the early Internet eventually gave way to the dot.com boom and shotgun sequencing took decades of progress on the human genome to the next level. All proved to be great outcomes for society and our economy, but were difficult for asset managers to make money on initially.

These innovations have provided platforms for disruption in their respective spaces, but the investments have taken time to play out into profitable solutions. Companies are built to survive, not always to thrive, and very few can maintain their growth throughout multiple business and innovation cycles—just ask Motorola, Palm Pilot, JDS Uniphase, Myspace, and Dell, to name a few. Consider even Google Search, which still has ads supplementing its revenue model to enable a seemingly simple function, and Gmail, which is not profitable despite a dominant market position.

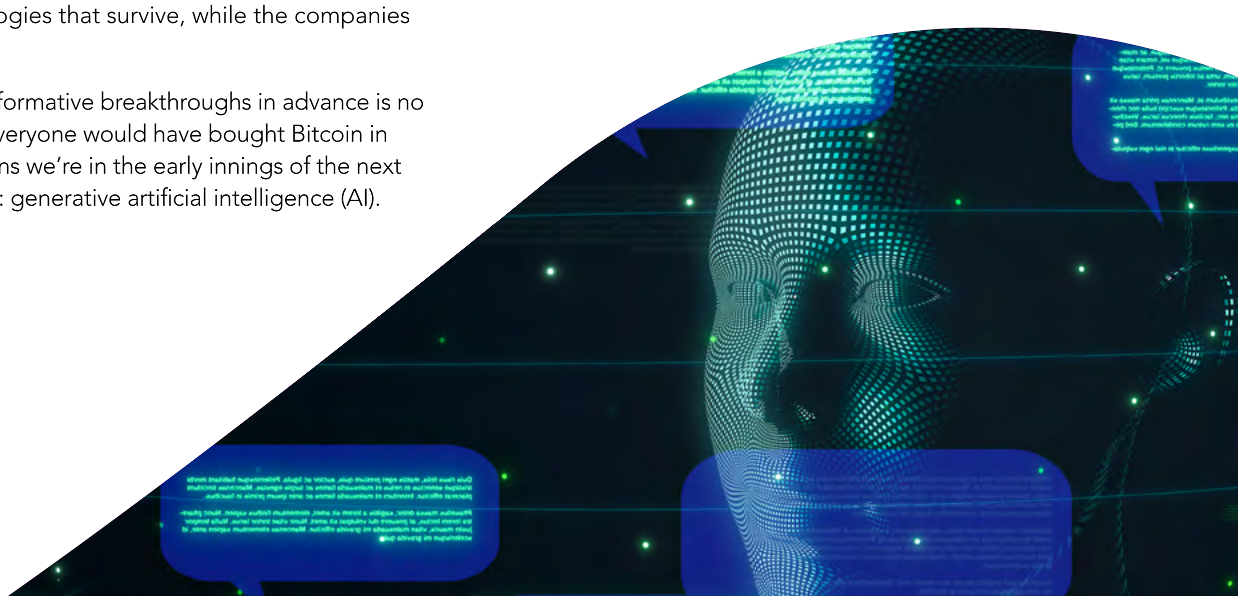
Often, it's the technologies that survive, while the companies themselves churn.

Identifying these transformative breakthroughs in advance is no easy feat—if it were, everyone would have bought Bitcoin in 2010. But there are signs we're in the early innings of the next big tech breakthrough: generative artificial intelligence (AI).

Figure 1: Google trends - mentions of generative AI



Source: Google trends as at 14 June 2023. Numbers on the y axis represent search interest relative to the highest point on the chart for the given region and time. A value of 100 is the peak popularity for the term. A value of 50 means that the term is half as popular. A score of 0 means there was not enough data for this term. ChatGPT is owned by OpenAI in which Microsoft has a potential 49% stake. Google acquired DeepMind in 2014. LaMDA is a conversational language model developed entirely in-house at Google. Bing AI, also known as Bing Chat, is an artificial intelligence (AI) chatbot developed by Microsoft on a foundation provided by ChatGPT and released in 2023. This information does not constitute a solicitation or offer to any person to buy or sell any related securities or financial instruments.



Generative AI is the next iteration of the cloud computing revolution that came out of the dot.com bubble, which came out of the mainframe revolution, which evolved from the microchip – I think you get the point.

Generative AI, which falls under the broad umbrella of 'machine learning', is about automating large learning models, i.e., ChatGPT, which is doing the computing automatically without human coders or enablers. This new innovation, with its sheer volume of potential applications and use cases, has captured the imagination of investors, consumers and governments alike.

Markets have been practically euphoric over the many 'what ifs' related to generative AI, including potential productivity gains, the creation of entirely new industries, the list goes on and on. But at the same time, as with anything new in the economy, much fear has accompanied this breakthrough and the amount of automation behind its rise makes the unknown a powerful fear factor. 'Disruption' is exciting for the disrupters, but not so much for the disrupted.

Who stands to benefit the most from generative AI?

Our take is the big companies with the most data and computing power at their disposal are first in line to have the biggest impact. However, the pace of change is likely to be rapid and it remains uncertain who the major winners will be long term.

So far, the hardware enablers look like clear and immediate beneficiaries. Investors should consider the sheer amount of infrastructure that will be needed for the massive data-centre buildout that's surely coming. Hardware enablers will also need electricity from multiple sources and complicated transformers to enable the input.

One thing to keep in mind is that generative AI users have little preference for 'legacy' brands. Sheer ability is, and likely will continue to be, the deciding factor. We've seen a number of newcomers rise up out of nowhere and gain more traction than some of the incumbent firms that have been deemed 'AI winners' by sell-side analysts and the financial media.

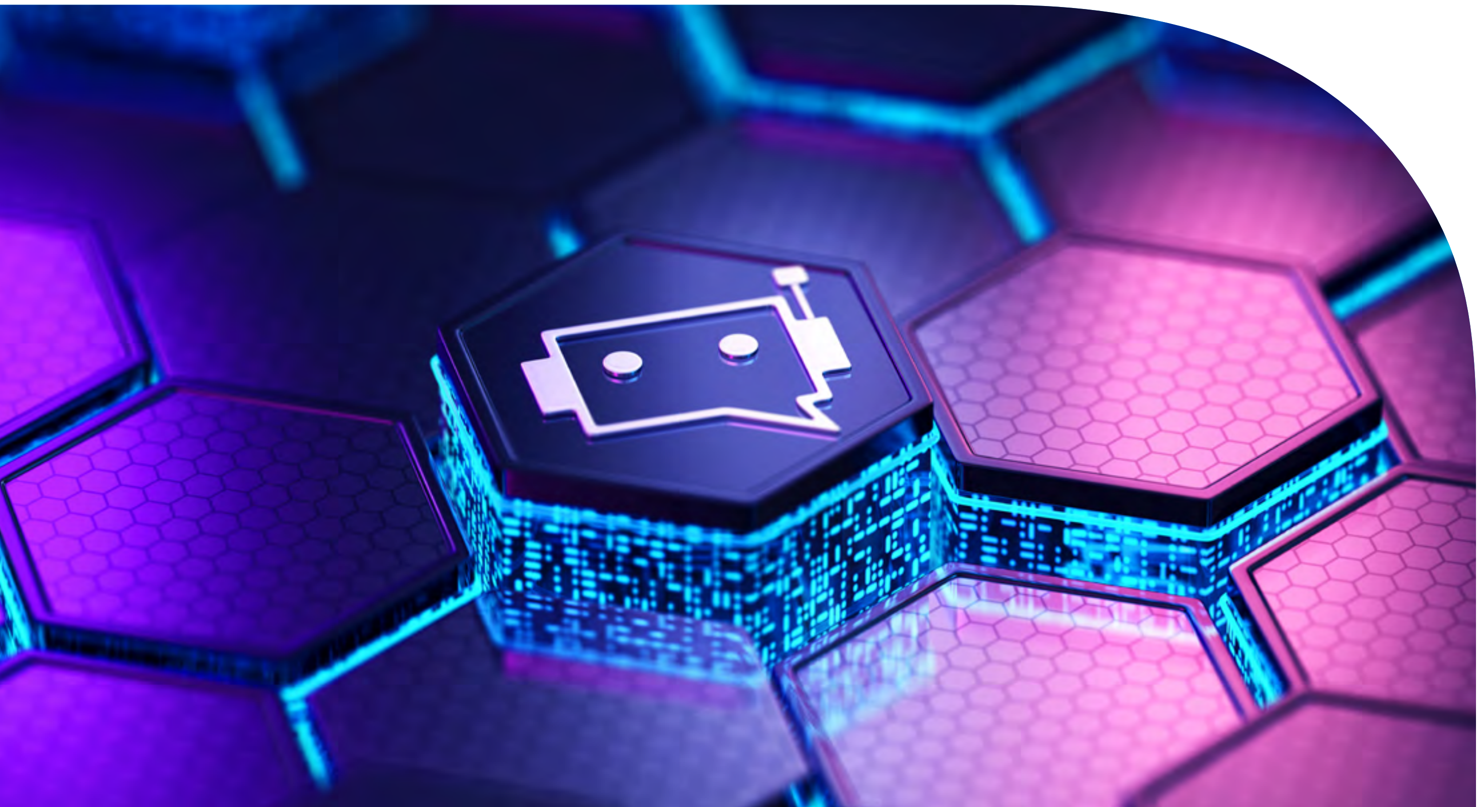
The specialization and use cases for generative AI have the potential to be very narrow.

Different industries will require specific learning formats that will cater to the end user. One early area of focus that we're watching is biotech, where some of these technologies will enable drugs to be tested in a supercomputer before even going to phase-1 trials. This could cut 50% of costs by some estimates. The potential applications are practically endless (see page 10 below for more on pharma and AI). Think of what generative AI could do for your Dexcom, anticipating your eating habits and responding to fluctuations in your blood sugar patterns with appropriate levels of insulin without a human's input at all.

Nonetheless, and for all of its potential, we don't see generative AI having a significant near-term impact on the economy at large. Why? This innovation is clearly deflationary. And what have rates done since this all started? They've gone up, not down. All this hype could turn into deflation, which could cause the market to rethink its rally.

Is generative AI going to be analogous to the mainframe computer age led by IBM, the search and email age with Yahoo, or even the social networking boom kickstarted by Myspace? Only time will tell.

To find out more about the Federated Hermes Kaufmann approach, please visit our website.



robot

[ˈrəʊbɒt]

1920s: from Czech, from robota 'forced labour'. The term was coined in K. Čapek's play R.U.R. 'Rossum's Universal Robots' (1920).

robota
forced labour

R.U.R.
Rossum's Universal Robots

→ **robot**
1920s

Technophobia: A timeline of terror

Fear of the new is nothing new – and if history tells us anything it's that innovation often breeds unease. Are current concerns around AI grounded in reality or just more of the same?

7th century BCE

The first written mention of the Prometheus myth, where demigod Prometheus unleashes the first wave of technological change by stealing fire from Mount Olympus.

1811-1816

Ned Lud and the Luddites unleash a wave of violence in the UK in protest at new-fangled forms of automation in textile production.

January 1818

The publication of Mary Shelley's Frankenstein - whose protagonist, through experiments in the new-fangled science of electricity, unleashes a monster on the world.

1862

The Lancet medical journal publishes research listing the health risks associated with new-fangled railways. These include heart palpitations and anxiety.

1954

German-American psychiatrist and author Fredric Wertham publishes The Seduction of the Innocent, a manifesto warning of the danger to society posed by the popularity of children's comics. A Senate hearing followed, as did a code of conduct cracking down on 'inappropriate' content in comics.

2:14 a.m., EDT, on August 29, 1997

Skynet becomes self-aware in James Cameron's Terminator franchise, a move that unleashes an all-out nuclear attack against humanity.

The [AI] future looks bright (will we have to wear shades?)

Investors are on a firmer footing than in previous tech-led market surges.

Linda Duessel

Senior Vice President, Senior Equity Strategist at Federated Hermes

One of the questions I'm sometimes asked about new technology is: how do we value it? With the current interest in AI, the mood feels reminiscent to me of the early 2000s and the original dotcom boom. This was when we had companies trading at price-to-earnings (P/E) multiples in their thousands – or actually not at all, since often they were still loss-making so had no P/E to speak of!

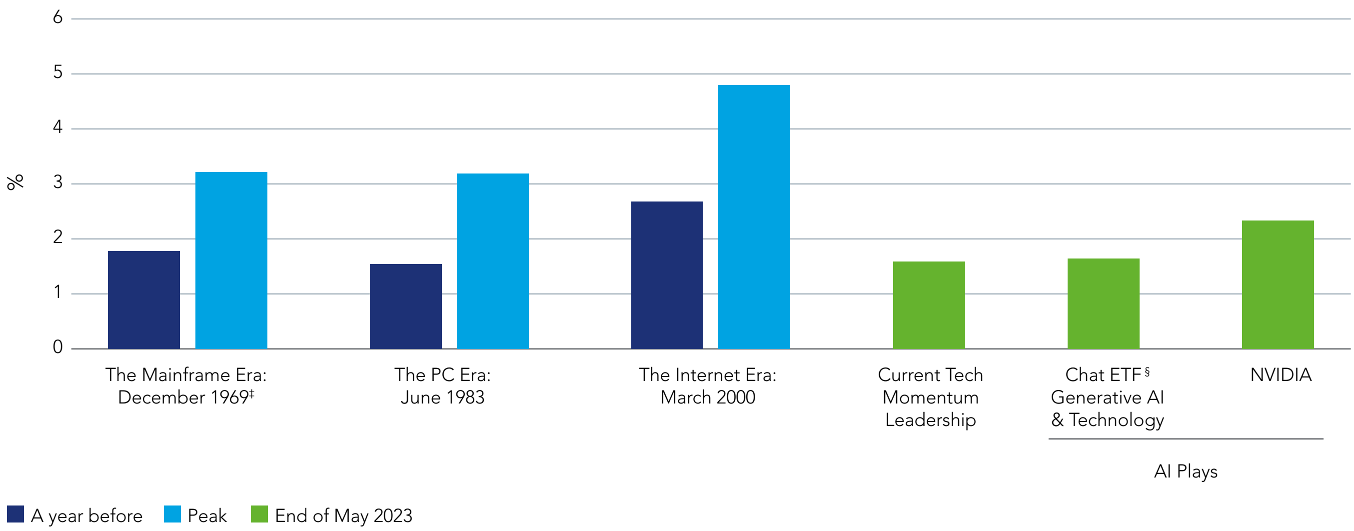
It feels kind of similar today – there's that same mention of buzzwords in conference calls (except this time the buzzword is 'AI' rather than 'dotcom') and the same bidding up of select stocks as the market creates its own momentum.

But if you actually look at AI-influenced stocks and where they're trading today you'd probably conclude we're in a different place from back then and that, actually, some of these stocks definitely are investable.

For one thing, this time some of the biggest companies driving innovation in AI have very solid, very visible cashflows (see chart below).

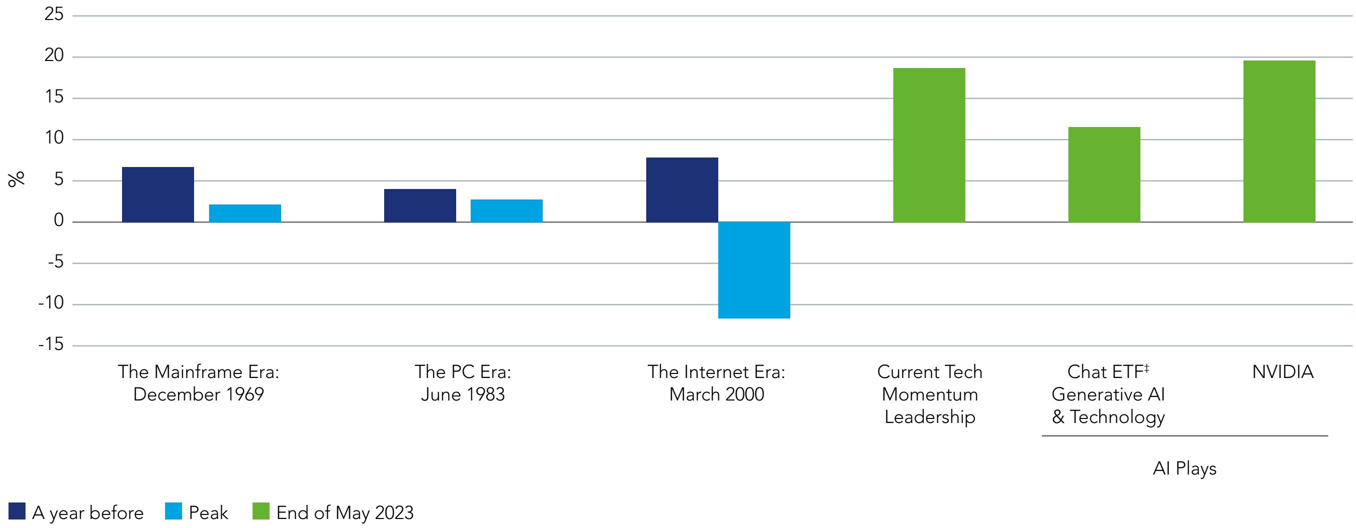
Riding the tech innovation wave

Figure 2: Large-cap technology and interactive media stocks in the best quintile of nine-month stock price trends, and the CHAT ETF*, market-relative forward P/E ratios†, 1968 to May 2023.



Source: Corporate Reports, Empirical Research Partners Analysis.
*Ranked within the sector.
† Capitalisation-weighted data.
‡ Relative-trailing P/E ratios.
§ ETF designed to capture AI plays. The top-ten positions, that comprise 58% of the portfolio, are: NVDA, MSFT, GOOGL, AMD, ADBE, AI, BIDU, ANET, Sensetime and CRM.

Figure 3: Large-cap technology and interactive media stocks in the best quintile of nine-month stock price trends, and the CHAT ETF*, free cash flow margins†, 1968 to May 2023.



Source: Corporate Reports, Empirical Research Partners Analysis.
*Ranked within the sector.
† Capitalisation-weighted data.
‡ ETF designed to capture AI plays. The top-ten positions, that comprise 58% of the portfolio, are: NVDA, MSFT, GOOGL, AMD, ADBE, AI, BIDU, ANET, Sensetime and CRM.

Second, while many of these companies were bid up almost as a defensive play during the Covid-19 pandemic, they had a rough ride in 2022. Since then, AI-fuelled stock-price gains may have eaten away at some of that upside, but with perhaps a few exceptions they are still nowhere near the eyepopping levels of the dotcom darlings at previous bubble peaks. (Add in the future risk of a hard landing – and the scope for some of those defensive properties to come to the fore once again – and you might argue for even greater upside from here!)

It's not all glass half full though – and there are potential headwinds to take into account when considering the longer-term investment case for AI.

First, you could factor in a slower-than-expected uptake of AI by companies. This is understandable. Although the promised improvements in productivity are great, AI implementation is difficult to get right. Management inertia is a very real possibility.

Second, employees themselves may oppose the adoption of AI – especially if there's scope for job losses at the end of the road.

Finally, there is the risk of regulation. Here the assumption is that for every ground-breaking innovation that comes to fruition, there's an equal and opposite impetus towards legislation. How this plays out in the real world and what the impact will be on future valuations is, by definition, impossible to know right now.

That said, I'm a glass-half-full person. What's fascinating is how quickly this is all taking place, particularly in terms of the scope for productivity enhancements across different industries. Here, we're keeping an eye on the opportunity among companies whose managements embrace the possibilities and invest their capital expenditures accordingly.

To find out more about our equity products, please visit our website.

Shake it off: Taylor Swift and AI

The applications of AI are many and varied and sometimes surprising. As long ago as 2018, Rolling Stone reported that fans at a Taylor Swift concert watching rehearsal clips were unaware of one crucial detail: that a facial recognition camera inside the big screen display was taking their photos. The images were being transferred to a Nashville 'command post', where they were cross-referenced with a database of hundreds of the pop star's known stalkers.

Today, facial recognition has expanded: it's now used in everything from verifying the identities of people making financial transactions, to travellers in airports – and even by marketeers looking to provide bespoke customer service.

Using big data to create a healthy future for humanity

Both excitement and fear around the accelerating evolution of AI have dominated the headlines in recent months. Like any new technology, we believe AI will be a disruptor in the truest sense, bringing both positive and negative impacts for society and the global economy. Health is one area where we believe AI will overwhelmingly be a force for good.

Ingrid Kukuljan
Head of Impact & Sustainable Investing, Federated Hermes Limited

Fast reading:

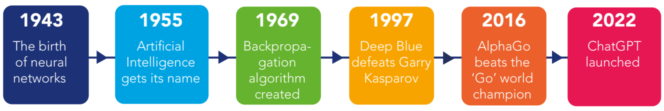
- Fears concerning the risks created by uncontrolled development of AI are understandable, however, they should not obscure the huge societal benefits the technology can offer. The healthcare sector is one area where we see clear potential for AI to deliver positive impact.
- Digitally driven drug discovery will benefit society by unlocking solutions to the most intractable problems in pharmaceutical research. Using the power of AI and big data in this way also holds the promise of reducing the cost of drugs, thereby increasing access for all.

Why now for AI?

The concept of artificial intelligence (AI) has been around since at least the mid-1950s, when, building on the work of British polymath Alan Turing, American computer scientist John McCarthy coined the phrase and founded AI as an academic discipline[2].

In the intervening decades, AI has seen a series of breakthroughs – or false dawns, depending on your viewpoint. High profile milestones have included the 1997 defeat of world chess champion Gary Kasparov by IBM's Deep Blue, and Google DeepMind's AlphaGo program beating Go world champion Lee Sedol in 2016.

Figure 4: How did we get here?



However, it is arguably only in the last year that AI has really exploded into the public consciousness. The release of generative AI chatbot ChatGPT in November 2022 generated a huge buzz of excitement around AI's potential, closely followed by rising concern regarding the risks if the technology is not effectively regulated.

Plenty of debate still exists around whether what currently constitutes AI is 'intelligent' in the strictest sense. However, the practical potential of neural networks like GPT-3, the AI system that powers ChatGPT is undeniable; by training neural networks and machine learning on the vast amounts of data increasingly available in a wide range of disciplines, AI can perform tasks that would otherwise be prohibitively expensive and/or time-consuming, if not impossible. It is little surprise therefore that, according to research by Accenture, 98% of global executives see AI foundation models playing an important role in their organisation's strategies within the next three-to-five years[3].

With AI seeing an acceleration in computing beyond Moore's Law, we believe AI could be disruptive in the truest sense.

It is little surprise therefore that, according to research by Accenture,

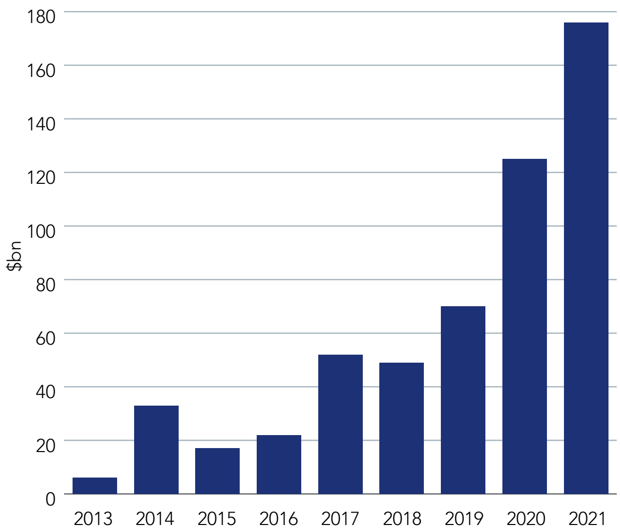
98% of global executives see AI foundation models playing an important role in their organisation's strategies within the next three-to-five years.

[2] 'The History of Artificial Intelligence', Rockwell Anyoha, Harvard University Graduate School of Arts and Science blog, August 28, 2017. https://sitn.hms.harvard.edu/flash/2017/history-artificial-intelligence/

[3] 'A new era of generative AI for everyone', published by Accenture, March 22, 2023. https://www.accenture.com/gb-en/insights/technology/generative-ai

Figure 5: Annual global corporate investment in AI

Sum of private investment, mergers and acquisitions, public offerings, and minority stakes. This data is expressed in US$, adjusted for inflation.



Source: Our World in Data, as at 2021.

In fact, the increased availability and affordability of sufficient computing power mean AI and big data tools are already becoming commoditised. As such, we believe the real differentiator will be who has access to the best datasets.

One area where we see clear potential for AI as a force for good is in the healthcare sector, specifically in the field of pharmacological research.

Drug discovery and the law of diminishing returns

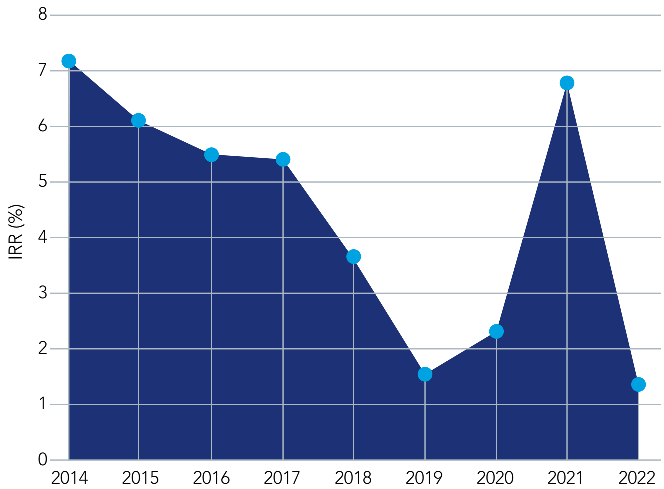
The returns on research and development (R&D) investment at big pharma have been steadily declining over the past 30-40 years. The 1980s and 1990s were marked by a steady flow of significant discoveries that saw wave after wave of exciting new drugs and treatments enter the market. However, with each new discovery, the incremental market opportunity has become smaller, while the bar for taking forward a new drug has had to be set higher.

The returns on R&D investment at big pharma have been steadily declining over the past

30-40 years.

At the same time as the market opportunity is shrinking, re-searchers are having to work harder and invest more resources to isolate potential candidates for commercialisation. As a re-sult, the sort of price deflation usually seen with technological advancement has not been in evidence in the drug market. However, AI has the potential to change that.

Figure 6: R&D returns have fallen to pre-pandemic levels



Source: 'Deloitte: Seize the digital momentum', as at 2022.

A new approach to drug discovery

Over the past few years, a handful of innovative companies have taken an entirely new approach to the problem of diminishing returns on investment in drug research. These firms aim to replace big pharma's traditional, labour-intensive approach to R&D with a tech-focused business model that harnesses the power of big data and machine learning. Rather than huge teams of researchers working in industrial laboratories, a large proportion of their employees are data scientists and IT experts.

These companies' sophisticated tech platforms can be harnessed for digitally driven drug discovery to solve big pharma's most intractable problems. Their business models combine upfront payment for projects with royalties to received throughout the lifetime of the product, providing both short- and long-term revenue streams.

The potential of this type of digitally driven medical research was demonstrated at the start of the Covid epidemic. A Canadian biotech firm (see case study below) beat every big pharma company to identify the first ever Covid-19 antibody in 2020 in just 90 days – an unprecedented speed for the industry.

A healthy dose of big data

In carrying out drug discovery projects for big pharma, companies like the aforementioned biotech firm are building up an invaluable resource of petabytes of data. Meanwhile, thanks to machine learning, with each project their AI-driven drug discovery platforms become smarter.

In carrying out drug discovery for big pharma, companies are building up an invaluable data resource.

The careful tagging and structuring of supplied and derived information can create a unique data architecture, enabling the identification of inferential patterns and grouping of molecules based on multiple characteristics. Effective collection and curation of such data will be a key differentiator that decides who wins out in the biotech and wider pharma sector over the long term. As these new tech-enabled businesses run more discovery campaigns, they build up their data libraries and refine their algorithms; this becomes a competitive advantage to drive more business through the platforms, creating a powerful flywheel effect.

The impact opportunity

Alongside the obvious commercial opportunity, digitally driven drug discovery offers several key advantages over traditional drug research that should benefit society as a whole:

- **Reduced cost:** Automating drug research significantly lowers the cost of developing new medicines, reducing the financial burden on national health services, and opening up new cures to far more of the global population.
- **Increased competition:** AI makes it possible to build a significantly enhanced and more widely accessible R&D capability in the pharma sector, creating a more competitive market.
- **Greater innovation:** Using AI, it should be possible to crack health problems that have hitherto remained beyond the reach of traditional medical researchers.

Taken together, we believe these factors provide a clear argument for the inclusion of digitally driven drug discovery in our Impact Opportunities Strategy.

Using AI, it should be possible to crack health problems that have hitherto remained beyond the reach of traditional medical researchers.

Canadian biotech firm

The holding is a Canadian biotechnology company focused on accelerating antibody discovery and resolving the toughest problems in drug development. Using its proprietary engine, it partners with drug developers of all sizes to push therapeutic programmes forward and fight disease.

Impact themes:
Health & Wellbeing
Impact Enablers

The company is shaping up to be a key disruptor in the pharmaceutical sector. The firm has built an end-to-end antibody discovery engine with its own data handling and visualisation architecture. The differentiation in its business model is demonstrated by the fact that a quarter of its employees are data scientists and engineers.

In its 10-year history, the company has arguably built out the most advanced antibody discovery capabilities in the entire pharmaceutical industry. This is illustrated by several recent successes:

Covid-19: The company discovered the first Covid-19 antibody within 90 days, the speed of which was unprecedented.

T-cell engagers: It has created a menu of more than 500 artificial antibodies from which drug developers can select candidates for use as anti-cancer treatments.

GCPR: Partnership with another major biotech firm, in progressing a drug candidate for a target known as G protein-coupled receptors (GPCRs) to Phase 1 clinical trials. GPCRs are important because they mediate most cellular responses to hormones and neurotransmitters, but until recently they had proven an intractable problem for the industry. Despite the aforementioned having arguably the strongest antibody capabilities in the industry, the companies chose to enter a partnership on GPCR research – a huge vote of confidence in the holding company's capabilities.

> **A quarter of all the company's employees are data scientists and engineers.**

Why we're invested

We see massive potential in AI-powered drug discovery and believe investors have yet to wake up to the full scale of the opportunity. Within this new discipline, we believe the business stands out for several reasons:

- **Leading IP:** Born from the research of its founder, the company has leading intellectual property rights in the key fields of micro-fluidics and single-cell sequencing.
- **Proprietary technology:** The firm's unique end-to-end platform is transforming access to digitally driven drug discovery, generating an enormous amount of value potential.
- **Unique data assets:** The company has unparalleled data handling expertise and is building up a wealth of proprietary data on antibody discovery to further enhance its competitive advantage.
- **Strong pipeline:** The business has an impressive client list, with nearly 180 contracts signed for antibody discovery and nine molecules already in clinical trials.
- **Proven results:** As well as discovering the first Covid-19 antibody, in a single screening campaign lasting a few weeks, the company's engine identified 12 antibodies against a tumour cell target – only two had been discovered via traditional research in the previous 40 years.
- **Future returns potential:** The company's revenue model is based on downstream participation in the drugs it helps develop, creating the potential for ultra-high returns from a diversified stream of royalties across its partner base.
- **M&A catalysts:** Recent M&A activity highlights the significant value that is sitting in the host of *pre-partner* programs that the business has successfully initiated. The company has hundreds of molecules which could be monetised for amounts in excess of US$100m.

The company in numbers

1/4	Proportion of all employees who are data scientists and engineers
500	Number of molecules in the firm's T-cell engager platform 'menu'
177	Number of signed contracts with clients for antibody discovery
12	Number of antibodies discovered against a tumour cell target in a single screening campaign (in the past 40 years the entire industry has discovered just two)

To find out more about our Impact Opportunities Equity Strategy, please visit our website.

The private equity route

For investors looking to get ahead of the curve on AI, private equity may be the answer.

Patrick Fuchs
Senior Associate, Federated Hermes GPE

At Federated Hermes GPE, we seek to put capital behind long-term growth trends. We see the pace of change in technology accelerating, as expressed in the recent advances in Artificial Intelligence (AI), as creating significant investment opportunities. Yet we are keenly aware of the risk of investing at the wrong point in the hype cycle. That's why we are strong believers in diversification as a way of building robust investment portfolios for our clients.

At the core of our investment beliefs is a diversified thematic investment model. We carefully monitor market changes that create risk and opportunities across all industries and geographies. We're interested in long-term structural trends – or megatrends – that could reshape global economic activity over the next 10-20 years, not just short-term shifts.

AI sits within our 'accelerating technological innovation' megatrend as an underlying technology platform. It is not confined to one industry and sector and will likely impact a broad variety of companies. Therefore, we do not try to confine our scope to certain industries but employ a diversified approach to explore opportunities from multiple angles. AI, for example, has the potential to significantly impact digital enterprise architecture, data and cybersecurity, fintech, the internet of things (IoT), e-commerce and the digitalisation of life sciences.

It is easy to fall into the trap of investing too early in innovation when the market opportunity and business models are unproven.

We have invested in several companies benefiting from the recent trend of generative AI, such as a Sweden- and US-based native graph database platform that enables efficient analysis and storage of data. Additionally, we have invested in a Portugal-based platform that enriches machine learning training datasets with efficient workflows and through crowdsourcing.

In addition, a variety of companies in our portfolio offer AI-based solutions to their customers such as a UK-based fintech platform that eases direct debit payments for customers and enterprises, and utilises machine learning and AI to conduct automatic fraud checks and pattern recognition.

Investor discipline

What's obvious is that some industries will be faster to adapt to AI than others. This will create opportunities to invest in businesses that have learned lessons elsewhere and can apply them across sectors. Once certain maturity has been reached in solutions and markets, we can spot more specific opportunities.

In this, we do not operate like early-stage venture capital firms, looking for companies that might have sharp hockey-stick-type growth curves. Our focus is on fundamentally sound businesses with predictable revenue and earnings growth within the investment horizon. We are cognisant that the investment universe is large and growing – and that AI will generate a variety of niche or local champions in their respective fields in which we can invest.

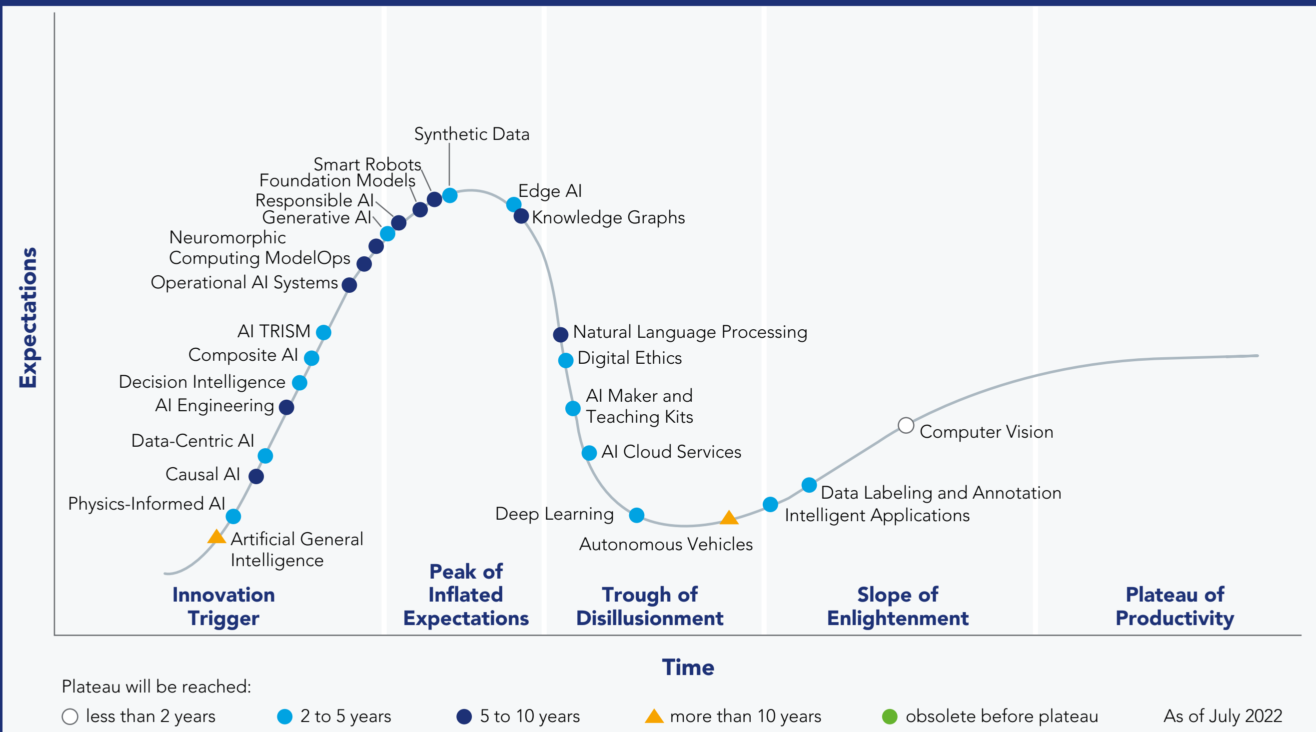
It is easy to fall into the trap of investing too early in innovation when the market opportunity and business models are unproven. Especially in hyped, very hot and trending markets such as AI, investor discipline is crucial to avoid falling into a trap of high entry valuations, inflated expectations and unnecessary risk. While seeking growth opportunities, as investors, we also need a healthy dose of scepticism.

Has AI hype jumped the shark?

The Gartner hype cycle is a concept developed and updated each year by US advisory tech firm Gartner to illustrate the different maturities and stages of adoption of various applications within AI.

According to a recent iteration of the cycle, while many applications are close to reaching peak hype territory (not least generative AI), some areas – such as autonomous vehicles – are currently languishing in Gartner's 'trough of disillusionment'. Other areas, most notably computer vision and data labelling and annotation, are well along the path to broad adoption and implementation.

Figure 4: Applications of AI – the stages of adoption



Source: Gartner as of July 2022.

Significant differences

In terms of an entry point, we typically avoid companies in the early stage of their development; before they are generating revenue or have yet to find their product market fit, even if growth and return prospects may seem exciting. We look to invest once a company has a sustainable source of revenue, with proven unit economics indicating a robust business model, where risk remains largely in the business plan execution, and where the company requires capital to scale sales and operations.

Growth equity, in particular, is well suited to invest in emerging themes. We can identify and back companies in fast-growing market niches earlier than public market or private equity buyout investors. As it stands, most AI companies are still privately held and not publicly traded, and it will take a significant amount of time until public market investors get broad access to new business models and under-the-radar innovation champions in this segment.

Our ability to hold an investment over the long term and incentivise the management team through strong alignment can enable companies to focus on their own growth and further accelerate the technological advances with less noise from market cycles.

A significant volume of private equity capital has been injected to the wider technology sector over the past decade, allowing it to grow exponentially and creating new sector-leading companies in the process. We believe AI will likely follow a similar route – including the ups and downs that entails.

Learn more about Federated Hermes GPE by visiting our website.

Part two:
How should asset managers use AI?

The game changer

AI could provide the ‘secret sauce’ that shifts momentum back from passive to active investing.

Frank Amato
Director of Advanced Analytics & Business Intelligence, Federated Hermes

Imagine this: An investment manager who listens to every single earnings call made by every single company, in every industry sector, every single quarter. Who then faithfully transcribes and summarises each of those calls before scanning the resulting text for key words, hidden language patterns and trends. Who then, finally, and best of all, uses all of that amalgamated insight to make unique investment decisions in pursuit of investment returns no one else can achieve.

None of this is science fiction. This is science fact and it’s happening now. As you read this, asset managers the world over are finding ever new and unique ways of embedding the power of AI into their processes to extract hidden alpha, to improve their customer experience and to win new business. And unlike other industries - think media/entertainment, for example, where the likes of Netflix have been using artificial intelligence to understand your viewing preferences for decades – in financial services we are only at the very beginning of the journey.

Or consider a different scenario, this time to do with client retention. Here, an asset manager might experience a redemption. In response, they key in all of their client engagement data leading up to the redemption, comparing and contrasting which strategies have been successful in defending assets and which strategies have led to redemptions: How many times was the client contacted in the months leading up to the redemption? What form did that contact take? Was it face-to-face or over the phone or on Teams? How long was the discussion? By comparing all the engagement across the business with its clients, the AI-enabled asset manager designs successful strategies and help us implement them.

Or how about request for proposals (RFPs)? Today you can use AI not only to help you put together an RFP but also to replicate and interrogate how the recipient of that RFP report will respond. That’s a scenario where AI can tell you whether you’ve answered the questions fully, whether you’ve been ‘light’ on any of your answers, or whether there are any internal contradictions in the content you’ve put together. It could even provide pointers on sentiment: Will the copy you’ve provided make the recipient feel happy or sad?

AI will also play a huge role in cyber security. We already have examples of bad actors using generative AI to write code to outrun defences put in place by companies to prevent hacking. What’s incredible is that this is happening in real time. So already, in essence, we have hacking AI and defensive AI going head-to-head.

The generation game

In terms of what's hot and what's not, Generative AI is absolutely 'the thing' right now and there's a ton of opportunity – whether that's from an investment perspective, from a client servicing perspective, from a sales perspective, or from an operational efficiency perspective.

What we're looking at in all of these scenarios basically boils down to one thing: AI's superhuman ability to discover hidden patterns. And while humans might be able to schedule time to manually interrogate data, an AI programme can do it consistently, automatically, thoroughly and without being distracted by the one-hundred-and-one things that come between humans and their to-do lists at work. In this sense, the way to look at the AI capability right now is as a second person sitting at the table improving efficiencies and providing insights that wouldn't otherwise be there.

> **What we're looking at in all of these scenarios basically boils down to one thing: AI's superhuman ability to discover hidden patterns.**

What's remarkable is the speed at which innovation is taking place: what's true about AI and its applications today is very unlikely to be true tomorrow.

What we can say with some certainty is that future generations will look back at the developments happening now – and, rightly, they will view the outcomes as a seismic change from what went before. From a philosophical point of view, you might ask a broader question: is technology developing faster than humanity's wisdom and ability to use it – but that's a bigger question and one for a different forum than this report.

To find read more insights from the US, please visit our website.

The three laws of robotics

In his 1942 short story 'Runaround', science-fiction writer Isaac Asimov postulated three laws that could frame the ethical development of robotics.

- **First Law**
  A robot may not injure a human being or, through inaction, allow a human being to come to harm.
- **Second Law**
  A robot must obey the orders given it by human beings except where such orders would conflict with the First Law.
- **Third Law**
  A robot must protect its own existence as long as such protection does not conflict with the First or Second Law.

Though Asimov had humanoid robots in mind when he wrote the laws more than seven decades ago, commentators have subsequently argued for a similar framework to be created to govern the development of AI.

The three godfathers of AI

In 2018, Prof Yann LeCun won the Turing Award with Geoffrey Hinton and Yoshua Bengio for their breakthroughs in AI and all three became known as 'the godfathers of AI'.

Two of the three 'godfathers' have subsequently warned of the dangers of unregulated AI, with only Prof Yann LeCun saying recent advances offer no threat to the future of humanity.

Until his retirement in May 2023 Hinton worked for Google. Prof LeCun now works as the chief AI scientist at Meta, the parent company of Facebook, Instagram, and WhatsApp. Bengio remains as a faculty member at the Université de Montréal.

Calling all clients: Five ways AI will change the world

Joined-up data, higher productivity and enhanced service. For clients, the AI 'what's-not-to-like?' list is a long one – but could there be more to it than meets the eye?

Mary Green
Vice President, Client Portfolio Manager, ESG & Hermes

Behind the scenes, around the world, a multitude of companies are taking part in a do-or-die race as they find ways to incorporate artificial intelligence not just into back-office processes but into customer-facing applications, too. The prize if they get it right is the breaking down of silos, better, more reliable data and a vastly enhanced client experience.

With its scope to enhance productivity, AI could change the nature of client relationships, elevating the advisory role of professional investors. Likewise, for regulators, it could deliver polished-up compliance and an easier route to audit companies in the sector.

> **Over the last decade, machine learning has contributed to models that help clients systematically define financial goals and objectives.**

Broadly speaking, we believe there are five ways AI stands to improve the client experience—from retail to institutional:

1. Increased personalization:

Over the last decade, machine learning has contributed to models that help clients systematically define financial goals and objectives. In the wealth management space, for example, AI models help clients understand spending and saving patterns, and reveal insights around the feasibility of early retirement or other big financial goals.

In the future, predictive analytics in the front office will identify client events triggering 'money in motion' and advice opportunities. However, this requires Big Data, while advisors currently have Small Data. And of course, generative AI can be used to produce super-personalized content from emails to newsletters, creating resonance with clients (and bolstering success of marketing campaigns).

2. Customer empowerment:

AI will improve client education, and generative-AI searches are already leading to more informed clients. Tech-savvy younger investors commonly favor digital touchpoints over traditional 'in-person' client servicing…at least at first when their needs are less sophisticated.

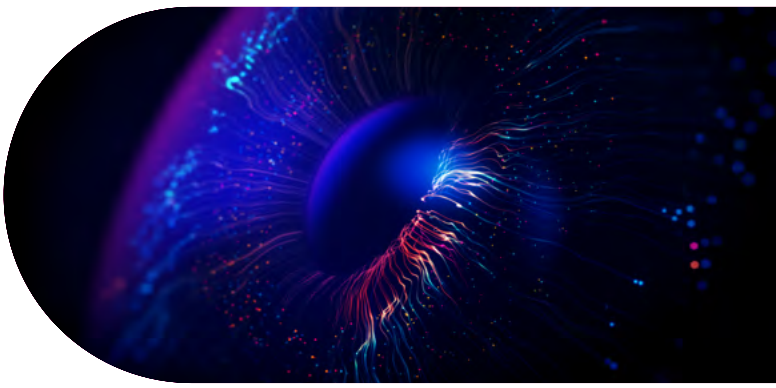
Likewise, institutions can model investments using machine learning and Natural Language Processing (NLP) and come to their asset manager prepared to discuss solutions. Prepared clients armed with potential financial solutions create elevated investment discussions; however, they need domain expertise of professional investors to validate and vet solutions.

Here, the caveat is that AI is more adept at deductive vs. inductive reasoning. When the cost of being wrong is high, humans will always tend to seek help from humans! (Would you pursue a health treatment protocol suggested by an algorithm without checking your symptoms with a doctor?)

3. AI as efficiency generator:

AI comes with the promise of a richer client experience as it automates routine processes and frees up investment practitioners to focus on higher value, strategic tasks.

In the back office, AI can enable intelligent data capture through machine learning (e.g., read handwriting, scan forms for key data etc.) and solve for repetitive manual processes. Quick business intelligence, efficient data migration and simplified data storage solutions would be the end result.



4. Reduced costs and convenience:

Machines performing more lower-level—albeit important—administrative tasks is inherently disinflationary. As costs come down in financial services, the consumer will ultimately benefit.

AI-powered robo-advisors are a cost-effective solution for individual investors with straightforward needs. Robo-advising relies heavily on the application of AI across all dimensions of asset management—from digital onboarding to advice algorithms based on client inputs.

They are particularly attractive to younger, tech-savvy investors, and create a doorway into full-service investment advisory services. Robo advising was particularly popular during the pandemic, with investors on lockdown and markets on melt-up. However, use of robo-advisors fell with the dislocation in the markets in 2022, suggesting that when the stakes are high, human interactions count more[4].

5. Better compliance and risk mitigation:

Automation is critical to simplifying regulatory compliance, and AI applications can assist asset managers with compliance pain points. Many asset managers maintain disparate sources of data, so there is no single source of truth[5] across applications.

> **Automated data processing, such as intelligent data capture, creates a compliance audit trail for asset managers.**

Automated data processing, such as intelligent data capture, creates a compliance audit trail for asset managers. AI can also be used to spot trends and abnormalities in business systems, highlighting potential fraud activities. From a client perspective, the elimination of data silos, and the consolidation of data onto a single platform, will reduce performance reporting errors.

Will algorithms disintermediate professional investors, or augment their capabilities? We bet on the latter—a future where machines augment the intelligence of clients and professional investors alike, and where humans remain central to the asset management client service model.

Technological solutions in the front and back office require constant human interaction to validate, update and regulate them, which make them far from artificial. While AI will find its way into trading systems and other functions, fiduciary duty should never be outsourced to algorithms.

Figure 8: The future of robo-advisors in investment management

- Despite their potential, standalone robo-advisors are not yet widely adopted by the mainstream market.
- They are struggling to become profitable.
- Additionally, these robo-advisors have faced challenges during uncertain and highly volatile bearish market conditions, which require testing to ensure their effectiveness.

Source: Gyan Consulting

[4] Source: Robo-advisers struggling to retain investors in 2022, research finds Investment News, 10/5/22.

[5] Single source of truth (SSOT) is a concept used to ensure that everyone in an organization bases business decisions on the same data.

Part three:
The second-order effects of AI for society

Automatic for the people

Artificial intelligence (AI) is having transformative effects on businesses, as well as people's daily lives.

Nick Pelosi
Associate Director of Engagement, EOS[6] at Federated Hermes Limited

This year, there has been a surge in interest in AI, as well as significant news flow and commentary in the media on the dangers it poses. This includes:

- More than 1,000 business leaders, tech researchers and others signed an open letter calling for a moratorium on the development of the most powerful artificial intelligence systems[7].
- As generative AI tools proliferate, the biases they reflect, albeit generally unintended, risk perpetuating stereotypes such as by gender or race that threaten to stall progress toward greater equality[8].
- AI deployment could lead to significant societal harms and even raises existential threats, but there is currently little agreement on how to regulate it[9].

EOS's approach to engagement on AI

EOS has been engaging on the business and wider societal impacts of artificial intelligence (AI) since 2017. In 2022, we consolidated our approach to engagement on this topic under the wider sub-theme of Digital Rights, which we define as human rights specific to digital products and services.

> **EOS has been engaging on the business and wider societal impacts of artificial intelligence (AI) since 2017.**

EOS's Digital Rights Principles set out our core expectations of companies on AI. These explain that companies should ensure robust governance and policies over AI. Companies should disclose the range of purposes for which they use algorithmic systems; explain how they work, including what they optimise for and what variables they take into account; and enable users to decide whether to allow them to shape their experiences[10]. Companies should take action to eliminate unintended racial, gender, and other biases in algorithms, including those recommended by the Equal AI Checklist to Identify Bias in AI.

Our Investor Expectations on Responsible AI and Data Governance, published in 2019, sets out a full engagement framework based on six principles as follows:

- **Trust:** Companies should earn trust by educating users on their rights to data privacy and give users control and the right to consent to the use of their data by providing fully free choices.
- **Transparency:** Companies should be transparent about tracking methods in the full value chain and disclose how they measure the robustness of data governance and the fair and safe use of AI. Companies should inform users when their data is being used for scoring and screening purposes.
- **Action:** Companies should thoroughly explore and make all reasonable efforts, in good faith, to avoid unintended consequences such as data and process bias, which may lead to discrimination.
- **Integrity:** Companies should demonstrate integrity in the treatment of customers, suppliers, and users. They should avoid user manipulation, including approaches that encourage addiction, such as shopping, gaming and device addiction that goes beyond the limits of targeted advertising. Companies should have risk disclaimers about addiction and consider providing users with an opt out option from targeted advertising.

[6] EOS at Federated Hermes (EOS) is a world-leading stewardship service provider. Founded in 2004 on a legacy dating back to 1983, EOS advises on more than US$1.3tn in assets (as at 31 December 2022) to deliver corporate engagement and proxy voting services .
[7] Elon Musk and Others Call for Pause on A.I., Citing 'Risks to Society' - The New York Times (nytimes.com)
[8] Humans are biased. Generative AI is even worse - Bloomberg
[9] The EU is leading the way on AI laws. The US is still playing catch-up. Everyone accepts that AI is dangerous. Agreeing on what to do about it is a different story – The Guardian
[10] Companies should take actions to eliminate unintended racial, gender, and other biases in algorithms, including those recommended by the EqualAI Checklist to Identify Bias in AI.

We will continue to engage on AI as a human rights issue and are closely exploring the overlay with two other themes: human capital management/DEI and wider societal impacts.

- **Accountability:** Companies should establish a clear accountability system internally and externally within their AI development and application ecosystems. There should be an appropriate due diligence process for supply chains and third-party access. Companies should build systems that allow for auditability and put in place appropriate insurance where possible.
- **Safety:** Human safety is of paramount importance, especially when it comes to access to critical services, such as water, electricity and healthcare or control of transportation such as autonomous vehicles. Companies should demonstrate that their AI applications put human safety as a priority over profit and revenue

This report also sets out a **'three lines of defence' model for Trusted AI implementation.** Each category of the assessment is mapped to the principles and analytical framework (legal and financial factor analysis and salient social impact analysis) that we highlighted in the April 2019 paper. Ethics sits at the core and is the first line of defence. Risk, Governance and Audit form the second line of defence. Responsible use of AI embedded in strategy and operations is the third line of defence.

Updates to our approach

Given the rapid pace of new developments in AI, we continue to review and evaluate our engagement approach. We will continue to engage on AI as a human rights issue and are closely exploring the overlay with two other themes: human capital management/DEI and wider societal impacts.

Human capital management/DEI: In 2017, McKinsey estimated that these technologies could displace 15% of the global workforce by 2030, as the midpoint of their scenario range[11]. These technologies impact employment, wages, and working conditions through the displacement effect, in which they replace workers or suppress wages, and the productivity effect, in which they enhance workers' efficiency or create new jobs[12]. Optimists assert that the productivity effect will offset the displacement effect as was the case during the industrial revolution and other technological advancements. We expect companies to 'show' (demonstrate) rather than 'tell' (claim) that this is the case.

We expect companies to disclose if and how their use of AI, automation, and robotics are impacting their workforce.

We expect companies to disclose if and how their use of AI, automation, and robotics are impacting their workforce. Disclosure should provide quantitative and qualitative information about jobs displaced and other impacts to employment, wages, and working conditions; describe policies and practices for managing impacts such as ensuring workers are given sufficient notice and/or priority for other open positions; and demonstrate evidence of retraining, upskilling, and other forms of financial or technical support for workers impacted by the transition.

Wider societal impacts:

An evolving issue, which may require more consideration, is company lobbying on AI regulation. Strong AI regulation that mitigates unintended risks inevitably slows innovation to some extent. However, major players in AI, including Google and OpenAI, recognise that consistent, global, and collaborative regulation may be necessary to avoid a 'race to the bottom' and mitigate extreme risks[13].

We may therefore spend more time looking to understand the approach that companies are taking to AI regulation, with an expectation that they support a regulatory approach which helps to mitigate the risk of societal harms and any resultant financial impacts on businesses.

Additionally, companies should go beyond compliance with regulations when it comes to deploying responsible AI through human rights due diligence throughout the business, including on capital expenditure being spent on AI or other emerging technologies. These procedures should show how risks to wider societal outcomes are considered in business decision making as well as clear no-go areas or restrictions being imposed on technologies.

[11] mgi jobs lost-jobs gained report december 2017.pdf (mckinsey.com)
[12] A new study measures the actual impact of robots on jobs. It's significant. | MIT Sloan
[13] Perspectives on Issues in AI Governance – Google, Governance of superintelligence - OpenAI

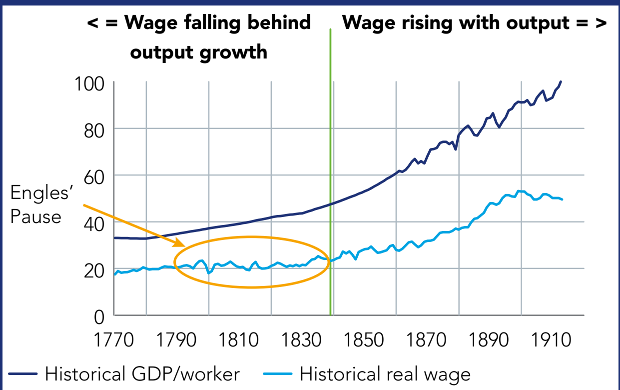
Will we see Engels' pause 2.0?

During the UK industrial revolution in the 18th century, and helped by innovations in technology, GDP in the UK grew explosively. Average wages, however, remained stagnant. This reflected a stark fact: that the fruits of the technology-driven improvements in productivity remained concentrated in the hands of the few rather than being distributed more broadly through society.

Friedrich Engels, friend and collaborator of Karl Marx, was the first to notice this – hence the name given to the phenomenon, 'Engels' pause'.

Today, as we stand on the cusp of a new AI-driven industrial revolution, we could ask the question: Are we set for Engels' Pause 2.0?

Figure 9: The two phases of the British Industrial Revolution



Source: Allen, R.C. Engels' pause: Technical change, capital accumulation, and inequality in the british industrial revolution. Explor. Econ. Hist. (2009), doi:10.1016/j.eeh.2009.04.004.

EOS's engagement on AI

EOS currently engages on over 60 objectives or issues that relate to AI, with over half of the companies engaged being in either the software or financial services sectors. Many of these issues and objectives aim to ensure that companies have appropriate ethical AI and data governance principles in place. Below are some examples of this engagement.

- **Sector use case:** Technology

The technology sector is leading the development of AI itself while also using AI for numerous purposes. For example, social media companies use AI to curate, rank, and recommend online content, targeted advertising, search results, and political news. AI advances human development, but there is the potential for misuse. Tech companies are increasingly powerful in influencing users' behaviour or contributing to social segmentation, while exerting significant control over media consumed. Recently, the US Surgeon General issued a new advisory on the effects of social media on youth mental health. We ask companies in our engagement program to build trust in responsible AI through various actions. For example, we asked one social media company to demonstrate that its business model does not incentivize problematic content and to include one of its key offerings in its human rights impact assessment. We encouraged another company in the sector to enhance disclosure of the policies and processes it uses to enforce child age restrictions and an assessment of their effectiveness. We recently completed an objective seeking for a third company to publish principles for responsible use of AI.

- **Sector case study:** Financial services

AI is being widely deployed across the financial services market today. Several specific applications include risk management, chatbots, virtual assistants, underwriting, fraud detection and algorithmic trading. The biggest issue in AI deployment is the potential for racial and gender bias. We have engaged on this issue to gauge how companies are thinking about it. We have also asked companies to publish ethical AI principles that their AI models follow and to consider conducting a bias assessment. At a leading North American financial institution, for example, we began engaging on ethical AI in Q1 2022 and were pleased to see the company begin an algorithmic fairness impact assessment and an AI fairness pilot this year. At another North American bank and asset manager, we discussed how the company is approaching the risks associated with bias in AI and learnt that the company doesn't use AI for candidate selection, has a technology committee at the board for oversight, and uses a framework to eliminate bias in algorithms. At another company, a Japanese multinational investment holding firm, we have requested guidelines and/or policies on responsible AI as the company makes significant investments in technology firms.

To learn more about EOS stewardship at Federated Hermes, please visit our website.

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