5 Sectors & AI: Hold On

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Executive Summary

Generative artificial intelligence (AI) provides a step-change evolution in the use of data. Its application is already proving disruptive because of superior accessibility and investors need to understand how widespread the potential is. In this white paper, we show how five sectors are utilising machine learning and accelerating pre-existing data science capabilities.

Our conclusion is that even though information technology has already been identified as the main AI winner, it's worth holding on as we have not yet seen the full impact of AI across sectors. Meanwhile, the market may have overlooked fast technological developments in health care and financials, while industrials could see a less cyclical revenue stream. Finally, there are single-company winners in consumer discretionary, but the case for the whole sector is more difficult.

Overview: The Impact of AI on Sectors

AI will have far-reaching effects across all sectors. However, we believe there are certain sectors that stand to undergo the most significant changes and are worthy of comment now because of how they are already using new capabilities.

Despite being in the early stages of development and adoption, the potential advantages of AI, and in particular the capabilities of generative AI and large language models (LLMs), are hard to ignore. The huge potential means that these new machine learning abilities have grabbed headlines in 2023, even though pre-existing uses of advanced analytics, machine learning algorithms and deep learning — as seen in manufacturing robots, chatbots, and autonomous driving features, for example — were already commercially available.

Given the pace of change and disruption, it is difficult to pin a figure on AI's potential. There is an often-quoted estimate of a 40%+ increase in productivity by 2035, but this can be traced back to an Accenture report written five years ago. More recent reports mention that 35% of businesses globally are utilising AI and another 42% are exploring the technology (according to an IBM report as of 6 July 2023), and that current generative AI technologies have the potential to automate work activities that absorb 60–70% of employees' time today (McKinsey report as of 14 June 2023).

AI use could financially benefit most sectors of the economy in most countries (we are not considering employment or social impact within this paper). Lower costs and greater efficiencies will benefit corporate productivity, and equity investors in general could be the winners. Nevertheless, we expect that some sectors will benefit from the new opportunities more than others. We have selected five sectors that look most interesting and explore a few of the AI (narrow and generative) applications already happening. The accelerating field of data science means that this paper may only scratch the surface of AI use cases.

A Word On Terminology

Machine learning (ML) is a big part of AI, and deep learning (DL) and use of neural networks, which have powered many of the recent advances in AI, are in turn a big part of ML. We are using the names interchangeably in this paper. Natural language processing (NLP) is a branch of AI that enables computers to understand, interpret and manipulate human language.

Advances in DL and NLP that have enabled machine translation, text summarisation, and language modelling have resulted in large language models (LLMs), which have produced the new headlines. LLMs are just one type of foundation model whose applications result in generative AI (again we use these phrases interchangeably).

Information Technology

What can we say? AI is really changing the game for tech companies. There are many applications.

The applications of generative AI are a step-change evolution allowing the processing of extremely large and varied sets of unstructured data and the ability to perform more than one task.

It has been suggested that about 75% of the value of utilising generative AI could be delivered in four areas: customer operations, marketing and sales, software engineering, and R&D (McKinsey report as of 14 June 2023). This would benefit corporate operations in all parts of the economy (i.e. all 11 sectors). **However, just one sector has the software, hardware infrastructure capabilities and semiconductor production necessary to build AI models and AI applications.**

Figure 1
**Revenue From
Training AI ($bn)**

- Generative AI IaaS
- AI Server
- AI Storage
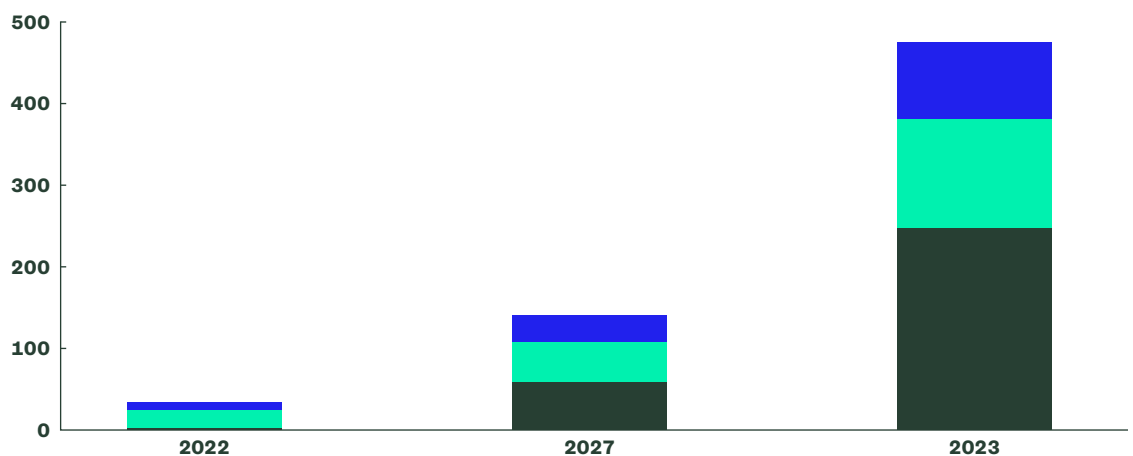
Source: Bloomberg Finance L.P., as of 1 September 2023.

Chips with Everything

Advanced microchips are essential for running the huge computations required for generative AI, in particular the training of LLMs. This has seen the move from CPUs to GPUs (graphic processor units), which have been developed for intensive image and video processing. This has brought the dominant supplier, Nvidia, strongly into focus. Recent quarterly results from the company show that demand for its accelerators is still extremely high.

Nvidia's competitors, including AMD and Intel, are accelerating their AI circuit development. In the meantime, their less-powerful AI chips can be used by smaller scale LLMs, utilised in more specialist ways or in house (which seek to keep corporate data private).

Hardware Necessities

Increasing use of AI necessitates greater processing ability and storage capacity for the enormous growth in data being generated. Data centres are critical. Increasingly, the provision is shifting from on-premise data centres to cloud hosting. A proliferation of companies, including telecoms and property, have traditionally owned physical data centres, but today the largest cloud providers are Microsoft Azure (in this sector), Amazon Web Services and Google Cloud Platform (part of Alphabet).

Cloud computing provides the computing resources and infrastructure needed to train and deploy AI models at scale. Provision to companies is through public, private or hybrid clouds and is increasingly sold as a service (such as "software as a service" or SaaS) giving access to an increasing number of applications.

At the same time, AI is enhancing cloud computing capabilities. AI-powered systems are increasingly used to automate complex tasks and optimise system performance. Customer experience is improved with the likes of web traffic tracking and issuing alerts on suspicious user activity. AI enables extensive data management and cloud computing maximises information security with benefits to business intelligence units, as data can already be mined and filtered.

This explosion in AI demand is driving a wholesale shift in data centre infrastructure, with a need for more power circuits, cooling infrastructure, and other advanced electronic products. Outside IT, industrials may be another sector to consider for electronic hardware elements.

Software Development Quicker & Cheaper

All software providers have the potential to add value with AI technology, bringing new revenue streams and hastening the development process.

NLP is already enabling the addition of new products and enhancements to existing services, examples being predictive modelling, conversational AI, and image recognition. This is giving revitalisation to established software providers such as Adobe, with its Firefly tool creating images from text in competition to the better known DALL.E and Midjourney offers. Salesforce.com provides predictive modelling and other AI applications in its customer relationship management software. IBM is showcasing conversational AI abilities with Watson. The group's supercomputer showed early use of AI with health applications (see the section of this paper on health care) and an NLP with its question answering computer system.

The rapid advances are probably best understood with additions to productivity tools, including customisation of search and personal productivity assistants. In our view, Microsoft's Copilot is probably the broadest application yet.

Software development is dramatically accelerated by using ML in the coding process. AI coding assistants, such as Microsoft's Github, enable developers to write code faster and more accurately by leveraging artificial intelligence that helps to edit and suggest code. A 70% annualised drop in training costs and feedback loops is possible with coding assistants, increasing the output of software engineers by approximately 10-fold by 2030.[1]

Tech Winners Large tech companies will undoubtedly be among the AI winners, with likely candidates including:

Nvidia Despite months of analysis to find another, it is still the AI king. Nvidia has 86% of the accelerator (GPUs and other specialised chips) market with the processing power essential for generative AI models, particularly at the training stage. Their H100 chip, and the earlier A100, have been essential to LLMs. An example of the speed of development is that H100 is 9x faster for AI training than its predecessor and commanding a price of up to 3x more.

The most serious rivals to Nvidia in AI chips are AMD, which launched its new GPU MI300X in June, with production set to ramp up in Q4, and Intel, with an AI accelerator pipeline of $1 billion as of end-July 2023. Concerns over short supply suggest there is room for more providers. The market for AI accelerators could rise five-fold to $150 billion in 2027, according to AMD.

Escalating chip production is likely to boost ASML's order books. Europe-quoted ASML is the global leader in manufacturing lithography machines, which are used to produce high-performance AI chips.

Microsoft The huge AI excitement really all began with the launch of Microsoft-backed OpenAI's large language model. ChatGPT is just one of many AI models that Microsoft is likely to bring to market in the vast development, public cloud infrastructure, and desktop application categories. Microsoft is almost unique, with three key components required to build and monetise foundation models with its compute scale (via Azure and Office 365), data scale (public cloud infrastructure and desktop applications), and data management expertise (SQL and Access). Microsoft even claims to have the greatest supply of AI chips in its possession while everyone else is short!

A word on Apple. The company has seemingly been left behind, despite early use of AI to power Siri. There is development of on an AI-powered health coaching service and technology for tracking emotions, but we're sure there is much more to come. Heavy AI workloads, as well as facilitation of conversational AI and computer vision, are likely to increase the replacement cycle of smartphones and PCs.

Technology share prices have soared this year on AI potential, making valuations rich. Nevertheless, we believe that growing long-term possibilities, including those not acknowledged yet, make this a sector to hold on to.

Health Care

AI developments in health care have largely been below the radar so far, but this will change.

Health care has been benefiting from transformational emerging technologies, for several years, without much fanfare from investors. For example, Pfizer has used IBM's supercomputer Watson since 2016 to accelerate drug discovery and development, particularly in immuno-oncology treatments. Deep Mind's AlphaFold (part of Alphabet), launched in 2018, has been instrumental in predicting the 3D structure of a protein. And Hong Kong-based Insilico Medicine already produced the first fully AI-based preclinical candidate some years ago.

We believe that AI technology applied to vast data sources could fundamentally change the R&D process and health care services across the sector.

AI Revolutionising Drug Discovery

Of greatest excitement to us in our AI research is the (rather quiet) revolution in drug discovery. Speeding up R&D from today's decade-long process to find and launch a new treatment should have huge cost benefits for pharmaceutical and biotech companies. Testing of drug candidates should become much cheaper and more efficient. The hit rate of experimental medicines should rise. More than 95% of those currently in the development pipeline are expected to fail, according to the National Center for Biotechnology Information.

We should also see top-line growth from new drugs and repurposed drugs. Morgan Stanley estimates that AI in early-stage drug development could bring an additional 50 novel therapies, worth more than $50 billion in sales over the next decade.

Figure 2
Drug Discovery Known to Take 10–15 Years or More, Cost > $1bn, >90% Failure Rate

Target Validation	Compound Screening	Lead Optimisation	Preclinical Research	Clinical Research: Phases I, II, III	FDA/EMA Drug Review
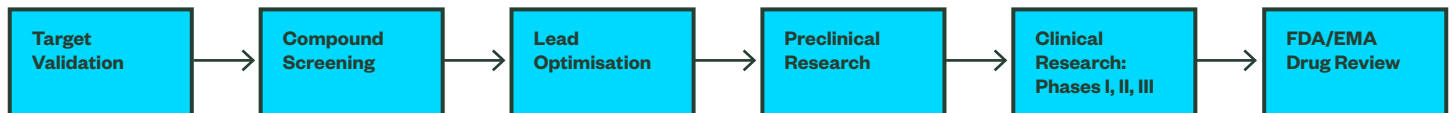
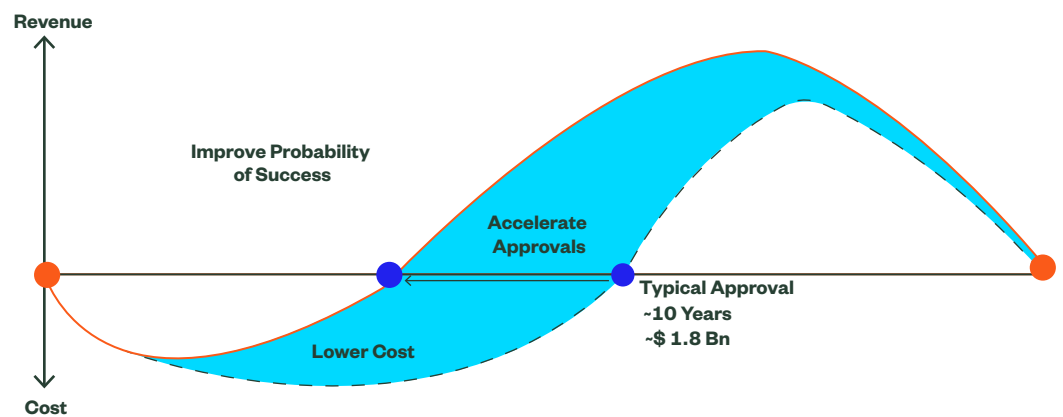Source: Adapted from FDA, DeepPharmaIntelligence, Exscientia.

The application of AI technology can already be seen helping the following processes:

1 **Aid structure-based drug discovery** in predicting 3D protein structure, which can help anticipate the impact of new chemical compounds.

2 **Predict key drug properties** such as the toxicity, bioactivity and physicochemical characteristics of pharmacological molecules. ML trains software using data generated from earlier compound optimisation, which bypasses the need for simulated testing of new drug candidates.

3 **Model polypharmacology** to identify unintended drug-target interactions and off-target activities of new chemical compounds.

4 **Identify patient response markers** predicting the most likely response to a particular treatment.

5 **Test compounds with lab robots** to give improved accuracy and reproducibility, as well as exhaustive, searchable record-keeping.

6 **Optimise clinical trials** by leveraging electronic phenotyping (using electronic health records to characterise patients' conditions) and using biomarkers to select patients.

7 **Generate documented reports** that are necessary during clinical development.

Figure 3
Application of ML Could Achieve Faster Cycle, Lower Cost, Higher Success Rate

■ Typical Economic Lifecycle of a Drug

■ The Goal of AI-derived Drugs for Improving the Economic Lifecycle of Drugs

Source: Adapted from FDA, DeepPharmaIntelligence, Exscientia.

The use of AI methodologies was evident during the COVID pandemic, especially to find new therapeutic use for existing drugs and speed up experimental testing. Pfizer was particularly active in its use of AI to develop its Comirnaty vaccine with BioNTech.

Most major pharmaceutical companies have exciting projects with AI start-ups. Among the highlights are:

AstraZeneca (UK) has partnered with BenevolentAI since 2019 and the combination of Astra's data and disease expertise with the latter's AI platform has identified novel targets. AstraZeneca iLab is aiming to fully automate the design-make-test-analyse cycle of new medicines.

GlaxoSmithkline (UK) says more than 70% of their early pipeline programs and research targets have been genetically validated, using advanced technologies, making them at least twice as likely to become medicines.

Sanofi (Switzerland) significantly expanded its research cooperation with Exscientia in 2022, which employs an AI-driven platform with actual patient samples. They are looking to develop up to 15 novel small-molecule candidates in oncology and immunology.

Takeda (Japan) bought an experimental oral treatment for psoriasis from Boston start-up Nimbus Therapeutics in February for $4 billion. The compound was selected in just six months from thousands of potential molecules by AI algorithms. It will now progress to stage three clinical trials and could generate as much a $3.7 billion in annual sales.[2]

A good biotech example is **Regeneron,** which is applying AI technology to genomic and clinical data. Time savings are apparent, with the example of data scientists and computational biologists able to run queries on their entire dataset in 30 seconds, down from 30 minutes.

More Personal & More Precise

ML algorithms are processing huge amounts of real-world data, such as electronic medical records, health insurance claims, genomic data and health apps to identify patterns and make predictions. We are starting to see the beneficial use of this in health care applications, including:

1 **Personalised medical care** employing **virtual nursing assistants** for diagnosing patient illness, monitoring health status, and following up after critical treatment.

2 **Precision medicine** application of ML to patient data to determine the most appropriate treatment options based on factors such as disease stage, genetic makeup, comorbidities.

3 **Medical imaging analysis** reducing workload for radiologists by segmenting structures and repetitive tasks.

4 **Pattern recognition** advanced medical software can identify patterns that humans don't, helping diagnose and detect diseases.

5 **Gene editing** such as the lab tool, CRISPR-Cas9, rapidly and accurately edits DNA sequences to correct defects in genes and treat diseases.

6 **Automation of administrative tasks** such as data entry and claims processing.

Leaders in this space include:

Medtronic, which is a medical device company using AI extensively. GI Genious, built with Nvidia, is the first computer-aided system to detect precancerous polyps during colonoscopy.

We believe that the AI revolution in health care will have a dramatic impact in coming years, albeit not seen in near-term forecasts yet.

Financials

Despite huge resources already poured into IT infrastructure, AI capabilities will fundamentally transform many practices.

AI technology is already being profitably employed across financial institutions in banking, insurance and financial services. Common elements of their business models make the abilities of AI particularly relevant:

1   **Data migration from outdated IT systems.** Generative AI enables quicker software development from drafting to testing, while natural-language translation capabilities can optimise the integration of legacy frameworks.

2   **Heavy regulation** and, by implication, complex risk, compliance and legal needs. Incorporating machine learning into real-time analysis should help identify fraudulent transactions and activity, as well as manage risk, based on deeper understanding of past patterns.

3   **Large customer bases,** including B2C and small business, which are costly to service. The use of algorithms and customer data should improve customer service and save money.

Good for the Company, Good for the Customer

Companies in the financials sector are predominantly customer facing. The holy grail is to provide a more efficient service but enhance personalisation, thus saving money and improving customer experience.

Model training on existing documents and data sets should help to streamline content generation and reporting. Ideally it will create personalised marketing and sales content tailored to specific client profiles and histories, at scale.

Customer service bots are now commonplace, but not always well received. The bots could be taught more extensively on proprietary knowledge such as policies, research, and customer interaction to provide deep technical support to front-office workers.

Modern Banking

Generative AI could have significant impact on banking, generating value from increased productivity of 2.8 to 4.7% of annual revenues, or additional $200–$340 billion, according to McKinsey.

Among the banks we see leading the way in the front office and back office use are majors:

JPMorgan Chase is using AI to enhance data analysis on risk, prospecting, marketing, customer experience and fraud prevention, with more than 300 use cases. CEO Jamie Dimon has lauded AI as a "groundbreaking technology" (as of April 23). The bank is developing a software service model, IndexGPT, for launch in 2026/7. It will combine search and content creation, allowing wealth managers to tailor information for any client at any time and guide them through suitable investments.

Royal Bank of Canada was an early provider of AI-powered tools for customers. Prism, an AI-powered electronic trading platform provides a simulated financial arena that supports algorithmic trading on a fictional stock called "PRSM" to allow participants to practice AI-based trading.

Faster Insurance

Benefits of AI use include faster contract underwriting and accelerated claims processing. Enough information is known about individual behaviour for algorithms to create risk profiles, automating much of the underwriting. Cycle times for completing the purchase of an auto, commercial, or life policy could reduce to seconds. Among the innovators are:

Allstate Corporation the US-based auto insurer is reinventing itself as "super.ai". It is using AI in image processing to analyse the impact and origin of traffic accidents and handle complex document processing.

Progressive Corporation another US auto insurer, is in this case using ML for predictive analysis to offer personalised insurance rates based on a customer's driving history (obtained via an app on their smartphone that collects data while on the move).

Fraud detection and prevention are improving across the sector. For insurance claims, new data sources are used to monitor risk and trigger interventions when factors exceed AI-defined thresholds.

Reducing Fraud in Financial Services

Companies in the new transaction and payment processing services sub-industry were among the first fintech players. They are now training models on years of transaction data with significant progress on fraud prevention. Interestingly, fraud is at historically low levels despite volumes of online transactions being much higher. Industry leaders include:

Mastercard is helping UK banks to predict scams in real time and before money leaves a victim's account. AI solutions for financial institutions and merchants allow in-depth data analysis to help detect fraud as well as better manage businesses.

Visa can approve or deny a transaction even if a bank network is down. AI risk scoring uses algorithms and 500+ data factors to score the riskiness of every transaction to help detect credit fraud. Meanwhile, Visa ID Intelligence advises financial customers on new forms of authentication (e.g. voice, facial recognition, fingerprint scan).

Paypal has managed a large improvement in payment authorisation rates using machine learning models to predict and address declines that interrupt user payment requests. A 2020 study (checkout.com, Oxford Economics) found that false card declines cost merchants in four European countries $20 billion in a year.

Among the smaller standouts are :

Block (formerly Square) provides mobile payment solutions — among its many AI offerings is Dessa deepfake detection technology, which is vital in protecting aspects of customers' security.

Fidelity National Information Services, another payments technology provider, uses AI to analyse client data across financial crime detection systems, such as know your customer, allowing financial companies to view reports and receive alerts on risks, suspicious activity, and AML scoring.

Figure 4
AI Already Playing Key Role in Insurance

Fraud Detection
New Underwriting Processes
New Insurance Propositions
Digitisation & Automation
Processing of Claims
Demand For Cybersecurity

Source: McKinsey Report & REVEChat, July 2023.

Improving the Risk & Return in Investment Management

Machine learning has been used to improve risk and returns in investment management for some years, particularly in quantitative strategies. Use cases include:

1 **Trading algorithms** making decisions based on large data sets at high speeds or exploiting possible arbitrage opportunities.

2 **Roboadvisors** make investment decisions and portfolio rebalancing proposals based on algorithms.

3 **Portfolio construction** including optimising asset allocations, pre- and post-trade analysis, and understanding market and credit risk.

4 **Risk management** analysis of historical data, market conditions, and other factors to identify potential risks, stress testing and scenario analysis.

5 **Sentiment analysis** where specialist LLMs are being trained on relatively small quantities of data for targeted outcomes, e.g. predicted share price moves on earnings announcements.

Financials companies have the need and the resources to apply new technological capabilities profitably, enhancing the prospects for the sector.

Industrials

The industrials sector has already begun to see major changes thanks to the cutting-edge of AI. Watch this space!

AI is not yet being widely talked about for this sector, and yet is easy to see where adoption is already helping reduce costs and increase across manufacturing and distribution.

In-house IT departments are rapidly building ML skills, allowing them to find new technology solutions and add revenue streams to their companies. Siemens and Schneider Electric are good examples.

This is a sector where application of AI should also help on the environmental front. AI-powered systems can optimise energy consumption in buildings and transportation systems, reducing energy waste, and help in the capture and storage of carbon dioxide emissions from industrial processes. In all cases, it would help to reduce greenhouse gas emissions.

Intelligent Automation

We have seen big strides in machine automation in recent years. However, the real progress is robots thinking for themselves (albeit with human oversight) rather than just following pre-written rules.

AI-powered machinery is being used across manufacturing companies in this sector and more broadly to improve efficiency, productivity and safety. Intelligent, self-optimising machines can learn from their environment, adapt to changing conditions, and optimise their performance over time. GE, Rockwell and Siemens (again) feature here.

The cost and efficiency improvements seen in supply chains are beneficial to the logistics and transport companies in this sector, as well as others. AI applications include:

1 **Inventory management** tools to quickly predict demand, optimise stock levels, and automate replenishment processes.

2 **Warehouse optimisation** analysing data across sales, production, and logistics to identify potential bottlenecks and minimise disruptions.

3   **Fleet management**   sensor data from fleet vehicles, equipment and machinery predicts maintenance needs and prevents breakdowns.

4   **Procurement**   analysis of supplier data, performance metrics, and market trends to identify the best suppliers and negotiate favourable terms.

Figure 5
Potential AI Benefits For Supply Chains

Percent

Reduced Logistics Costs	Better Inventory Management	Increased Service
15	35	65
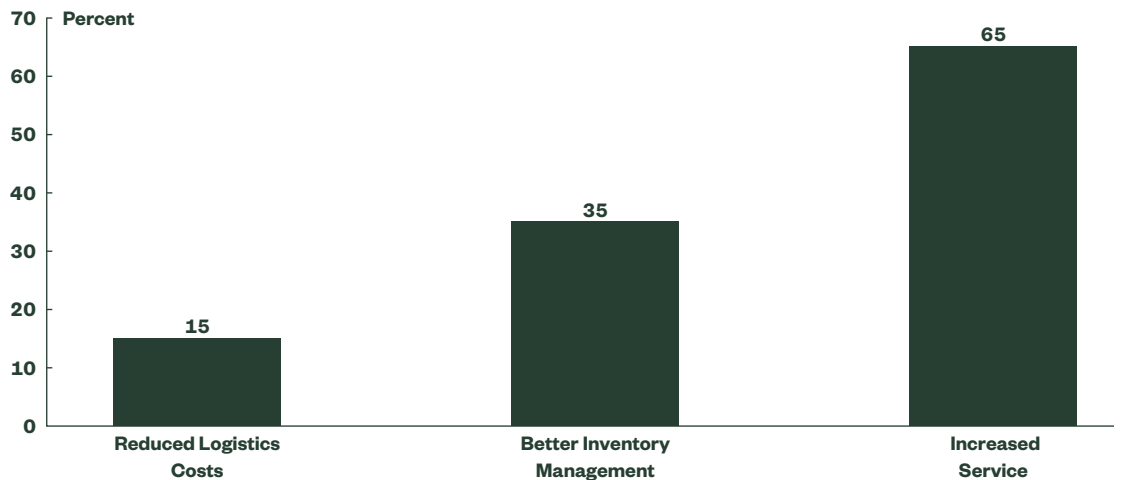
Source: BBG, McKinsey from logistics manager expectations, as of 1 June 2023.

Keeping Data Centres Working

As already mentioned, greater adoption of AI is driving the need for greater power density in data centres. This entails upgrades to power delivery, additional distribution units, and uninterruptible power supply systems, cooling systems (traditional air, as well as liquid) and networking gear such as switches and routers. Electrical and HVAC capacity already accounts for about 20% of data centre cap ex (Bank of America, June 2023). Electrical equipment manufacturers and industrial conglomerates such as Johnson Controls and Honeywell supply the necessary kit.

Siemens   talks of the "Industrial Metaverse" and AI-enabled operations are employed across its factories, improving security and scalability as well as productivity. Its software business, Xcelerator, offers innovative solutions for other industries, including the Insights Hub AI for Everyone, which could enable any employee to become a citizen data scientist and run analysis on predictive maintenance, efficiency and product quality. A tie-up with Nvidia Omniverse provides "digital twins" and their physics-based digital models with real-time capabilities to improve production and product lifecycles.

Rockwell   US industrial automation provider using digital technologies to provide more sophisticated models, for example detecting anomalies in manufacturing, such as speed variations and broken tools. UK utilities are using its AI technology to predict weather conditions, forecast maintenance, and control waste flow to better manage sewage networks.

Boeing   among AI use cases is data analysis to identify potential hazards in its aircraft operations in the boost to safety culture following two fatal 737 Max crashes. Leading edge research includes a self-driving AI aircraft pilot that can fly in military zones where enemy forces have disabled navigation systems.

Honeywell   conglomerate with many AI use cases, including video and audio analytics technology capable of studying crowd behaviour and detecting guns.

The industrials sector has big prospects in helping to build clean energy infrastructure. Together with new revenue streams from selling automation and AI solutions, the sector may become less cyclical and deserve a higher rating.

Consumer Discretionary

Stocks in this sector enjoy a variety of impacts that predate the generative AI evolution.

This diverse sector has a few standout names. Overall, greater use of customer data will enable AI-driven demand forecasting, more efficient inventory management, and supply chain optimisation.

Cooler Customer Conversations

AI has the potential to revolutionise the retail industry through personalisation. AI-powered tools giving access to customer data can analyse behaviour, preferences and demographics. Personalisation is achievable through targeted marketing and tailored product suggestions, and can be enhanced with unique shopping experiences and customer service chatbots. An example is Nike's Fit app using computer vision to recommend trainers.

Amazon has heavily invested in AI. "Every single one" of Amazon's businesses has "multiple generative AI initiatives going right now," said Amazon CEO Andy Jassy (Q2 2023 earnings call). Of significant importance is AWS (Amazon Web Services). The cloud platform offers a range of pre-trained AI services to help companies prepare data, and to train and deploy their own models to improve customer service or business processes.

Among Amazon's leading AI products are computer vision from Amazon Rekognition (enabling deep learning-based visual search, spotting specific people or products), language AI from Amazon Polly (which uses DL to synthesize speech that sounds like a human voice), and automated data extraction from Amazon Comprehend (used for insights within documents).

Autonomous Autos

Car manufacturers (Nissan, GM, Toyota) are working with data scientists to solve traffic congestion and fuel consumption.

Tesla is the best-known user of AI in the sector, using autonomy at scale in vehicles and robots. As Tesla drivers know, visual data is gathered in real-time from eight cameras in the car, producing a 3D output that identifies obstacles, their motion, lanes, roads and traffic lights, to help model a decision for the car. Continuous training with such data on the Dojo supercomputer is helping to develop full self-driving. The company is developing its own AI training chips to power the system as well as futuristic projects including a robotic humanoid and robotaxi.

Drawing on its battery knowhow, Tesla has developed a significant range of software, Autonomous Control, using ML to optimise power plants, grids, and energy resources.

While there are two stand-out stocks using AI extensively, we are less compelled to own this sector as a whole versus information technology.

Endnotes

1 Source: ARK Investment Management LLC, 2023. GitHub 2023. 31st January 23.

2 Source: Jefferies.

About State Street Global Advisors

Our clients are the world's governments, institutions and financial advisors. To help them achieve their financial goals we live our guiding principles each and every day:

- Start with rigor
- Build from breadth
- Invest as stewards
- Invent the future

For four decades, these principles have helped us be the quiet power in a tumultuous investing world. Helping millions of people secure their financial futures. This takes each of our employees in 29 offices around the world, and a firm-wide conviction that we can always do it better. As a result, we are the world's fourth-largest asset manager* with US $3.8 trillion[†] under our care.

* Pensions & Investments Research Center, as of December 31, 2022.

[†] This figure is presented as of June 30, 2023 and includes approximately $63 billion USD of assets with respect to SPDR products for which State Street Global Advisors Funds Distributors, LLC (SSGA FD) acts solely as the marketing agent. SSGA FD and State Street Global Advisors are affiliated. Please note all AUM is unaudited.