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The case for Artificial Intelligence (AI)

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What is Artificial Intelligence?

Artificial intelligence (AI) has been contemplated and discussed going all the way back to the 1940s and 1950s when researchers would postulate the ultimate capabilities that machines could one day embody. The gist is that instead of humans needing to program every single action a machine can take explicitly; they can recognise the patterns around different goals and plot their own course to get there. The development of semiconductors and the increasing capabilities described by such things as Moore's Law—the idea that roughly every two years, the capabilities of semiconductors double—have allowed us to see systems that can process data and gain potential insights from that data across the entire internet.

Most often, people think about their current jobs and then discuss whether different AI systems can match human performance in those jobs. Large language models, for example, are one type of AI that is frequently cited as being able to produce marketing copy at a much greater rate than individuals.

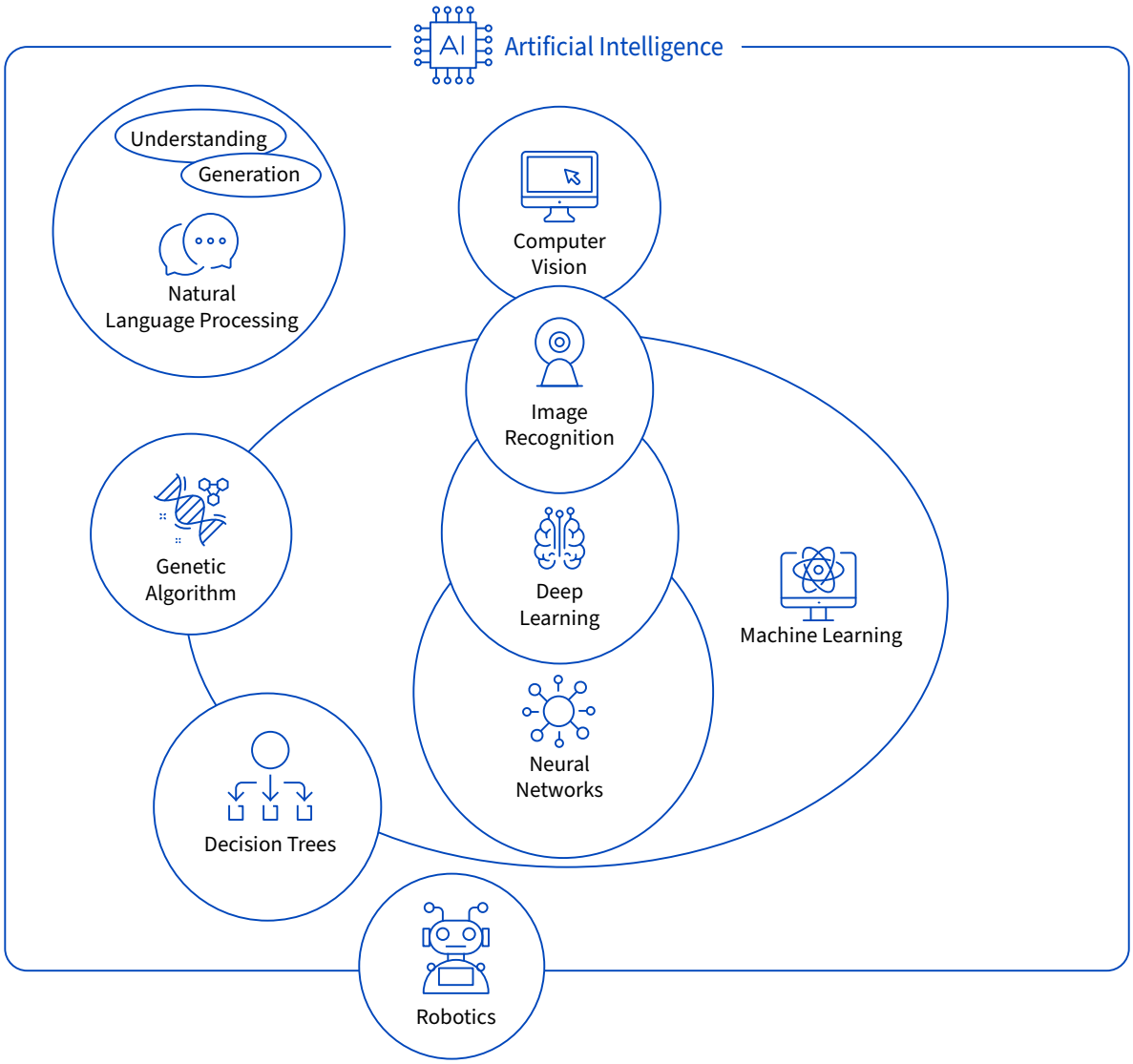
Importantly, AI systems are unbelievable in their capability to process data at scale and generate outputs at scale. However, they do not yet exhibit anything that approximates what we consider 'understanding.' Generating outputs does not always mean generating 'correct' outputs, so there are many examples of systems that may provide value most of the time but then 'hallucinate' in certain cases that get a lot of attention.

Figure 1: What is AI?

AI is an algorithm
AI uses computers and software to absorb, process, and output data

AI 'learns'
Using the result of past experiences, AI is able to infer relationships and make predictions without being explicitly programmed to control every possible scenario.

AI automates
As AI learns, it adapts. It offers the potential for near-complete elimination of the need for human involvement in complex processes, opening new doors for automation in virtually all industries.



Source: WisdomTree

Figure 2: AI stands to impact every industry

Retail

+ Better, more efficient inventory management
+ Ability to use dynamic pricing and even personalization to extract value related to individual customers

Electric utilities

+ Capability to develop predictive capacity for energy usage across the power grid
+ Development of models to predict faults and maintenance needs

Education

+ Virtual teaching assistants for routine questions
+ Faster, more accurate grading of different types of assignments

Manufacturing

- Possibility to have lower staffing needs when processes are automated
- Utilisation of methods to predict servicing revenues

Healthcare

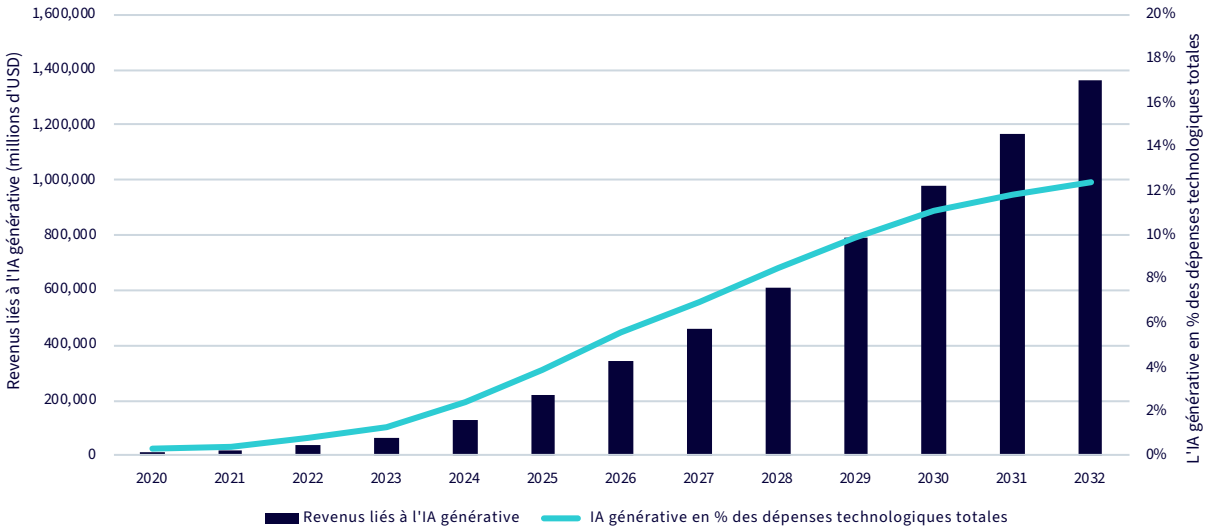
- Population health forecasting
- Preventative care and reduce non-elective hospital admissions
- Tailoring of drugs and treatments

Source: WisdomTree

What are the drivers of growth?

The primary driver of growth was an awakening worldwide that came with the release of ChatGPT in November 2022. This tool may ultimately be forgotten one day, but what it did was cause nearly every company on nearly all corporate earnings calls to mention AI, its possible promise, and its potential. This trend has also attracted substantial investment in AI segments, with Goldman Sachs forecasting a surge to $200 billion by 2025 [1]. This occurred throughout 2023 and is still ongoing in 2024. Adopting new technologies takes a long time at the corporate level, so we expect this discussion to continue. According to Bloomberg's forecasts on the growth of generative AI, the massive investment and adoption could generate $1.3 trillion in revenue and account for 12% of total tech spending by 2032.

Figure 3: Generative AI Revenue Forecasts



Source: Bloomberg Intelligence, IDC, eMarketer, Statista. The future values are from Bloomberg's "Generative AI's Trillion-Dollar Disruption". **Forecasts are not an indicator of future performance and any investments are subject to risks and uncertainties.**

1 AI investment forecast to approach $200 billion globally by 2025 (goldmansachs.com)

After ChatGPT, the next wave was in what people would call the 'picks and shovels.' This is a historical reference to the United States' gold rush in the late 1840s and early 1850s. People were trying to find gold, but the more surefire way to earn money was to supply these people, these 'prospectors', with mining equipment. In 2023 and 2024, Nvidia has been the quintessential 'picks and shovels' player in the AI market. It is exciting to watch this company announce the different technological developments that it can produce. Still, we also remind people that it is not the only semiconductor player and that when people think about laptops and smartphones—key venues for AI—this is a whole different set of chips than an Nvidia H100 or B100.

The most tangible growth metric is the amount of money the big cloud infrastructure players (Oracle, Amazon Web Services, Google Cloud, Microsoft Azure) spend to expand their compute infrastructure. They currently spend close to $200 billion per year[2], and this trend is expected to continue for at least a few more years. As of the publicly-reported earnings calls that these firms have delivered, top executives spent more time commenting on the risk of not spending enough to be ready for this megatrend instead of trying to prove that there would be excellent returns on these investments in the near term[3].

Over time, it will become more important to understand what this infrastructure is being used for and how it is helping other companies increase their revenues and earnings. One way to think about 'why large language models matter' could be[4]:

+ **10 Second Tasks:** Things like translations, substituting in 'better wording' or offering suggestions of titles.
+ **5 Minute Tasks:** Compile charts or the writing of simple paragraphs.
+ **15 Minute Tasks:** Summarising existing reports or PDF documents, maybe with a prompt like 'give me the highlights.'
+ **1 Hour Tasks:** Making a more detailed array of charts or summarising longer documents. Could also include writing a longer, more detailed report.
+ **5 Hour Tasks:** Full brainstorming for original content of some sort that is pointing to specific sources. Experimenting with possible conclusions and exhibits.

ChatGPT, which was released in November of 2022, did a great job of quickly getting up to speed on the 10 second tasks and even built up to the 5 minute tasks. GPT-4o (and similarly capable models) have been able to attack the 15 minute tasks.

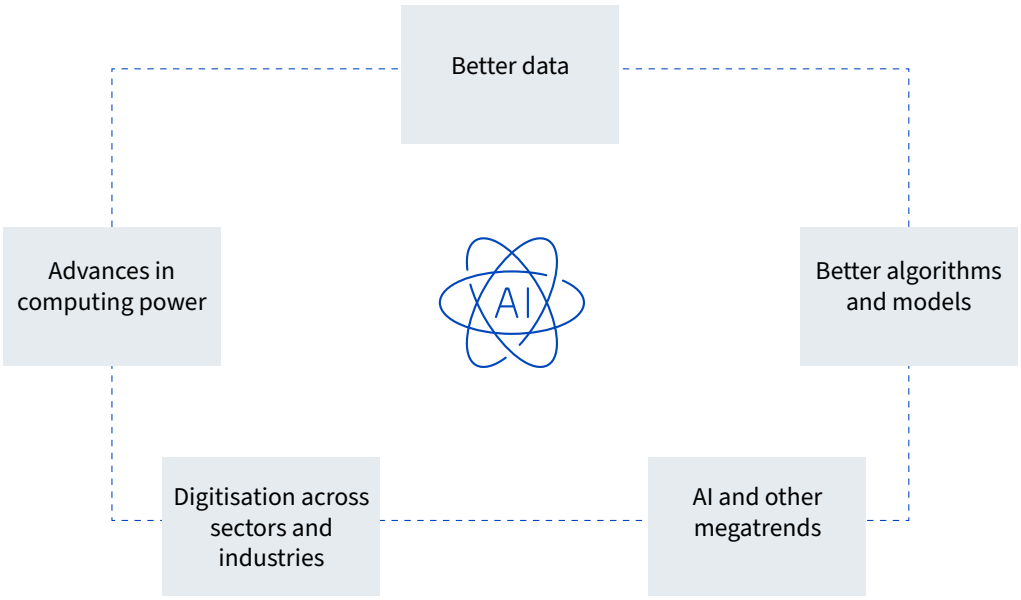
Will newer models or newer versions be able to make the jump into the 1 Hour and 5 Hour realm? This is one of the biggest, current questions in the space.

2 Source: Weise, Karen. "Tech Bosses Preach Patience as They Spend and Spend on A.I." New York Times. 2 August 2024.

3 Source: Rattner, Nate. "Breaking Down the Tech Giants' AI Spending Surge." Wall Street Journal. 3 August 2024.

4 Source: Stanley, Edward et al. "Mapping AI's Rate of Change." Morgan Stanley Research. 4 June 2024.

Figure 4: Key factors driving AI proliferation and adoption



Source: WisdomTree

- Citizens and businesses are producing more data than ever before, and AI presents the set of tools that can be used to take this data and use it to leverage different types of usable insights.
- Advances in computing power and computing methods/algorithms as well as the increasing sophistication of models improves the accuracy of model predictions opening up new avenues for AI applications.
- Increasing digitisation across sectors and industries create fruitful ground for expanding use causes of AI to new areas.
- Intersection of AI with other megatrends only accelerates the adoption of AI technologies.
- One example here, Artificial Intelligence of Things (AIoT) that implies performing AI calculations directly on a device, i.e. at the edge, is creating opportunities for AI to penetrate a range of industries.

The Artificial Intelligence value chain

When we think of the AI value chain, the main demarcation is whether the company is a 'user' of AI or a 'provider' or 'enabler' of AI. In our view, a provider or enabler is pursuing a business strategy that, if successful, spreads AI to more and more users in different ways. A user is a company like Netflix. Netflix sells entertainment. As part of selling entertainment, they use AI to give consumers better recommendations to convince them that the service is useful and adds value. We do not think 'users' are representative for a pure-play AI exposure, given their bottom position on the AI value chain, so they are not included in our AI strategy.

We think about **enablers** – primarily hardware companies that provide the infrastructure for

AI to run. However, it is more important to consider that in many cases these companies are providing something that others can ultimately 'build on top of' over time. When people think about the data centres that are filled with the Nvidia semiconductors – for example – these are not an end in themselves, but they allow for different AI models to be developed, trained and run more efficiently. There are a wide array of semiconductor companies, with many people focusing on the 'leaders' of different areas. Currently, Nvidia has been leading the data centre GPU space. Qualcomm is seeking to jump out as a leader in 'AI on devices', which could include smartphones, tablets and laptops. AMD, currently, is following quite quickly on both of these fronts, providing its own version of high-performance GPUs as well as its own version of 'on device' AI chips. Over time, foundation model providers (Large Language Models are examples of foundation models), could qualify as enablers as more and more players start building further applications on top of this foundation.

Within the different providers of AI, we think about **engagers** – software companies that are directly involved in AI and running an AI business. The engagers represent pure-play opportunities in the AI space. Most of them, like ServiceNow and Palantir, are in the software segment.

When people seek to think about the Global Industry Classification Standard (GICS) construct, if people are thinking about 'industries', software and semiconductors, in our opinion, are quite important, and these industries would represent the dominant exposure between the Enablers and the Engagers.

Finally, some companies offer value-added services within the AI ecosystem, though AI is not central to their core products or services. For example, Apple designs its own chips and integrates AI services into its devices; however, consumer electronics remain its primary business, and AI is not core to its product offering. We place these firms in the '**enhancers**' category, and in our strategy, we limit the focus of this category given that they enhance the AI ecosystem by creating solutions for cloud computing, image recognition, autonomous driving, generative design, etc., but this is not the core part of their business.

Figure 5: The AI value chain

Chip manufacturers, platform and algorithm provides power the development and running of AI-powered products and services.

They are classified into:

Enhancers: Companies who are a prominent force in AI but whose relevant product or service is not currently part of their core revenue

Enablers: Companies who are key players in the space, with some of their core products and services enabling AI

Engagers: Companies whose focus is on providing AI-powered products and services

Source: WisdomTree. You cannot invest directly in an index. **Historical performance is not an indication of future performance and any investments may go down in value.**

What is the long-term growth potential?

AI can benefit any industry that is involved in the collection or generation of data. It's important never to forget that AI is a tool, just like any software. The user must point the software at a particular use case. The fuel that enables AI to run, at least presently, is data. To the extent that

different companies in different industries want to gain more insights from this data, AI is the set of tools that allows this to be done. Every major consultancy has a different estimate, but they all cite numbers in the trillions of economic value-added over the coming years. While this may be true, it's essential to recognise that many steps must be continually monitored to understand the different phases of AI adoption.

Why invest in Artificial Intelligence?

AI is set to revolutionise many industries by significantly boosting productivity. Global gross domestic product (GDP) is predicted to be boosted 15% by AI in the next 10 years. This remarkable growth potential is fuelled by AI's capability to optimise processes, enhance decision-making, and automate tasks, leading to substantial efficiency gains across industries like manufacturing, healthcare, finance and beyond.

AI requires robust infrastructure to reach its full potential, with semiconductors being a critical component. Advanced semiconductors are essential for computing power needed to train and deploy AI models, which drives demand for high-performance chips. This includes applications in data centres, edge computing and various AI-driven technologies. Companies that provide the necessary hardware to support AI's growth are at the forefront of this surge.

Furthermore, companies leading in AI development and integration have the potential to achieve significant growth, much like early internet companies in the late 1990s. Back then, investing in companies like Amazon, which were small but innovative, led to substantial returns as they transformed entire industries. It is interesting that these companies in the late 1990s frequently had no earnings and no profits. Today, the developers of large language models are either within or associated with some of the largest and most profitable companies that we have ever seen.

Today, AI holds similar potential to reshape the business landscape. Investing in companies within the AI value chain at this stage could potentially yield significant returns over the long-term as the emerging technology evolves and companies strive to become the next generation of tech giants.

While there is no doubt that AI technology offers compelling investment potential, there isn't a simple method to identify the top publicly listed AI companies across the world. To overcome this, WisdomTree partnered with the Consumer Technology Association (CTA) to identify and classify AI-focused companies and develop the WisdomTree Artificial Intelligence strategy, providing investors the opportunity to access the diversified value chain of this exciting megatrend with a single investment solution. To learn more, visit our dedicated page.

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