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From hype to reality:

Embracing AI in 2023

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A new wave of AI-first businesses is flowing into the market, shifting the competitive landscape, and having a profound impact on our daily-life activities.

With AI evolving at an unprecedented pace, it is important for businesses to take advantage of this wave of innovation now, as it represents a significant opportunity for organisations to innovate, optimise their operations, and drive growth.

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1. Artificial intelligence at a glance

We call ourselves *Homo sapiens* because intelligence is our most precious asset. For thousands of years, we have been trying to understand how we, simple handfuls of matter, can think, perceive, understand, predict and influence a world much larger and more complicated than ourselves.

Now imagine a world where machines can create art, write articles, design products, and even hold conversations that are virtually indistinguishable from those between human beings. One may say that such a world is futuristic at the very least, but nothing could be further from the truth.

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Defined by computer scientist John McCarthy almost 20 years ago, artificial intelligence (AI) is "the science and engineering of making intelligent machines, especially intelligent computer programs with human-like intelligence". And that is precisely what we are witnessing today.

AI refers to a field which combines computer science and robust datasets to enable problem-solving. It also encompasses sub-fields of machine learning and deep learning, which are frequently mentioned in conjunction with AI. These disciplines are comprised of AI algorithms which seek to create expert systems to make predictions or classifications based on input data.

But AI is more than just a field for study. Thanks to recent advances it is now delivering real value to end users. This technology is already being used across multiple sectors including retail, healthcare, manufacturing and education. Tools such as **ChatGPT** and **Stable Diffusion** have showcased the potential of AI to revolutionise numerous industries and the way technological advances are exploited across the board. They have also captured the public's imagination.

This real-world viability is the result of the combined effect of a series of fast-moving technology trends, including: (i) massive distributed computing power, (ii) the decreasing cost of data storage, (iii) the rise of open source frameworks, and (iv) the increase in AI research and development investment. Between them, these advances have helped to accelerate the application of AI, making it a powerful force for digital disruption and affecting a wide range of industries.

A new wave of AI-first businesses is now flowing into the market, shifting the competitive landscape for incumbents, accelerating task automation, and enhancing productivity, all of which is having a profound impact on our daily lives. In the healthcare sector, for example, AI is being used to improve diagnoses, create personalised treatment plans, and reduce medical errors. In the financial industry, AI is being used to detect fraud, manage risk, and improve investment decisions.

This is only the start. An increasing impact and significant growth are expected over the next five years as AI business models become more mature and easily deployable commercially. Private investment is already booming: venture funding for AI in Europe reached $5.6 billion, with 501 deals, in 2021; in the US alone the number of AI start-ups has increased by twenty times in just four years.[1]

Governments and academic institutions are also looking to ensure their economies maximise the benefits of this technology. It is estimated that AI could increase global GDP by $15.7 trillion, a full 14%, by 2030.[2] However, the rapid advancement of AI also raises important ethical and social questions, such as job displacement and privacy concerns. These must be carefully considered and addressed.

But first we need to explain what sort of technology we are discussing. AI is what economists call a general-purpose technology.

General-purpose technologies are a big deal: think electricity and the internal combustion engine. Their significance lies in the fact that they cause disruption not only through their direct contribution to society, but also through the way their knock-on effects enable a vast range of complementary innovations.

Electricity made possible factory electrification, telegraphic communication, and all that followed. The internal combustion engine gave rise to the automobile, the aeroplane, and modern transportation and logistics networks. AI will impact society on a similar scale.

It all adds up to a fast-paced, ever-shifting competitive, investment, and research landscape. The bottom line? AI is here, and every executive must sit up and take notice.

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1. CB Insights. (January 12, 2022). State of Venture 2021 Report
2. PwC. (2017). Sizing the Prize: What's the Real Value of AI for Your Business and How Can You Capitalise?

2. AI value chain, market segmentation and investment trends

2.1 The AI value chain

As fast as new applications and sectors are developed in which AI can play a key role, new players appear, along with an ever-developing value chain that grows just as fast. Although different market conceptualisations exist, AI industry stakeholders can be roughly divided into five interconnected layers. These include the AI computing chips layer; the cloud or self-built computing infrastructure layer; the machine learning frameworks layer; the AI model producers layer; and the AI-enabled applications layer.

Artificial intelligence is underpinned by **AI computing chips**, which are used to train AI algorithms and process large data sets to draw inferences. Currently, graphic processing units (GPUs) are the dominant technology in the AI industry, but field programmable gate arrays (FPGAs) and application-specific integrated circuit (ASIC) chips are also emerging.

To store all the data being amassed to develop AI business models, companies rely on **cloud computing infrastructure**, also used to increase computing power. This infrastructure may come from existing cloud service providers (such as AWS) or companies may build their own data centres.

The training of AI models is done using **machine learning frameworks**, which can be open-sourced or self-developed by AI companies. These companies define the testing and basic guidelines required for the training and development of AI models.

Next in line are the **AI model producers,** who deliver their capabilities in different forms to solve specific needs given certain data. These forms range from AI software licensing and AI software-embedded hardware to AI-as-a-service – but all will allow producers to supply and work with end users.

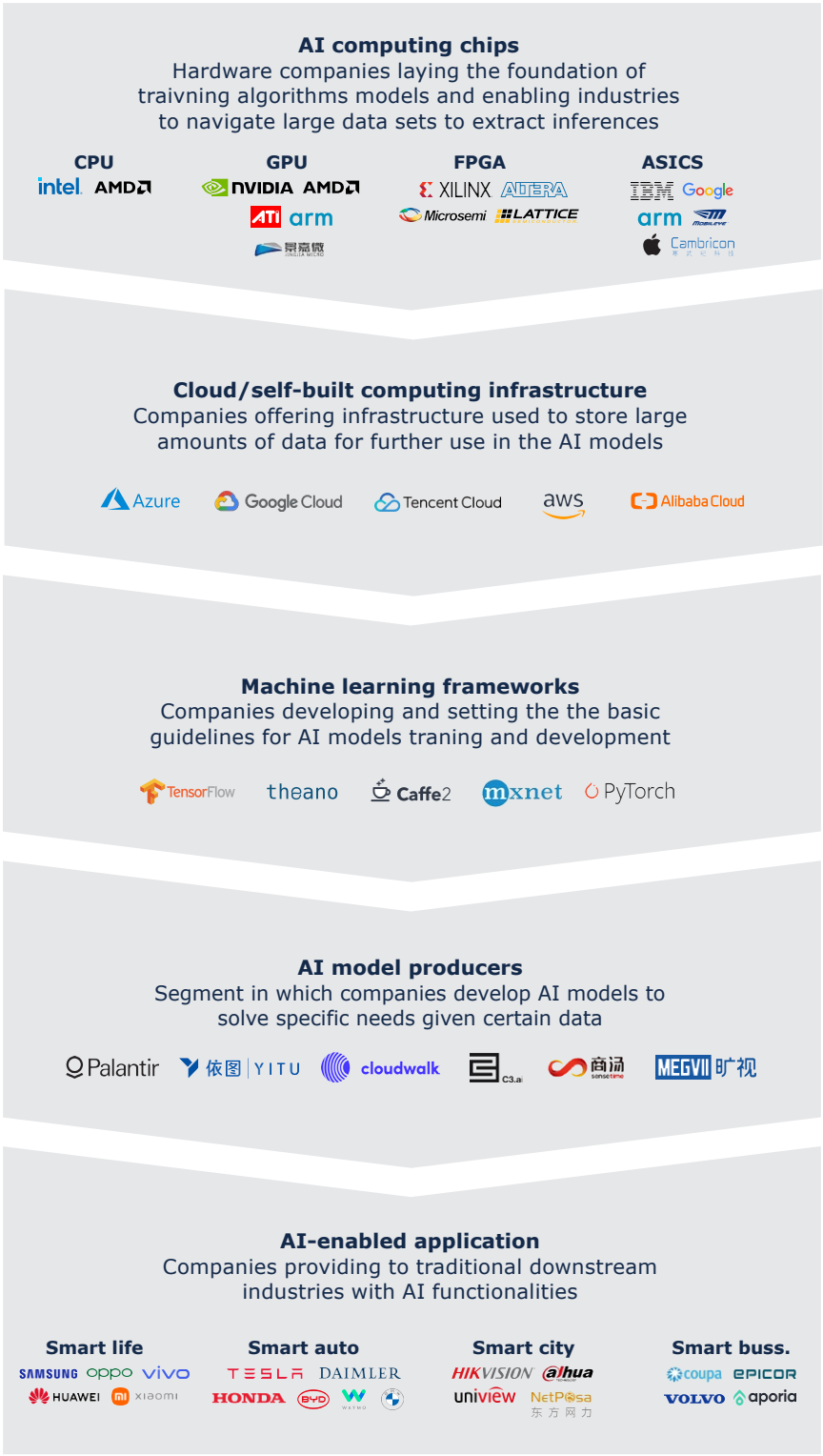

Figure 2.1. AI value chain layers and key players [Source: Axon]

Finally, there's the end users. These are companies providing **AI-enabled applications** to traditional downstream industries, translating into different AI functionalities for many sectors such as smart cities, smart businesses, smart life, and smart transportation.

Of course, the implementation of AI is not a simple process; it requires the interconnection of the entire value chain in order to succeed. But above all, it requires huge amounts of data. Data management and preparation are thus key to successful AI applications, and organisations must ensure that the data used is accurate, relevant, and up to date. Such data can be fed into algorithms that will identify patterns and make predictions, which can later be integrated into an AI system or application. This integration allows the AI system to be used by businesses, organisations, and individuals to automate processes, make predictions, and drive innovation.

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2.2. AI market segmentation

The global artificial intelligence market was valued at $137 billion in 2022 and is projected to expand at a compound annual growth rate (CAGR) of 37.3% from 2023 to 2030 to reach about $2 trillion.[3] Continuous research and innovation, led by tech giants, are driving the adoption of advanced technologies in industries such as automotive, healthcare, retail, and manufacturing.

This adoption in almost all sectors of our society is driven by the progress and development of different downstream technology verticals within AI, promoting new and diverse applications. These verticals are tailored to specific use cases; in practice, however, they usually complement each other to enable more complex AI applications. Eight "core" AI verticals can be identified: natural language processing (NLP), data analytics, cloud AI, network & security, machine learning (ML), AI hardware, computer vision, and deep learning. Some of the more representative use cases to which each vertical may be applied are shown in the graph on the next page.

3. Grand View Research. (2022). Artificial Intelligence Market Size & Share Analysis Report 2030

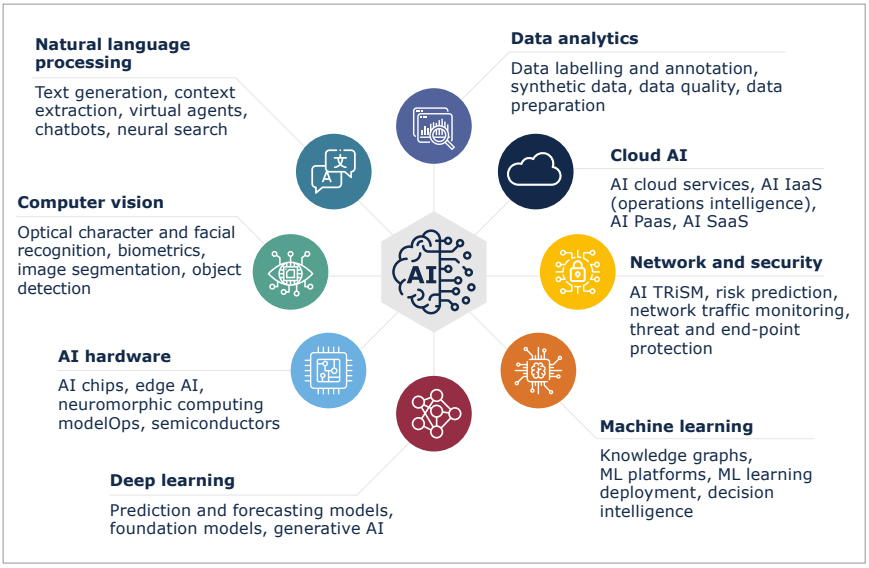
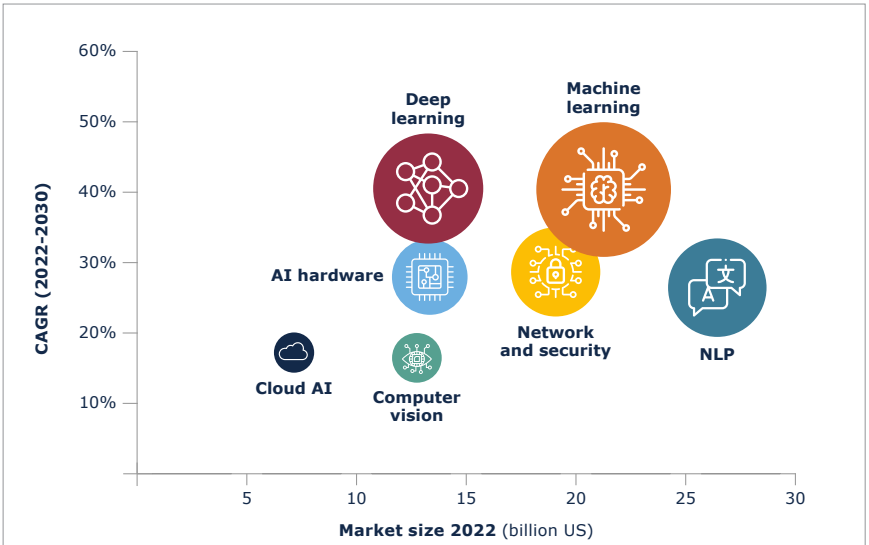


Figure 2.2. AI verticals and main use cases [Source: Axon]

As touched upon earlier, the development of AI applications involves the interconnection of several core AI technologies. For example, the deployment of a task-performing and conversational robot requires the adoption of data analytics, ML, computer vision and NLP to design the whole AI system.

All AI verticals are expected to grow consistently in the 2023-2030 period. Deep learning and ML will lead the way with almost 40% CAGR. Deep learning's strong expected growth is based on the expectation that its complicated data-driven applications, including text/content/speech recognition and generative AI, will offer lucrative investment opportunities as it helps users overcome the challenges of dealing with high data volumes.[4] The graph on the next page shows the expected growth per AI vertical.

4. Grand View Research. (2022). Artificial Intelligence Market Size & Share Analysis Report 2030



Note 1: The size of the bubbles represents the market size in 2030 (in billion USD)
Note 2: Data analytics vertical is not represented due to the complexity to isolate pure AI use cases.

Figure 2.3. projections of AI verticals [Source: Axon based on Grand View Research, Precedence Research, Globe Newswire]

The growth of the four most prominent verticals is based on a number of factors:

- An increasing demand for hybrid AI models to enable utilisation of different types of data, which, in turn, drives growth for the **deep learning** vertical.
- Advances in computer programs that analyse text and voice, and developments in big data technologies that lead to wider demand for **NLP** solutions.
- Increasing SME tech spending on deploying **machine learning** technologies to reduce ICT investments and access digital resources.
- A growing number of cyberthreats due to home networks internet access dependency, IoT adoption, and the increased need for cloud solutions; these cyberthreats will drive **network and security** growth.

2.3.
AI investment trends

The potential and widespread adoption of AI across industries and enterprises of all sizes is driving high investment values and a large number of deals

From the supply side of things, the potential and widespread adoption of AI across industries and enterprises of all sizes is driving high investment values and a large number of deals. Private investment in AI has doubled in two years, with the US accounting for over half of global AI funding. In fact 60% of investment in the past five years has gone to six industries: healthcare, data & cloud management, banking, retail, industrial automation and automated vehicles.

The number of VC deals has been increasing; in 2021 it reached more than 7,500 deals with a total deal value of almost $120 billion.

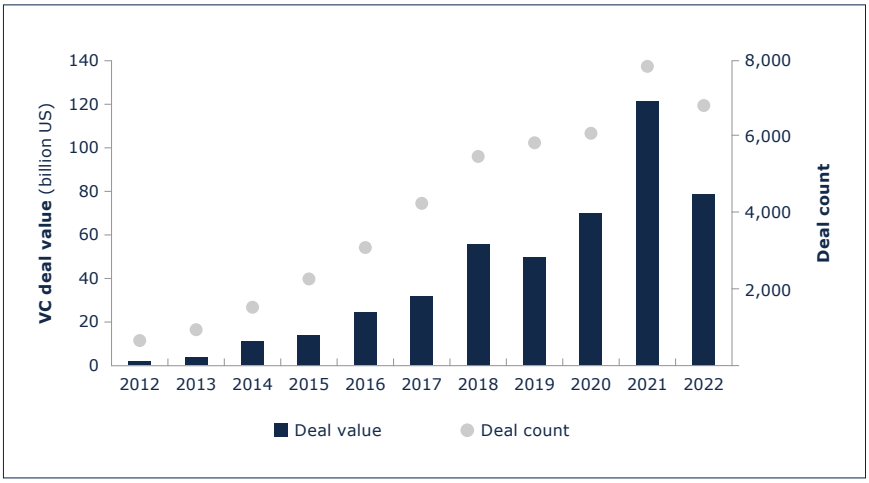


Figure 2.4. AI VC deal value and number of deals [Source: Pitchbook]

However, in 2022, well-funded AI vendors faced challenges that could make it difficult for them to shape the future of the field. VC funding for AI-related investments decreased by 34.9% compared to 2021, resulting in a total VC deal value of $78.0 billion. Although the total AI deal value in 2022 still exceeded that of 2020, the number of AI deals decreased. This was mainly due to a decline in the number of early-stage deals, while the number of late-stage deals remained high. The decline was particularly pronounced in the segments related to autonomous vehicles, processor design, automation platforms, and intelligent sensors, as investors were hesitant to put money into businesses that require significant hardware and labour costs.

That said, the growth in the enterprise value over EBITDA (EV/EBITDA) multiple in deals made by companies dedicated to AI use cases is a clear indication of the attractiveness to investors of AI-related investments. It also signals the need for continued innovation in the field to remain competitive and maintain investor interest.

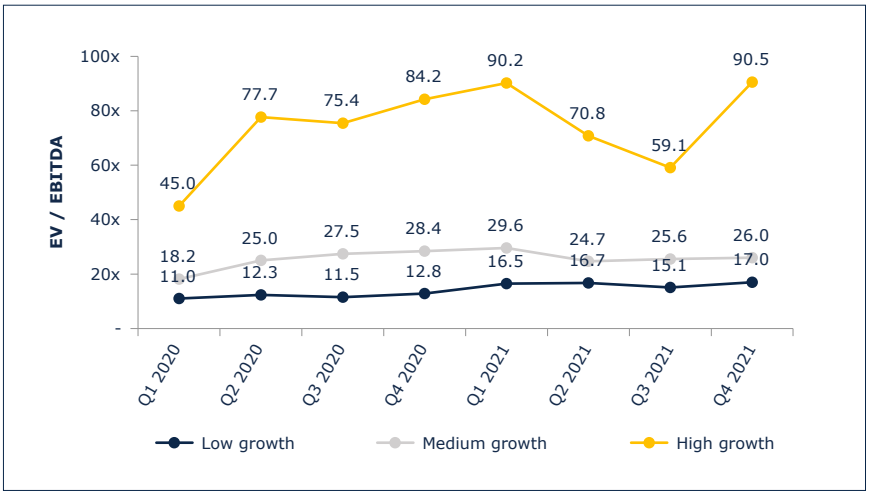


Figure 2.5. EV/EBITDA multiples paid in AI companies gobally [Source: Axon based on Finerva data]

From the chart above one can see that transaction multiples paid in AI companies globally increased on average over 25% in a two-year window, showing market maturity and attractive prospects. On the one hand, top-performing AI companies achieved over 80x EV/EBITDA multiples, with 60x being within the 75% percentile. On the other hand, low and mid growth AI companies are more likely to be evaluated based on long-term profitability – yet they promise very attractive multiples in the 11x-30x range.

3. Are AI business models profitable for my company?

Software technology is developing very fast, naturally impacting all layers of a business, from its culture to its selling and buying behaviour, and even its communication trends. In this sense, AI is moving out of R&D labs and starting to disrupt the business world. Dozens of industries around the globe, and thousands of top companies, are combining the power of AI and applied artificial intelligence to achieve more efficient and profitable operations. In short, AI-driven systems have the ability to boost revenue and cut costs.

A McKinsey survey[5] shows that almost 90% of respondents cited cost decreases and approximately 70% reported revenue increase via AI adoption as key benefits of the technology. At the enterprise level, AI is inching towards achieving higher revenue totals (up to 5% improvement year-on-year)denoting that limiting the implementation of AI approaches within enterprise functions could restrict both usage and user-based growth and hence miss its upside potential. That same survey showed that about 80% of companies see scaling AI and ML use cases as a top priority in their data strategies to maximise company value over the next three years.

For a long time, AI was cost-prohibitive for most companies, mainly due to three factors: machines with the required computing power were huge and expensive; seasoned programmers to work on those machines were in short supply; and many companies had insufficient data sets to study. Today, as cloud services have become increasingly affordable, AI has become more accessible, and companies can collect and store vast amounts of data and exploit it at a cheaper price. Given that most companies do not have AI developers in their workforce, this is where artificial intelligence as a service (AIaaS) comes in.

5. McKinsey. (August 2022). Technology Trends Outlook 2022 – Applied AI

AIaaS refers to standard AI tools that enable companies to apply and scale AI techniques at a fraction of the cost of full in-house AI. This allows such companies to take advantage of AI technology and solutions without the need for large upfront investments in infrastructure, hardware, and software. Instead, customers pay for the AI services they use on an as-needed basis through a subscription or pay-per-use model. The AIaaS provider typically handles the maintenance and upkeep of the AI technology, freeing up enterprises to focus on using the technology to drive their business forward.

According to the International Data Corporation, a provider of market intelligence, advisory services, and events for the information technology, telecommunications, and consumer technology markets, in the coming years 75% of commercial enterprise applications will use AI[6], in many cases exploiting existing business models such as:

- **Cognitive computing APIs**. This business model uses application programming interface (API) calls through an API developer in order to incorporate AI into applications. This includes a variety of services such as NLP, knowledge mapping, and computer vision. Each has the capacity to produce commercial value from unstructured data.

- **Bots and digital assistance**. This famous form of AIaaS includes chatbots, automated email services, and digital customer service agents, relieving the workforce from the tedium of performing the easier, more repetitive end-client-facing tasks.

- **Fully managed ML services**. This model is aimed at non-technological companies that are looking for a fully managed approach. These services typically provide customers with pre-built AI models and template options, often provided as code-free interfaces for those who are not programming-savvy.

There are two key enablers here. One is the development in the technology behind these models. The other is the ease of monetisation of the "as a service" concept through a subscription that comprises the management, running and monitoring of the AI models that are used as the foundation of the provided service.

The number of companies using AI will multiply by 2025: from 20% to 49% of companies in the case of the IT industry, and from 8% to 43% in the case of the financial sector

6. FourWeekMBA. (February 2, 2023). AIaaS: The New Business Model of Artificial Intelligence As A Service.

The start-ups developing such technologies in recent years hope to see their profits skyrocket very soon, based on the demand market size discussed above. This is the final part of the equation defining the success of the AI services business model since, in addition to the model being fully scalable with low variable costs, there is an established and growing demand for the products it can bring to market, expandable to all sectors, and its remarkable added value. Proof of this market growth comes from the IT industry and the financial sector, where the number of companies using AI will multiply by 2025: from 20% to 49% of companies in the case of IT, and from 8% to 43% in the case of finance.[7]

From issues of bias and discrimination to concerns about privacy and job losses, the ethical challenges of AI are complex and multifaceted

3.1. Ethical issues

AI is a rapidly evolving field that is having a profound impact on our world. AI has the potential to improve our lives in countless ways, in sectors ranging from healthcare and transportation to education and entertainment. However, as the technology advances, it also raises important ethical and moral questions that must be addressed.

From issues of bias and discrimination to concerns about privacy and job losses, the ethical challenges of AI are complex and multifaceted. It is critical that we carefully consider these challenges as we continue to develop and implement AI systems in our society. We must ensure that the benefits of this technology are realised in an ethical and responsible manner.

Addressing these challenges will require ongoing effort and collaboration between technology experts, policymakers, and consumers. This will involve developing clear guidelines and regulations for the development and deployment of AI systems or, ultimately, their usage.

Some of the ethical challenges associated with AI include:

- **Biases in AI**. AI systems are only as unbiased as the data they are trained on. If this data contains biases, the AI system can perpetuate and amplify them. The issue of bias in AI has far-reaching implications for fields such as criminal justice, hiring, and lending, where AI systems are being used to make decisions that can have significant consequences for individuals. To mitigate the risks of bias in AI, it is important to carefully evaluate the data used to train the models and to continuously monitor and test their outputs.

It is often difficult to determine who is responsible for decisions made by AI systems, particularly in cases where the system makes a mistake or causes harm

7. Based on Global CIO survey on AI adoption in 2025 produced by MIT Technology Reviews Insights and Databricks.

- **Lack of accountability.** It is often difficult to determine who is responsible for decisions made by AI systems, particularly in cases where the system makes a mistake or causes harm. This lack of accountability can lead to moral and ethical dilemmas. To address this challenge, it is important to establish clear and transparent standards for accountability in the development and deployment of AI systems. These could include measures such as regular auditing, testing, and monitoring of AI systems to ensure that they are functioning as intended and not causing harm.

- **Privacy concerns**. AI systems process and store vast amounts of personal data; this raises important privacy concerns for individuals. There is a vital need to have strong privacy laws in place that give individuals control over their personal data and ensure that it is used responsibly.

- **Job losses**. AI has the potential to automate a variety of tasks, which could result in the transformation of certain job roles and the elimination of others. Such a scenario could lead to economic disruption. This trend raises important questions about the social and economic consequences of AI and the need to ensure that the benefits of this technology are distributed fairly. To mitigate the impact of job losses, there may be a need to invest in education and training programs to help workers transition to new careers, as well as to implement policies that support worker retraining and job creation.

- **Manipulation and addiction**. AI systems, especially those in the form of social media, can be designed to be addictive and to manipulate users. This raises ethical concerns about the responsibility of AI designers and the effects that these systems can have on individuals and society.

In light of these issues, there is a need for ongoing dialogue about the impact of AI on employment and the future of work, to ensure that the benefits of this technology are realised in a way that supports the well-being of all members of society. In particular, addressing the issue of job losses in the context of AI will require careful consideration of the social, economic, and ethical implications of this technology, and a commitment to finding solutions that ensure a fair and just transition for workers. In addition, there should be clear guidelines and legal and regulatory frameworks for the collection, storage, and use of personal data by AI systems, to ensure that these systems do not violate individual privacy rights. These frameworks may also need to address issues of transparency and accountability in the development and deployment of AI systems, to ensure that they serve society in a responsible manner and for the public good.

There is a need for ongoing dialogue about the impact of AI to ensure that the benefits of this technology are realised in a way that supports the well-being of all members of society

It is important to address these ethical considerations to increase productivity, minimise workplace disruption and enhance customer relationships because it ensures that AI technology is used in a way that benefits society as a whole, while also protecting the rights and well-being of individuals. By establishing clear guidelines and regulations, and promoting transparency and accountability, we can ensure that both the development and deployment of AI systems are responsible, ethical, and sustainable.

4.
Surfing the AI wave

Leaders of businesses today need to pay close attention to AI, as it represents a significant opportunity for organisations to innovate, optimise their operations, and drive growth. Businesses should not miss the chance to leverage AI as a powerful tool that can help them gain a competitive edge, enhance customer experience, and increase productivity.

But AI is evolving at an unprecedented pace. That means it is important for businesses to take advantage of this wave of innovation now. Failure to do so could result in being left behind by competitors who have already embraced AI, leading to missed opportunities and reduced efficiency.

With AI evolving at an unprecedented pace, it is important for businesses to take advantage of this wave of innovation now

Surfing the AI wave requires businesses to take a proactive approach in exploring and implementing AI technologies that best suit their operations and objectives. Business leaders should invest in the necessary resources, such as talent and infrastructure, to develop and deploy AI-driven solutions that can transform their business models and unlock new opportunities for growth.

In short, AI represents a transformative opportunity that businesses cannot afford to ignore.

Tech giants surfing the AI wave

The market is full of examples of leading corporates embracing AI-powered solutions and embarking on key partnerships to ensure their strategic relevance in the future. For instance, Alphabet's Google has invested $400 million in Anthropic, which is developing a competitive foundation model to OpenAI's GPT-3. Additionally, Amazon Web Services (AWS) has partnered with Stability AI, despite the latter being an open-source AI company. Stability AI used 4,000 NVIDIA A100 GPUs from AWS to train its Stable Diffusion text-to-image model. Finally, Microsoft's investment in OpenAI and continued support indicate a strong partnership in the future. OpenAI can act as an R&D lab for Microsoft's future enterprise software products and search ambitions.

Businesses surfing the AI wave

Not just tech giants but companies of all kinds are already seeing benefits from surfing the AI wave. AI-powered solutions have the potential to provide cost reductions for enterprises by automating tasks, optimising supply chains, and identifying inefficiencies in business processes, resulting in increased profitability. Plus, with the increasing amount of data available and improvements in data quality, AI models will perform better in time, making AI-powered business models even more profitable.

A human-like robot that solves all your business operations is not the end result. The goal is much simpler and is focused on daily tasks. Its role in organising meetings and calendars or helping you to code in a given programming language shows that AI is already a reality and is here to stay.

A human-like robot that solves all your business operations is not the end result – the goal is much simpler and focused on daily tasks

Citizens surfing the AI wave

Consumer acceptance and interest in AI applications emerged strongly in 2022. The public is becoming increasingly comfortable with AI-powered products and services, and is increasingly willing to pay for them. This shift in consumer preferences is driving demand for AI-powered products and services. The viral adoption of products like ChatGPT, which achieved 100 million monthly active users in just two months, surpassed the speed at which TikTok achieved the same number (nine months). This made ChatGPT the fastest-adopted tech product in history.

Governments surfing the AI wave

The AI wave is not going unnoticed by governments, which have realised that they should prioritize the development and promotion of AI to harness its benefits while also addressing the potential risks and challenges associated with the technology. Several countries, including China, Canada, the United States, and the United Kingdom, have made significant investments in AI research and development, and established national AI research centres and innovation hubs. For instance, China aims to become a world leader in AI by 2030, while Canada has launched a $125 million Pan-Canadian AI Strategy to support research and talent development in AI. The US has launched the National AI Initiative to maintain leadership in AI and promote responsible use, while the UK has established the Centre for Data Ethics and Innovation and developed a national AI strategy to ensure ethical and responsible use of AI. In addition, in 2021 the European Union proposed an EU artificial intelligence law called the "AI Act"; this could be the first AI-related law passed by a major regulator.

The viral consumer adoption of products like ChatGPT (OpenAI) made it the fastest adopted tech product in history

It is essential that governments understand the importance of AI and work together to create regulatory frameworks that allow it to advance responsibly and safely. Italy's recent decision to block ChatGPT is an example of how unilateral measures can stifle innovation and put a country's economic future at risk. It is time to embrace technology and international cooperation, rather than closing our borders to progress and prosperity.

Overall, the economic impact and rate of adoption of AI will depend upon the level of digital maturity in different countries, societies and businesses, the abilities of individuals to understand and manage rapid technological change, and how well governments can adapt to the disruptive changes of AI and utilise it to improve public service delivery while protecting citizens from potential risks.

The economic impact and rate of adoption of AI will depend upon the level of digital maturity in societies

About
Axon Consulting

Axon is a globally recognised advisory and investment firm that provides comprehensive services and expertise to help businesses extract the full potential of artificial intelligence (AI). Leveraging its unrivalled investment expertise and advice, the group works with businesses of all sizes and types to navigate the rapidly changing AI landscape and make informed investment decisions.

Axon can grant any business access to our vast network of contacts at all levels in the AI value chain. Whether businesses are sourcing promising investment opportunities or trying to identify the right strategic partners, Axon's extensive network can help them connect with the right people to help them achieve their AI goals.

In addition to investment advice and networking opportunities, Axon also provides consulting and advisory services to help businesses understand technological requirements, regulatory landscapes, and commercial viability. These services help businesses evaluate the potential risks and rewards associated with AI adoption, develop comprehensive AI strategies, and optimise their AI investments.

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