



Snapshot of the European and Global AI environment

Looking back on the past five years and discussing how the future may look like



April 2025

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“Artificial intelligence and generative AI may be the most important technology of any lifetime.”

– Marc Benioff, Chair, CEO and Co-Founder of Salesforce

Foreword

The rapid evolution of the artificial intelligence (AI) market is transforming the global business landscape in unprecedented ways. Over the past decade, AI has shifted from a futuristic concept to an integral component of business strategy, driving innovation, efficiency, and competitive advantage across diverse sectors.

AI's meteoric rise can be attributed to several factors, including significant advancements in computational power, the proliferation of big data, and the development of sophisticated algorithms. The convergence of these elements has enabled AI to perform complex tasks that were once thought to be exclusively within the realm of human intelligence. From natural language processing and image recognition to predictive analytics and autonomous systems, AI technologies are now embedded in various applications that enhance decision-making, automate routine tasks, and create new value propositions.

Companies like OpenAI, Google Cloud, and Microsoft Azure are at the forefront of developing foundation models and cloud services that provide the backbone for AI applications. These advancements in AI Infrastructure are democratizing access to powerful AI tools, enabling businesses of all sizes to leverage AI capabilities without needing to invest heavily in bespoke infrastructure. This accessibility is fostering a new wave of innovation and competition, as more companies can now harness the power of AI to solve complex problems and optimize their operations.

In conclusion, the AI market is rapidly evolving, with substantial implications for businesses across all sectors. It enables businesses to unlock new opportunities and achieve unprecedented levels of efficiency and innovation. As we continue to explore the dynamic landscape of AI, it is clear that this technology will remain a cornerstone of business strategy and a catalyst for future growth and development.

Executive Summary

AI Tech Development

- Generative AI has accelerated AI's mainstream adoption by enabling content creation, automation, and decision support at scale
- Key advancements are driven by the AI tech stack, comprising: Hardware (e.g., GPUs from NVIDIA), Infrastructure (e.g., foundation models from OpenAI, Mistral), Applications (e.g., AI assistants, predictive tools)
- However, training costs and energy requirements for large models (e.g., GPT-4, Gemini Ultra) are rising exponentially, challenging long-term scalability

Implementation & Adoption of AI

- US dominates AI commercialization, but Europe shows strong potential with deep industrial data, R&D talent, and a growing base of sovereign AI players
- AI adoption is uneven across industries: most mature in marketing, sales, product development, and service ops, with untapped potential in HR, supply chain, and finance
- Adoption remains modest on average but is expected to rise sharply as implementation costs decline and competitive pressure increases

Regulation

- Europe is leading on AI regulation through the EU AI Act, introducing: A risk-based framework for classifying AI systems, strict obligations for high-risk use cases, rules around transparency, accountability, and data quality
- The regulation balances risk mitigation and innovation support, providing an edge to "AI made in Europe" and increasing trust among users and enterprises

M&A & Deal activity

- VC funding has declined in volume, but capital per deal has increased, especially in infrastructure-focused AI firms, reflecting high capital needs and investor preference for defensibility
- Europe has seen a significant rebound in exits (+332% YoY in 2024), driven by strategic M&A in application and infrastructure companies
- M&A is the dominant exit route globally (~75% of proceeds), reflecting strategic interest from corporates seeking AI capabilities

Future Outlook of AI

- Despite massive economic potential (e.g., €12tn by 2030), AI's long-term scalability faces structural challenges, including the absence of a clear "killer app," rising training and power costs, and growing capital moats that favor well-funded incumbents
- Nonetheless, AI is expected to remain a key driver of cost efficiency, revenue growth, and innovation across sectors, with high-impact applications emerging particularly in high-tech, finance, and healthcare

Table of Contents

1	The Artificial Intelligence Sphere	5
2	The AI Funding Environment	14
3	Deal Activity	19
4	How could the Future of AI look like?	23

Table of Contents

1	The Artificial Intelligence Sphere	5
2	The AI Funding Environment	14
3	Deal Activity	19
4	How could the Future of AI look like?	23

Overview of the world of AI

Artificial intelligence

is the science of creating machines that mimic human intelligence

Generative AI

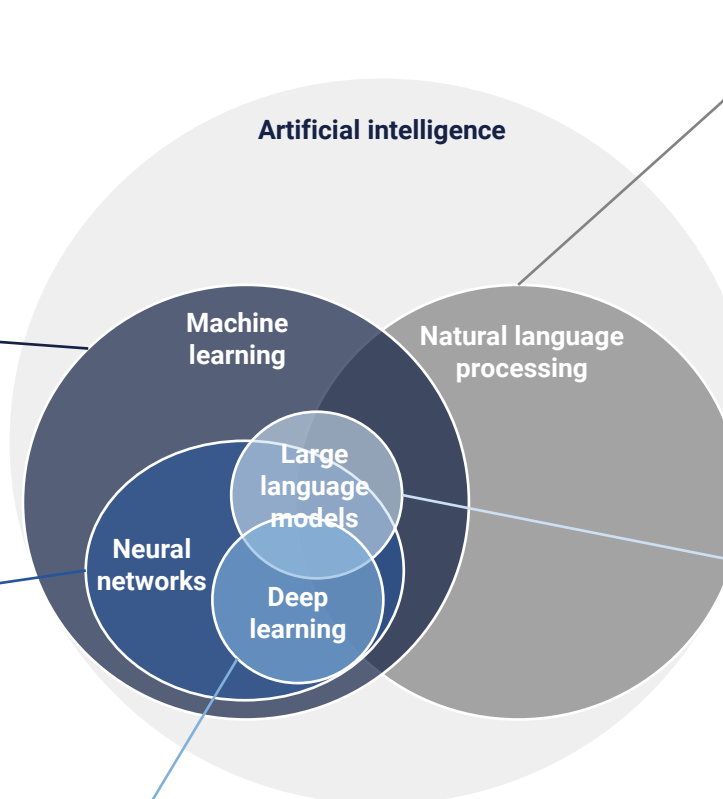
is an AI system that is able to create contents such as text and images in response to natural language prompts

Machine learning (ML)

is a subcategory of AI focused on developing models and algorithms to help computers improve their performance through experience. Large amounts of data are collected and fed into a computer, which then discovers patterns in the data and uses it to make predictions and decisions

Neural networks

are mathematical models aimed at operating similar to the human brain structure. Each "neuron", or node, of the network takes an input, performs a computation, and creates an output. If the output of any individual node is above a specified threshold value, the node is activated and sends data to the next layer of the network. This is the way Google's search algorithm works



Natural language processing (NLP)

are a type of AI giving computers the ability to understand text and spoken words in a similar manner to human beings. These models operate based on computational linguistics combined with statistical, machine learning and deep learning models to enable computers to understand human language. They work by using syntactic analysis to identify the structure and relationship between words and sentences and semantic analysis to understand the meaning of words and their context within sentences. Google Translate, Siri and Alexa rely on NLP

Large language models

are a subfield of ML models trained on large amounts of unlabeled data using self-supervised learning or semi-supervised learning to perform NLP tasks. Large language models use deep neural networks to generate outputs, such as ChatGPT

Deep learning

are neural networks with three or more layers. While classical machine learning algorithms need more structured, labeled data to make predictions, deep learning doesn't necessarily require a labeled dataset, and it's less dependent on human interaction. Deep learning models can be used for speech recognition and autonomous driving, for example

Foundational aspects of the AI tech-stack

AI Hardware

encompasses the physical devices and components designed to support AI computations. This includes specialized processors (e.g., GPUs and TPUs from NVIDIA, Intel, and AMD), sensors, and other hardware designed to handle the intensive computational requirements of AI workloads. These hardware components are crucial for enabling the practical application of AI by significantly enhancing processing speed, efficiency, and performance

Processor design



Intelligent sensors & devices



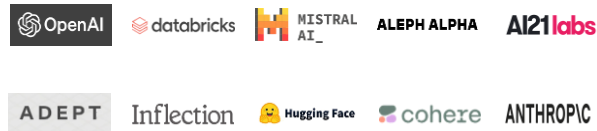
Data center



AI Infrastructure

refers to the foundational technologies and services that enable the development, deployment, and management of AI applications. This includes foundation models (large pre-trained models like those developed by OpenAI, Mistral, and Anthropic), cloud services (such as those provided by Google Cloud, Amazon AWS, and Microsoft Azure), and data management platforms

Foundation models



Natural language technology



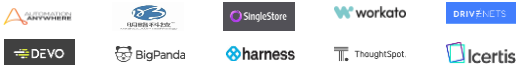
AI Applications

refer to the end-user solutions that leverage AI technologies to perform specific tasks and provide value across various industries. These applications span a wide range of sectors, including consumer (e.g., personalized recommendations, chatbots), industrial (e.g., automation, predictive maintenance), finance (e.g., fraud detection, algorithmic trading), and healthcare (e.g., diagnostics, personalized medicine)

AI core



AI automation platforms



Industrial



Healthcare

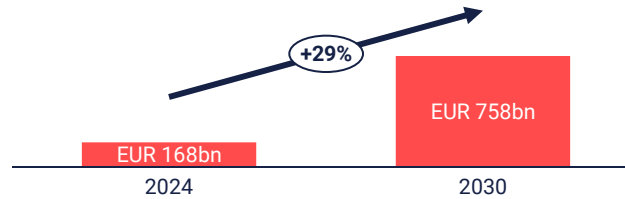
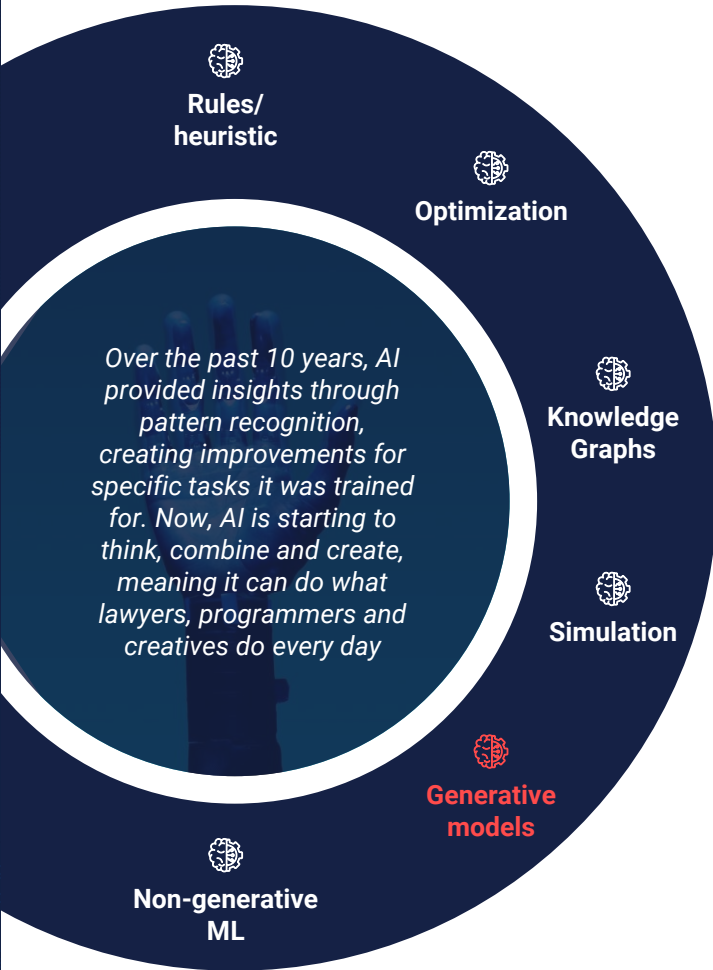


Financial services



Note: the companies shown are relevant players globally, including in Europe

The Artificial Intelligence (AI) landscape is characterized by various technologies, making each implementation unique

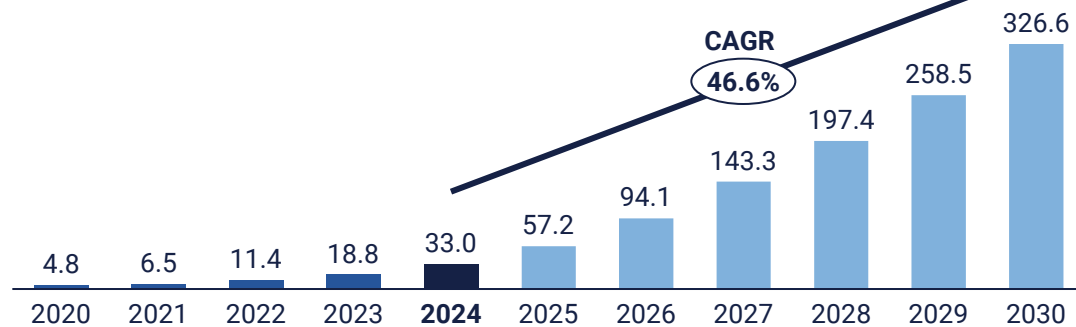


- The global market for AI is expected to grow by a CAGR of around 30% until 2030
- Experts believe, however, that additional global economic value delivered by AI by 2030 will be around EUR 12tn

- Optimization** | Maximizes benefits and manages trade-offs by optimizing resources within constraints and time limits, using prescriptive analytics techniques
- Rules/ heuristic** | Faster problem-solving technique that finds approximate solutions when traditional methods fail or are too slow, using cost/utility guesses to guide informed searches
- Knowledge graphs** | Representing information in a structured form, connecting concepts and relationships combined with AI it can help AI to understand and interpret context
- Simulation** | Combining AI and simulation technologies to develop and test AI agents within simulated environments
- Generative models** | Learns from data to create new artifacts similar to the originals, enabling the creation of innovative content and accelerating R&D in science-heavy fields
- Non-generative ML** | Technique that does not generate new content but rather focuses on tasks such as classification, recognition and prediction

Generative AI adoption has skyrocketed in the past year due to its versatile applications

Global generative artificial intelligence market (spending on the platform and application layer) (EURbn)



What are the benefits and use cases of generative AI?

- Foundation models like generative pretrained transformers automate, augment, and autonomously execute business and IT processes, driving innovations such as ChatGPT
- Generative AI offers benefits like faster product development, enhanced customer experiences, and improved employee productivity, with specifics varying by use case
- In 2023, 2,500 executives were surveyed about the primary purpose of their generative AI investments – The survey revealed that the primary focus of AI initiatives is mainly aimed to increase customer experience & retention, revenue growth or optimize costs

Looking ahead – what brings the future for generative AI?

- Generative AI can transform industries with applications like personalized learning plans, patient rehabilitation, design innovation, and advanced digital assistants
- On-device generative AI enhances data privacy, reduces latency, increases performance, and lowers costs, driving technological advancements and productivity

AI does not revolve around generative AI



There are many use cases that are not properly addressed with generative AI, i.e., intelligent automation, forecasting, decision intelligence or autonomous systems

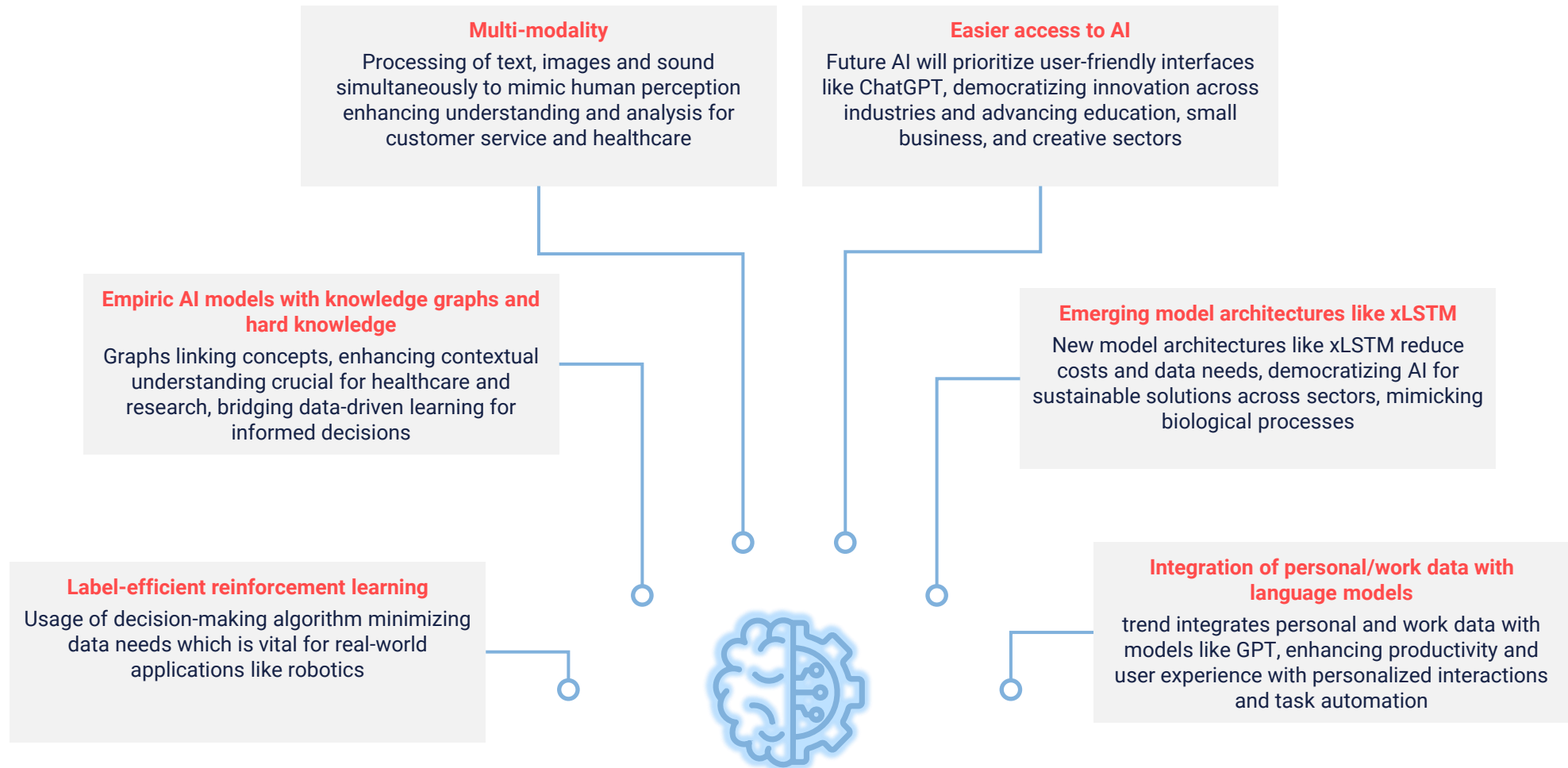


Generative AI also bears significant risks for cooperations that cannot be effectively mitigated – these risks mainly revolve around data privacy, IP or regulatory compliance

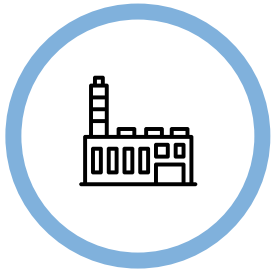


Companies unknowingly diminish value by misusing generative AI instead of combining it with less risky, cheaper, and more understandable AI technologies

Six trends in AI advancements are shaping the future of various industries



Although US companies dominate the AI sphere, Europe boasts significant strengths across various domains, positioning the region favourably for the future



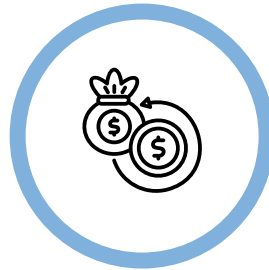
Europe has significant strengths in traditional industries like healthcare, manufacturing, and biotech

The data richness in these industries allows for effective training of AI models, which can then be leveraged to maximize economic benefits



The commoditization of AI and availability of open-source models significantly boost global competition

This amplified competition considerably reduces computing costs, making market entry more attractive for new players



Investors have historically underestimated and undervalued European VC investments

As a result, European VC investments have consistently outperformed those in the US, increasingly attracting capital investors



Europe boasts a highly promising network of talent in prestigious research institutions compared to the US

Statistics show Europe has significantly more AI researchers, supported by a higher number of published research papers (around 50% more)



A stronger regulatory environment in Europe leads local software suppliers and users to prefer AI "made in Europe"

This European seal of approval differentiates local solutions from foreign ones, attracting more users concerned about data security

Despite Europe's strong positioning in relevant domains, US VC investments have historically been much higher. Over the long term, this has resulted in the undeniable dominance of US companies in the hardware layer of AI, such as NVIDIA and Intel, and a significant edge for US companies in the infrastructure layer of AI, such as OpenAI, Google, and Meta.

The EU AI Act addresses the most relevant legal risks and issues of generative AI without limiting benefits or hindering growth

The regulatory landscape of generative AI in Europe is experiencing fundamental changes through the EU AI Act

To address these issues, EU regulatory bodies have introduced the EU AI Act, which mainly covers the following contents



The risks of generative AI are significant and evolving, with threat actors using it to create deep fakes, counterfeit products, and complex scams. Tools like ChatGPT, trained on public data, are not GDPR-compliant and can contain biases, highlighting the need to implement regulations

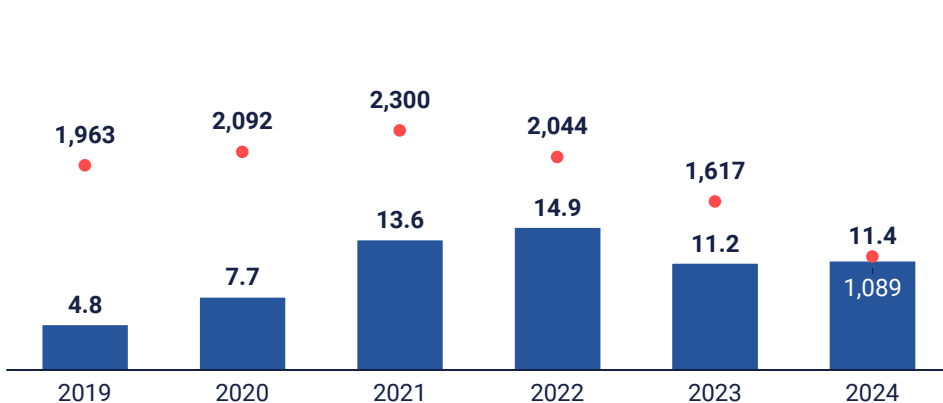
- 1. Risk-based Framework**
 - Categorizes AI systems into four categories: unacceptable risk, high risk, limited risk and minimal risk
 - AI systems that pose unacceptable risks, such as those manipulating human behavior or exploiting vulnerabilities, are banned
 - High-risk systems, like those used in critical infrastructure or law enforcement, are subject to strict requirements
- 2. High-Risk AI Requirements**
 - For high-risk AI systems, the act mandates compliance with strict obligations, including risk management, data quality, documentation, transparency, human oversight, and robustness
 - These systems must undergo conformity assessments before they can be deployed in the EU market
- 3. Transparency & Accountability**
 - Requires AI systems to be transparent, meaning users should be informed when they are interacting with AI
 - Also emphasizes accountability, with obligations for providers and users of AI systems to ensure compliance
- 4. Innovation & Competitiveness**
 - While aiming to protect citizens, the act also seeks to foster innovation and competitiveness in the AI sector
 - It includes provisions to support small and medium-sized enterprises (SMEs) and startups in developing AI technologies
- 5. Enforcement & Penalties**
 - The act establishes enforcement mechanisms, including national supervisory authorities and a European Artificial Intelligence Board
 - Non-compliance can result in significant fines, similar to the GDPR framework

Table of Contents

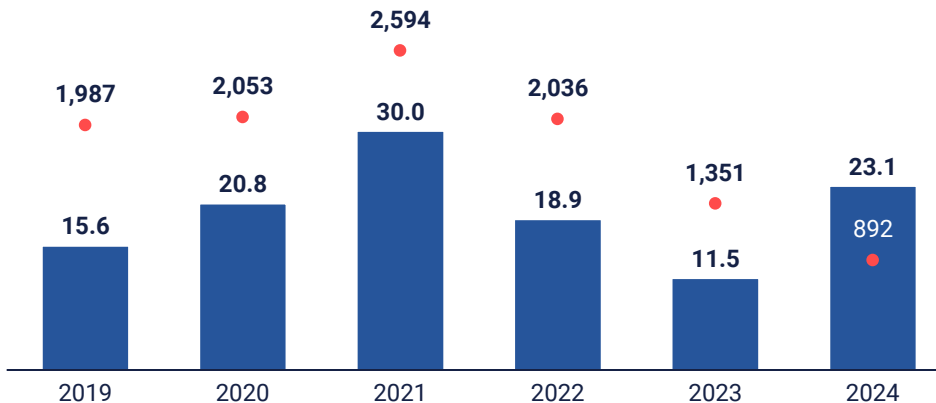
1	The Artificial Intelligence Sphere	5
2	The AI Funding Environment	14
3	Deal Activity	19
4	How could the Future of AI look like?	23

While global AI VC deal count has declined across regions since 2021, the amount of capital raised has picked up in 2024, especially in the US and Asia

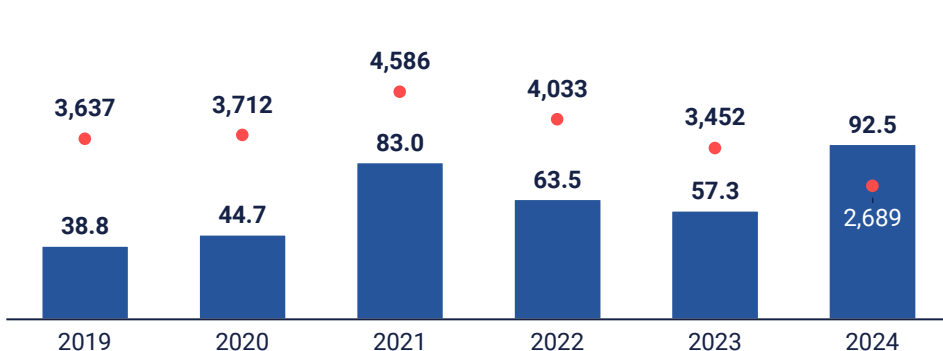
Europe



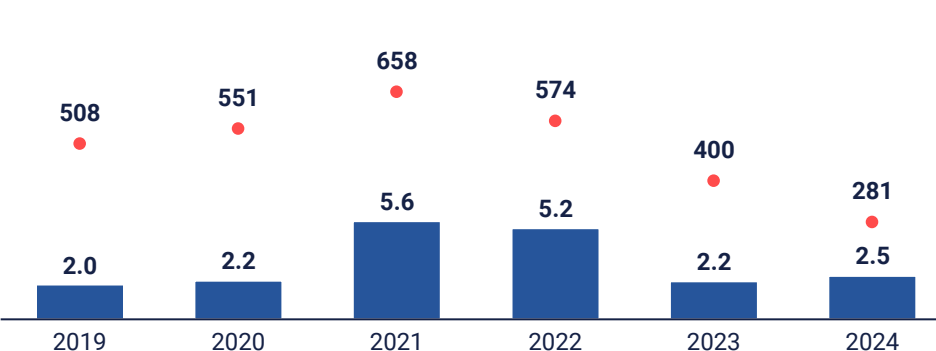
Asia



Americas



Rest of the world



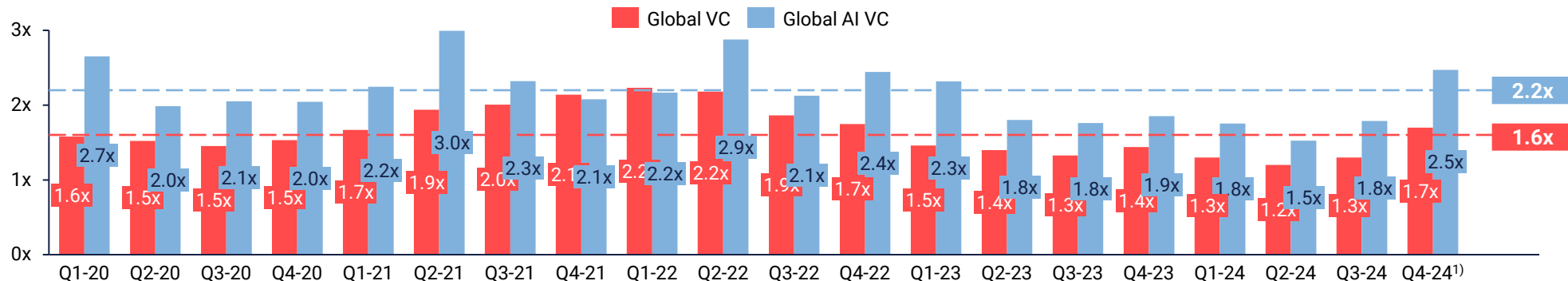
In 2024, venture capital deal count dropped globally, reflecting cautious investor sentiment worldwide. However, the amount of capital raised per deal has increased as the costs of training state-of-the-art generative AI models have reached unprecedented levels

- Deal count
- Capital invested

Note(s): Capital Invested figures are in EURbn; Includes data until December 2024
Source: Pitchbook

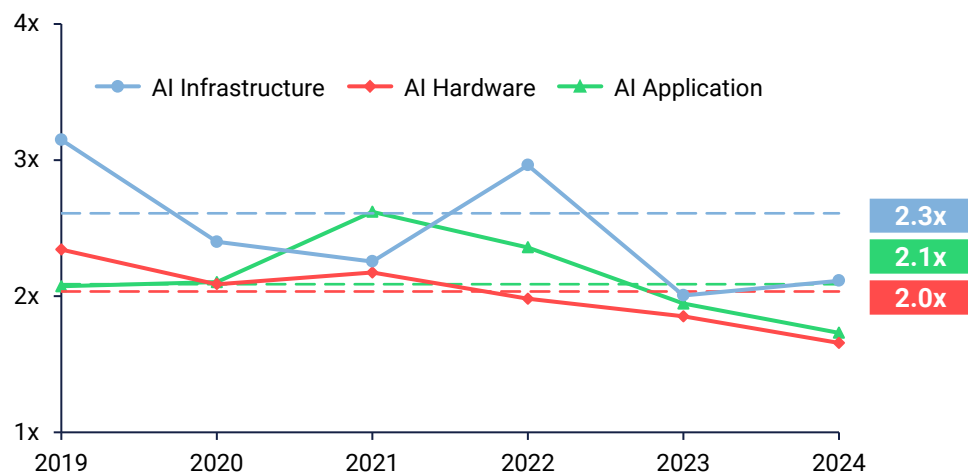
AI companies, especially in the infrastructure segment, have recorded significant premiums in their valuation step-ups over the last five years

Valuation step-up¹⁾ – Global VC vs. Global AI VC



Over the last 5 years, AI companies experienced significantly higher valuation step-ups than companies from other sectors

Global valuation step-up by segment



1.
2.
3.

Higher valuation step-ups for AI infrastructure

- Companies from the AI infrastructure segment realized significantly higher valuation step-ups than AI hardware and application firms
- Investors reward the higher technological complexity and innovation efforts of the AI infrastructure segment

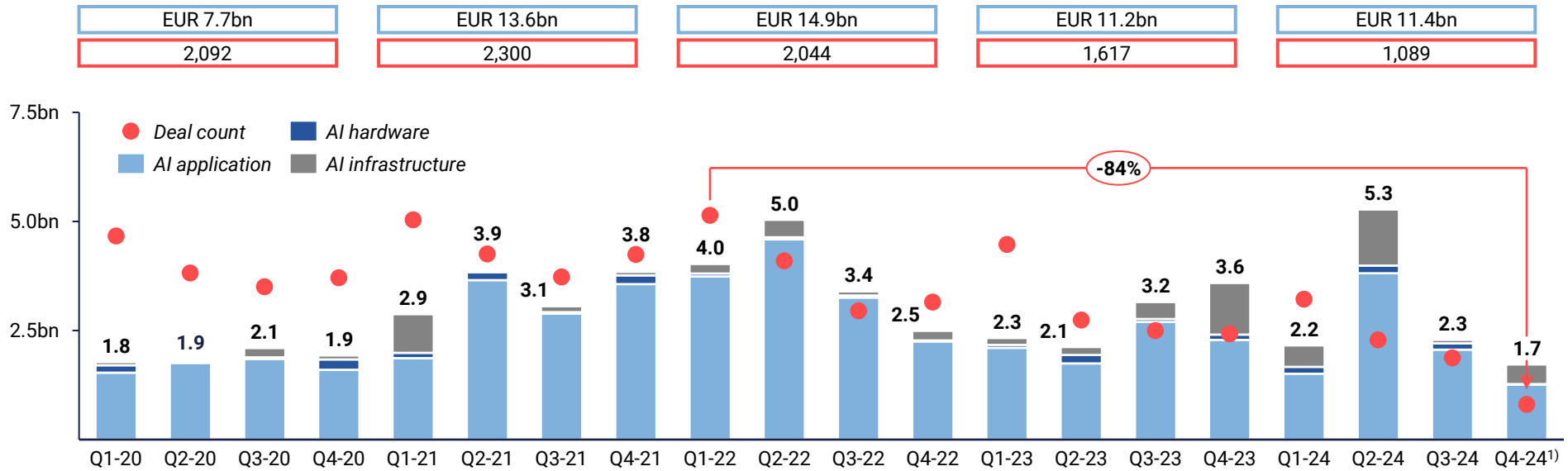
Decreased valuation step-ups in 2023

- Every segment fell below their 5-year median in valuation step-up in 2023
- This movement is in line with a drop in the valuation-premium for the AI sector

AI infrastructure valuation step-ups picking up in 2024

- Due to strong demand for AI infrastructure products and high costs of training new generative AI models, this segment has started to rebound

After a continuous rise until the mid of 2022, the European AI funding activity has seen significant decreases in both deal count, and capital invested until 2024



184%

Increase in average annual deal size from 2020 to 2024

(84%)

Decline in deal count of 84% from peak in Q1-22 to Q4-24

76%

Share of invested capital in 2024 dedicated to AI application companies

EUR 33m

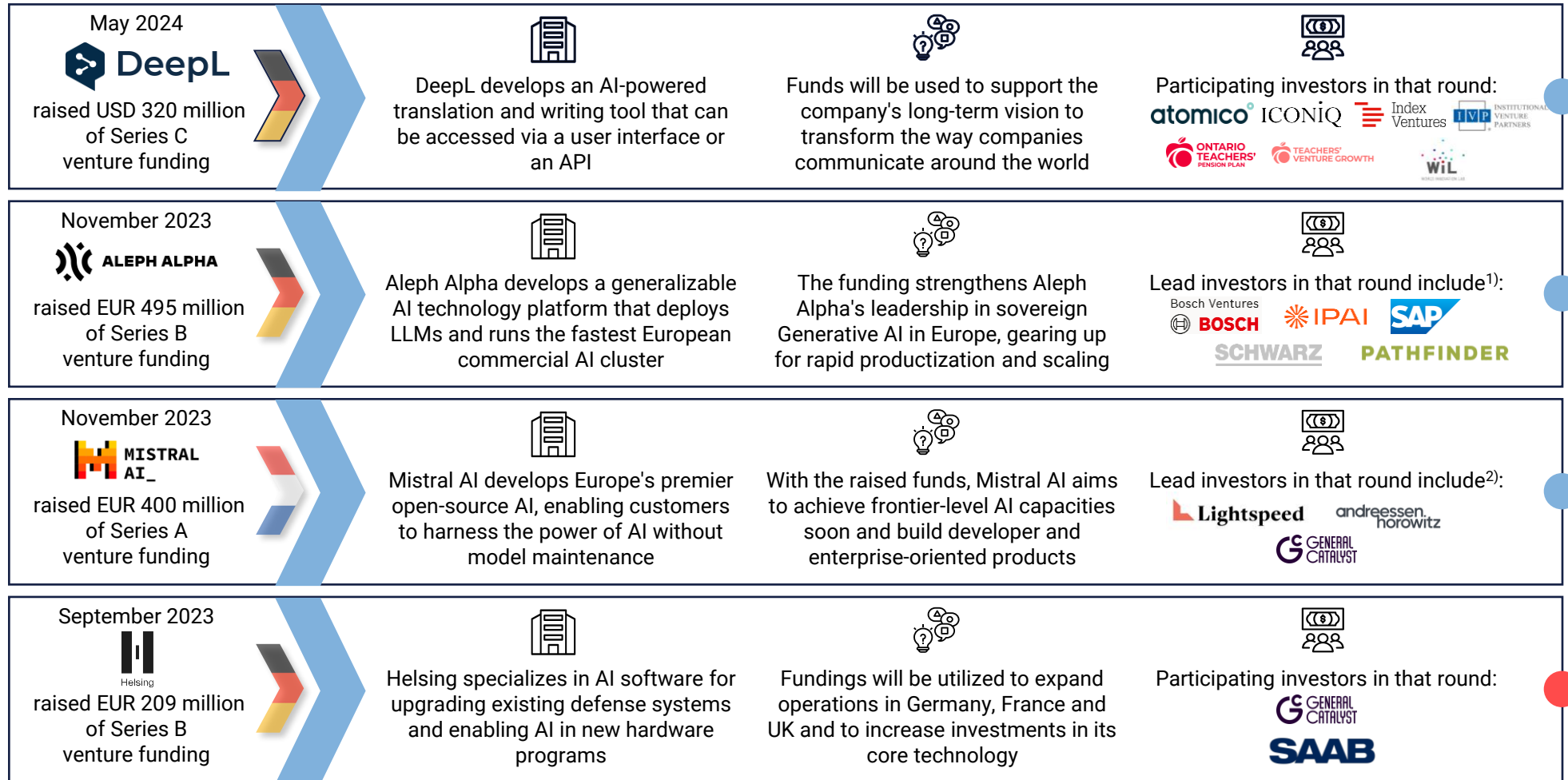
Average deal size for AI infrastructure firms in 2024 (other AI firms: EUR 9.0m)

Annual capital invested

Annual deal count

Note(s): Includes data until December 2024
Source: Pitchbook

The European AI landscape has been shaped by a series of large deals across the industry, with the highest funding levels being directed towards the AI infrastructure segment



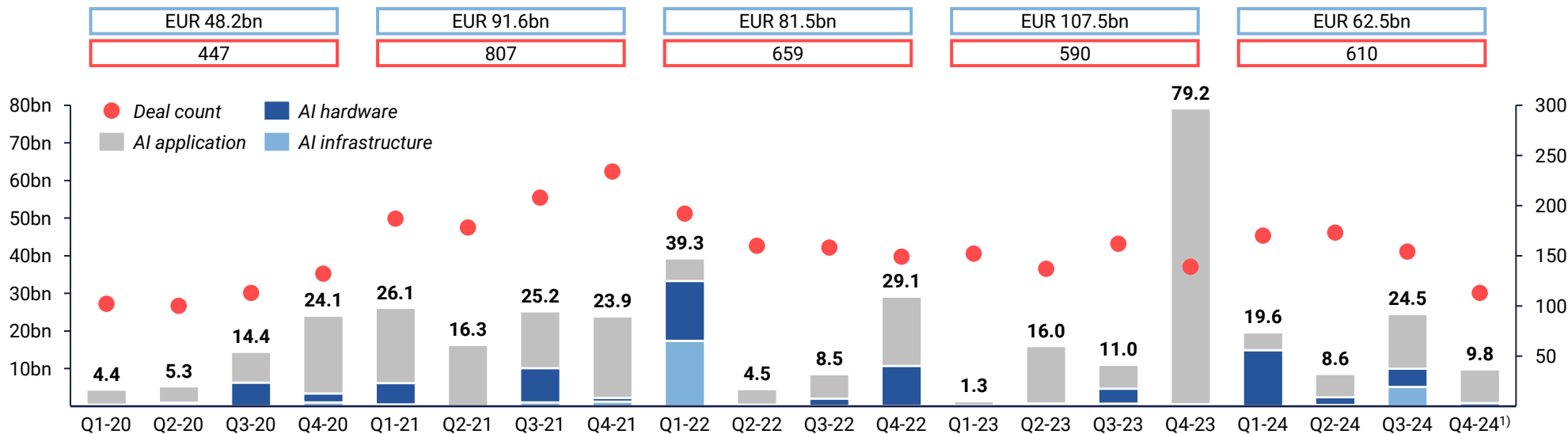
- AI infrastructure
- AI application
- AI hardware

Note(s): 1) Logo list is non-exhaustive – consortium comprised 12 investors in total; 2) Logo list is non-exhaustive – consortium comprised 23 investors in total

Table of Contents

1	The Artificial Intelligence Sphere	5
2	The AI Funding Environment	14
3	Deal Activity	19
4	How could the Future of AI look like?	23

While the number of global exits of VC investors has been relatively stable over the past 2 years, proceeds from exits have started to pick up in 2024



70%

Of exit proceeds over the past 5 years were achieved in the application segment

(29%)

Decrease in exit volume from 2021 to 2024

54%

Increase in average exit size from 2023 to 2024

(24%)

Decline in exit count from peak year 2021 to 2024



Annual capital invested

Annual deal count

Note(s): Includes data until December 2024






Various exits from the AI industry display the value and potential that AI companies hold for market leaders of other industries like Thomson Reuters and Biontech

March 2023

Overview

Astera Labs provides an intelligent connectivity platform featuring semiconductor-based, high-speed mixed-signal products with integrated microcontrollers and sensors


<p>Sellers¹⁾:</p>   		<p>IPO:</p> 
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Rationale

Astera Labs plans on using the funds to hire over 200 engineers while contemplating mergers and acquisitions as a further strategy of increasing its engineering capacity


<p>EV</p> <p>EUR 5.06bn</p>	<p>Raised to date</p> <p>EUR 770m</p>
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July 2023

Overview

InstaDeep is a leading company in the field of AI-based decision support systems, providing its partners with a competitive advantage through high ML expertise



<p>Sellers³⁾:</p>    		<p>Buyer:</p>  
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Rationale

The acquisition strengthens Biontech's know-how in AI-based drug development and design through InstaDeep's expertise in developing advanced decision-making systems







<p>EV</p> <p>EUR 562m</p>	<p>Raised to date</p> <p>EUR 95m</p>
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August 2023

Overview

Casetext uses advanced AI and ML to build technology for legal professionals through its key product CoCounsel, an AI legal assistant powered by GPT-4

<p>Sellers²⁾:</p>   		<p>Buyer:</p>  
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Rationale

The acquisition supports Thomson Reuters 'build, partner and buy' strategy to bring generative AI solutions to customers and redefine the future of professionals

<p>EV</p> <p>EUR 650m</p>	<p>Raised to date</p> <p>EUR 61m</p>
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- AI infrastructure
- AI application
- AI hardware

Notes: 1) Logo list is non-exhaustive – consortium comprised 10 investors in total; 2) Logo list is non-exhaustive – consortium comprised 43 investors in total; 3) Logo list is non-exhaustive – consortium comprised 15 investors in total
Source: MergerMarket

US M&A activity has slowed down in 2024 shifting to AI hardware, while IPO markets are recovering

Key observations about the exits of US AI VC investments

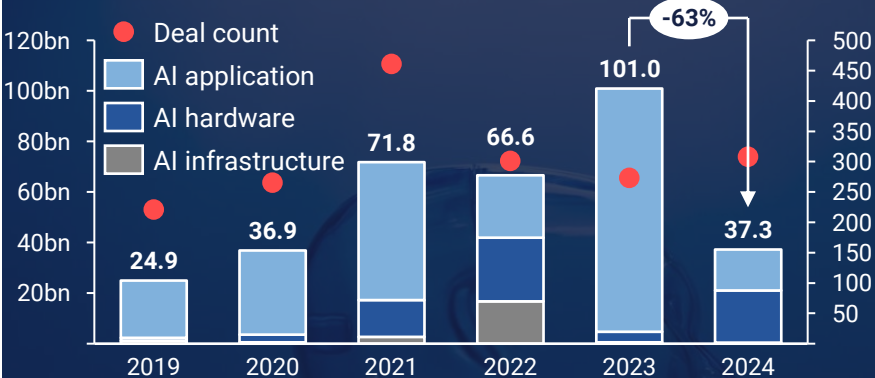
- US AI deals during 2024 were mostly centred around cloud infrastructure, streamlining data management and optimisation, growing generative and sector-specific AI, attracting AI talent and building cross-platform AI solutions
- Deal volume went down by 63% during 2024 compared to the previous year while deal count went up simultaneously, indicating a decrease in average deal size
- Merger/Acquisitions remain the most popular exit type generating ~76% of proceeds, while IPOs and secondary offerings become a substantial exit form as well, accounting for ~10% of proceeds each in 2024, as equity markets have started to recover

A selection of interesting transactions of US AI companies

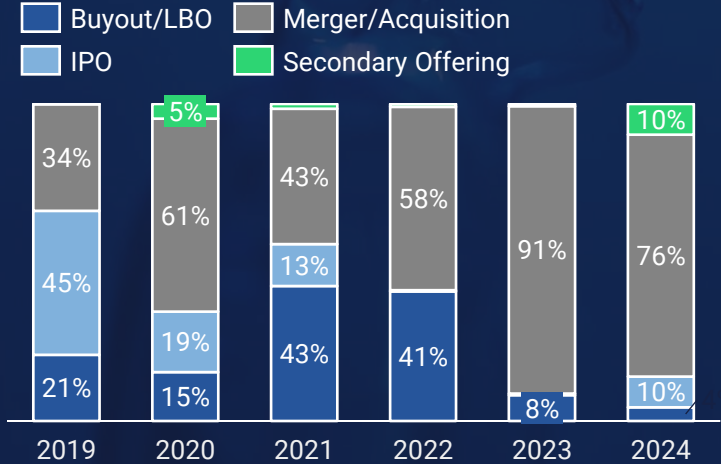
Jan. 2024 acquired by 	<p>EV: USD 14.3bn</p> <p>AI hardware</p>	<p>Designs and markets IT networking products to enable AI platforms, such as routers, switches, edge routers, data centers, aggregated devices and IT security products</p>
Jul. 2024 acquired by 	<p>EV: USD 2.13bn</p> <p>AI hardware</p>	<p>Developer of a data integration platform to build and run smart data pipelines</p>
Aug. 2024 acquired by 	<p>EV: USD 4.9bn</p> <p>AI hardware</p>	<p>Provides server solutions and equipment for cloud and infrastructure to enable an AI data centers ecosystem</p>

Sources: Pitchbook, MergerMarket

Proceeds from exits in the US (in EURbn)



Relative exit proceeds by exit type

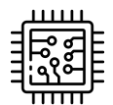


European M&A activity has gained significance and deal activity has started to rebound in 2024

Key observations about the exits of European AI VC investments



European ventures have become more significant in the AI sector, marked by a +332% increase in successful VC investor exits from 2023 to 2024



Apart from two major exits in the AI applications space with Darktrace's EUR 4.9bn sale in the cybersecurity sector and Keyword Studios' EUR 2.5bn sale, the exit activity has gradually shifted from AI applications towards the AI hardware space, highlighted by a strong rise in VC investment proceeds from 2023 to 2024



Except for two major buyouts in 2024, sponsor activity in the AI space remains relatively modest since 2022, as a result of ongoing high interest rates and M&A exits to strategic investors remain the main exit route

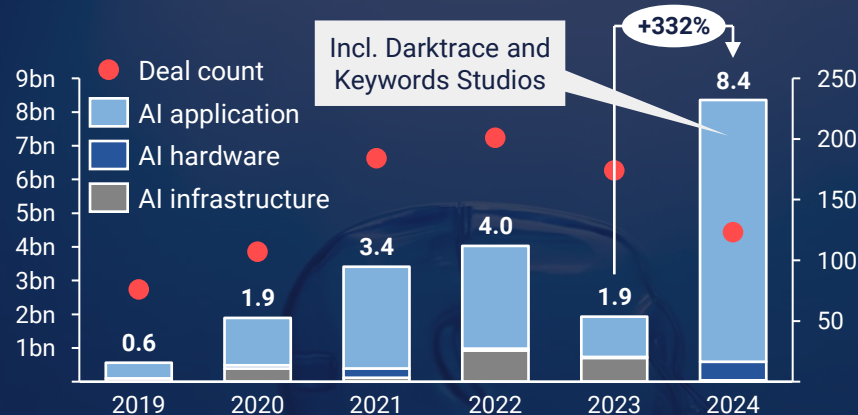
A selection of interesting transactions of European AI companies

	DARKTRACE	EV: EUR 4.9bn	Developer of AI-based cybersecurity solutions using unsupervised machine learning techniques to build intrinsic patterns for networks and devices to detect potential threats and launch automated responses
Apr. 2024	acquired by	AI application	
	THOMABRAVO		

	Keywords Studios Imagine More	EV: EUR 2.5bn	Developer of technical and creative solutions to the global video games and entertainment industry, offering one-stop-shop solutions for various stages of video game development
May. 2024	acquired by	AI application	
	TEMASEK		

	SILO_{AI}	EV: EUR 614m	Largest private AI lab in Europe, developing cutting-edge AI models, platforms and solutions for large enterprise customers via open source multilingual LLMs
Jul. 2024	acquired by	AI infrastructure	
	AMD		

Proceeds from exits in Europe (in EURbn)



Relative exit proceeds by exit type

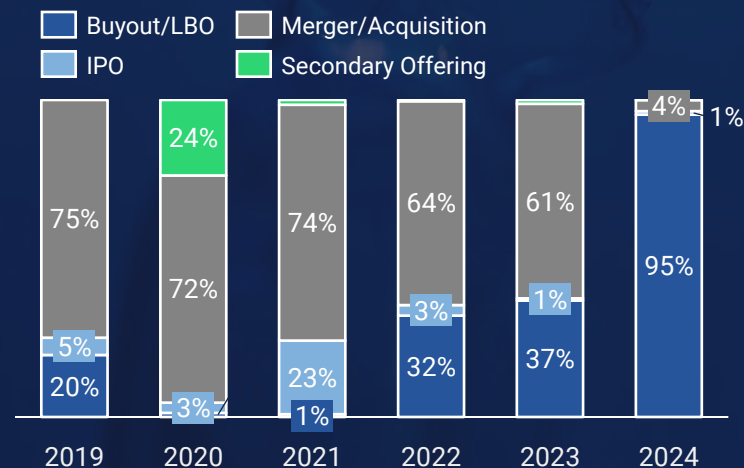
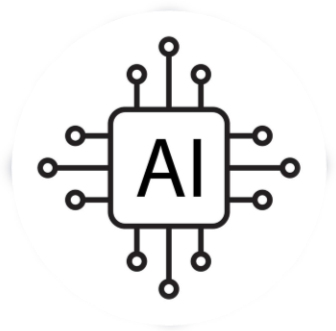


Table of Contents

1	The Artificial Intelligence Sphere	5
2	The AI Funding Environment	14
3	Deal Activity	19
4	How could the Future of AI look like?	23

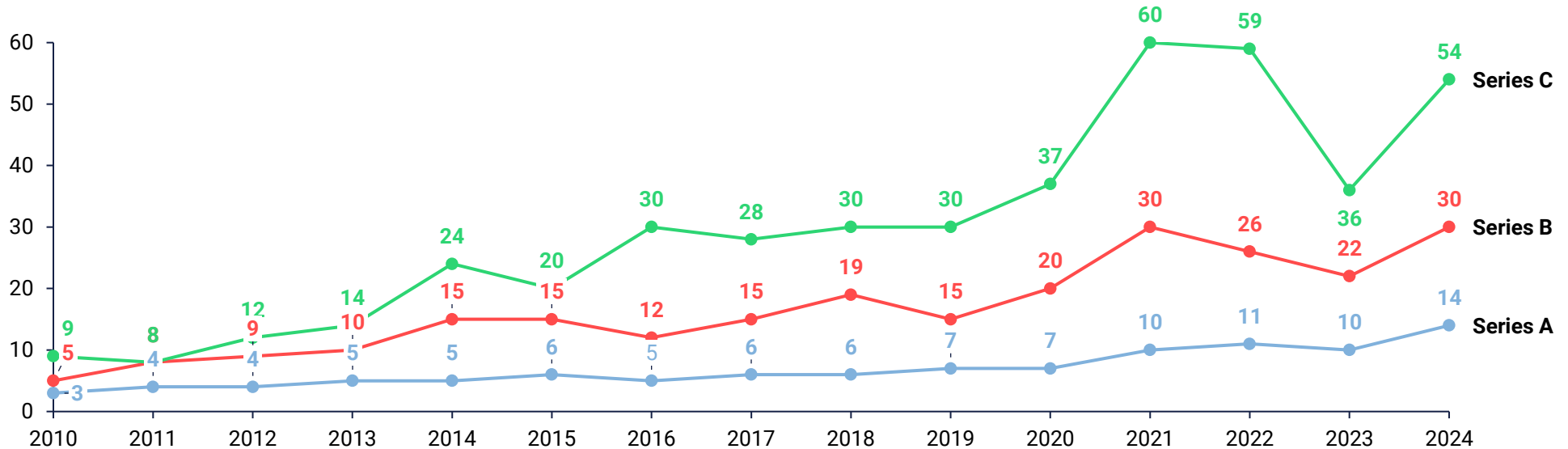
How could the future of AI look like?



- 1** Enormous capital moats are emerging. Will only the capital-richest start-ups survive?
- 2** Are we in a bubble? AI's killer application has yet to emerge
- 3** While potential for AI adoption is tremendous, actual adoption still remains modest on average across industries
- 4** Currently, AI is predominantly used in marketing & sales, product development and services operations with substantial potential in other areas
- 5** The costs of training state-of-the art generative AI models are getting more expensive as expected and have reached unprecedented levels
- 6** AI decreases costs and increases revenues
- 7** AI-related spending & investments by tech companies are expected to remain high and increase in the medium-term
- 8** Funding round sizes as well as valuations have been growing over the past ~11 years, making it harder for VCs to recoup their investments
- 9** Is it sustainable to use generative AI in all fields of application, given massive power consumption, storage requirements and running costs?

1 Enormous capital moats are emerging. Will only the capital-richest start-ups survive?

Median AI funding round sizes by stage (USDm)



Massive funding rounds from leading AI players

- OpenAI secured \$10bn in its last funding round and is in talks to raise \$6.5bn from investors at a \$150bn valuation
- Anthropic raised \$2.75bn from Amazon in March 2024 at a \$18.4bn valuation, taking its total raised from Amazon to \$4bn
- Dario Amodei, CEO of Anthropic, predicted that within 2 years, training AI models could cost \$10bn
- Mistral raised capital at a \$6.2bn valuation in June 2024 from Nvidia, Samsung, A16z and Lightspeed

Survival of the wealthiest start-ups?

- These developments lead to massive capital moats, making it harder for new start-ups to compete and train AI models as fast as the leading players
- The key challenge for start-ups aiming to build LLM models is to rapidly gain scale and maintain growth momentum in order to attract investors
- As a consequence, AI start-ups may need to raise funds through an IPO at an earlier stage or via partnerships with big tech companies in order to become less dependent on VC money
- For example, as Character AI was unable to grow revenue to a meaningful size and maintain strong growth momentum, in August 2024 their CEO moved to Google and established a licensing agreement for its LLM technology in order to survive in a challenging funding environment

2 Are we in a bubble? AI's killer application has yet to emerge (1/2)

2000 – Tech bubble leaders

	Market cap (USDbn)	24m fwd P/E	24m fwd EV / Sales
Microsoft	581	53.2x	19.2x
Cisco Systems	543	101.7x	17.5x
Intel	465	42.1x	11.5x
Oracle	245	84.6x	19.0x
IBM	218	23.5x	2.3x
Lucent	206	37.9x	4.1x
Nortel Networks	199	86.4x	6.4x
Median	245	53.2x	11.5x

2024 – Magnificent seven

	Market cap (USDbn)	24m fwd P/E	24m fwd EV / Sales
Apple	3387	26.5x	7.7x
Microsoft	3043	25.7x	9.4x
Nvidia	2649	24.1x	13.2x
Amazon	1850	25.4x	2.5x
Alphabet	1808	16.6x	2.0x
Meta Platforms	1118	19.2x	5.5x
Tesla	672	55.4x	4.9x
Median	1850	25.4x	5.5x

Valuation levels imply that we are not in a bubble...

- Despite larger market caps, valuation levels of the leading tech companies in 2024 are roughly half as high as those of the leaders of the tech bubble in 2000
- Big tech giants in 2024 are also highly profitable and much more cashflow generative vs. the companies of the tech bubble in 2000
- Current valuations already incorporate some of the AI efforts of the leading players in the next few years, but are still not unreasonable
- Hence, it is far less likely that we are in an AI bubble

...however, AI's killer application hasn't emerged yet

- Applications ultimately drive the success of technology cycles, such as ERP software in the late 1990s, e-commerce applications in the 2000s and cloud applications in the 2010s, enabling the creation of low-cost computing infrastructure at massive scale
- However, the AI “killer application” is yet to be found, as AI currently rather simplifies or takes over processes instead of disrupting the world like the Internet or mobile phones did and the majority of the value creation is currently generated at the AI infrastructure level, rather than at the application level

Applications of AI

Natural language processing (NLP):

NLP allows computers to understand and generate human language. This technology is used in a variety of applications, such as machine translation, spam filtering, and sentiment analysis.

Computer vision:

Computer vision allows computers to identify and interpret visual content. This technology is used in a variety of applications, such as self-driving cars, facial recognition, and object detection.

Machine learning (ML):

ML allows computers to learn from data and improve their performance over time. This technology is used in a variety of applications, such as predictive analytics, fraud detection, and recommendation systems.

Robotics:

Robotics is the branch of AI that deals with the design, construction, and operation of robots. Robots are used in a variety of applications, such as manufacturing, healthcare, and space exploration.

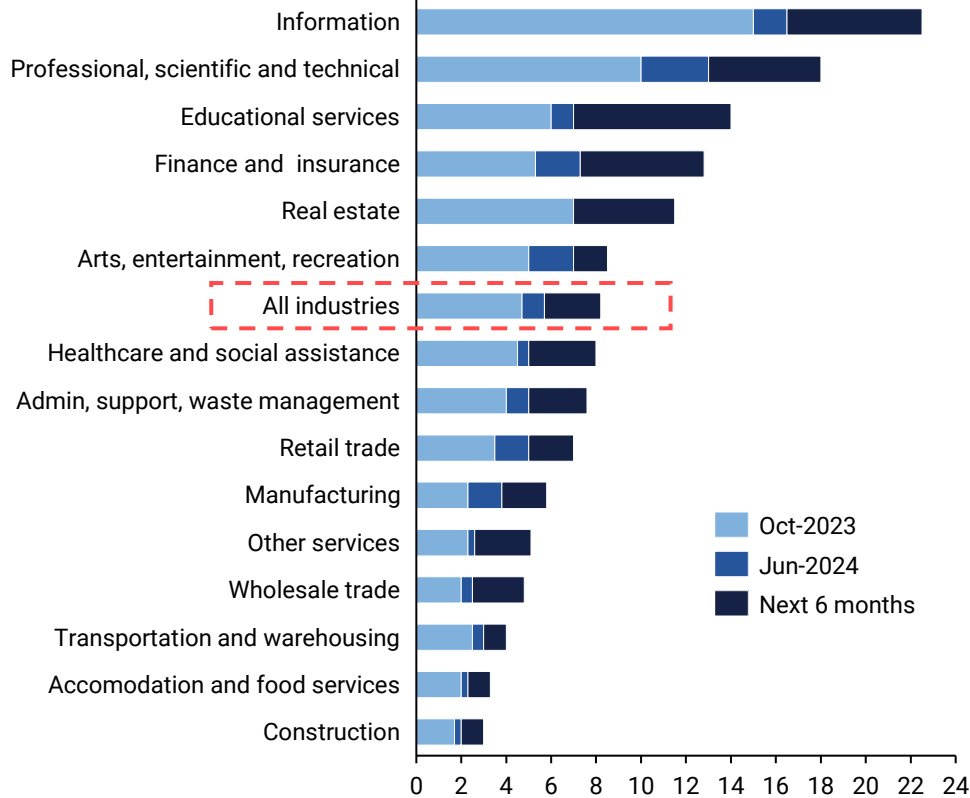
2 Are we in a bubble? AI's killer application has yet to emerge (2/2)

Sectors, in which AI applications may play a major role in the future

AI in business intelligence	AI in healthcare	AI in education	AI in finance	AI in manufacturing	AI in other industries
<p>AI is playing an increasingly important role in business intelligence (BI). AI-powered BI tools can help businesses collect, analyze, and visualize data more efficiently and effectively. This can lead to improved decision-making, increased productivity, and reduced costs.</p> <ul style="list-style-type: none"> Data collection: Collecting data from a variety of sources, including structured data (for example, databases) and unstructured data (for example, text documents, images, and videos) Data analysis: To analyze data and identify patterns, trends, and relationships Data visualization: AI can help create visualizations that make it easier to understand data Decision-making: Insights and recommendations generated by AI models can help drive data-driven decision-making for businesses 	<p>AI is also playing an increasingly important role in healthcare. AI-powered tools can help doctors diagnose diseases, develop new treatments, and provide personalized care to patients.</p> <ul style="list-style-type: none"> Disease diagnosis: AI can be used to analyze patient data and identify patterns that may indicate a disease. This can help doctors diagnose diseases earlier and more accurately. Treatment development: By analyzing large datasets of patient data, AI can identify new patterns and relationships that can be used to develop new drugs and therapies. Personalized care: By analyzing a patient's data, AI can help doctors develop treatment plans that are tailored to the patient's specific needs. 	<p>AI could be used in education to personalize learning, improve student engagement, and automate administrative tasks for schools and other organizations.</p> <ul style="list-style-type: none"> Personalized learning: AI can be used to create personalized learning experiences for students. By tracking each student's progress, AI can identify areas where the student needs additional support and provide targeted instruction. Improved student engagement: AI can be used to improve student engagement by providing interactive and engaging learning experiences. For example, AI-powered applications can provide students with real-time feedback and support. Automated administrative tasks: Administrative tasks, such as grading papers and scheduling classes can be assisted by AI models, which will help free up teachers' time to focus on teaching. 	<p>AI can help financial services institutions in five general areas: personalize services and products, create opportunities, manage risk and fraud, enable transparency and compliance, and automate operations and reduce costs.</p> <ul style="list-style-type: none"> Risk and fraud detection: Detect suspicious, potential money laundering activity faster and more precisely with AI. Personalized recommendations: Deliver highly personalized recommendations for financial products and services, such as investment advice or banking offers, based on customer journeys, peer interactions, risk preferences, and financial goals. Document processing: Extract structured and unstructured data from documents and analyze, search and store this data for document-extensive processes, such as loan servicing, and investment opportunity discovery. 	<p>Some ways that AI may be used in manufacturing include:</p> <ul style="list-style-type: none"> Improved efficiency: Automating tasks, such as assembly and inspection Increased productivity: Optimizing production processes Improved quality: AI can be used to detect defects and improve quality control 	<p>In addition to the applications listed above, AI is also being used in a variety of other industries, including:</p> <ul style="list-style-type: none"> Retail: AI is being used to personalize the shopping experience, recommend products, and manage inventory Transportation: AI is being used to develop self-driving cars and improve traffic management Energy: AI is being used to improve energy efficiency and predict energy demand Government: AI is being used to improve public safety, detect crime, and provide citizen services

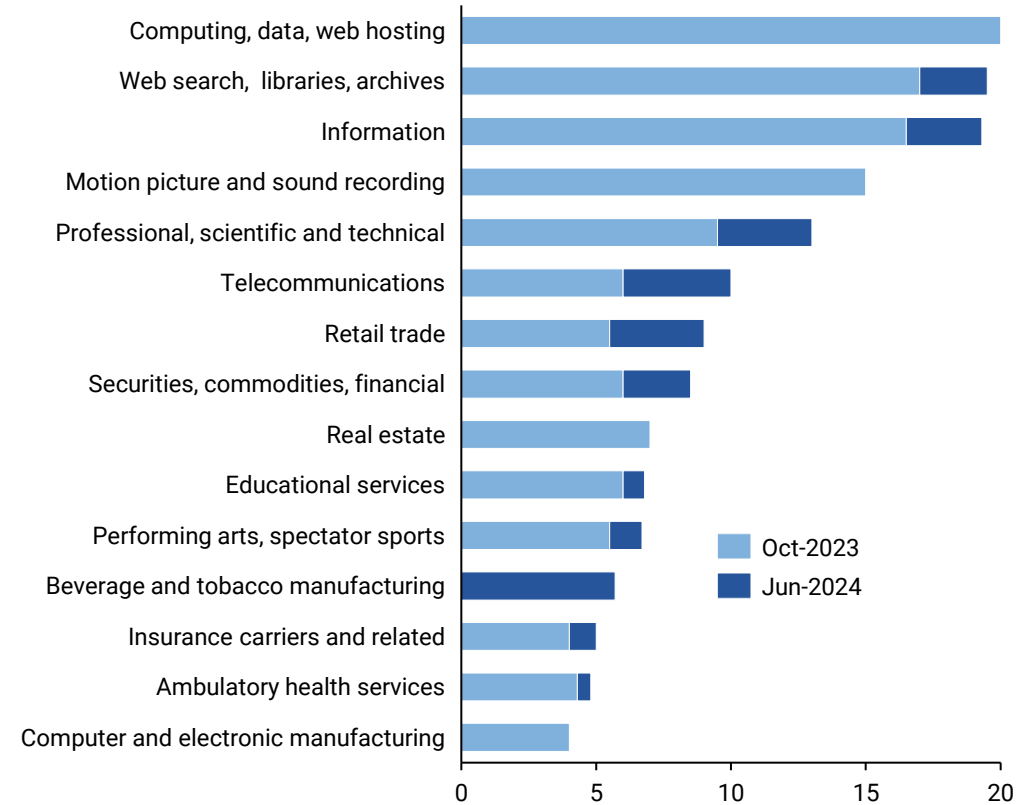
3 While potential for AI adoption is tremendous, actual adoption still remains modest on average across industries

Share of US companies using AI by sector (%)



- AI adoption remains modest on average across most sectors as of June 2024, while it is expected that adoption will increase significantly over the next 6-12 months
- As the cost of adopting new technologies is likely going to fall over time, companies will likely increase adoption significantly in many sectors in the medium-term, in order to stay competitive

Share of US companies using AI, top 15 subsectors (%)



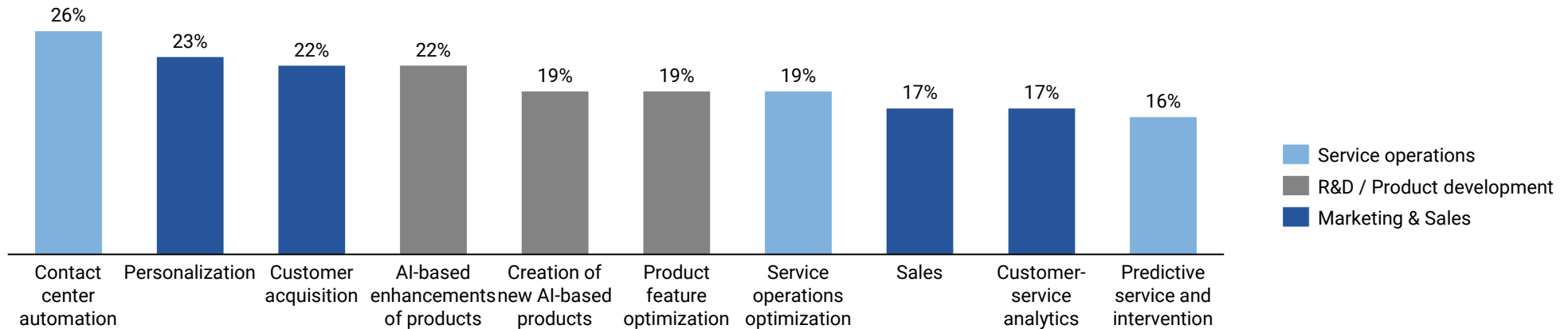
- AI adoption rates are particularly high in the technology or related subsectors, as well as in other digitally-enabled segments

4 Currently, AI is predominantly used in marketing & sales, product development and services operations with substantial potential in other areas

AI adoption by industry and business function (%)

	Human resources	Manufacturing	Marketing & sales	Product & service development	Risk	Service operations	Strategy and corporate finance	Supply-chain management
All industries	9%	6%	25%	26%	12%	24%	8%	9%
Business, legal and professional services	9%	5%	28%	24%	10%	19%	13%	6%
Consumer goods / retail	7%	9%	31%	15%	6%	22%	2%	14%
Financial services	9%	1%	22%	20%	28%	31%	14%	4%
Healthcare	5%	7%	8%	26%	7%	15%	6%	11%
Technology, media and telecommunications	14%	6%	36%	44%	7%	36%	6%	9%

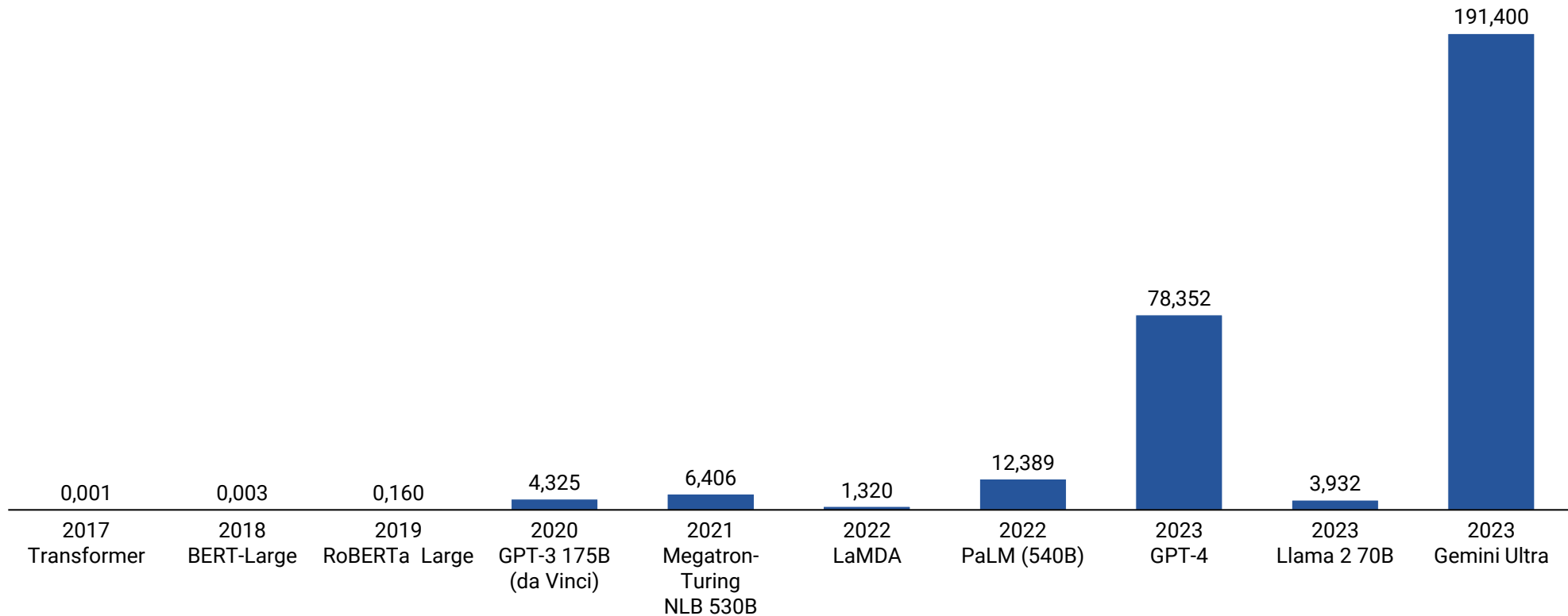
Most commonly adopted AI use cases (%)



Across industries, AI is most commonly used in the marketing & sales, product and services development, as well as services operations functions of businesses. There is significant potential to apply AI in other fields as well going forward, such as HR, strategy, corporate finance, as well as supply-chain management

5 The costs of training state-of-the-art generative AI models are getting more expensive as expected and have reached unprecedented levels

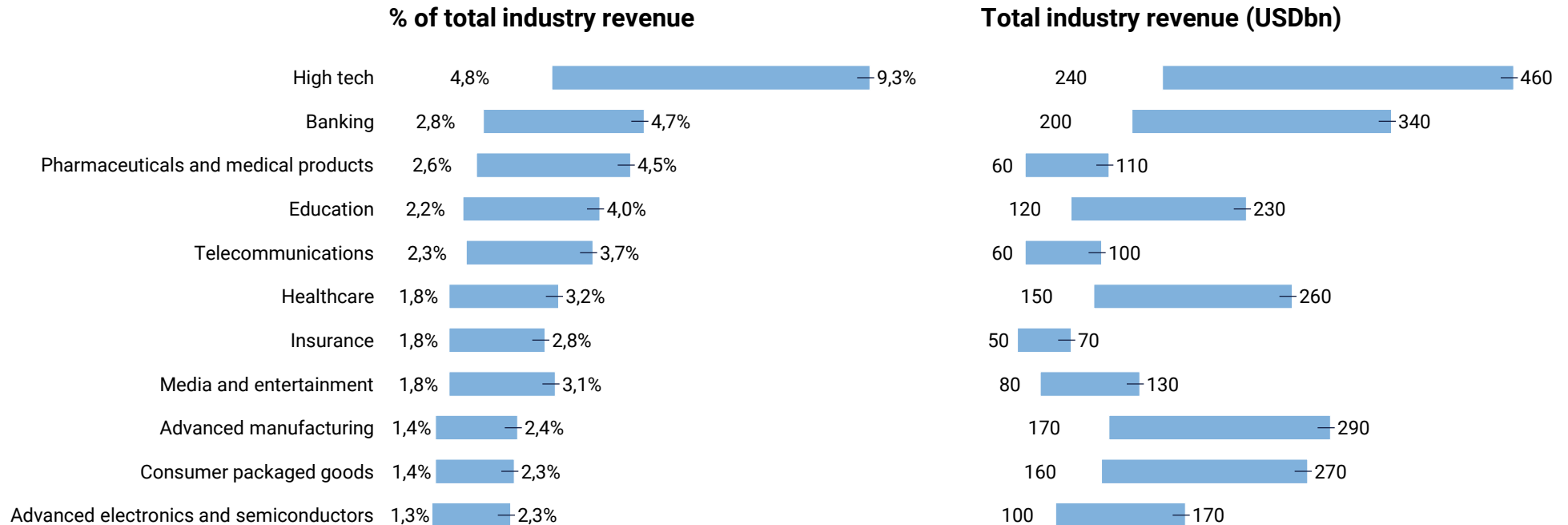
Estimated training cost of leading AI models (USDm)



According to the AI Index report 2024, published by Stanford University, the training costs of state-of-the-art AI models have exponentially increased since 2017 and have reached unprecedented levels. For example, OpenAI's GPT-4 used an estimated \$78m worth of computing power to train, while Google's Gemini Ultra costs \$191m to train

6 AI decreases costs and increases revenues

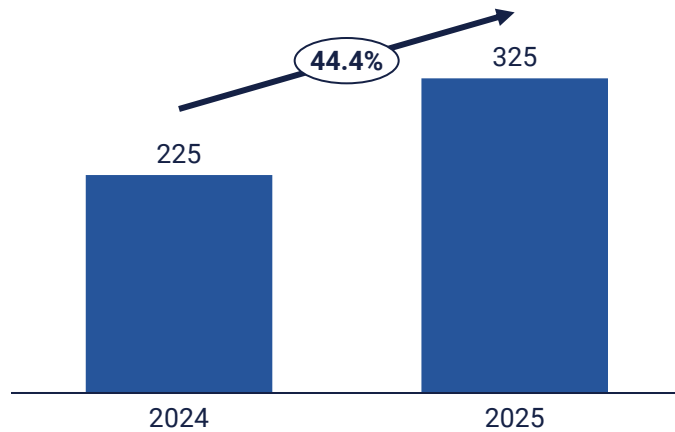
Anticipated impact of generative AI on revenue by industry



- A study by McKinsey from 2023 revealed that 42% of surveyed organizations have achieved cost reductions from implementing AI solutions, including those based on generative AI and 59% report revenue increases
- Compared to the results from 2022, McKinsey found a 10 percentage point increase in respondents reporting decreased costs, indicating AI is effectively driving business efficiency gains
- The study also examined the degree to which generative AI might impact revenue across industries and found that especially in the high tech sector, aggregated revenue could increase by c.5-9%, an equivalent of \$240-460bn revenue, as a consequence of the deployment of generative AI

7 AI-related spending & investments by tech companies are expected to remain high and increase in the medium-term





















Big tech's investments in AI infrastructure (USDbn)¹⁾



Big tech' AI-related capex are skyrocketing

- Apart from investing heavily in AI start-ups, tech giants are expected to spend more than a trillion USD on AI-related capex in the coming years
- The leading US tech companies combined are spending approximately \$200bn in 2024, which is equivalent to almost one quarter of the entire European continent's capex across all sectors
- Driven by a continued commitment to build out their AI infrastructure, big tech companies are expected to invest \$325bn in 2025, a substantial increase vs. 2024
- Capex are predominantly spent on data centers to provide computing power required to run and train AI applications

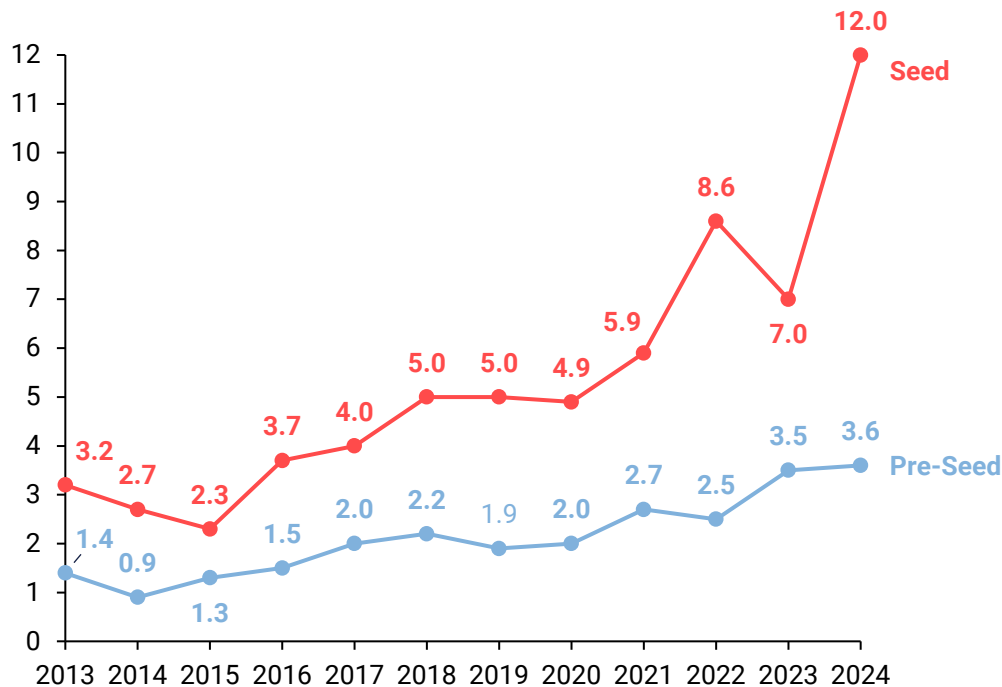
AI-related spending at the platform and application layer

Investor	No. of investments	Total money invested (USDm)	Notable investments
SoftBank Vision Fund	48	13,320	 CLARITY AI  eightfold.ai  ContractPodAi
 Microsoft	14	11,006	 ChatGPT  Builder.ai  KUDO
 Tencent 腾讯	25	6,325	 iCarbonX  KINDRED  VoxelCloud
TIGERGLOBAL	65	5,518	 scale  SentinelOne  ABACUS.AI
 FINANCIAL	1	5,000	 cruise
 INSIGHT PARTNERS	110	4,488	 AssemblyAI  UNLEARN  Prophecy

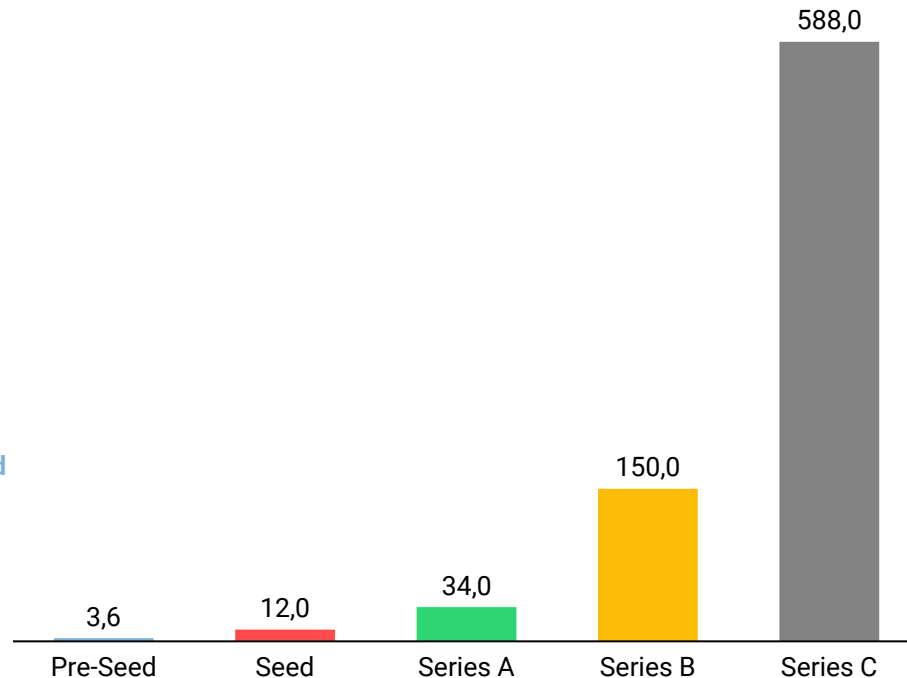
Note: 1) Based on the actual and expected capital expenditures of Meta, Microsoft, Amazon and Alphabet to build out their AI infrastructure.
Sources: Aventis Advisors, Goldman Sachs

8 Funding round sizes as well as valuations have been growing over the past ~11 years, making it harder for VCs to recoup their investments

Median pre-money valuations of AI start-ups (USDm)



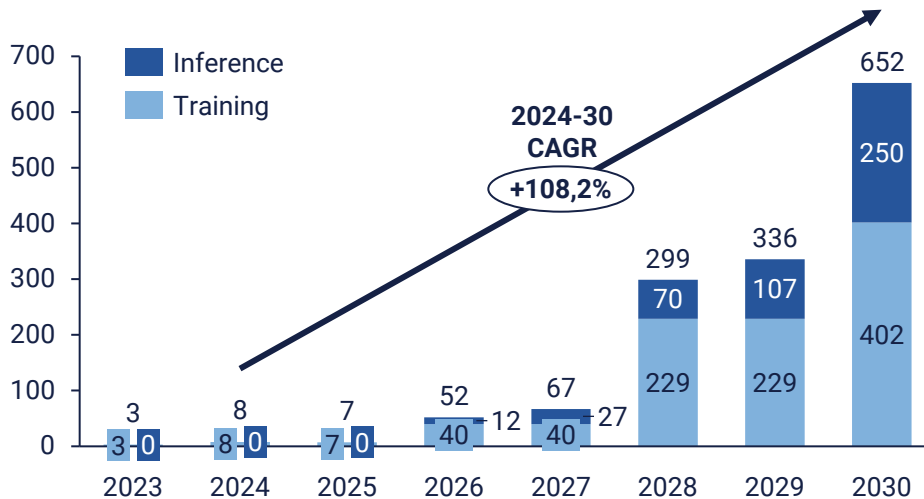
Median AI start-up pre-money valuations as of 2024 (USDm)



Reflecting the growing interest in AI and the increasing capital requirements to train or use AI, both the median funding round sizes, as well as median valuations have been growing over the past 11 years, making it harder for VCs to recoup their investments

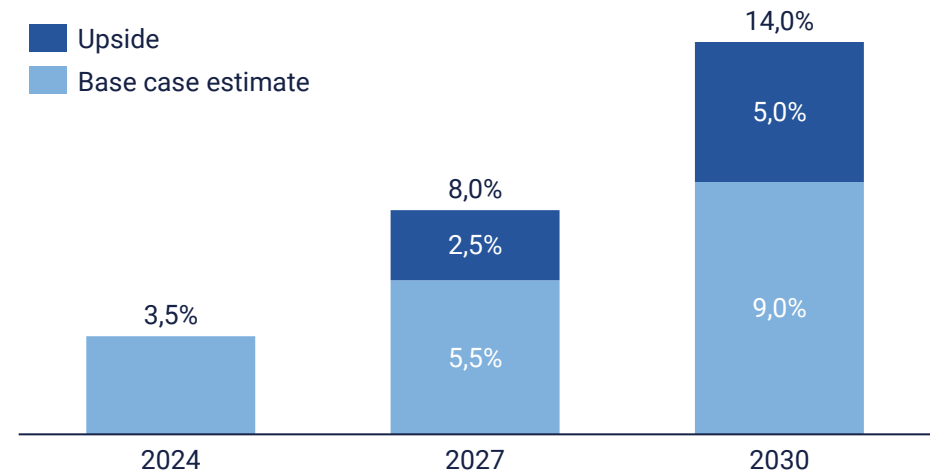
9 Is it sustainable to use generative AI in all fields of application, given massive power consumption, storage requirements and running costs?

Gen AI demand forecast in the US (TWh)



- Generative AI's demand for power is expected to grow substantially over the next six years
- While power demand for training gen AI models will be driving demand growth in the near future, power usage for inference is estimated to grow exponentially in the mid-term

Data centre demand as % of total US electricity generation



- Data centres currently account for ~3.5% of total US electricity consumption and are estimated to demand 9-14%, as a result of running and training generative AI tools



- Meeting rising electricity demand while lowering emissions will likely be a monumental challenge for grid operators
- Renewable energy sources will likely not be the only future source of energy, as AI requires a constant power supply, while solar and wind cannot be tapped around the clock
- Natural gas could fill the missing gap and supplement wind and solar energy, while nuclear power plants currently still offer the greatest reliability

Given massively rising power consumption required for training and operating generative AI models, it is likely that they cannot be run energy and cost efficiently for every conceivable application, but only for the ones where they are able to significantly outperform non-gen AI solutions and create a substantial value-add



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