McKinsey Digital

Technology Trends Outlook 2024

July 2024

–26%

tech trends job postings from 2022 to 2023

–17%

global job postings from 2022 to 2023

+8%

tech trends job postings from 2021 to 2023

Electrification and renewables was the other trend that bucked the economic headwinds, posting the highest investment and interest scores among all the trends we evaluated. Job postings for this sector also showed a modest increase.

Although many trends faced declines in investment and hiring in 2023, the long-term outlook remains positive. This optimism is supported by the continued longer-term growth in job postings for the analyzed trends (up 8 percent from 2021 to 2023) and enterprises' continued innovation and heightened interest in harnessing these technologies, particularly for future growth.

In 2023, technology equity investments fell by 30 to 40 percent to approximately $570 billion due to rising financing costs and a cautious near-term growth outlook, prompting investors to favor technologies with strong revenue and margin potential. This approach aligns with the strategic perspective leading companies are adopting, in which they recognize that fully adopting and scaling cutting-edge technologies is a long-term endeavor. This recognition is evident when companies diversify their investments across a portfolio of several technologies, selectively intensifying their focus on areas most likely to push technological boundaries forward. While many technologies have maintained cautious investment profiles over the past year, gen AI saw a sevenfold increase in investments, driven by substantial advancements in text, image, and video generation.

Despite an overall downturn in private equity investment, the pace of innovation has not slowed. Innovation has accelerated in the three trends that are part of the "AI revolution" group: generative AI, applied AI, and industrializing machine learning. Gen AI creates new content from unstructured data (such as text and images), applied AI leverages machine learning models for analytical and predictive tasks, and industrializing machine learning accelerates and derisks the development of machine learning solutions. Applied AI and industrializing machine learning, boosted by the widening interest in gen AI, have seen the most significant uptick in innovation, reflected in the surge in publications and patents from 2022 to 2023. Meanwhile, electrification and renewable-energy technologies continue to capture high interest, reflected in news mentions and web searches. Their popularity is fueled by a surge in global renewable capacity, their crucial roles in global decarbonization efforts, and heightened energy security needs amid geopolitical tensions and energy crises.

The talent environment largely echoed the investment picture in tech trends in 2023. The technology sector faced significant layoffs, particularly among large technology companies, with job postings related to the tech trends we studied declining by 26 percent—a steeper drop than the 17 percent decrease in global job postings overall. The greater decline in demand for tech-trends-related talent may have been fueled by technology companies' cost reduction efforts amid decreasing revenue growth projections. Despite this reduction, the trends with robust investment and innovation, such as generative AI, not only maintained but also increased their job postings, reflecting a strong demand for new and advanced skills. Electrification and renewables was the other trend that saw positive job growth, partially due to public sector support for infrastructure spending.

Even with the short-term vicissitudes in talent demand, our analysis of 4.3 million job postings across our 15 tech trends underscored a wide skills gap. Compared with the global average, fewer than half of potential candidates have the high-demand tech skills specified in job postings. Despite the year-on-year decreases for job postings in many trends from 2022 to 2023, the number of tech-related job postings in 2023 still represented an 8 percent increase from 2021, suggesting the potential for longer-term growth (Exhibit 1).

Generative AI

The trend—and why it matters

Generative AI (gen AI) has been making significant strides, pushing the boundaries of machine capabilities. Gen AI models are trained on vast, diverse data sets. They take unstructured data, such as text, as inputs and produce unique outputs—also in the form of unstructured data—ranging from text and code to images, music, and 3D models.

Over the past year, we've seen remarkable advancements in this field, with text generation models such as OpenAI's GPT-4, Anthropic's Claude, and Google's Gemini producing content that mimics human-generated responses, as well as with image-generation tools such as DALL-E 3 and Midjourney creating photorealistic images from text descriptions. OpenAI's recent launch of Sora, a text-to-video generator, further showcases the technology's potential. Even music composition is being revolutionized, with models such as Suno creating original pieces in various styles.

Gen AI has sparked widespread interest, with individuals and organizations across different regions and industries exploring its potential. According to the latest McKinsey Global Survey on the state of AI, 65 percent of respondents say their organizations are regularly using gen AI in at least one business function, up from one-third last year,[1] and gen AI use cases have the potential to generate an annual value of $2.6 trillion to $4.4 trillion.[2]

However, it's important to recognize the risks that accompany the use of this powerful technology, including bias, misinformation, and deepfakes. As we progress through 2024 and beyond, we anticipate organizations investing in the risk mitigation, operating model, talent, and technological capabilities required to scale gen AI.

[1] "The state of AI in early 2024: Gen AI adoption spikes and starts to generate value," McKinsey, May 30, 2024.
[2] *The economic potential of generative AI: The next productivity frontier*, McKinsey, June 14, 2023.

THE AI REVOLUTION

Generative AI

Scoring the trend

Gen AI saw a surge in 2023, driven by ChatGPT's late-2022 launch, alongside earlier models such as DALL-E 2 and Stable Diffusion. Gen AI saw significant growth from 2022 to 2023 across each quantitative dimension, such as a sevenfold increase in the number of searches and investments, reflecting a strong sense of excitement about the trend.

Adoption score, 2023

Frontier innovation → Fully scaled

1 2 3 4 5

Equity investment, 2023, $ billion

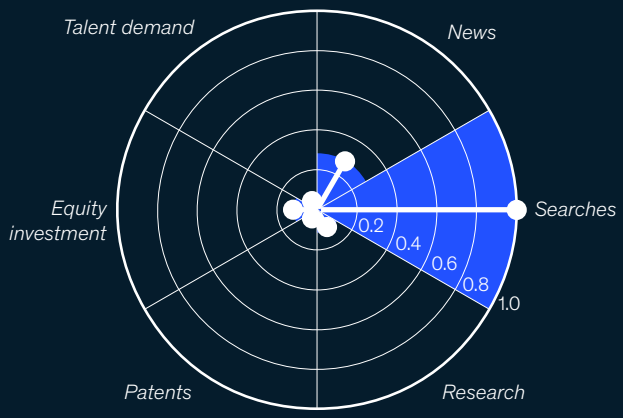
$36

Job postings, 2022–23, % difference

+111%

Industries affected: *Aerospace and defense; Agriculture; Automotive and assembly; Aviation, travel, and logistics; Business, legal, and professional services; Chemicals; Construction and building materials; Consumer packaged goods; Education; Electric power, natural gas, and utilities; Financial services; Healthcare systems and services; Information technology and electronics; Media and entertainment; Metals and mining; Oil and gas; Pharmaceuticals and medical products; Public and social sectors; Real estate; Retail; Semiconductors; Telecommunications*

Score by vector (0 = lower; 1 = higher)



- **Talent demand** Ratio of skilled people to job vacancies
- **Equity investment** Private- and public-market capital raises for relevant technologies
- **Patents** Patent filings for technologies related to trend
- **News** Press reports featuring trend-related phrases
- **Searches** Search engine queries for terms related to trend
- **Research** Scientific publications on topics associated with trend

Adoption developments across the globe

Gen AI emerges as a front-runner in the trends landscape, sharing the top spot with electrification and renewables for the highest percentage of respondents scaling its implementation. This underscores its significance as a pivotal, high-growth trend to closely monitor throughout the year.

Many companies have made progress throughout the year on adopting gen AI and are currently working on scaling it across their businesses. While gen AI adoption has surged across various sectors, the technology, media, and telecommunications sector has notably emerged as a leader in the deployment of the technology.

The lack of availability of local language support poses challenges to adoption globally. Some countries, including India, Japan, and countries in the Middle East, have pushed to develop their own LLMs. In Africa, the prioritization of data locality and proximity hampers the building of LLMs.

Significant progress has been made recently with the emergence of multilingual models. Multilingual capabilities could become essential for any LLM, with the primary focus shifting to the degree of localization, including the use of slang, technical terms, and other nuances.

Adoption dimensions

The adoption trajectory of advanced technologies varies for each technology and each use case within that technology. Advancements along the following dimensions could enable reaching the next level of adoption for gen AI:

— a clearly defined ROI for widespread horizontal and vertical use cases by sector, along with a demonstrated ability to control risks and ensure safety with the development and deployment of new AI solutions

— decreased computational costs, alongside improvement in overall AI efficiencies (for example, improving latency)

‘Since gen AI captured public attention at the end of 2022, a significant amount of focus has been placed on delivering value through foundation models. Many are already demonstrating cross-industry value, such as coding acceleration or sales and marketing use cases, as well as domain-specific models, such as protein engineering or chemistry discovery foundation models. The field continues to improve quickly with new tools—for example, multimodal, agent-based models. Companies should concentrate on building capabilities in this domain and prioritize areas of focus to ensure they capture early value and aren’t left behind.’

– Matej Macak, partner, London