EDGE

State of Innovation

The technologies that defined 2024 and will shape 2025

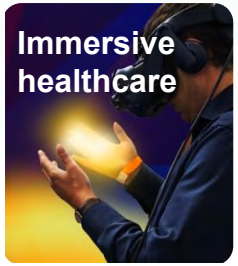
What's inside?

An overview of the tech trends of 2024 and innovative technologies likely to disrupt in 2025.

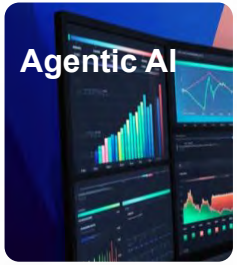
- **Section 1: Tech trends of 2024:** The top five breakthrough tech trends in 2024, with a focus on industry developments, company activity, and outlook

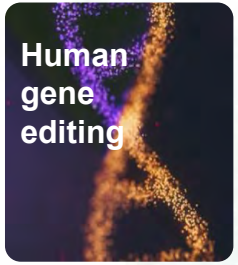
- **Section 2: SPEEDA Edge innovation forecast:** Top five innovative technologies likely to disrupt industries in 2025

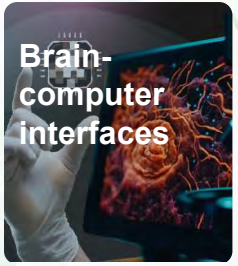
Top five tech trends in 2024



Top five innovative technologies likely to disrupt 2025







The top five tech trends that shaped 2024

What is immersive tech?

This is also known as extended reality (XR) and include:

- **Augmented reality (AR),** which overlays computer-generated content (i.e., videos, images, and holograms) onto real environments
- **Virtual reality (VR)**, which offers a fully immersive experience using either 360-degree video or pre-made computer-generated content
- **Mixed reality (MR),** which offers a combination of the above elements, allowing digital content to interact with real-world objects

1: Immersive healthcare

In 2024, immersive technologies gained momentum in the healthcare space, driven by their transformative capabilities in enhancing patient care, improving medical training, and increasing operational efficiency.

XR has opened up new avenues in medical training: XR has proven to deliver better learning outcomes, and recent studies also show that this is more cost effective compared to traditional training methods and helps develop critical soft skills among healthcare professionals.

Therapy and rehabilitation redefined: Key use cases emerged from remote patient monitoring and pain management, enhancing clinical outcomes through personalized treatments.

Regulatory clearance for wider applications: In 2024, Sira Medical, ImmersiveTouch, and Surgical Planning Associates received FDA clearances for their AR surgical applications.

Notable product launches

OSSO VR

Extended its training platform for healthcare professionals to include orthopedic surgery specialties

Virtuleap

Launched Cogniclear VR, a VR-based cognitive assessment tool designed to detect and monitor cognitive impairments

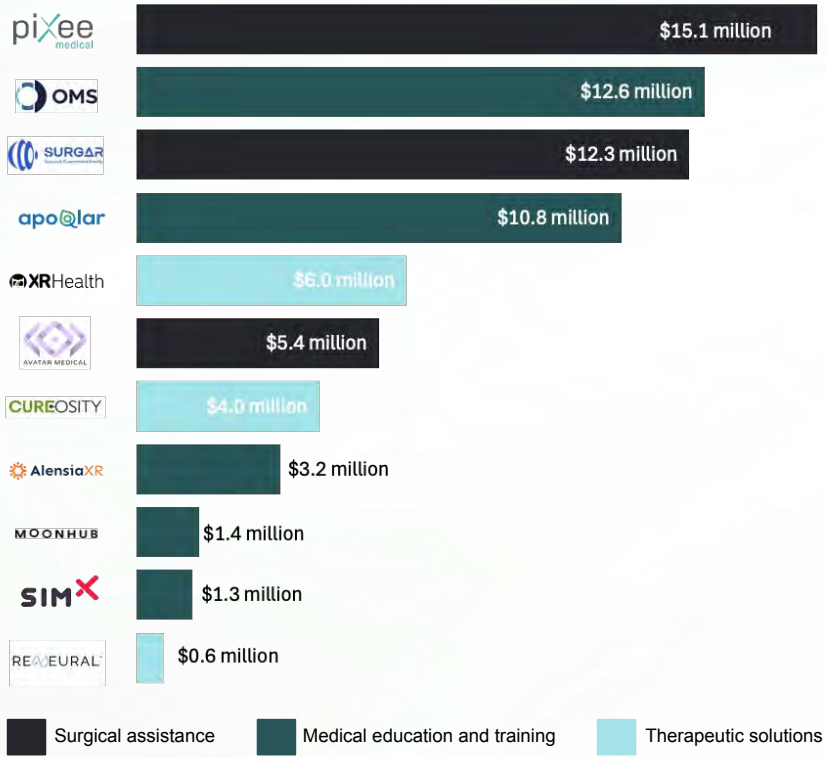
XRHealth

Launched an AI-powered XR platform for medical applications including physical therapy, cognitive rehabilitation, pain management, and mental health

Abundance of players in the medical education and training space

Note: This is not an exhaustive list of companies operating in the space
Source: SPEEDA Edge research

Startups raised $72.6 mn in 2024, most of it to develop surgical assistance tools



Note: 1) $ refers to USD, 2) data represents funding raised up until November 20, 2024
Source: SPEEDA Edge research • Funding data powered by Crunchbase

Our analysis of 50 XR startups in healthcare shows that 2024 had 11 funding rounds, raising a total of $72.6 million. These included early-stage funding and grants that mainly focused on surgical assistance, advancing medical education and training, and developing new solutions for therapeutics.

Notable funding raised in these areas included the following:

- **Surgical assistance (three rounds, $33 million)**
  Pixee Medical raised the most funding ($15.1 million) to expand its targeted application of AR technology to enhance surgical precision and patient safety during procedures. Other funding rounds also focused on commercializing new products.

- **Medical education and training (five rounds, $29 million)**
  Oxford Medical Simulation (OMS) raised the most amount of funds ($12.6 million) for product development and expansion efforts. Companies like AlensiaXR and SimX also raised funding to develop new XR experiences for medical education.

- **Therapeutic solutions (three rounds, $11 million)**
  XRHealth raised the most funding ($6 million) for product development and geographic expansion. Other companies that raised funds included CUREosity and Reneural Technologies.

Partnerships

- **Recent partnerships highlight the growing interest in using XR in healthcare applications.** Partnerships focused on therapeutic solutions took the spotlight, while collaborations in medical education and training were also seen.
- **These partnerships have helped XR startups navigate challenges** such as high technology costs and regulatory hurdles.
- Collaborating with established healthcare providers has allowed XR startups to combine expertise, facilitating smoother integration of XR technologies into clinical settings.

Partnerships helped XR startups share knowledge, resources, and best practices to transform traditional practices

GigXR | CAE Healthcare

GigXR partnered with CAE Healthcare to combine capabilities **to enhance medical education outcomes and broaden the scope for better care** (January 2024).

apoQlar | Mayo Clinic

apoQlar partnered with Mayo Clinic **to jointly create personalized treatment plans for cancer patients**, visualizing medical data in 3D (March 2024).

BRINK | novobeing

BrinkXR partnered with Novobeing **to address anxiety, stress, and pain in healthcare settings by offering immersive travel experiences** within its XR patient experience platform (August 2024).

Mynd Immersive | VA U.S. Department of Veterans Affairs

Mynd Immersive partnered with the US Department of Veterans Affairs **to develop therapeutic VR content** targeting aging vietnam veterans, addressing their emotional and psychological needs (February 2024).

M&A

- **Companies like XRHealth are actively consolidating their capabilities through strategic mergers and acquisitions.** In 2023, XRHealth also merged with Amelia Virtual Care, creating what was claimed to be the largest XR therapeutics platform in the World. CEO of the company, Eran Orr, emphasized that these acquisitions are steps toward creating a comprehensive XR platform for therapeutic applications.

1: Immersive healthcare

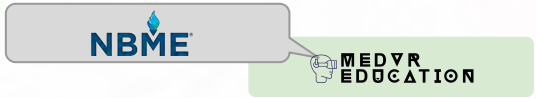
M&A helped consolidate XR capabilities within healthcare to improve treatment outcomes and patient engagement

The National Board of Medical Examiners (NBME) acquired MedVR Education

Date: February 2024

Transaction value: Undisclosed

Objective: To combine its expertise in psychometrics, test development, and research with MedVR's simulation technology **to create tools and assessments in medical education**

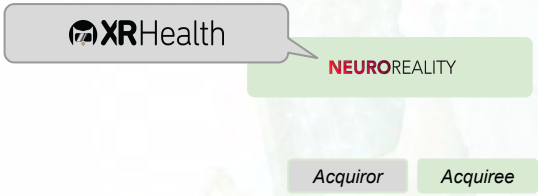


XRHealth acquired NeuroReality

Date: November 2024

Transaction value: Undisclosed

Objective: To strengthen its position as a leading XR therapeutics platform by **providing a more comprehensive set of tools for therapy and rehabilitation**



Outlook

- **The FDA expects these technologies to continue to make inroads** with potential applications such as pediatrics, pain management, mental health, and surgery planning
- **The restoration of Executive Order 13944 is likely to spur growth.** Under the Trump administration, ensuring essential medicines, medical countermeasures, and critical inputs are made in the US is expected to promote domestic manufacturing of medical devices. As a result, increased integration of immersive technologies into these hardware components is expected.

1: Immersive healthcare

Key companies to look out for in 2025

Company details	Description	What to expect in 2025
OSSO VR **HQ:**  **:** 2016 **PS:** Expansion **Total funding:** $109 million	Offers a VR platform designed for surgical training and assessment to address challenges in surgical education	Osso's **surgical training app** and the **new Hand Control feature** for controller-free interactions is **expected to gain traction in 2025**
XRHealth **HQ:**  **:** 2016 **PS:** GTM **Total funding:** $40.8 million	Offers a suite of VR applications designed for health conditions, including mental health disorders and physical rehabilitation	The recent acquisition of NeuroReality, along with its flagship product **Koji's Quest is expected** to position the company as **a leader in the XR therapeutic space**
apolar **HQ:**  **:** 2017 **PS:** GTM **Total funding:** $10.8 million	Leverages AI neural networks, computer vision, and 3D rendering to convert grayscale medical images into color-based 3D objects	Funding raised and partnerships entered during 2024 will help **establish market presence in the US and beyond**

HQ: Headquarters PS: Product stage GTM: Go-to-market

Note:
The companies mentioned above are selected based on their activities during 2024 and the potential they hold to further enhance their offerings in 2025

What is generative AI?

- Generative AI (GenAI) refers to a class of machine learning (ML) models that can generate new, original content, such as text, images, or even molecular structures.
- These models are trained on vast datasets and can learn to mimic the patterns and structures inherent in the data, allowing them to create novel and previously unseen outputs.
- Since the debut of ChatGPT in November 2022, GenAI has experienced remarkable advancements, with the rapid launch of new tools and models that found applications across a wide range of domains including content creation, personalized customer experiences, workflow automation, and coding.

2: GenAI drug discovery

In 2024, the integration of GenAI into drug discovery emerged as a groundbreaking advancement, with several advanced models launched. These models use vast datasets that were previously not possible to analyze, leading to improved results and reducing the drug discovery timeline from years to days, while also lowering associated costs.

GenAI models can accelerate the identification of novel drug candidates and predict which compounds have the highest likelihood of success, allowing for quicker transitions from hypothesis to experimental validation.

New capabilities allowed for simulating interactions among molecules to help predict how new candidates behave with other compounds. The Alphafold 3 model by Google DeepMind claims to surpass the accuracy of all existing systems and be 50% more accurate.

GenAI gives the ability to predict clinical outcomes earlier, potentially reducing the high failure rates associated with clinical trials.

Notable product launches

Google DeepMind | Isomorphic Laboratories

DeepMind and Isomorphic Labs released Alphafold 3, which can **predict the interactions between** DNA and RNA and small molecules

Chai Discovery

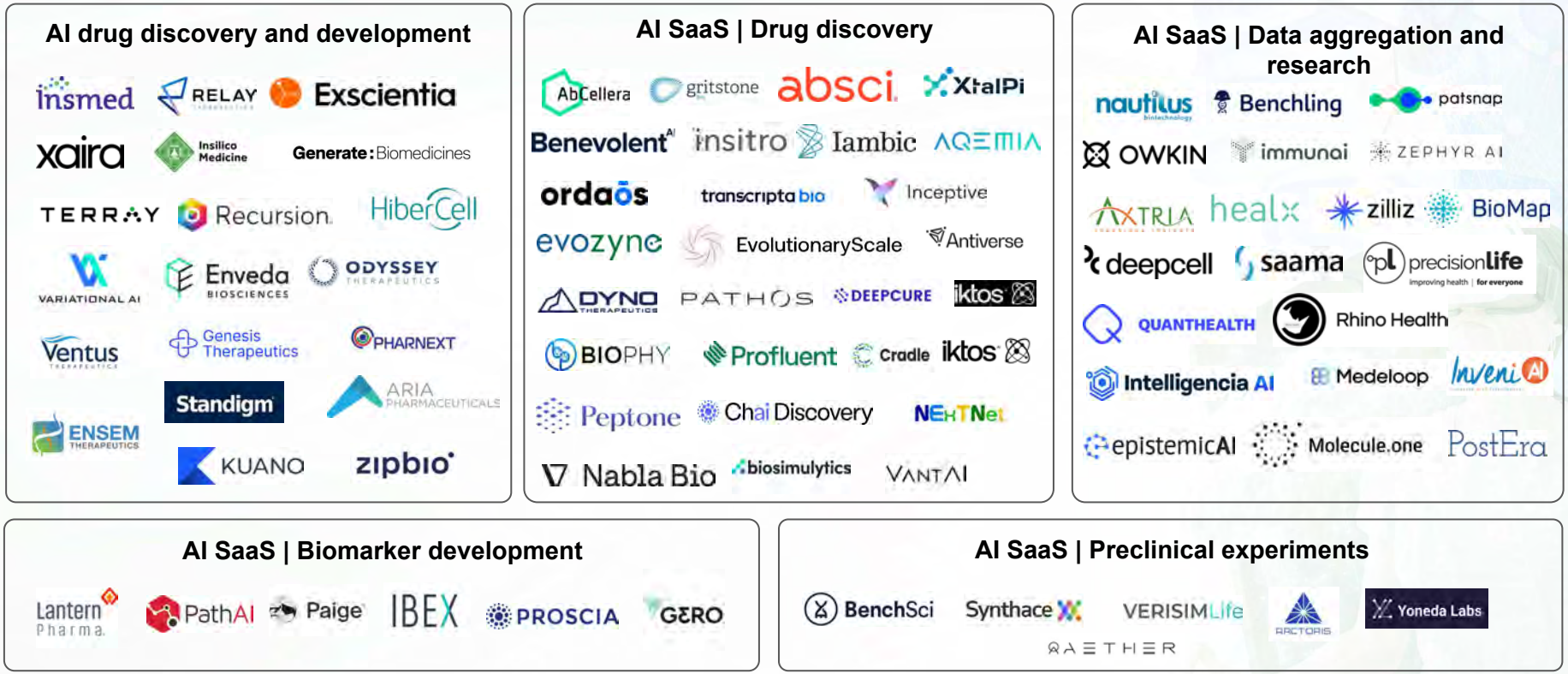
Launched Chai-1 that enables **unified prediction of proteins,** small molecules, DNA, RNA, and covalent modifications

EvolutionaryScale

Launched a model that can **generate novel protein sequences that diverge significantly from known ones**

2: GenAI drug discovery: Market map representing a selection of top disruptors

Most companies engage in drug discovery, development, and data synthesis

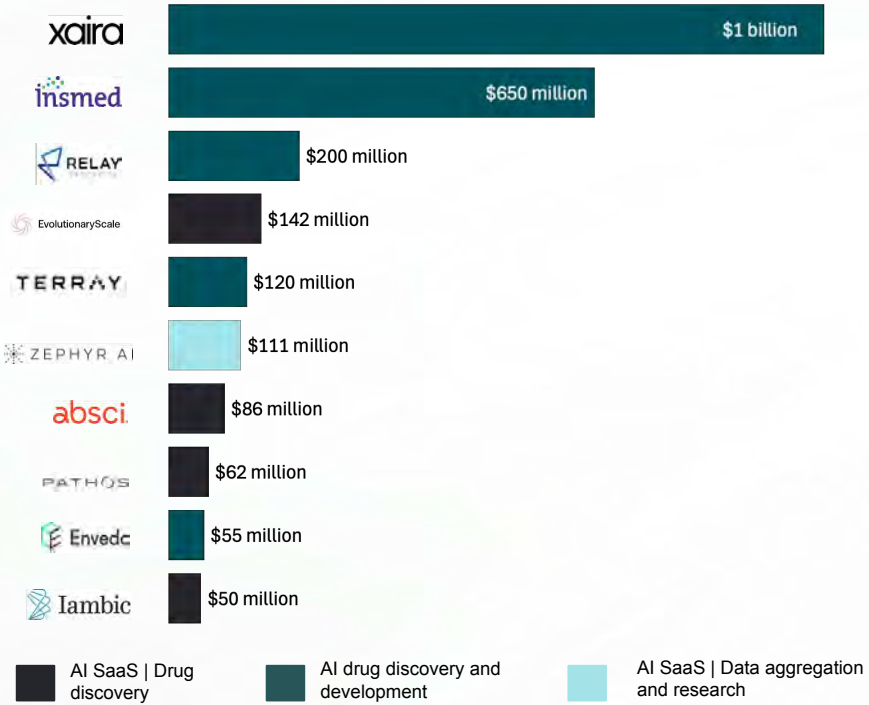


Note: This is not an exhaustive list of companies operating in the space

Source: SPEEDA Edge research

Substantial funding in GenAI drives drug discovery innovations in protein design

Top 10 funding rounds



Note: 1) $ refers to USD, 2) data represents funding raised up until November 20, 2024
Source: SPEEDA Edge research • Funding data powered by Crunchbase

In 2024, companies using GenAI in their drug discovery process collectively raised $3 billion. Among those disclosing funding purposes, nearly half of the capital was allocated to developing GenAI models, emphasizing a shared industry focus on leveraging advanced AI to drive innovation.

Notable funding raised in these areas included the following:

- **Protein design (nine rounds, $1.9 billion)**
  The largest funding round reported this year was the $1 billion raised by Xaira Therapeutics, aimed at developing technology to create protein drugs tailored to specific disease targets.

- **Oncology therapeutics (six rounds, $589 million)**
  Companies including Recursion Pharmaceuticals, Relay Therapeutics, and Pathos raised funds to develop drugs to treat various types of cancers.

- **Small molecule drug development (three rounds, $277 million)**
  Terray Therapeutics raised $120 million to improve drug discovery speed, cost, and success rates through its GenAI pipeline by integrating advanced computation with novel data.

Partnerships

- **Heavy focus on protein models.** There is a heightened focus on antibody and protein therapeutics that aims to streamline R&D, enabling faster identification of viable drug candidates and optimization of existing compounds.
- **Strategic shift toward advanced computational infrastructure.** Recent partnerships between biotech firms and tech giants like Microsoft, NVIDIA, and Google highlight a shift toward using advanced computational infrastructure for drug discovery, enabling a more efficient market entry for new therapies.

Partnerships bring together diverse expertise from academia, biotech firms, and pharmaceutical companies

Isomorphic Labs partnered with Eli Lilly and Novartis **to accelerate drug discovery** (January 2024).

1910 Genetics and Microsoft partnered **to combine computational and wet lab biological data, laboratory automation, and AI models** (February 2024).

Ginkgo Bioworks and Cradle partnered **to provide a platform for advanced protein designing** by integrating Cradle's generative models with Ginkgo's technology (March 2024).

Insilico Medicine and NVIDIA partnered **to launch new model Nach0**, which can bridge the gap between biomedical natural language texts and chemical structure descriptions (May 2024).

M&A

- **The broader industry shift toward integrating AI-driven platforms will streamline research processes.** Companies are acquiring technologies that focus on critical interactions, such as protein-protein and RNA-protein interactions, which are essential for addressing complex diseases like cancer and neurodegenerative disorders.
- **The consolidation of resources are expected to create comprehensive, end-to-end drug discovery solutions.** By acquiring rights to promising drug candidates and enhancing their technological frameworks, companies aim to accelerate the transition from discovery to clinical application.

2: GenAI drug discovery

Consolidation of resources to enhance technological frameworks

Ginkgo Bioworks acquired the AI drug discovery assets of Reverie Labs

Date: February 2024

Transaction value: Undisclosed

Objective: To further **expand AI/ML capabilities** and accelerate work to **build next-gen biological foundation models**

Recursion Pharmaceuticals and Exscientia entered a definitive merger agreement

Date: October 2024

Transaction value: Undisclosed

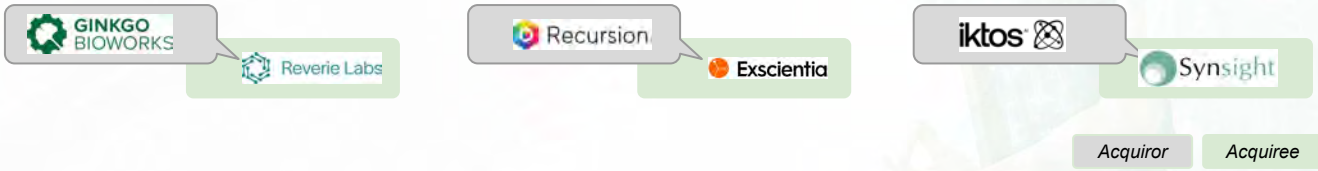
Objective: To **combine portfolios and create complementary synergy**. The combined entity expects to deliver results from **10 clinical trials** over the subsequent 18 months

Iktos acquired Synsight

Date: July 2024

Transaction value: Undisclosed

Objective: To integrate Synsight's MT Bench with its robotic synthesis platform **to automate compound testing and enhance drug discovery programs**



Outlook

- **Specialized AI models signify a shift toward tailored solutions addressing unique challenges.** This targeted approach is likely to accelerate the process and improve the chances of success in bringing effective therapies to market.
- **The promotion of the domestic manufacture of medicines may necessitate improvements in methods**. As the industry focuses on strengthening local production, the adoption of advanced drug discovery methods, including GenAI, will be crucial.
- **The rollback of AI regulations may help in accelerating AI drug development.** Removing what is perceived as burdensome regulations is likely to enable companies to advance AI technologies more rapidly.

2: GenAI drug discovery

Key companies to look out for in 2025

Company details	Description	What to expect in 2025
xaira **HQ:**   : 2024 **PS:** Ideation **Total funding:** $1 billion	Develops novel drugs by leveraging the RFdiffusion model, capable of designing protein drugs that bind to influenza molecules in a matter of weeks	Given its substantial initial funding of over $1 billion, Xaira may be in a position to **accelerate its R&D efforts**, potentially moving some of its drug candidates into preclinical or early clinical stages
Chai Discovery **HQ:**   : 2024 **PS:** MVP **Total funding:** $30 million	Developed Chai-1, an AI model designed to predict the 3D structures of biomolecules including proteins, nucleic acids (DNA and RNA), small molecules, and their interactions	The company's **open-source approach might enable broader access to Chai-1 for researchers and industry professionals**, fostering innovation in drug discovery
Isomorphic Laboratories **HQ:**   : 2014 **PS:** GTM **Total funding:** $4.4 million	The company's technology platform centers on AlphaFold 3 which can predict the structures and interactions of proteins, DNA, RNA, and small molecules	Given its substantial partnerships and backing from Google, the company might be in a position to **integrate its breakthrough model into various stages of drug discovery**, from target identification to lead optimization

HQ: Headquarters PS: Product stage MVP: Minimum viable product GTM: Go-to-market

Note:
The companies mentioned above are selected based on their activities during 2024 and the potential they hold to further enhance their offerings in 2025

What is privacy tech?

- Privacy-enhancing technologies (PETs) include encryption, data anonymization, pseudonymization, and differential privacy for securing data during storage, processing, or sharing.
- Tools like homomorphic encryption and secure multi-party computation enable computations on encrypted data without revealing underlying information. Federated learning supports collaborative ML without sharing raw data.
- By embedding "privacy by design," PETs help address data collection and surveillance concerns while aligning with privacy laws like the General Data Protection Regulation (GDPR) and the California Consumer Privacy Act (CCPA).

3: AI cyber resilience

AI and GenAI represent breakthroughs in cybersecurity by enabling advanced threat detection, response automation, and predictive analysis. These technologies help security teams adapt to evolving attack methods with speed and precision, reducing manual workloads.

AI and GenAI are reshaping cybersecurity, with Fortinet and Check Point launching AI assistants for IoT security and CrowdStrike and Palo Alto Networks introducing GenAI-enhanced platforms for threat management.

AI-powered MDR enhancements: AI-driven MDR offerings expand, as ESET targets SMBs with 24/7 protection, Darktrace combines AI detection with expert analysis, and BlackBerry enhances CylanceMDR with its Cylance AI platform.

Growing focus on AI-driven cloud security solutions: Corelight, Elisity, and Averlon raised funds for AI-driven cloud security, while Check Point, Darktrace, and Tenable enhanced capabilities with automated threat response and faster deployments.

Notable product launches

FORTINET

Launched a new GenAI assistant for IoT security and expanded its unified SASE solution with AI integration

CHECK POINT

Launched Infinity AI Copilot, a GenAI-powered chatbot integrated with its unified Check Point Infinity platform

CROWDSTRIKE

Announced Falcon Next-Gen SIEM, an updated SIEM designed to keep up with modern threats, which includes functionality such as GenAI and workflow automation

AI sees strongest adoption across detection and response companies

Detection and response tools

vicarius, nullify, symbian, Dropzone AI, corelight, FILIGRAN, FORTINET, CHECK POINT, CROWDSTRIKE, BlackBerry, RELIAQUEST, SentinelOne, paloalto

Managed detection and response (MDR)

FORTINET, eset, CROWDSTRIKE, CHECK POINT, BlackBerry, paloalto, DARKTRACE, CYREBRO, SentinelOne

Endpoint security

CHECK POINT, CROWDSTRIKE, paloalto, DARKTRACE, FORTINET, deep instinct, BlackBerry, SentinelOne

Cloud network security

ELISITY, FORTINET, CHECK POINT, AVERLON, zscaler, DARKTRACE, paloalto

Industrial IoT/operational technology security

CHECK POINT, Operant, FORTINET, DARKTRACE, BlackBerry, paloalto, SentinelOne

Cloud-native application security

Protect AI, CROWDSTRIKE, paloalto, Operant, CHECK POINT

API and web application security

FORTINET, CHECK POINT, Abnormal, paloalto

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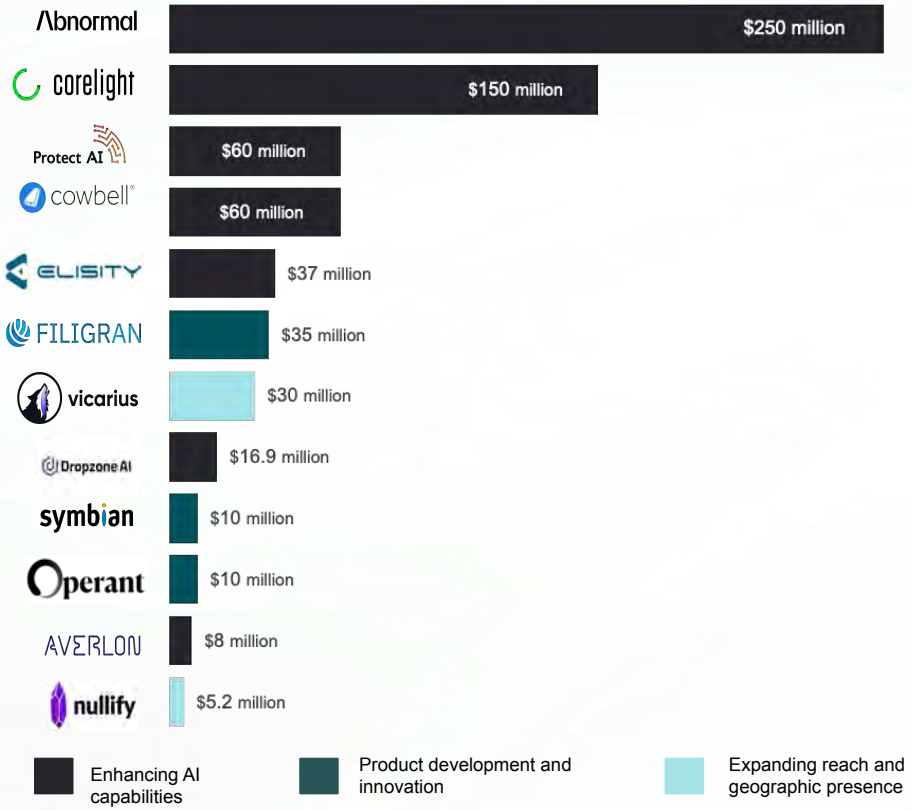
Source: SPEEDA Edge research

Majority of cybersecurity startups raised funds to boost AI integration



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Source: SPEEDA Edge research • Funding data powered by Crunchbase

In 2024, out of all cybersecurity startups that raised funding, 12 rounds focused on raising funds to strengthen AI integration into product offerings. The total funding from these rounds amounted to $672.1 million. Notably, this mainly comprised of growth-stage funding, with the bulk of them being Series A or later.

Notable funding raised in these areas included the following:

- **Enhancing AI capabilities (seven rounds, $581.9 million)**
  Corelight, Elisity, Averlon, Protect AI, and Abnormal Security raised funds to enhance their AI-driven platforms, including capabilities for cloud security, autonomous solutions, and AI security management.

- **Product development and innovation (three rounds, $55.0 million)**
  Vicarius, Simbian, Filigran, and Operant AI secured funding to drive product innovation, support development efforts in areas like data engineering, and expand their offerings.

- **Expanding reach and geographic presence (two rounds, $35.2 million)**
  Vicarius and Nullify raised funds to expand market reach, with Nullify specifically focusing on entering the US market.

Partnerships

- **Recent cybersecurity focus on bolstering threat detection, response, and prevention capabilities**, emphasize a growing demand for advanced AI-powered cybersecurity solutions.
- **Strategic partnerships focused on enhancing MDR/XDR platforms**, while cloud security and AI-driven managed services stood out, reflecting the industry's pivot toward intelligent and scalable solutions.
- These alliances are helping cybersecurity companies **address challenges such as the complexity of threat environments** and the need for real-time, adaptive responses.

3: AI cyber resilience

Partnerships enable cybersecurity companies to leverage AI-powered solutions to strengthen AI integration

CrowdStrike and NVIDIA partnered **to bring the latter's AI computing to the CrowdStrike Falcon XDR platform** (March 2024).

Check Point announced a collaboration with Microsoft **to enhance Check Point's Infinity AI Copilot with Azure OpenAI Service**, aiming to advance AI in cybersecurity (March 2024).

TCS expanded its partnership with Google Cloud **to offer two new AI-powered cybersecurity solutions**: TCS Managed Detection and Response (MDR) and TCS Secure Cloud Foundation (September 2024).

NTT Data, a global IT services provider, partnered with Palo Alto Networks, a cybersecurity company, **to launch an AI-powered Managed Extended Detection Response (MXDR) Service** (November 2024).

M&A

- **Cloud and multi-cloud security took center stage.** SentinelOne's acquisition of PingSafe highlights the emphasis on integrating CNAPP solutions into unified platforms for enhanced multi-cloud monitoring and protection, aligning with the growing complexity of cloud environments.
- Acquisitions like Protect AI's integration of SydeLabs and Cisco's acquisition of Robust Intelligence focus on securing GenAI applications and safeguarding AI models and data throughout their life cycles, showcasing **a broader push toward comprehensive AI and GenAI security**.

3: AI cyber resilience

M&A aids cybersecurity companies to tap into AI-powered cyber solutions

SentinelOne acquired Pingsafe

Date: January 2024

Transaction value: ~$100 million

Objective: To enhance its cloud security capabilities by leveraging PingSafe's technology and integrate PingSafe's CNAPP with SentinelOne's Singularity platform, allowing users to access a **unified AI-powered platform**

Protect AI acquired SydeLabs

Date: July 2024

Transaction value: Undisclosed

Objective: To **enhance Protect AI's capabilities** in monitoring various layers and components of ML systems

Cisco acquired Robust Intelligence

Date: August 2024

Transaction value: Undisclosed

Objective: To **integrate Robust Intelligence's automated model assessment and risk mitigation capabilities** into the Cisco Security Cloud

Outlook

- **By end-2024, GenAI is expected to become a critical factor in cybersecurity investments** due to its proven ability to enhance efficiency and streamline threat response. This will also be complemented with robust policies to address adversarial attacks and compliance risks.
- **Stricter compliance frameworks are anticipated** to push businesses toward managed security services like AI-driven MDR to mitigate growing liabilities and regulatory pressures.
- **The cybersecurity landscape may see increased investment** in countering state-sponsored threats and safeguarding critical infrastructure, driven by a focus on national defense.

3: AI cyber resilience

Key companies to look out for in 2025

Company details	Description	What to expect in 2025
CROWDSTRIKE **HQ:**  : 2011 **PS:** Expansion **Total funding:** Public	Offers next-gen cybersecurity products for endpoint, cloud security, threat response, and consulting	CrowdStrike is expected to focus on enhancing its **Falcon platform through GenAI and workflow automation**. Its partnership with NVIDIA will likely bolster Falcon XDR's threat detection and response capabilities
SentinelOne **HQ:**  : 2013 **PS:** Expansion **Total funding:** Public	Offers endpoint protection solutions, including the AI-based "Singularity" platform, for monitoring device behavior and identifying threats	SentinelOne is expected to redefine cybersecurity, **combining AI-powered cloud security with predictive analytics and adaptive threat responses** enabled by its AWS collaboration
DARKTRACE **HQ:**  : 2013 **PS:** Expansion **Total funding:** Public	Offers AI-powered solutions for detecting, responding to, and investigating cyber threats with self-learning "Cyber AI" technology	Darktrace is poised to expand its **AI-driven capabilities,** leveraging its **MDR service** for enhanced threat detection and human-guided expertise

HQ: Headquarters PS: Product stage GTM: Go-to-market

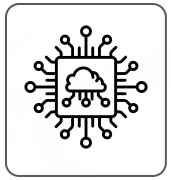
Note:
The companies mentioned above are selected based on their activities during 2024 and the potential they hold to further enhance their offerings in 2025

What are industry cloud platforms?

- Industry cloud platforms (ICPs) are designed to offer tailored services, compliance features, and specialized tools that address the unique challenges and requirements of industries.
- These platforms combine infrastructure (IaaS), platform services (PaaS), and software services (SaaS) into a comprehensive package that's focused on delivering targeted results for an industry.
- This specialization enhances operational efficiency, accelerates innovation, and ensures adherence to industry regulations, empowering organizations to leverage cloud technology more effectively.

4: Industry cloud

In 2024, ICPs enabled organizations to leverage cloud computing to unlock new capabilities within their domains. The specialization and scalability it provides has made it a key driver for organizations to accelerate digital transformation.



Increased traction resulted in wider industry focus: ICPs expanded beyond sectors such as retail, manufacturing, healthcare, and financial services, targeting other sectors such as agriculture, media and entertainment, etc. and for data sovereignty.

The integration of AI/ML opened up new avenues for improvements: These technologies enhanced data analytics capabilities, improved operational efficiency, and created pathways to facilitate faster innovation cycles.

Increased focus on compliance and regulatory requirements: As industries face stricter regulations, industry cloud platforms are evolving to incorporate compliance features that help businesses meet legal and regulatory standards.

Notable product launches

Microsoft

Announced the 2024 release wave one, launching industry-specific cloud solutions across seven different industries

SAP

Launched Sovereign Cloud capabilities in the UK

VULTR

Launched industry cloud platforms for six sectors including retail, manufacturing, healthcare, and finance

Incumbents dominate the space, focusing on multiple industries

	Focus industries																	
	Retail	Consumer packaged goods	Automotive	Manufacturing	Financial services	Supply chain and logistics	Healthcare and life sciences	Media and entertainment	Telecommunication	Capital markets	Government and public sector	Defense and intelligence	Energy and utilities	Mobility	Sustainability	Non-profit	Sovereignty	Advertising and marketing
Google Cloud	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					
Azure	✓	✓		✓	✓		✓	✓			✓	✓	✓	✓	✓	✓	✓	
aws	✓	✓	✓	✓	✓		✓	✓	✓				✓					✓
IBM Cloud				✓	✓	✓	✓		✓		✓							
SAP	✓	✓	✓	✓			✓				✓		✓				✓	

Note: This is not an exhaustive list of companies operating in the space
Source: SPEEDA Edge research

Partnerships

- **Industry-focused collaborations have been instrumental in expanding scope.** By leveraging each other's strengths, these collaborations are not only enhancing service offerings but also driving innovation across various industries.
- **Partnerships are also fostering the integration of new technologies such as GenAI into cloud platforms.** Such technologies are enabling organizations to automate processes, enhance decision-making, and drive digital transformation across industries.

4: Industry cloud

Partnerships deepened industry-specific expertise of key players

Microsoft and Eviden announced a five-year strategic partnership **to co-create and launch GenAI-enabled industry solutions** across industries including financial services, automotive, and manufacturing (January 2024).

Microsoft partnered with Providence to leverage Microsoft Cloud for Healthcare and Azure **to develop AI-powered applications to improve interoperability and care delivery** (March 2024).

IBM partnered with SAP **to combine expertise to deliver GenAI capabilities and industry-specific cloud solutions** (May 2024).

AWS partnered with e& **to deliver secure and scalable cloud solutions** tailored for public sector and regulated industries in the Middle East (October 2024).

M&A

- **AWS, Azure, Google Cloud, and IBM are leading the charge in the M&A space.** It is expected to be a preferred channel in this space, as companies aim to enhance their capabilities and quickly adapt to evolving market demands.
- **M&A activities have focused on critical areas in cloud computing**, including data integration and migration, cost optimization, operational efficiency, and security enhancements. These aim to facilitate smoother transitions, maximize synergies, and ensure long-term success.

4: Industry cloud

M&A helped bolster cloud capabilities, creating an ecosystem for industry cloud platforms to evolve

IBM acquired HashiCorp

Date: April 2024

Transaction value: $6.4 billion

Objective: To create a comprehensive end-to-end hybrid cloud platform for the AI era. IBM expects the deal to drive synergies across multiple strategic growth areas including Red Hat, watsonx, data security, IT automation, and consulting

Salesforce acquired Own Co.

Date: September 2024

Transaction value: $1.9 billion

Objective: To enhance Salesforce's data security, privacy, and compliance offerings, aligning with the company's focus on **strengthening its cloud platform's security features**

IBM acquired Kubecost

Date: September 2024

Transaction value: $1.9 billion

Objective: To **integrate Kubecost into its FinOps Suite**, boosting cost transparency and resource optimization for Kubernetes workloads, aligning with its strategy to enhance multi-cloud cost management and IT capabilities

Outlook

- **The interest and movement toward adopting these specialized platforms are likely to increase.** According to a survey by Gartner, nearly 39% of North American and European enterprises have already begun implementing ICPs, with an additional 14% in pilot stages and 17% exploring deployment by 2026.
- **As a result, rapid growth in this space is expected in the coming years.** Gartner predicts that more than 70% of enterprises will use ICP to accelerate their business initiatives by 2027—a significant increase from less than 15% in 2023.

4: Industry cloud

Key companies to look out for in 2025

Company details	Description	What to expect in 2025
Microsoft HQ:  : 1975 PS: Incumbent	Offers a suite of tailored solutions known as Microsoft Industry Clouds that are designed to provide industry-specific functionalities	While expanding its cloud offerings, it is expected to **integrate more GenAI tools into its industry clouds**
aws HQ:  : 2002 PS: Incumbent	Offering a wide range of cloud services and solutions including a mix of IaaS, PaaS, and SaaS, catering to various industry needs	Expected to introduce **more powerful and flexible cloud services**. It is also set to deepen its commitment **to AI and ML**, with tools like Amazon SageMaker becoming more robust
IBM HQ:  : 1911 PS: Incumbent	Offers a suite of cloud computing services through its IBM Cloud platform	Focus is expected to be directed toward enhancing its hybrid cloud capabilities through **AI integration and supporting multi-cloud strategies**

HQ: Headquarters PS: Product stage

Note:
The companies mentioned above are selected based on their activities during 2024 and the potential they hold to further enhance their offerings in 2025

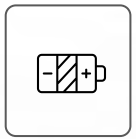
What are energy storage technologies?

- Energy storage is essential for various applications, including electric vehicles (EVs), electricity grids, renewable energy, and consumer electronics. These systems can store energy during surplus periods and release it when needed.
- Energy storage systems for electric power generation include batteries, pumped hydro storage, flywheels, supercapacitors, and compressed air energy storage, with batteries being the most widely used in the EV sector.
- As the demand for advanced battery solutions grows, there is increasing interest in developing alternative battery chemistries.

5: Next-gen EV batteries

New battery technologies are essential for supporting the growing need for energy storage solutions, facilitating a smoother transition to a more sustainable energy landscape. 2024 saw developments in battery technologies in several different areas.

Advancements in lithium-ion (Li-ion) batteries significantly improved driving range. Companies introduced battery tech capable of traveling hundreds of kilometers with just a few minutes of charging.



Solid-state battery technology gained traction. Batteries with higher energy density and safety replace liquid electrolytes with solid materials. Factorial Energy delivered B samples of EV batteries to Mercedes-Benz, marking the first B-sample shipment to a global automotive OEM.

Faster charging solutions are critical for improving EV adoption. Advancements include improved electrode designs and optimized charging methods that enhance efficiency and reduce heat. Recent launches feature EV charging solutions enabling curbside access without infrastructure upgrades and supporting universal compatibility.

Notable product launches

StoreDot

Launched I-BEAM XFC, integrating extreme fast charging to provide **160 km of range in five minutes**

CATL

Launched Shenxing PLUS, offering a **600 km range with 10 minutes** of charging and started 20Ah All-Solid-State battery sample test

chargepoint

Launched **adaptable EV charging** solution Omni Port and **home installation** program for EV chargers

5: Next-gen EV batteries: Market map representing a selection of top disruptors

Li-ion battery tech and charging infrastructure companies dominate

EV batteries: Li-ion

northvolt, Sila, KOREPOWER, ENEVATE, Group14 TECHNOLOGIES, ROMEO POWER TECHNOLOGY, NEXON, amprius, StoreDot, Vianode, Mitra Chem, LITHOS ENERGY, Nanoramic LABORATORIES, nyobolt, ADDIONICS, NANOGRAF, ADVANO, InoBat, Zeta ENERGY, ECELLIX

EV charging infrastructure

EVgo, chargepoint, XOS, wallbox, blink, BEAM, Terawatt, einride, enteligent, ELECTRA, FREEWIRE, JOLT, Weev, MONTA, VIRTA, AMPECO, PIONIX, NUVVE, CHARGELAB, ElectricFish, RESILIENT POWER

EV batteries: Other

QuantumScape, Solid Power, 24M, SES, one, Factorial, NE Nanotech Energy, ADDIONICS

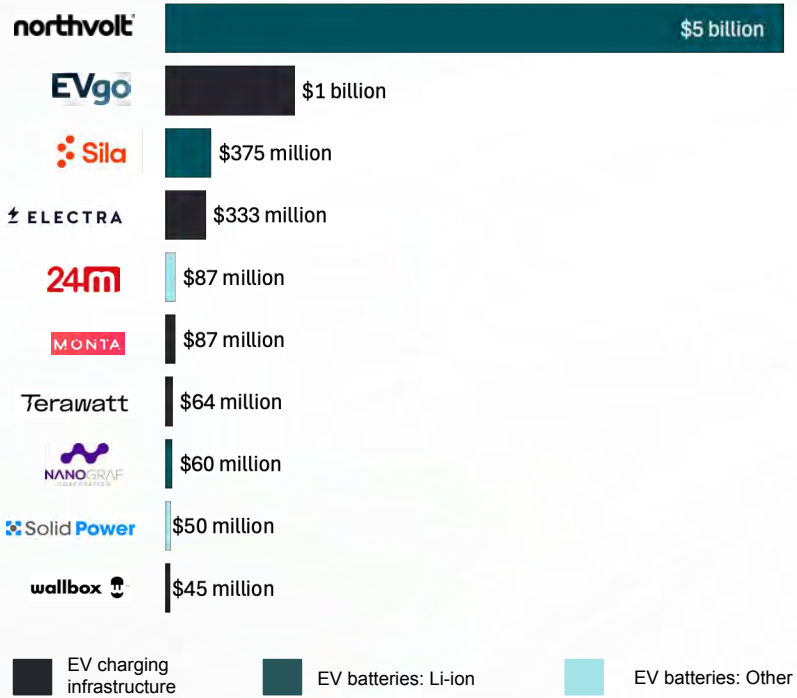
EV fleet and battery management

E/NRIDE, ev.energy, TWAICE, TITAN, novo, StandardFleet, ION ENERGY

Note: This is not an exhaustive list of companies operating in the space
Source: SPEEDA Edge research

Significant investment directed toward EV battery technologies and infrastructure

Top 10 funding rounds



Note: 1) $ refers to USD, 2) data represents funding raised up until November 20, 2024
Source: SPEEDA Edge research • Funding data powered by Crunchbase

In 2024, companies developing EV battery technologies (including materials and charging infrastructure) collectively raised $7.3 billion. Despite emerging interest on novel battery concepts like solid-state, the majority of this funding was directed toward the development of Li-ion batteries.

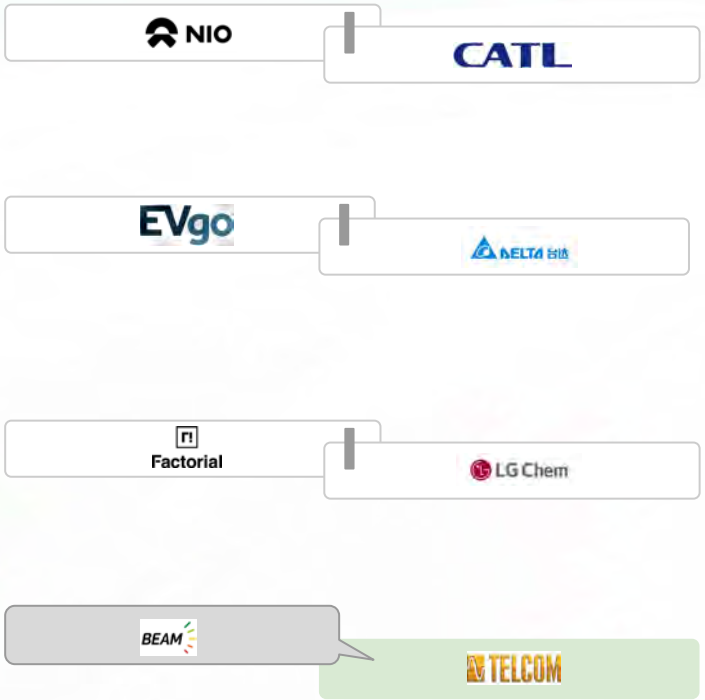
Notable funding raised in these areas included the following:

- **Development of Li-ion batteries (four rounds, $5.1 billion)** Zeta Energy, Inobat, and 24M raised funds to **advance Li-ion battery technologies.** Northvolt raised an impressive $5 billion to expand battery production capacity, but filed for Chapter 11 reorganization later in the year.
- **Expansion of charging infrastructure (six rounds, $1.5 billion)** EVgo, Terawatt, Monta, Electra, and Ev.energy secured funding aimed at **expanding EV charging infrastructure**.
- **Development of battery materials (four rounds, $507 million)** Vianode and NanoGraf received funding to expand **Li-ion battery materials production,** while Mitra Chem and Sila received funds to advance the technology of Li-ion materials.

Partnerships and M&A

- **Partnerships were a common occurrence to expand charging infrastructure.** The highest number of partnerships was struck to expand EV charging infrastructure locally and internationally, emphasizing the critical role of collaboration in building a robust and accessible charging network.
- **Companies joined forces to overcome challenges associated with solid-state batteries.** Partnerships in solid-state battery development focused on pooling resources to tackle key challenges like achieving higher energy densities, safety improvements, and cost-effectiveness for mass production.

Expanding EV charging infrastructure was a key focus of partnerships and M&As



Nio and CATL partnered to develop EV **batteries that can last up to 15 years**, which is twice the current national warranty standard (March 2024).

EVgo and Delta Electronics partnered to **co-develop next-gen EV charging architecture** featuring advanced software, 400 kW ultra-high power dispensers, extended cable lengths, and power sharing (October 2024).

Factorial Energy partnered with LG Chem to **combine its next-gen material and processes** with LG Chem's battery material capabilities to develop solid-state battery tech (April 2024).

Beam Global acquired Telcom to reduce costs by **replacing third-party power electronic components** with in-house engineered solutions (September 2024).

Outlook

- **Solid-state batteries are on the pathway to commercialization.** Many automakers and tech companies are testing solid-state battery prototypes. Despite challenges like production costs and scalability, ongoing research is making them a viable option, with several manufacturers aiming for commercialization by 2030.
- **Emission mandate cancellations may threaten EV battery innovation and progress.** The cancellation of mandates that promote the transition to EVs may shift the auto industry's focus back to fossil-fueled vehicles, impacting EV battery development by reducing the urgency for innovation and investment in cleaner technologies.

5: Next-gen EV batteries

Key companies to look out for in 2025

Company details	Description	What to expect in 2025
QuantumScape **HQ:**   : 2010 **PS:** MVP **Total funding:** $1.5 billion (listed)	Develops solid-state lithium-metal batteries	Plans to **deliver "higher-volume B samples"** for testing by 2025, which is a crucial step toward commercialization. The **integration of the "Cobra" battery separator** positions QuantumScape to produce higher-volume QSE-5 solid-state cells in 2025
Factorial **HQ:**   : 2021 **PS:** MVP **Total funding:** $240 million	Develops solid-state batteries	Strategic **partnerships with major automakers** like Mercedes-Benz, Stellantis, Hyundai, and Kia, along with a collaboration with LG Chem, position it well for commercialization. The **planned demonstration fleet of Dodge Charger Daytona EVs** will be a key test ahead of commercialization
CATL **HQ:**   : 2011 **PS:** Incumbent	Offers advanced battery solutions, including high-performance Li-ion batteries and battery management systems (BMSs)	Set to **launch its second-gen sodium-ion batteries** in 2025, offering improved performance in low temperatures and enhanced safety. It also plans to **mass-produce solid-state batteries** in small batches by 2027, with **potential interim developments** likely in 2025

HQ: Headquarters PS: Product stage MVP: Minimum viable product GTM: Go-to-market

Note:
The companies mentioned above are selected based on their activities during 2024 and the potential they hold to further enhance their offerings in 2025

SPEEDA Edge innovation forecast

Top five innovative technologies likely to disrupt 2025

What is agentic AI?

- Agentic AI refers to a new generation of AI systems that can operate autonomously, making decisions and taking actions without continuous human oversight.
- The latest catalyst in developing autonomous AI agents is using foundation models as the agent's brain, paired with software that serves as "decision-making engines" to guide AI models through reasoning capabilities.
- The growing interest in the area is largely driven by their potential to streamline operations, reduce the need for constant human oversight, and improve overall productivity.

1: Agentic AI

Autonomous AI agents are rapidly gaining traction as transformative tools that can significantly **enhance business efficiency and decision-making processes.** Currently, developments in this field are progressing swiftly, with **ongoing research focused on improving the agents' learning capabilities, decision-making processes, and integration** with other technologies, paving the way for broader adoption in the near future.

This year saw several breakthrough developments in the **launch of agents** as well as the **launch of underlying GenAI models** to power the agents, which are capable of planning, self-healing, intuitively engaging with users, carrying out independent operations, and better collaborative functions.

Notable startup activities in 2024

Product updates

MultiOn introduced Agent Q, Anthropic launched **computer use**, Microsoft introduced an **autonomous agents** creation platform, and Google launched "**Project Martiner**".

Funding

H AI raised $220 million to **develop frontier action models** to boost the productivity of workers, while Writer raised $200 million to accelerate the development of **enterprise-grade agentic AI**.

Partnerships

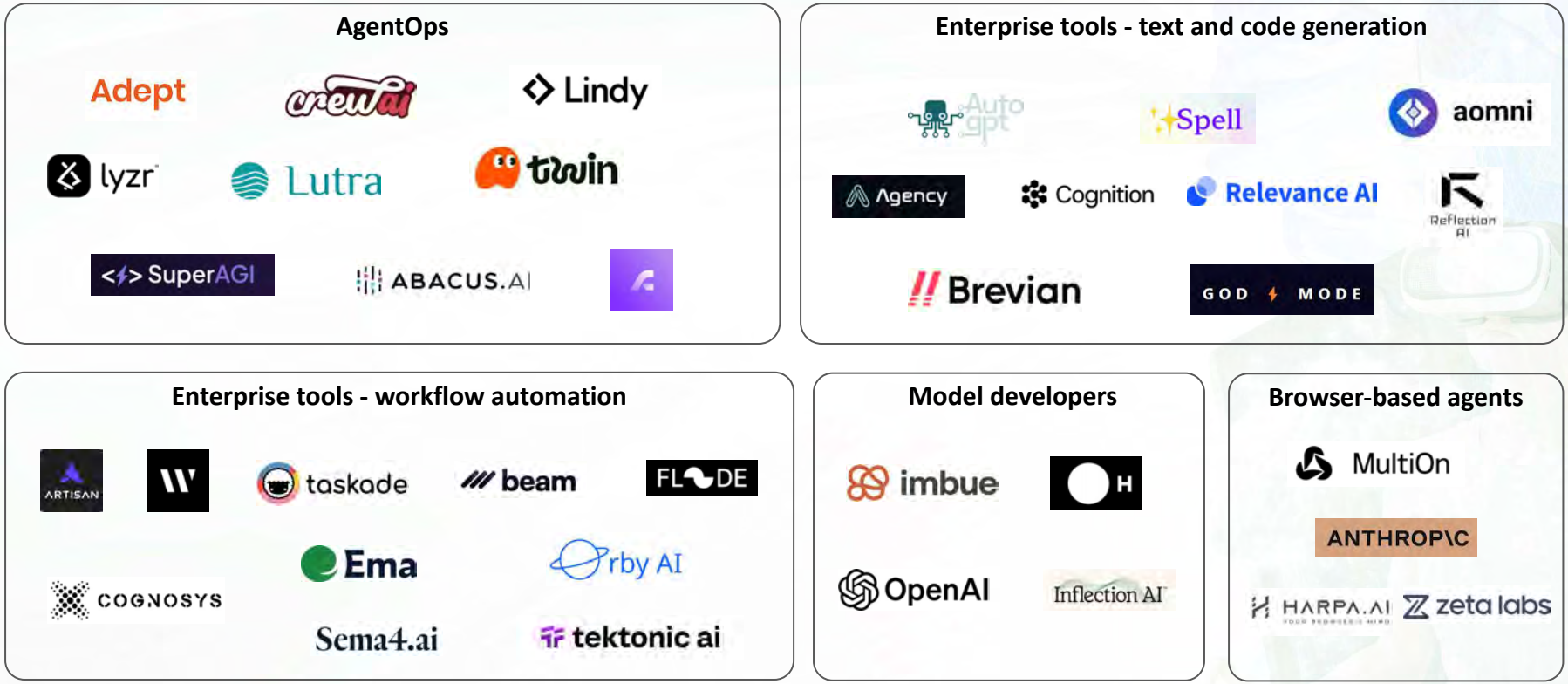
Ema announced a series of partnerships joining Microsoft's Pegasus program and also forming collaborations with major global enterprises to **co-sell its AI agent** Ema.

M&A

Salesforce, which entered the agentic AI space in 2024 through the launch of "Agentforce," acquired AI agent startup Tenyx, to expand its capabilities.

1: Agentic AI: Market map representing a selection of top disruptors

AgentOps and enterprise tools shape the emerging autonomous agentic AI market



Note: This is not an exhaustive list of companies operating in the space
Source: SPEEDA Edge research

1: Agentic AI

Autonomous agents can revolutionize task efficiency across diverse domains

Industry	Use case	Description	Benefits
Customer service	Virtual assistants	Provide 24/7 support, answering queries and resolving issues across multiple channels	Consistent service quality, reduced response times, cost savings
IT and software	Coding	Support coding, testing, and debugging efforts by conducting research	Faster development cycles, reduced coding errors
Finance	Algorithmic trading	AI agents analyze market trends and execute trades at high speeds, capitalizing on small price changes	24/7 market monitoring, reduced human error
	Fraud detection	Examine transaction trends to detect and thwart fraudulent activities in real-time	Faster fraud identification, reduced financial losses
Healthcare	Remote patient monitoring	Continuously monitor patients' vital signs and health data, alerting providers if intervention is needed	Early detection of health issues, reduced hospital readmissions
Retail	Personalized recommendations	Analyze customer data to provide tailored product suggestions, enhancing the shopping experience	Improved customer satisfaction and loyalty, increased sales
Manufacturing	Predictive maintenance	Analyze equipment data to predict failures and schedule maintenance, reducing downtime and costs	Minimized unplanned downtime, optimized resource allocation
Transportation	Autonomous vehicles	Self-driving cars that adhere to traffic rules and ensure passenger safety	Enhanced mobility, decreased transportation costs
Security	Cybersecurity	Detect and respond to cyber threats in real time, continuously adapting to new threats	Faster incident response, reduced security breaches

Note: This is not an exhaustive list of potential use cases
Source: SPEEDA Edge research

Outlook

- We can expect a **significant shift in the capabilities** of autonomous agents to move beyond simple, self-contained tasks to managing large projects from start to finish.
- **A surge in funding is anticipated, as companies launch new products**, while agentic AI startups have already raised over $2 billion in the past two years. The growing adoption is likely to fuel innovation and funding, as investors capitalize.
- **The rollback of AI regulations is expected to positively impact the market.** Policies that foster AI development are likely to facilitate foundation model creation, thereby bolstering the advancement of AI agents.

1: Agentic AI

Key companies to look out for in 2025

Company details	Description	What to expect in 2025
OpenAI **HQ:**  : 2015 **PS:** Expansion **Total funding:** $21.9 billion	Specializes in developing foundation models and related applications (ChatGPT)	Reportedly plans to launch **an autonomous AI agent code-named "Operator"** in 2025, first as a research preview and developer tool
amazon **HQ:**  : 1994 **PS:** Incumbent	Established a new R&D lab named "Amazon AGI SF Lab" in December 2024, with the aim of developing foundational capabilities for AI agents. It partnered with Adept to license its technology	Although the exact timeline for the product launch remains uncertain, these agents are anticipated to seamlessly **integrate with existing services** like AWS and Alexa
Ema **HQ:**  : 2014 **PS:** MVP **Total funding:** $1.5 billion	Launched a "Universal AI Employee" for activating specialized AI roles and Agentic Business Automation (ABA), where AI agents collaboratively execute complex workflows end-to-end	The company will likely **expand its pre-built personas** to cover a range of use cases and industries

HQ: Headquarters PS: Product stage GTM: Go-to-market MVP: Minimum viable product

Note:
The companies mentioned above are selected based on their activities during 2024 and the potential they hold to further enhance their offerings in 2025

What are humanoid robots?

- Humanoid robots are robotic systems designed to mimic human anatomy, enabling them to perform tasks that require human-like movements and interactions.
- These robots are equipped with sensors, cameras, and AI technologies that allow them to recognize faces, respond to voice commands, engage in conversations, and even exhibit human emotions.
- Unlike traditional industrial robots, humanoid robots can navigate complex settings, making them versatile and capable of performing a wide range of tasks.

02: Humanoid robots

The **integration of generative AI into humanoid robots** has revolutionized their operational capabilities. This technology enables robots to exhibit improved 3D awareness, skill planning, and enhanced decision-making, allowing them to perform a wider range of tasks autonomously.

In 2024, companies like Tesla and NVIDIA made notable strides in this space with Tesla **unveiling its latest humanoid robot, the Optimus Gen2,** with enhanced flexibility, weight reduction, and human-like movements. Meanwhile, NVIDIA **launched Project GR00T, a platform aimed at accelerating the development of humanoid robotics**. Startups in the space also made notable advancements.

Notable startup activities in 2024

Product updates

Figure **unveiled the Figure 02**, a humanoid robot **aimed at industrial applications**. In addition, 1X **introduced the NEO Beta prototype,** as it prepares for pilot deployments in homes. This humanoid robot is designed **to assist with household chores**.

Funding

Eight funding rounds were tracked in 2024, with **two rounds exceeding $100 million**. These included Figure's fundraise of $675 million in February and Skild AI's fundraise of $300 million in July. In addition, OpenAI-backed 1X raised $100 million in January.

Partnerships

In February 2024, Figure partnered with OpenAI **to develop AI models for humanoid robots**, aiming to enhance linguistic processing and reasoning abilities of robots. The company also partnered with BMW **to integrate humanoid robots into automotive production**.

Widespread adoption of humanoid robots in industries seems increasingly feasible

Personal support and caregiving

SoftBank Robotics, diligent, Vstone robotics, Unitree Robotics, AGIBOT, SANCTUARY AI, Sanbot, BLUE FROG THE ROBOT COMPANY, DEVANTHRO The Robody Company, OVERSONIC

Manufacturing and logistics

UBTECH, FIGURE, SANCTUARY AI, APPTRONIK, mimic, Agility Robotics, Unitree Robotics, AGIBOT, KAWADA Robotics, CYBORG LINE

Entertainment and social interaction

UBTECH, SoftBank Robotics, BLUE FROG THE ROBOT COMPANY, kokoro, SIMAROBOT, Furhat Robotics, promobot, ENGINEERED ARTS, Sanbot, HANSON ROBOTICS, tinbot ROBÓTICA

Humanoid-related technologies

AGILE ROBOTS, CARNEGIE ROBOTICS, QibiTech, PSYGIG, Boardwalk Robotics, INTUITIVE ROBOTS, HOOMANO, seed robotics, BEYOND IMAGINATION, SKILD AI

Research and education

UBTECH, HANSON ROBOTICS, SIMAROBOT, ROBOKIND ADVANCED SOCIAL ROBOTICS, EAGLE ROBOT LAB, PAL ROBOTICS, LEJU ROBOT, seed robotics

Customer service and hospitality

MACCO, CYBORG LINE, mimic

Note: This is not an exhaustive list of companies operating in the space
Source: SPEEDA Edge research

2: Humanoid robots

The versatility and efficiency of humanoid robots are transforming industries

Industry	Use case	Customer	Product used	Description	Potential/claimed benefits	Source
Automobiles	Automobiles manufacturing (automotive)	BMW	Figure	To deploy robots at BMW's manufacturing site in the US for the body shop, sheet metal, and warehouse operations	Potential to increase productivity of battery and car production and alleviate employees from unsafe tasks during the manufacturing process	Press release
Financial services	Customer service (banking)	BBBank	SoftBank Robotics	To assist customers by providing information and assistance in a friendly and efficient manner	Improved customer service through 24/7 credit card blocking and increased efficiency with quicker responses and solutions	Press release
Healthcare	Health screening	Merck	Furhat Robotics	To use the PETRA robot to increase awareness and early detection in areas with limited healthcare access	Potential to increase awareness and early detection of diabetes, alcoholism, and hypothyroidism	Case study
Aerospace & Defense	Space exploration	NASA	General Motors	To assist astronauts aboard the International Space Station	Improved productivity by having the robot take over dull, dangerous, and dirty tasks, thereby reducing the crew's workload in space	Press release

Note: This is not an exhaustive list of potential applications
Source: SPEEDA Edge research

Outlook

- **Advancements in AI technologies like ML, NLP, and computer vision are enhancing the capabilities of humanoid robots**, allowing them to perform complex tasks and engage more naturally with humans.
- Also, **the increasing demand for automation and robotic solutions**, particularly in sectors with labor shortages, such as healthcare, construction, and manufacturing, **presents a significant market opportunity** for humanoid robots.
- **The deregulatory stance** of the Trump administration toward AI and robotics sectors, which will reduce government oversight, **is expected to foster innovation**, particularly among smaller tech companies.

2: Humanoid robots

Key companies to look out for in 2025

Company details	Description	What to expect in 2025
TESLA **HQ:**  : 2003 **PS:** Incumbent **Total funding:** Public	Development of humanoid robots like Optimus, designed to perform tasks such as manufacturing assistance and labor-intensive activities	While Tesla will focus on the **internal use of its humanoid robots in 2025**, Elon Musk has expressed optimism about **scaling production for external clients by 2026**
FIGURE **HQ:**  : 2022 **PS:** GTM **Total funding:** $854.0 million	Develops AI-powered humanoid robots designed for versatile applications in various industries	Aims to **transition to mass production** with projections suggesting it could ship ~1,000 robots in 2025, with aspirations to ramp up production significantly by 2030
SKILD AI **HQ:**  : 2023 **PS:** MVP **Total funding:** $300.0 million	Develops a scalable AI foundation model known as Skild Brain, which aims to provide a general-purpose intelligence for robots	Aims to **further develop its foundational model**, making it versatile for use in industries like healthcare, construction, and manufacturing

HQ: Headquarters PS: Product stage GTM: Go-to-market MVP: Minimum viable product

Note:
The companies mentioned above are selected based on their activities during 2024 and the potential they hold to further enhance their offerings in 2025

What is quantum computing?

- Quantum computing leverages the principles of quantum mechanics to process information in ways that classical computers cannot.
- The technology uses qubits, which can exist in multiple states simultaneously, allowing for faster and more efficient data processing compared with classical computers that use binary bits.
- The technology is still in its early stages, facing challenges such as qubit fragility and environmental noise, which require highly controlled operating conditions for effective computation.

3: Quantum computing

Recent advances in error correction by Microsoft and Quantinuum have **reduced logical qubit error rates**. Researchers are also **exploring topological qubits, improved error codes, and efficient cooling to ensure stability**, signaling a shift toward more reliable quantum technologies.

The convergence of quantum computing and AI is also expected to drive transformative changes across industries, with potential applications in fields such as drug discovery, materials science, and cybersecurity.

Notable startup activities in 2024

Product updates

Oxford Ionics **achieved a record 99.9993% SPAM* fidelities**—the highest for any quantum platform. Google also **announced Willow**, a powerful quantum computing chip.

Funding

We tracked 39 funding rounds in 2024, out of which **three rounds raised over $100 million**. In addition, Novo Holdings and Singapore invested ~$200 million to develop quantum technologies.

Partnerships

Quantinuum and Microsoft created logical qubits with 800x lower error rates. PASQAL partnered with Mila, and D-Wave partnered with Zapata to integrate GenAI into quantum applications.

M&A

Four M&A deals were tracked in 2024. SandboxAQ acquired Good Chemistry, Infleqtion acquired Sinoptiq, ORCA Computing acquired GXC's Integrated Photonics Division, and Kipu Quantum acquired the PlanQK platform.

*State preparation and measurement

Most startups in the space focus on developing hardware, particularly processors

Note: This is not an exhaustive list of companies operating in the space
Source: SPEEDA Edge research

3: Quantum computing

Though in its nascent stages, quantum computing is being explored across a range of industries

Industry	Use case	Customer	Product used	Description	Potential benefits	Source
Biotechnology	Drug design	AstraZeneca	ProteinQure	To leverage ProteinQure's quantum-powered structure-based design technology to create therapeutic libraries and speed up the R&D of peptide drugs	Will be able to develop novel therapies using peptides, despite having high levels of variations	Press release
Electrical equipment	Data analytics	CERN	IBM	To explore quantum ML to test its ability to sift through massive sets of data generated from the Large Hadron Collider	Analyzed LHC data faster and a general quantum algorithm has already matched CERN's best classical algorithms	Case study
Financial services	Capital markets	Cirdan Capital	Terra Quantum	To create an improved options pricing algorithm that is based upon tensor networks	Reportedly 75% faster than the conventional methods, despite using the same regular computer equipment	Press release
Ground transportation	Process optimization (transportation)	Transport for New South Wales	Q-CTRL	To improve the performance of quantum algorithms for transport optimization problems and efficient transport network management	Will be able to provide solutions with a success probability of 99.9%+—over 100x better than previously known approaches	Case study

Note: This is not an exhaustive list of potential applications
Source: SPEEDA Edge research

Outlook

- The continued evolution of this field promises to reshape critical **sectors such as cryptography, pharmaceuticals, materials science, etc.**
- **Startups operating in this space have raised a total of $6.4 billion in funding,** with funding growing at a CAGR of 52% over 2019–2024. This underscores the increasing confidence investors have in this technology.
- **The growth trajectory remains strong,** as governments and the private sector continue to invest heavily in quantum technologies. As such, further funding and innovation can be expected, as the technology matures.

3: Quantum computing

Key companies to look out for in 2025

Company details	Description	What to expect in 2025
QUANTINUUM **HQ:**  : 2021 **PS:** GTM **Total funding:** $325 mn	Develops quantum computing applications across various sectors, including chemistry, cybersecurity, and finance	Set to launch **Helios, its next-gen quantum computer in 2025**. This system is expected to surpass classical computing capabilities, marking a pivotal step toward fully fault-tolerant quantum computing
IONQ **HQ:**  : 2015 **PS:** GTM **Total funding:** $432.0 mn	Develops general-purpose quantum computers using trapped-ion technology	Aims to achieve **99.999% accuracy in two-qubit systems by the end of 2025**. In 2025, it also plans to introduce its next-gen system, IonQ Tempo
oxford ionics **HQ:**  : 2017 **PS:** GTM **Total funding:** $10.8 mn	Develops quantum processors using trapped-ion technology	Has developed **a quantum chip that can be mass-produced**. This positions it to potentially deliver the world's first practical quantum computers

HQ: Headquarters PS: Product stage GTM: Go-to-market

Note:
The companies mentioned above are selected based on their activities during 2024 and the potential they hold to further enhance their offerings in 2025

4: Human gene editing

What is gene editing?

- Gene editing is a developing medical technique that **alters and modifies DNA within the human genome**. This can be done by directly introducing gene-editing components into the body (in vivo) or by delivering cells that have been edited in a specialized laboratory to the patient (ex vivo).
- **The CRISPR technology has become the most widely used method** in gene editing, due to its simplicity, versatility, and precision. Additionally, it is the most efficient and cost-efficient technology available, making it appealing to companies and investors.

In December 2023, human gene editing reached a significant milestone with the **FDA approving the first gene-editing therapy,** Casgevy, developed by CRISPR Therapeutics, which targets sickle cell disease.

More gene-editing treatments are in Phase I and II clinical trials and can be **expected to enter the market in the next few years**. Ongoing research also aims to refine these techniques and **expand their applicability across other diseases**. In particular, this approach **shows promise for advancing cancer treatment** and potentially improving outcomes for patients.

Notable startup activities in 2024

Product updates

The Vertex-CRISPR **beta-thalassemia drug received FDA approval**, while iECURE and Caribou Biosciences received FDA Fast Track designation for their Gene Insertion program and CAR T-cell therapies.

Funding

We tracked 23 funding rounds in 2024, out of which **seven rounds raised over $100 million.** Most of these funds were raised to advance clinical programs.

Partnerships

The key partnerships during the year included the gene editing collaboration between Mammoth Biosciences and Regeneron as well as the partnership between Editas Medicine and Genevant Sciences.

M&A

Three M&A deals were tracked during the year. Tome Biosciences acquired Replace Therapeutics, Arbor Biotechnologies' acquired Serendipity Biosciences, and Agilent Technologies acquired Biovectra.

Most startups operate in the CRISPR/Cas9 technology space

R&D therapies: CRISPR/Cas9 technology

editas MEDICINE
Sana Biotechnology
POSEIDA THERAPEUTICS
CARIBOU BIOSCIENCES
Mammoth Biosciences
CRISPR THERAPEUTICS
Intellia THERAPEUTICS
AiRNA
Integra therapeutics
arbor
scribe THERAPEUTICS
acrigen BIOSCIENCES
SNIPRBIOME A CRISPR COMPANY
Alia THERAPEUTICS
Beam THERAPEUTICS
verve THERAPEUTICS
LOCUS BIOSCIENCES
SPOTLIGHT THERAPEUTICS
ELIGO BIOSCIENCE
EXCISION
prime medicine
LEMPO THERAPEUTICS
recombinetics™
GRAPHITE BIO

Gene editing: SaaS platforms

Beam THERAPEUTICS
arbor
prime medicine
cellectis EDITING LIFE
PRECISION BIOSCIENCES
ARCTURUS THERAPEUTICS
scribe THERAPEUTICS
ELIGO BIOSCIENCE
SNIPRBIOME A CRISPR COMPANY
CRISPR QC
Sangamo THERAPEUTICS
EMENDO BIOTHERAPEUTICS
2seventybio
INSCRIPTA
CARIBOU BIOSCIENCES

Diagnostic and delivery systems

Mammoth Biosciences
LIGANDAL
SHERLOCK BIOSCIENCES
HOPEWELL Therapeutics
CellFE
GENEDIT GENE THERAPY DELIVERED
Vesigen THERAPEUTICS
Hunterian

Gene editing support services

AiRNA
seamless THERAPEUTICS
SYNTHEGO
TIGERq
elevatebio
GeneLancet

R&D therapies: Other technologies

GENESPIRE
2seventybio
recombinetics™
ECURE
TESSERA
ARCTURUS THERAPEUTICS
Sangamo THERAPEUTICS
Metagenomi
cellectis EDITING LIFE
PRECISION BIOSCIENCES
egenesis ENGINEERING HOPE

Note: This is not an exhaustive list of companies operating in the space
Source: SPEEDA Edge research

4: Human gene editing

The method could deliver more affordable and simpler treatments for genetic disorders and diseases

Type of disease	Name of disease	Patient pool (US)	Cost and effectiveness of alternative medication	Potential for commercialization
Cancer	Lung cancer	541,000	• No curative therapy available. Five-year survival rate: 18.6% (lower than most other types of cancer) • Chemotherapy: $10,000–200,000 in total • Medication: $48,000 per year	High
Cardiovascular	Cholesterol	94 million (with cholesterol levels above 200 mg/dL)	• Medication (PCSK9 inhibitors): More than $14,000 per year	High
Viral infection	AIDS	~1.2 million	• No curative therapy available • Lifetime treatment cost: $420,285 (as of 2019)	High
Neurological	Parkinson's disease	~1 million	• No curative therapy available, medications available to control symptoms • Medication: $2,500 per year • Therapeutic surgery: $100,000 per person	High
Lung disease	Cystic fibrosis	40,000	• No cure or treatments available to ease symptoms • Conventional therapy: $10,000–34,000 per year Lifetime cost: $306,332 • Lung transplantation: More than $1 million for both lungs	Moderate or limited due to low patient pool

Note: This is not an exhaustive list of potential therapeutic applications
Source: SPEEDA Edge research

Outlook

- **Advancements in this field suggest a promising future for healthcare and food security solutions.** Particularly, the CRISPR technologies are paving the way for significant improvements.
- **Startups raised a total of $14.14 billion in funding,** growing at a CAGR of 32% over 2019–2024. With clinical programs now reaching final stages, the funding is expected to fast-track market entry.
- In the past, the Trump administration **favored deregulation in biotechnology** to promote innovation. However, ensuring the safety of these techniques will be paramount for the growth and expansion of the industry.

4: Human gene editing

Key companies to look out for in 2025

Company details	Description	What to expect in 2025
CRISPR THERAPEUTICS **HQ:**   : 2013 **PS:** GTM **Total funding:** $407 million	Develops gene editing-based novel therapeutics for a variety of areas including immuno-oncology and hemoglobinopathies	Although the company faces challenges, **the expansion of gene editing would open new revenue streams** and enhance market position over time
editas MEDICINE **HQ:**   : 2013 **PS:** GTM **Total funding:** $932 million	Develops novel therapeutics for a variety of areas including oncology, ocular diseases, and blood diseases	The company is set to **provide updates on its in vivo gene editing programs**, particularly for sickle cell disease and beta-thalassemia, in the first quarter of 2025
PRECISION BIOSCIENCES **HQ:**   : 2006 **PS:** GTM **Total funding:** $265 million	Develops novel therapeutics for oncology and genetic diseases by leverages the ARCUS platform	**Targets clinical progress for PBGENE-HBV**, backed by Phase I trial data expected in 2025. **Also plans regulatory submissions** for PBGENE-3243, addressing mitochondrial diseases, to transition into clinical trials

HQ: Headquarters PS: Product stage GTM: Go-to-market MVP: Minimum viable product

Note:
The companies mentioned above are selected based on their activities during 2024 and the potential they hold to further enhance their offerings in 2025

What are brain-computer interfaces?

- A brain-computer interface (BCI) is a direct **communication link between the human brain and a computer**, translating the brain's neural signals into commands that can be **processed by external devices**.
- This essentially means that **neural signals (our commands to act) flow directly into the devices, rather than through our bodies**. For example, BCIs eliminate the need to manually navigate devices such as mouses/touchpads, enabling individuals to instead directly move the cursor on the screen with their mind.

5: Brain-computer interfaces

BCI technologies are increasingly being used to **assist** patients with conditions such as amyotrophic lateral sclerosis (ALS), spinal cord injuries, or strokes to communicate and interact with devices through neural signals.

BCIs have been studied for decades and have largely been geared toward non-invasive wearables, such as EEG headsets and electrodes. However, **invasive solutions have been gaining traction** following successful clinical trials of procedures on humans by major industry players like Neuralink.

Notable startup activities in 2024

Product updates

Neuralink implanted its **device in a human patient.** Synchron and Precision Neuroscience also **reported positive results from preclinical studies**, demonstrating the efficacy of minimally invasive procedures for treating neurological conditions.

Funding

Eleven funding rounds were tracked in 2024, with funds raised reaching **over $200 million**. These funding rounds were mainly focused on **driving product innovation and expediting clinical trials.**

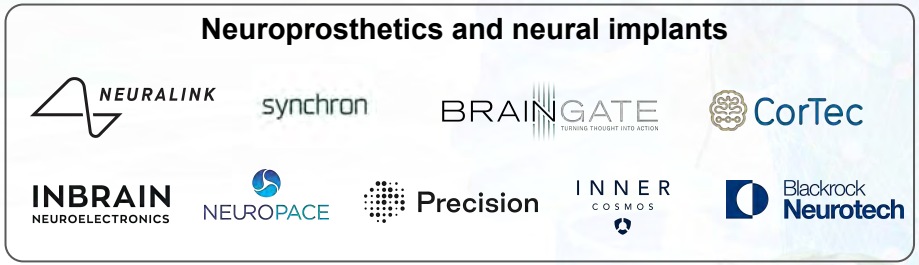
Partnerships

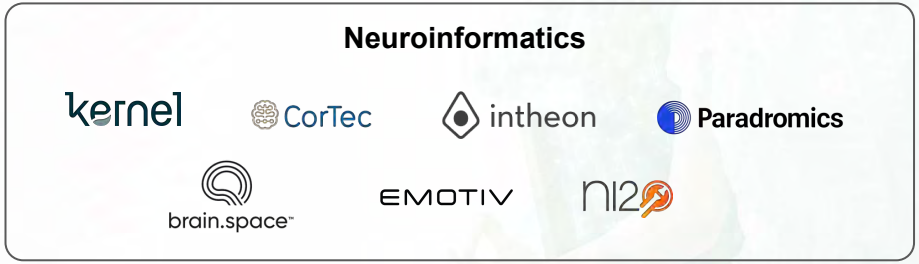
A key partnership during the year was the one between Allianz Trade and Inclusive Brains to develop "Prometheus," a brain-machine interface that **converts neuro-physiological data into mental commands.**

M&A

Three M&A deals were tracked in 2024. This included Synchron's acquisition of Acquandas, Tether's acquisition of Blackrock Neurotech, and Science's acquisition of Pixium Vision's PRIMA retinal implant technology.

Most startups focus on non-invasive wearables, but implants are rapidly gaining traction





Note: This is not an exhaustive list of companies operating in the space
Source: SPEEDA Edge research

5: Brain-computer interfaces

Use cases for BCIs could evolve beyond assistive applications

Industry	Use case	Customer	Product used	Description	Potential benefits	Source
Biotechnology	Brain health measurement	Healthspan Digital	Neurable	To integrate Neurable's neurotechnology into health and longevity clinics globally to measure brain health and cognitive performance	Precise monitoring and analysis of individual health data, leading to more tailored and effective health interventions	Press release
Biotechnology	Stroke rehabilitation	Kandu	NeuroLutions	To enhance access to Neurolutions' IpsiHand BCI and provide remote support for stroke rehabilitation	Improved stroke recovery by offering stroke survivors easier access to advanced rehabilitation technology	Press release
Biotechnology	Brain imaging and neurostimulation	Butterfly Network	Forest Neurotech	To co-develop non-invasive next-gen BCIs using Butterfly's Ultrasound-on-Chip technology	Improved real-time brain imaging, resulting in better therapeutic possibilities for patients with neurological disorders	Press release
Automobiles	Vehicle manufacturing	Nissan Motors	Federal Polytechnic School of Lausanne	To develop futuristic car interfaces to combine driver and vehicle intelligence to enable a safe driving environment	More intuitive and efficient vehicle controls, resulting in improved driving experience and safety	Press release

Note: This is not an exhaustive list of potential use cases
Source: SPEEDA Edge research

Outlook

- **BCIs are poised to move beyond assistive technologies** into areas like cognitive enhancement, immersive gaming, and human-device integration. However, ethical and regulatory considerations will shape their deployment across industries.
- The industry has witnessed a surge in funding since 2021. **More funds are expected to be raised** to develop and phase out the commercialization of BCIs.
- **Deregulation could speed up BCI commercialization** by lowering approval barriers, fostering innovation while raising ethical concerns about user privacy and mental integrity.

5: Brain-computer interfaces

Key companies to look out for in 2025

Company details	Description	What to expect in 2025
NEURALINK **HQ:**  : 2016 **PS:** MVP **Total funding:** $686 mn	Develops BCIs, which includes its flagship N1 Implant, a coin-sized device that is surgically implanted in the brain	The company is likely to initiate **more clinical trials**, expanding its focus to other regions such as Canada, following its recent receipt of approval
synchron **HQ:**  : 2016 **PS:** MVP **Total funding:** $130 mn	Develops implantable BCIs designed to enable patients with severe paralysis to control digital devices through their thoughts	Likely to continue **exploring integrations with consumer tech**, including Amazon Alexa and Apple Vision Pro, for thought-controlled devices
PrecisionNeuroscience **HQ:**  : 2021 **PS:** MVP **Total funding:** $146 mn	Develops BCIs that are designed for implantation and removal by neurosurgeons without damaging brain tissue	Expected to **commercialize its product**, initially targeting applications such as stroke rehabilitation and treatment of refractory depression

HQ: Headquarters PS: Product stage GTM: Go-to-market MVP: Minimum viable product

Note:
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Report by Rodney Fernando, Nathasha Peiris, and Nihara Gooneratne