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How AI is reshaping the auto industry: A look at 15 high-momentum technologies across the automotive value chain

We highlight emerging tech markets across automotive R&D, manufacturing, sales, vehicle use, and the aftermarket.

Automotive firms are grappling with several disruptive forces.

A major one is that the shift toward a fully electric, software-defined vehicle is driving R&D and production costs higher while demanding more agility and flexibility from automakers. The growing adoption of new vehicle form factors will also change how vehicles are sold, used, and maintained, requiring new financing models and repair processes.
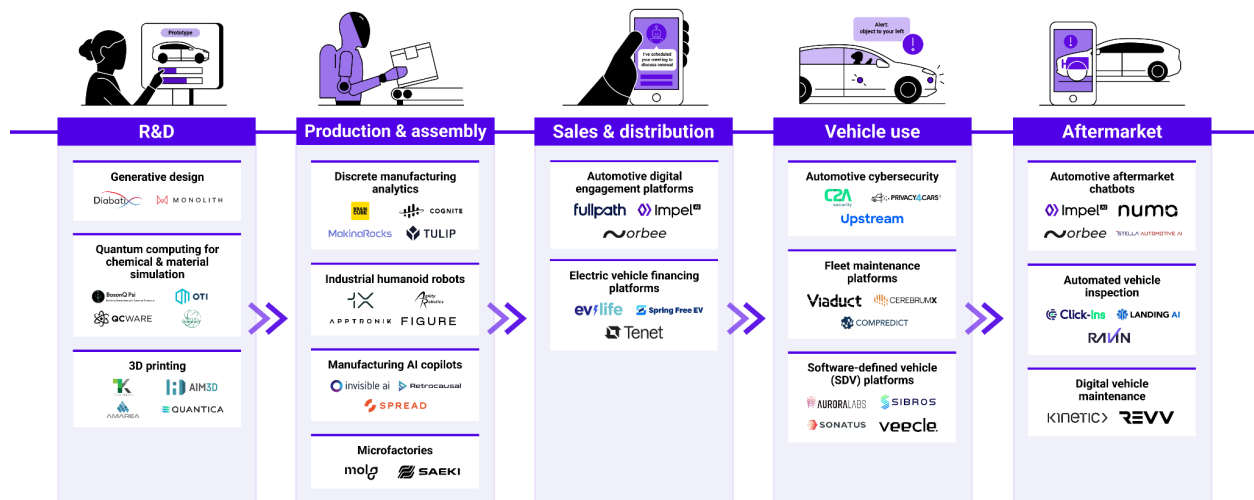
Meanwhile, the proliferation of online car-buying and more sophisticated e-commerce technology across other retail verticals has pressured automotive dealerships to invest in an increasingly digital experience to meet car buyer expectations.

In response to these trends, an emerging set of companies is leveraging large language models (LLMs) and AI more broadly to build a new set of tools and capabilities across the automotive value chain, from AI copilots used in manufacturing, sales, and servicing, to microfactories for production and automated vehicle inspection in the aftermarket.

These solutions hold substantial potential to help automotive players drive growth, improve visibility, and reduce costs across their lines of business.

In this report, we use CB Insights data to identify 15 high-momentum technology markets across the automotive value chain. We focus on solutions that are seeing positive sentiment from investors at earlier deployment stages, but which we expect to have a notable impact within the next 5-10 years. Our analysis factors in funding, analyst briefings, business relationships, headcount growth, Mosaic scores, and more.

15 technologies gaining momentum across the automotive value chain

R&D	Production & assembly	Sales & distribution	Vehicle use	Aftermarket
Generative design Diabatix, MONOLITH	**Discrete manufacturing analytics** STAR, COGNITE, MakinaRocks, TULIP	**Automotive digital engagement platforms** fullpath, Impel, orbee	**Automotive cybersecurity** C2A, PRIVACY4CARS, Upstream	**Automotive aftermarket chatbots** Impel, numa, orbee, STELLA AUTOMOTIVE AI
Quantum computing for chemical & material simulation BosonQ Psi, QTI, QCWARE	**Industrial humanoid robots** 1X, Agility Robotics, APPTRONIK, FIGURE	**Electric vehicle financing platforms** ev.life, Spring Free EV, Tenet	**Fleet maintenance platforms** Viaduct, CEREBRUMX, COMPREDICT	**Automated vehicle inspection** Click-Ins, LANDING AI, RAVIN
3D printing TK, AIM3D, AMAREA, QUANTICA	**Manufacturing AI copilots** invisible ai, Retrocausal, SPREAD		**Software-defined vehicle (SDV) platforms** AURORALABS, SIBROS, SONATUS, veecle	**Digital vehicle maintenance** KINETIC, REVV
	Microfactories molg, SAEKI			

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*This report was created using the help of **CBI's Instant Insights tool**. Customers can generate scouting reports, analyze funding patterns, and dig deeper into business relationships for each of the companies mentioned in this report using this tool.*

Contents

Key takeaways

1. **AI and quantum computing are accelerating vehicle development and reducing R&D costs**, allowing OEMs to introduce new designs, prototypes, and materials.

2. **Automotive production will see gains from more sophisticated robotics and automation solutions**, laying the groundwork for cost-effective, modular production of next-generation vehicles.

3. **AI is enabling a more personalized, efficient automotive sales process**, with new fintech solutions and engagement tools speeding up the sales cycle and improving accessibility for car buyers.

4. **Connected vehicle technology is enabling real-time visibility into vehicle health and security**, providing OEMs with valuable data to enhance other facets of the auto value chain and the in-vehicle experience.

5. **Chatbots and computer vision-led inspection solutions are driving efficiencies in vehicle repair**, improving service desk productivity and technician accuracy.

R&D

AI and quantum computing are accelerating vehicle development and reducing R&D costs

The shift toward a fully electric, autonomous, and connected vehicle is requiring automakers to invest substantially in R&D.

Concurrently, automakers are working to meet aggressive sustainability goals, adding challenges like reducing emissions and waste during production.

In response, many OEMs are experimenting with tech-enabled solutions to speed up development and prototyping, while also lowering costs.

[Generative design](#)

Design tools are integrating generative AI capabilities to accelerate product validation.

Using generative design tools, engineers can set parameters for an end product, such as an automotive component made of certain materials that should also be lightweight and highly efficient. The generative design software will run simulations, generating a range of outputs and then deciding which works best.

Monolith, for example, is developing a solution that allows engineers to input their design goals with parameters around component performance, materials, manufacturing methods, and cost constraints. Monolith's solution then explores all possible combinations of these parameters, ultimately suggesting an optimal design.

The company is already working with leading automakers such as BMW, Honda, and Mercedes-Benz on applications like improving vehicle acoustics and speeding up EV battery development.

## Quantum computing for chemical & material simulation

Quantum computers process information in a fundamentally different way than conventional computers. This opens up new types of algorithms that show promise for applications like training machine learning models, discovering materials, and solving complex optimization problems involving lots of variables. As the tech matures, quantum computers will allow engineers to run simulations faster and with greater accuracy.

For example, Terra Quantum is developing quantum solutions to support automotive players with discovering new materials and building better batteries. The early-stage startup has raised $86M in total funding and has grown its headcount 3x over the past 2 years.

Terra Quantum Headcount

87   6 mo change **▲7%**   1 yr change **▲36%**   2 yr change **▲200%**
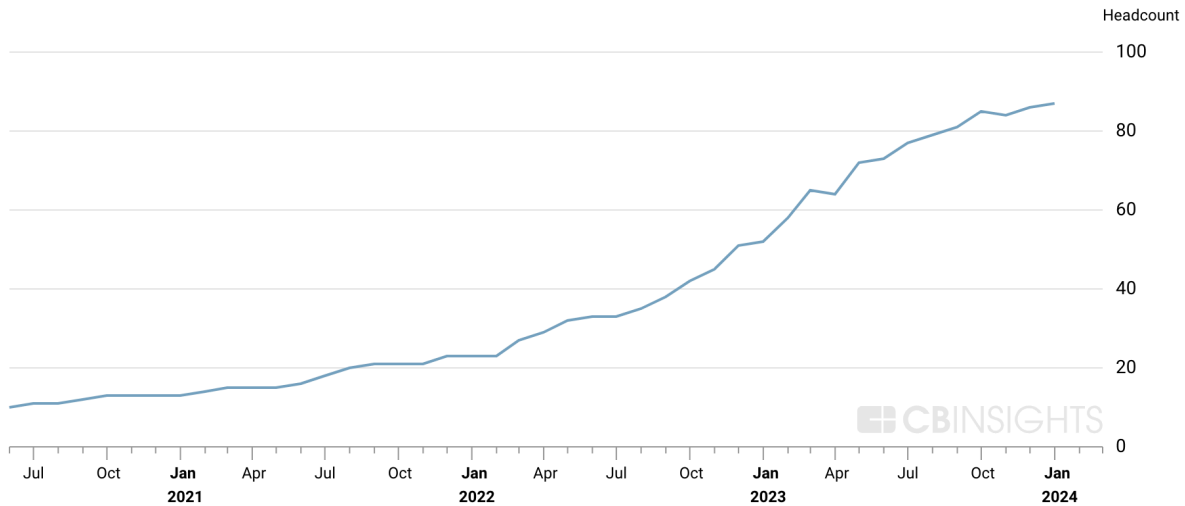
Terra is also working with Volkswagen Group's Data Lab on other applications of quantum computing in automotive development, such as improving AI training for vehicle image recognition systems.

3D printing

Advances in AI are improving 3D printing for automotive R&D.

For example, metal additive manufacturing firm 1000 Kelvin, which raised $3M in seed funding in November 2023, is developing an AI copilot for 3D printing. This tool is intended to predict issues and perform corrections in real time, reducing the number of printing attempts needed during development and enabling more complex parts to be made that would otherwise require time-consuming design iterations.

Production & assembly

Automotive production will see gains from more sophisticated robotics and automation solutions

The rise of generative AI has had an impact across the production process, including helping humanoid robots learn complex tasks more quickly and powering manufacturing copilots. AI is also enhancing existing technologies such as manufacturing analytics platforms and factory floor automation solutions.

Discrete manufacturing analytics platforms

Industrial IoT platforms for discrete manufacturing capture and assess data from systems and machines and then use this data to identify ways to make the manufacturing process more efficient.

Companies in this space are developing tools to help OEMs and Tier 1 suppliers lower energy use, reduce water consumption, improve yield, and predict equipment failures.

Platforms like Tulip and Cognite combine LLMs with these datasets to expedite workflows.
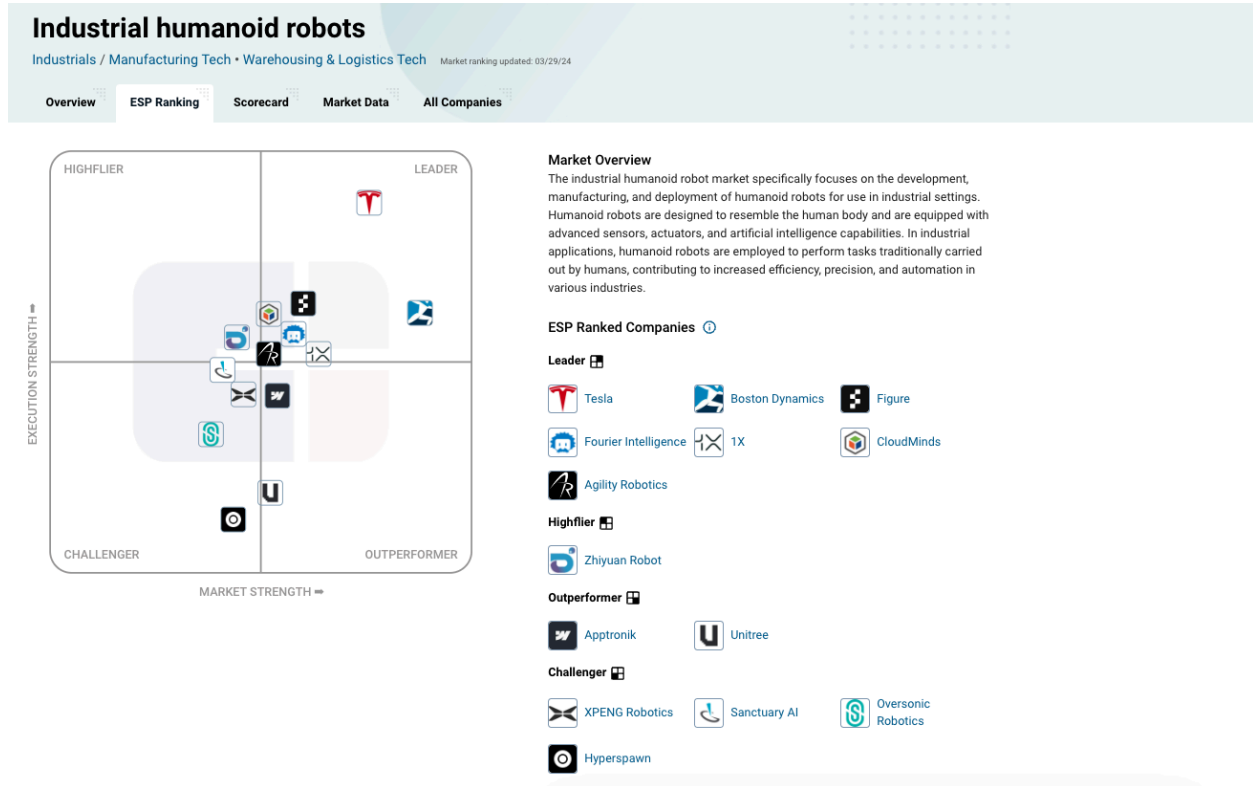
Industrial humanoid robots

Factory robots have been central to automating the manufacturing process for a long time, but in recent months, humanoid robots have captured the attention of investors, automakers, and big tech firms. These robots resemble the human body in form and are typically designed to handle a broader range of tasks — including those still currently handled by humans — than traditional robot form factors.

Humanoid robots have also been given a boost from the use of LLMs to facilitate more effective human-robot interactions.

Growth-stage humanoid robotics players have closed large investments in 2024, with Figure raising $675M in Series B funding in February and competitor 1X raising $100M in Series B funding in January.

BMW recently announced a collaboration with Figure to begin testing its general-purpose humanoid robot in auto manufacturing environments. Mercedes-Benz

partnered with Apptronik to deploy its humanoid robot, Apollo, on the assembly line. Meanwhile, Tesla is working on its own humanoid form factor, which it plans to use for vehicle production and assembly in its manufacturing facilities.

Dig into how players in [the industrial humanoid robots market](#) stack up using the CB Insights ESP ranking tool.

Manufacturing AI copilots

Generative AI has fueled the emergence of manufacturing AI copilots, which work alongside human operators to analyze large datasets and provide real-time suggestions for process improvements.

For instance, manufacturing optimization platform Retrocausal's copilot monitors the workflow of automotive production workers. The company claims it is capable of catching 80% of worker mistakes, cutting down line-stopping events by half and reducing the time needed for onboarding.

Microfactories

Some automakers are exploring the use of microfactories, which operate as small, modular, and highly automated manufacturing cells that are designed to replace the traditional assembly line.

Microfactories are intended to make production more customizable and adaptable without requiring big equipment overhauls — potentially offering new models for manufacturing at smaller scales.

SAEKI Robotics, which raised $2M in seed funding in August 2023, offers a robotics-as-a-service model for customers to book cells to produce large components, allowing automakers to bypass the cost of retooling their machines.

Sales & distribution

AI is enabling a more personalized, transparent automotive sales process

Automotive retail has seen several transformational shifts over the last few years.

As the pandemic spurred traditional dealers to adopt digital selling and e-commerce enablement tools, digital dealerships such as Vroom and Shift rode the wave to go public — but have since floundered due to profitability issues.

Tesla's direct-to-consumer (D2C) sales model has also influenced other automakers to reconsider conventional dealership distribution and adopt a more tech-forward approach to vehicle sales, though the transition has been slow.

Given the challenges associated with a large-scale shift to online sales or a D2C model, auto dealers have been exploring a number of technologies that are easier to deploy in the near term.

Automotive digital engagement platforms

Digital engagement firms such as Orbee and Impel are developing copilots for automotive sales teams. These solutions aim to accelerate the sales process by leveraging customer data to deliver personalized marketing and customer communication.

Companies in the space are already partnering with automotive retailers. Impel, for one, is working with auto dealership solutions provider CDK Global, which plans to integrate Impel's conversational AI platform into its existing customer experience solution.

Electric vehicle financing platforms

As automakers increasingly move electric, companies such as EV Life and Tenet are designing fintech products for EV financing. These help users access loans that take into account EV tax credits, rebates, and home charger installation costs.

These solutions streamline the financing process for dealerships and customers, making it easier to assess customer creditworthiness, compare multiple financing options, and complete transactions efficiently. EV financing firms are also leveraging solutions like predictive lending to improve their offerings, as highlighted by digging into EV financing business relationships using CBI's AI-powered Business Relationship Insights tool.
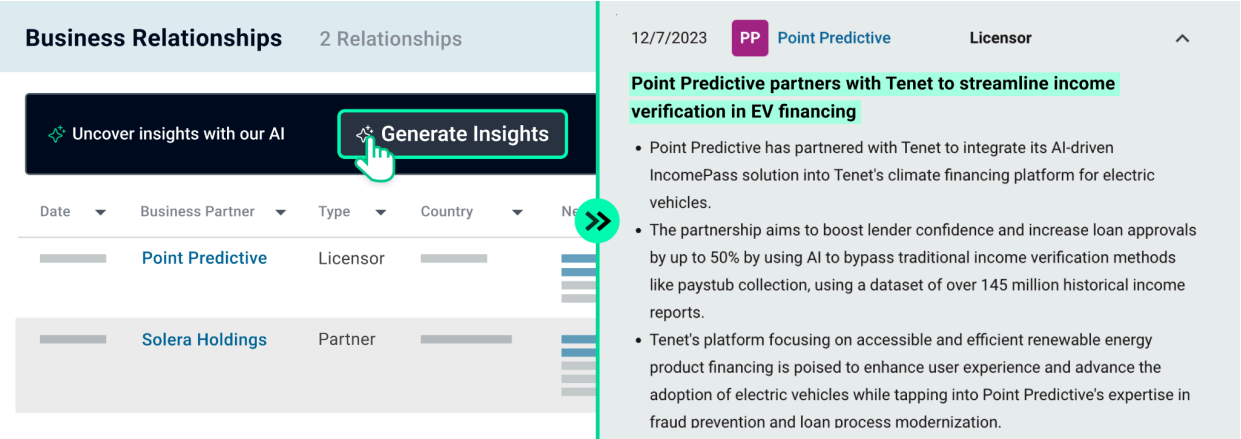
Vehicle use

Connected vehicle technology is enabling real-time visibility into vehicle health and security

With the rise of vehicle connectivity, several tech-enabled solutions are emerging to enhance vehicle functionality and safety on the road.

When connected, vehicles on the road are generating datasets that are valuable to stakeholders across the value chain, including OEMs, Tier 1 suppliers, and automotive retailers. Vehicle diagnostics data, for example, can help inform OEMs and suppliers for product development purposes, while also enabling predictive maintenance for auto dealerships and service centers — allowing for more proactive vehicle repair and better customer service.

Software-defined vehicle (SDV) platforms

Software-defined vehicle platforms allow vehicles to be controlled, managed, and updated through software rather than just dedicated hardware components. This enables OEMs to deliver updates and new features (like upgraded automated driving features) to cars over-the-air (OTA) — meaning wirelessly and often without the user actually needing to initiate the update. This provides OEMs and other stakeholders with more control during the vehicle use process, while also setting the foundation for other connectivity services that help generate valuable data for OEMs.

Sonatus, which is backed by Kia and has partnered with Hyundai, recently unveiled its Software-Defined Component product that allows OEMs and suppliers to monitor, test, and optimize various parts of the car as it's being used. The company has raised $110M across multiple Series A rounds.

Automotive cybersecurity

Automotive cybersecurity technology is central to securing the emerging class of software-defined vehicles. Notably, a number of emerging players such as Israel-based C2A Security are starting to leverage generative AI to automate security controls and prioritize responses to vulnerabilities.

C2A is already partnering with Tier 1 suppliers and vendors, deploying tools to secure connected vehicle software and EV ecosystems including charging stations — as can be gleaned using the CB Insights' Business Relationship Insights tool to analyze its partnerships.

Key themes across C2A Security's 8 business relationships

Automotive Cybersecurity Standards Compliance — Collaborations aimed at ensuring compliance with emerging automotive cybersecurity standards and regulations such as UN Regulation No. 155, ISO/SAE 21434, and UNECE WP.29. (Relationships: VinCSS JSC, Siemens)

Securing Connected and Autonomous Vehicles — Partnerships focused on addressing cybersecurity vulnerabilities in connected and autonomous vehicles, protecting against sophisticated cyberattacks targeting vehicle networks and systems. (Relationships: NXP Semiconductors, NTT Data)…

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Fleet maintenance platforms

Fleet maintenance platforms, which help fleet managers track and optimize their fleets in real time, are also offering solutions for OEMs, as the vehicle diagnostics data they capture can help OEMs develop more targeted products and services.

Companies in the space such as Compredict and CerebrumX are tracking everything from EV battery health to tire and brake wear to engine issues, ultimately generating valuable insights for OEMs on vehicle health and performance.

Vehicle diagnostics are becoming more relevant for OEMs as they focus on new vehicle prototypes and prioritize sustainability.

Aftermarket

Chatbots and computer vision-led inspection solutions are driving efficiencies in vehicle repair
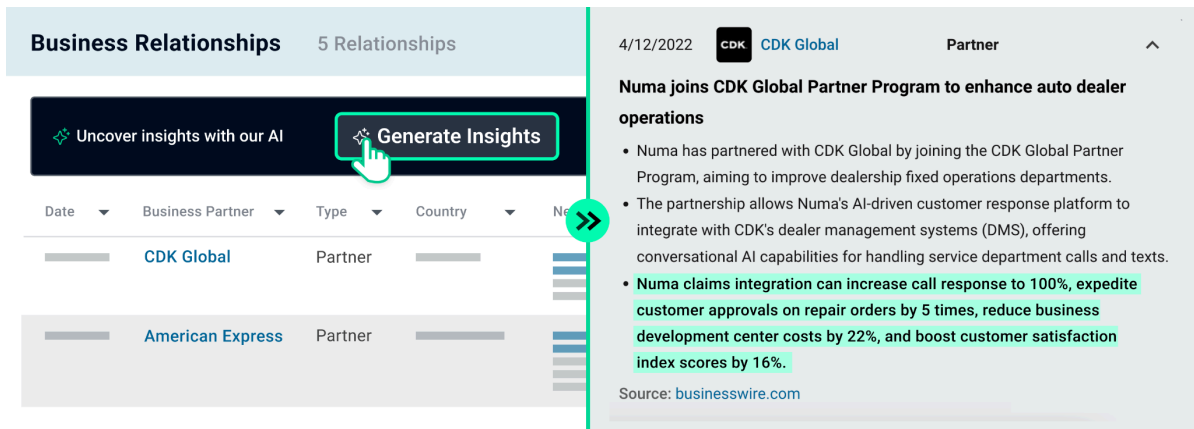
Auto dealers and repair shops are facing a number of headwinds, from downward pressure on vehicle prices to a shortage of skilled technicians. In response, startups are developing solutions that automate tasks across the entire auto servicing process, from automated vehicle inspection to digital repair to AI chatbots.

Automotive aftermarket copilots

One area that has gained investor interest in recent months is genAI-powered chatbots and copilots for automotive service desks. Companies in the space raised a collective $118M across 3 deals in 2023, hitting a new high.

Companies such as Impel and Numa are designing chatbots specifically for auto dealership service centers. These bots will allow dealers to engage with more customers and improve the customer experience for vehicle maintenance.

Numa claims that integrating its chatbot can expedite customer approvals on repair orders by 5x and boost customer satisfaction scores by 16%, as highlighted by CBI Instant Insights on its partnership with dealership software provider CDK Global.

Automated vehicle inspection

Automated vehicle inspection, which leverages computer vision to detect issues that may be missed by the human eye, helps auto repair shops reduce errors while also mitigating the current labor shortage. The tech has implications not just for auto dealerships but also for insurance companies handling claims.

Mid-stage startup Ravin AI, for one, is developing mobile apps that can help consumers, auto retailers, and fleet operators more effectively and affordably assess damage.

Digital vehicle maintenance & repair

As vehicles grow increasingly connected and autonomous, maintenance and repair will also need to cover vehicle software and sensors.

As a result, a number of companies are leveraging the power of AI, IoT, and robotics to support more complex vehicles with solutions such as sensor calibration and digital programming. For example, Kinetic Automation is building technology to automate and support advanced driver assistance system (ADAS) calibrations.

These technologies will become more important as vehicles with increasingly complex capabilities need repairs.

Looking ahead

Though the auto industry — and the industrial sector more broadly — has historically been slower to adopt new technology, current advances in AI are fueling a new set of solutions that are quick to adopt and fast to have an impact.

Startups leveraging the power of generative AI will see sustained investor interest and industry adoption, and automakers should explore ways to automate functions across the value chain with chatbots and AI-led data analytics tools.

As AI grows more sophisticated, it will also help to reduce the costs of more capital-intensive solutions, such as humanoid robots, microfactories, and automated vehicle inspection systems, suggesting that these technologies will offer stronger return on investment in the years to come.

Tech startups across the auto value chain

Value chain	Market	Company	Mosaic	Latest Funding Round	Latest Funding Date	Latest Funding Amount	Country
R&D	**3D printing**	Quantica	650	Series A	April 2023	$15.3M	Germany
R&D	**3D printing**	1000 Kelvin	500	Seed	November 2023	$3.0M	Germany
R&D	**3D printing**	Aim3D	270	Seed VC - II	July 2023		Germany

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R&D	3D printing	AMAREA Technology	320	Seed	November 2023		Germany
R&D	Generative design	Monolith	600	Incubator / Accelerator	July 2022		United Kingdom
R&D	Generative design	Diabatix	460				Belgium
R&D	Quantum computing for chemical & material simulation	BosonQ Psi	510	Incubator / Accelerator - IV	June 2023		India
R&D	Quantum computing for chemical & material simulation	QC Ware	590	Grant - III	April 2022	$1.5M	United States
R&D	Quantum computing for chemical & material simulation	Terra Quantum	690	Series B	February 2023		Switzerland
R&D	Quantum computing for chemical & material simulation	OTI Lumionics	610	Series B	October 2022	$55.0M	Canada
Production & assembly	Discrete manufacturing analytics	Tulip	680	Series C	August 2021	$100.0M	United States
Production & assembly	Discrete manufacturing analytics	Cognite	730	Series B	May 2021	$150.0M	Norway
Production & assembly	Discrete manufacturing analytics	MakinaRocks	640	Series B	December 2022	$12.7M	South Korea

Production & assembly	Discrete manufacturing analytics	[Braincube](#)	730	Series B	November 2023	$91.2M	France
Production & assembly	Industrial humanoid robots	[Figure](#)	900	Series B	February 2024	$675.0M	United States
Production & assembly	Industrial humanoid robots	[1X](#)	880	Series B	January 2024	$100.0M	Norway
Production & assembly	Industrial humanoid robots	[Apptronik](#)	700	Corporate Minority	February 2023		United States
Production & assembly	Industrial humanoid robots	[Agility Robotics](#)	800	Unattributed	August 2023	$0.6M	United States
Production & assembly	Manufacturing AI copilots	[Retrocausal](#)	640	Seed VC - II	November 2023	$5.3M	United States
Production & assembly	Manufacturing AI copilots	[Invisible AI](#)	470	Series A	September 2022	$15.0M	United States
Production & assembly	Manufacturing AI copilots	[Spread](#)	540	Series A	May 2023	$16.7M	Germany
Production & assembly	Microfactories	[SAEKI Robotics](#)	570	Seed VC	August 2023	$2.3M	Switzerland
Production & assembly	Microfactories	[Molg](#)	530	Seed	February 2022	$0.1M	United States
Sales & distribution	Automotive digital engagement platforms	[Orbee](#)	710	Series A	September 2023	$10.3M	United States
Sales & distribution	Automotive digital engagement platforms	[Impel](#)	690	Growth Equity	January 2023	$104.0M	United States

Sales & distribution	Automotive digital engagement platforms	Fullpath	660	Series C	November 2022	$40.0M	United States
Sales & distribution	Electric vehicle financing platforms	Tenet	800	Debt	November 2023	$20.0M	United States
Sales & distribution	Electric vehicle financing platforms	EV Life	520	Pre-Seed	October 2023		United States
Sales & distribution	Electric vehicle financing platforms	Spring Free EV	640	Series A - II	January 2024	$4.6M	United States
Vehicle use	Automotive cybersecurity	C2A Security	640	Series A - III	June 2023	$1.3M	Israel
Vehicle use	Automotive cybersecurity	Upstream	750	Incubator / Accelerator - II	May 2023		Israel
Vehicle use	Automotive cybersecurity	Privacy4Cars	520	Series A - II	December 2022		United States
Vehicle use	Fleet maintenance platforms	CerebrumX	570	Corporate Minority - II	June 2023		United States
Vehicle use	Fleet maintenance platforms	Compredict	380	Incubator / Accelerator - V	June 2023		Germany
Vehicle use	Fleet maintenance platforms	Viaduct	490	Corporate Minority	January 2024		United States
Vehicle use	Software-defined vehicle (SDV) platforms	Sonatus	710	Series A - III	September 2023		United States

Vehicle use	Software-defined vehicle (SDV) platforms	sibros	680	Unattributed VC	November 2022		United States
Vehicle use	Software-defined vehicle (SDV) platforms	Veecle	540	Seed VC	November 2023	$2.9M	Germany
Vehicle use	Software-defined vehicle (SDV) platforms	Aurora Labs	660	Series C	July 2022	$63.0M	Israel
Aftermarket	Automotive aftermarket chatbots	Orbee	710	Series A	September 2023	$10.3M	United States
Aftermarket	Automotive aftermarket chatbots	Impel	690	Growth Equity	January 2023	$104.0M	United States
Aftermarket	Automotive aftermarket chatbots	Numa	310	Incubator / Accelerator	January 2020		United States
Aftermarket	Automotive aftermarket chatbots	STELLA	640	Convertible Note	May 2023	$4.0M	United States
Aftermarket	Automated vehicle inspection	Click-Ins	620	Series A	March 2023	$7.5M	Israel
Aftermarket	Automated vehicle inspection	Landing AI	650	Corporate Minority - II	November 2023		United States
Aftermarket	Automated vehicle inspection	Ravin AI	720	Series E	July 2023	$65.0M	United Kingdom

Aftermarket	Digital vehicle maintenance & repair	Kinetic Automation	690	Series A	October 2023	$10.0M	United States
Aftermarket	Digital vehicle maintenance & repair	Revv	530	Seed VC - II	March 2023	$2.1M	United States

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