



China's Leading Autotech 50 4th Edition



毕马威中国未来50榜单系列
KPMG China Future 50 Ranking Series



汽车科技
Autotech

KPMG China
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Raymond Ng

As China enters a new Five-Year Plan period, innovation has become a top priority. Along with industrial modernization, dual circulation, and the digital economy, innovation will be a major focus area for public and private investment. As a key sector and a nexus of all these priorities, investment in the automotive sector is expected to continue to increase, beginning with large-scale vehicle electrification.

At a national level, the environmental message is clear. Carbon dioxide emissions must peak by 2030, and carbon neutrality must be achieved by 2060. To meet the carbon neutrality goal, it is estimated that China needs to invest RMB 139 trillion over the next 40 years. To support this initiative, new energy vehicle sales are expected to account for 20% of new auto sales by 2025, and these targets are expected to increase beyond 2025. Vehicle electrification and sustainable supply chains will be key elements of the automotive sector's environmental transformation. Advancing technology, new electric vehicle brands, and an active startup ecosystem will all contribute to the establishment of a robust electric vehicle market in China.

While the momentum towards electrification is growing, challenges remain. First, China lags the world leaders in research and development spending by percentage of total R&D spend. While Europe and Japan spend above 30% of every R&D dollar in automotive and transport, China spends approximately 10%. Second, shortages continue to oscillate throughout the supply chain—starting with imported components in early 2020, to shipping equipment shortages later in the year, to the current global chip shortage. Third, as with any transformation, there will be winners and losers, and not all the new vehicle brands will survive.

This is the most pivotal moment for the auto sector in China in decades. With a renewed public interest, the commercialization of advanced technology, and clear objectives from the central government, automotive technology companies are better positioned than ever to transform the way the country moves.



Raymond Ng
Vice Chairman
KPMG China



第 4 屆中國未來 50 汽車科技系列
KPMG China Future 50 (Automotive Series)



汽車科技
Automotive

Norbert Meyring

The automotive sector in China continues to show resilience. Sales of new vehicles remain robust in China, despite the many challenges of the past year and weaker vehicle demand elsewhere in the world. Investment levels in the automotive sector are rebounding, and we have crossed a critical threshold towards a more electric future with many companies committing to the large-scale commercialization of new energy vehicles. While the short-term sector outlook remains heavily influenced by externalities, we believe that China will maintain a strong appetite for vehicles that employ the latest technologies and best integrate into China's unique vehicle ecosystem. Within this context, we have received a record number of applications for the fourth edition of the Autotech 50, which is a testament to the optimism in the sector.

As car makers consider their strategies for the next decade in China, they will find themselves operating in an increasingly unique market. Many new technologies are being debuted in China first, ahead of other markets; and in many cases they are being debuted by companies whose founders intend to focus exclusively on China. Additionally, China's consumer demands are unique, and the auto makers that are most connected to their customers will find themselves better positioned for future success. Partnering with new companies that can bridge that technological gap, provide that key innovative service, or bring better visibility into consumer demand will be top priorities for car makers over the next few years.

This year's edition of the Autotech 50 has been divided into four major categories: Electrification, Mobility, Service Innovation, and Connectivity. In addition, this year we have taken an episodic approach, publishing segments of the list throughout the year. This final publication brings together all categories and highlights our selection for the 50 leading automotive technology companies in China, plus another subset of emerging companies that represent new entrants with strong potential. If you would like to learn more about any of the companies listed, you can find our contact information on the final page of this report.



Norbert Meyring
Automotive Sector
Head
KPMG China

01

Autotech 50 finalists



Autotech 50 finalists by category



Electrification



Mobility



Service Innovation



Connectivity



Note: The above logos were provided by the companies themselves and are arranged randomly.

Autotech 50 finalists by name



This year, 50 Leading autotech companies and 25 Emerging enterprises were acknowledged.

**Companies are arranged in alphabetical order based on their Chinese pinyin names.*

China's Leading Autotech Innovators

ABUP	Aulton	Banma	Ebusbar	Benewake
BRETON	PATEO	CIHON	CAOCAO	Asensing Technology
Das Master	Neusoft Reach	SVOLT	Freetech	Hesai Technology
Hong Jing Drive	Human Horizons	Livox	Lechebang	Log56
Megatronix	MXNAVI	Data Enlighten	MINIEYE	MOTOVIS
Nassen Automotive Electronics	NewLink	NETA	Pachira	Horizon
Qingtao Energy	T3 Mobility	TAGE IDRIVER	ENOVATE	WM Motor
WeRide	BEAN TECH	SAIC Mobility	Pony.ai	CIDI
SemiDrive	New CarZone	Neolix	Inceptio Technology	Next Engine
Unex	DeepRoute.ai	UISEE	Plus	Zhito

China's Emerging Autotech Innovators

Boonray	First Technology	CHUHANG TECH	PowerShare	iSmartWays
Waytous	JDO	LiangDao Intelligence	007VIN	Meijun Electronics
Modern Auto	Tsingtech	QCraft	Xiamen Shinline	Tongyu Automotive
Futurus	Xingshen Intelligent	ZVISION	Ecar Tech	InGeek
EVS	New Vision	MAXIEYE	iMotion Automotive	Heading Data Intelligence

Note: The featured company profiles of these **startups** are based on information submitted by the Autotech candidates and on interviews conducted by KPMG with their senior executives. This list is neither a complete market screening nor an exhaustive listing of companies in the automotive market. The authors of the China Leading Autotech 50 aim to enhance the attention given to technological innovation in China's automotive sector and promote industry communication. This publication is not an evaluation of the compliance or creditworthiness of these companies, **or an endorsement of the companies or their business models**; and the contents should not be construed as constituting investment advice.

Autotech company profiles



To access the profiles of each of the autotech companies, please see the Chinese language version of the fourth edition of China's Autotech 50. Each profile includes:

- 
Company website and official WeChat account
- 
Brief introduction to the company and its products or services
- 
Key management positions
- 
Current funding round



<https://assets.kpmg/content/dam/kpmg/cn/pdf/zh/2021/08/kpmg-china-leading-autotech50-4th-edition.pdf>



If you would like to learn more about any of the companies, please contact us:

autotech@kpmg.com



02

Methodology and results



Methodology



Already the largest single vehicle market, China is transforming into a major source of world-leading automotive technological development. To highlight and validate the development of automotive technology in China and provide support to innovative and entrepreneurial enterprises, KPMG first established a list of notable automotive technology companies in 2017. Since then, this annual list has been recognized in the industry both in China and globally for highlighting the most robust and advanced players and startups in the autotech sector. Several profiled companies have since held successful IPOs, and others have received significant levels of funding or established partnerships with major manufacturers.

The final listing has been curated based on interviews, analysis, and reviews conducted by industry and KPMG experts. The list is circulated globally to auto manufacturers, investors, media outlets, and more.

Scope of enterprises

The fourth edition expands the categories of the selected enterprises to match the evolving technological landscape. China-based enterprises that submitted an application, have been operational for at least 9 consecutive months, are not publicly listed on a stock exchange, and fall into one or more of the following categories were considered:



Methodology



Autotech candidate selection criteria

Inclusion criteria	Exclusion criteria
<ul style="list-style-type: none"> Owns or has self developed innovative technology 	<ul style="list-style-type: none"> Dominates the market based on revenue or market share
<ul style="list-style-type: none"> Financially stable or recently funded 	<ul style="list-style-type: none"> Publicly listed or with USD 1B+ in funding
<ul style="list-style-type: none"> Recognized by an expert panel 	<ul style="list-style-type: none"> Directly connected to a major supplier or OEM
<ul style="list-style-type: none"> China-headquartered or with a China market focus 	<ul style="list-style-type: none"> In operation for less than 9 months

Company categorization – Leading and Emerging

Leading Autotech Innovators are those companies with significant investment, existing volume sales, high visibility in the market, and/or existing significant commercial or technological partnerships with major players in the automotive industry.

Emerging Autotech Innovators represent the next generation. These companies are typically at an earlier stage of development or growth than the Leading companies and have new business models or technologies that may not yet be widely adopted.

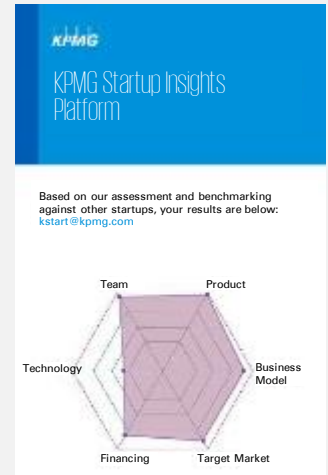


Evaluation journey



Core evaluation dimensions

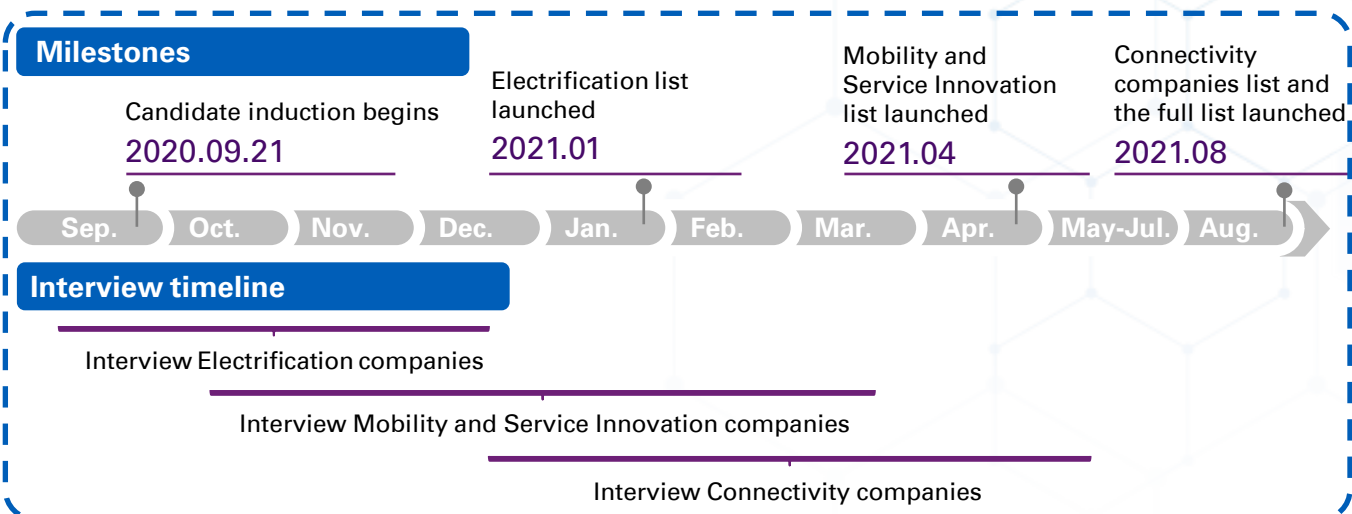
- Innovative technology or business models
- Influence on and compatibility with the traditional automobile industry
- Financial health and rate of growth
- Market acceptance and specific market opportunities
- Valuation and capital market recognition
- Management capabilities and enterprise innovation mechanisms



Composition of the evaluation committee

The evaluation committee is composed of more than 50 KPMG partners and experts. The committee takes into account discussions with management in leading auto companies, auto investors, R&D experts, etc.

- 100+ automotive technology companies
- 28 offices nationwide
- 50 global and China experts
- 100+ interviews with founders and C-suite executives
- 365 days and nights



Autotech cohort analysis

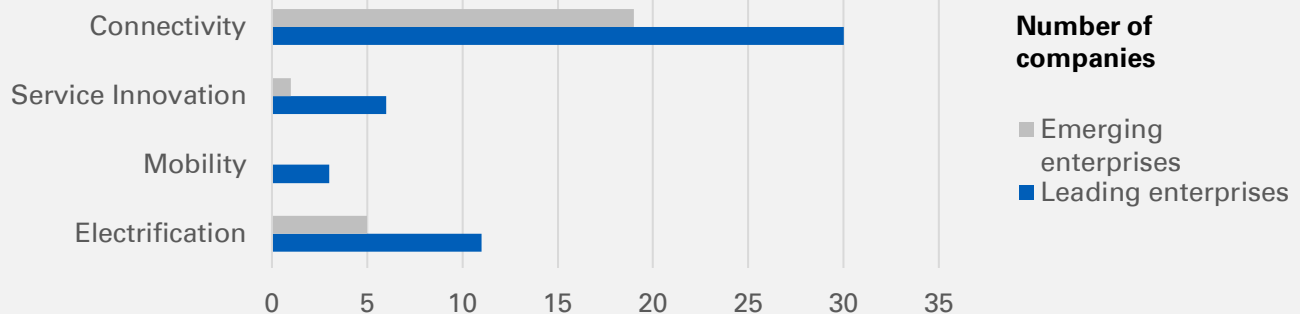


In addition to the 50 Leading autotech companies, this year, we have also included a list of 25 Emerging enterprises with unique technological characteristics that are actively embracing digital transformation. We have analyzed data from these 75 companies from different perspectives as described below.

01

Core businesses

In this fourth edition, we evaluated four categories of innovation in China's developing automotive technology sector: Electrification, Mobility, Service Innovation, and Connectivity. As two of the core trends of the automotive industry, software-defined vehicles (SDVs) and vehicle-to-everything (V2X) technology are not only changing driving habits, but also laying the groundwork for further innovation and the provision of diversified services for car owners. We have witnessed UBI vehicle insurance and smart charging services make significant progress on this basis. Furthermore, human-computer interaction has continued to evolve, and voice control and augmented reality displays are now ready for mass production. Cutting-edge autonomous driving technology has matured; and quasi-commercial applications of this technology have been launched in some market segments, such as long-distance freight, mobile sales, and mining and port operations. In the mobility sector, one company has continued to dominate the market as the enthusiasm of OEMs seems to have diminished further. The above trends are reflected in the shortlisted companies' industry distribution statistics, which are shown below:



Note: The above statistics are based on data disclosed by the Leading and Emerging autotech companies.



Autotech cohort analysis



02 Geographic distribution

With their convenient transportation, abundant talent pools and mature supply chains, China's coastal areas have remained fertile areas for innovation and entrepreneurship. Beijing and Shanghai remain the most popular cities for autotech companies. Labor costs and supportive local government policies are motivating an increasing number of startups to operate in economically developed second-tier cities, such as Suzhou and Nanjing, or in central and western cities where colleges and universities are clustered, such as Wuhan and Changsha.

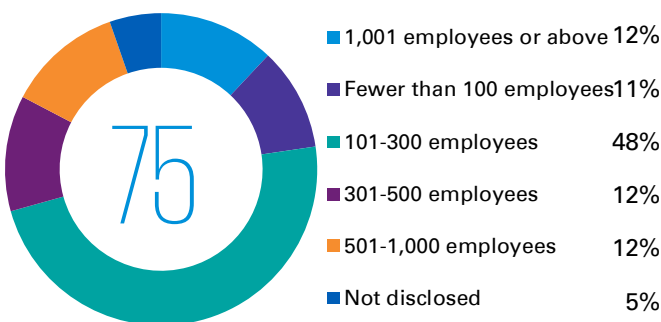
Since the Two Sessions in 2020, an array of policies and regulations that support the new energy industry and V2X technology have been promulgated, and local governments at all levels have enacted various measures to support innovation and entrepreneurship. We expect geographic diversity to continue to be a trend in autotech in China.



Note: The list of cities above is not exhaustive.

03 Team size

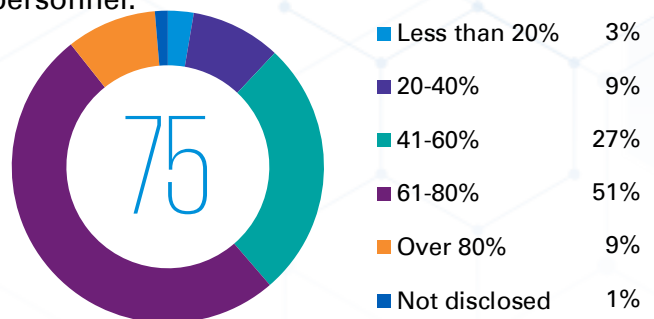
The autotech companies selected are still mostly small and medium-sized companies. Like in previous years, nearly half of the companies employed 100 to 300 people. The rest of the companies were fairly evenly distributed in terms of their number of employees, with around 12% in each category. The team size not only reflects each company's stage of development, but its business model as well. For example, companies that employ more than 1,000 people are mostly new vehicle manufacturers and innovative service providers.



Note: The above statistics are based on data disclosed by the Leading and Emerging autotech companies.

04 Proportion of IT personnel

R&D is the bedrock of innovation, so the proportion of IT personnel also represents a key indicator in the evaluation of autotech companies. Among the 75 startups selected this year, 38 of them have workforces that are comprised of 61% to 80% IT personnel, which is considered mainstream. On the other hand, companies with production and operations teams, such as mobility platforms and automotive aftermarket service providers, have a relatively low proportion of IT personnel, typically less than 40%. Meanwhile, companies engaged in software-driven businesses such as autonomous driving and V2X may have workforces that are composed of over 80% IT personnel.



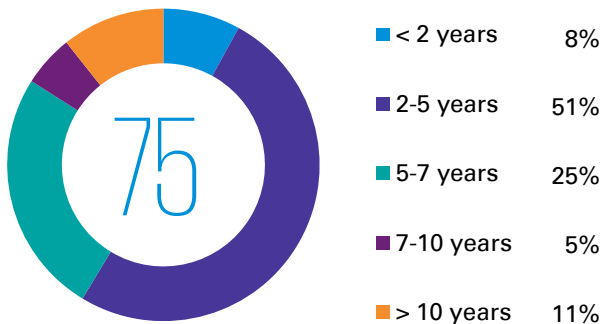
Note: The above statistics are based on data disclosed by the Leading and Emerging autotech companies.



Autotech cohort analysis

05 Years of operation

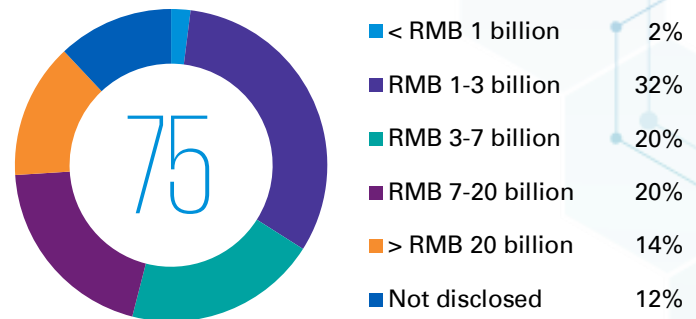
In terms of length of operation, most of the shortlisted companies have been established for 2 to 5 years or 5 to 7 years, with these brackets accounting for 76% of the total.



Note: The above statistics are based on data disclosed by the Leading and Emerging autotech companies.

06 Valuation

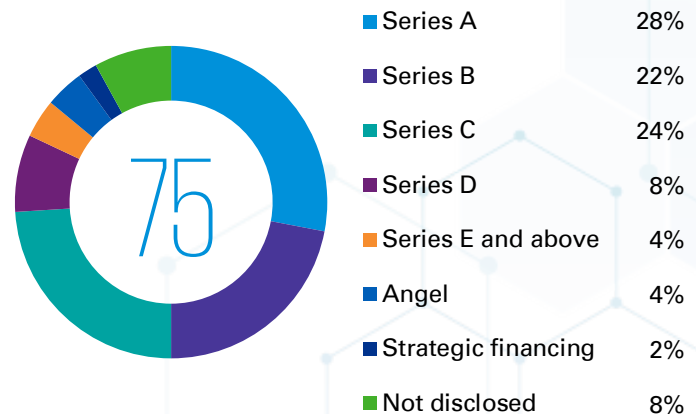
According to their information disclosures, 32% of the companies—the largest share—are valued between RMB 1 billion to RMB 3 billion. Meanwhile, 14% of the companies are valued at more than RMB 20 billion, and these companies are mostly engaged in vehicle services, autonomous driving, and smart mobility.



Note: The above statistics are based on data disclosed by the Leading and Emerging autotech companies.

07 Funding rounds

Among the 75 companies shortlisted this year, about 50% are in a critical period of development and expansion, having conducted Angel, Series A or Series B rounds of financing. These companies are still seeking potential business partners to support their growth. Through this edition of the Leading Autotech 50, we hope to provide a platform for these growing autotech companies to demonstrate their value and find more partners, with the ultimate goal of generating benefits for investors and investees, and contributing to the development of the industry as a whole.



Note: The above statistics are based on data disclosed by the Leading and Emerging autotech companies.



03

Trends in automotive technology in China





Autotech top trends

Based on our interviews and observations, we have provided an analysis of the development trends in the automotive sector below (pages 16-22).

A tipping point has been reached for vehicle electrification

For the first time, sales of new energy vehicles surpassed 1 million units in both Europe and China in 2020. Also, in the past 12 months, more and more OEMs have committed to large-scale transformation towards an all-electric future. Tied to these announcements are billions of dollars of investments into battery facilities, partnerships and the development of new electric vehicle technologies. These investments are partly a response to the commercial success of innovative Chinese new energy vehicles ranging from low-cost miniature EVs to high-end luxury models, which are competing against the most valuable global brands. Incumbents are realizing they are at risk of continuing to lose market share to new entrants across the world, including in China. With smaller, high-profile companies garnering global attention, the major OEMs have committed billions of dollars to new models, new research centers, new factories, and new partnerships. All these investments are pointing towards a future in which the charging pile will replace the pump.

New brands bring new life to the digital experience

Innovative companies in China are embedding more advanced technology into every link in the automotive value chain and every element of the driving experience. From sophisticated voice recognition and smart heads-up displays to robust and secure over-the-air updates, innovations are emerging faster than the traditional OEM development cycle can implement them. In order to embed the latest technologies into their products, the OEMs are launching purpose-built brands with faster development cycles, more of a focus on the digital experience, and more user customization to match increasing consumer demands. These agile, well-funded, and digital-first brands have shed many of the legacy corporate functions of bigger OEMs in order to focus on product design, marketing, and customer experience. Innovators will find higher acceptance and a stronger appetite for the latest tech among these new brands, which will speed along efforts to commercialize their products and services.

The lines between Big Tech and Big Auto have become more blurred

Large-scale partnerships have always characterized the automotive industry. Historically, these have been between OEMs and governments or suppliers. More recently, the trend has been for competing OEMs to collaborate on new vehicle platforms or new battery technologies. The automotive sector has also welcomed the involvement of big tech in the past to develop or improve features such as autonomous driving systems, navigation, or infotainment systems.

In the past 12 months, nearly all of China's largest technology companies have announced partnerships in the automotive sector, with several investments exceeding RMB 1 billion. While 2020 saw a decrease in the overall quantity of investments into the automotive sector, the overall value of investment nearly reached RMB 100 billion. Many of these investments came from or were contributed to new joint ventures between technology companies and automotive manufacturers. Even tech companies that have not formally announced their intention to manufacture finished vehicles have shifted significant funding and senior leadership into the development of automotive products and services. These investments and partnerships may accelerate similar tie-ups between automotive OEMs and technology firms elsewhere in the world as well.



Autotech top trends

Autonomous driving scenarios continue to expand

This year, more autonomous driving candidates submitted applications for the Autotech selection than any other category. While the robo-taxi is still the most high profile scenario, innovation continues to accelerate in areas beyond the transportation of individuals. Autonomous driving scenarios continue to become more niche as companies realize that differentiation will be based on the ability to provide reliable services within a certain context, as broad and complete autonomous mobility remains out of reach.

Autonomous driving pilot zones continue to pop up across the country as local governments work with startups to promote local investment into cutting edge technology. In cities across the country, observers will catch glimpses of buses, taxis, commercial vehicles, and last-mile delivery vehicles on the streets, in parking lots, or in industrial zones, often being driven or trailed by a young engineer equipped with a laptop.

Commercial and industrial applications remain a key focus of autonomous driving R&D as food and goods delivery staff number in the hundreds of thousands for some companies. Automated delivery by land or by air would have a serious impact on China's massive delivery sector, which employs millions of delivery staff. Industrial scenarios, such as the retrofitting of existing mining equipment for autonomous or remote operation, are driven primarily by safety.

Mobility services scenarios diversify, profitability remains challenging

According to the KPMG 2020 Global Automotive Executive Survey, Chinese consumers value brand trust (43%) and vehicle availability (27%) most when choosing mobility services. As the mobility-as-a-service market matures, demands from customers will continue to guide changes in mobility offerings.

Mobility services have expanded in scope from traditional online car hailing services to adjacent services like time-sharing leasing, chauffeuring and bike sharing. According to the 47th Statistical Report on Internet Development in China released by the China Internet Network Information Center, by the end of 2020, the number of online car hailing users in China had reached 365 million.

Mobility provider integration continues to drive innovation and competition. Examples in this regard include the integration of competing third-party mobility service providers into major mobility platforms. Differentiation is becoming crucial, so service providers are constantly digging into specific service scenarios. Now, providers also cover scenarios such as regular medical visits, transportation to and from school, and customized business travel. Competition in the mobility market has evolved from what was initially a subsidy war to a competition based on user operations and user experience. In the future, we believe that the diversified development of travel services and the continuous innovation of technology will continue to provide opportunities for market participants to identify pathways to profitability.





Autotech top trends

Environmental and social concerns no longer limited to the tailpipe

Emission standards have long since guided the direction of innovation for internal combustion vehicles. Following the release of the China VI emission standards for both passenger and heavy-duty vehicles, companies are increasingly hedging their bets by investing in alternative powertrains. With a new powertrain comes new supply chains and new responsibilities for recycling and scrapping. Now, auto makers of all types are examining not only the final product but also the complete supply chain to assess the total environmental and social impact of their vehicles. Concerns over child labor within the battery supply chain have led to reforms in raw material supply. At the other end of the value chain, electric vehicles at the end of life now have a different component makeup than combustion engine vehicles. This presents both challenges and opportunities for OEMs and service providers that are reclaiming material from scrapped vehicles. Meanwhile, this change will present new opportunities for innovative companies to provide products that draw their materials from more transparent supply chains. Innovative companies will also have the opportunity to provide services or technologies to auto makers that enhance their visibility and flexibility in building sustainable and ethical supply chains.

Supply chain and supplier risk will further drive localization

The automotive industry has been characterized by efficient and reliable supply chains for decades. In the past 18 months, the challenges presented by global supply chains have become more apparent. Between COVID-19's influence on the international flow of goods and people, the uncertainty of vehicle demand, and the semiconductor shortage, the expansive nature of the automotive supply chain has become global news.

However, changing sources for components is not an easy task. Homologation can be time and resource consuming, and it is made more difficult by travel restrictions. Meanwhile, keeping large lists of active suppliers requires resources to maintain relationships and inspections, making switching suppliers challenging. For the suppliers themselves, local availability of talent, costs, infrastructure, incentives, distance from the customer and political risk all factor into site selection.

Automotive companies increasingly rely on advanced components ranging from LIDAR to processors, which are sourced globally due to scarcity or intellectual property protection. Domestic automotive technology companies may find that buyers from across the spectrum are highly interested in reliable local production of these high-tech components. Going forward, greater access to local technology paired with concerns over global supply chain reliability will continue to drive the development of automotive supply chains.





Autotech top trends

The automotive aftermarket is facing disruption by new entrants

The number of registered motor vehicles had reached 378 million as of March 2021, among which the number of passenger cars had reached 248 million. As the car parc increases and vehicles age, the focus of consumer spending will shift towards vehicle maintenance, repairs, insurance, etc. We estimate that post-purchase expenditure for passenger vehicles can reach RMB 200,000 over the lifetime of a vehicle. This represents a high value for companies focused on the automotive aftermarket.

Currently, the automotive product and repair aftermarket is characterized by fragmentation. Independent operators or small service centers provide many of the regular services on which drivers rely: daily repairs, part purchases, and used car sales. At present, these categories are being rapidly disrupted.

The upgrade in the delivery of aftermarket services is driven heavily by technology. New platforms that are being deployed are providing more friendly interfaces for both consumers and service centers. This 'platforming' of the automotive aftermarket will benefit drivers by providing faster service, more transparency in pricing, and more competitive offerings for used vehicles. Investment in aftermarket autotech companies is significant, with companies closing investment rounds with valuations in the hundreds of millions of dollars for those companies that can connect the many links of the automotive aftermarket.

Vehicle connectivity represents one of the largest new commercial opportunities in the auto sector in decades. With vehicles increasingly digitized, new business models have been developed for software-based upgrades, improved operating systems, and improved personalization of the vehicle experience. The spectrum of investment in this area is broad, and for this reason, we have dedicated the largest section of this edition of the Autotech 50 to Connectivity.

The development path of vehicle connectivity is expected to differ in China compared to other countries. In the 2020 KPMG Automotive Executive Survey, respondents in China were much more likely to believe that the government will be the ultimate owner of driver data. Based on this concept, we expect to see more infrastructure-driven connectivity as city-level infrastructure such as smart cameras, traffic lights and charging piles interact directly with vehicles. We also expect to see vehicle-generated data being shared more among OEMs, private service companies, telecoms, and regulators.





Autotech top trends

Cybersecurity will increase in significance

A key element of cybersecurity in China is compliance with existing regulations, including the Cybersecurity Law, Data Security Law, and other policies that require a China-specific approach to handling customer and vehicle information. The scope of applicability of cyber policies in China can be very broad, and the impact of non-compliance can lead to investigations by multiple governmental authorities, fines, and reputational damage, and even affect a company's ability to accept new users.

More and more companies that operate both domestically and overseas are constructing local data centers and local digital R&D teams. Driven initially by compliance, this data localization will create a separation in how data is utilized in China versus Europe or North America. Cybersecurity management systems (CSMS) will become standard in the industry, even if the standards themselves vary from region to region. The consequences of cybersecurity noncompliance or cyber breaches can be severe, even if the threat is only perceived.

With more and more components of vehicles powered by software that is continuously tweaked and updated over-the-air (OTA), the risks of and vulnerability to cyberattacks are increasing. Standards for cybersecurity are now increasingly being baked in at the earliest stage of vehicle and software development. Automotive technology companies must embed cybersecurity compliance and cyber defense into their products in order to be competitive. The following pages illuminate some of the coming trends in automotive cybersecurity.



Autotech top trends - Cybersecurity focus

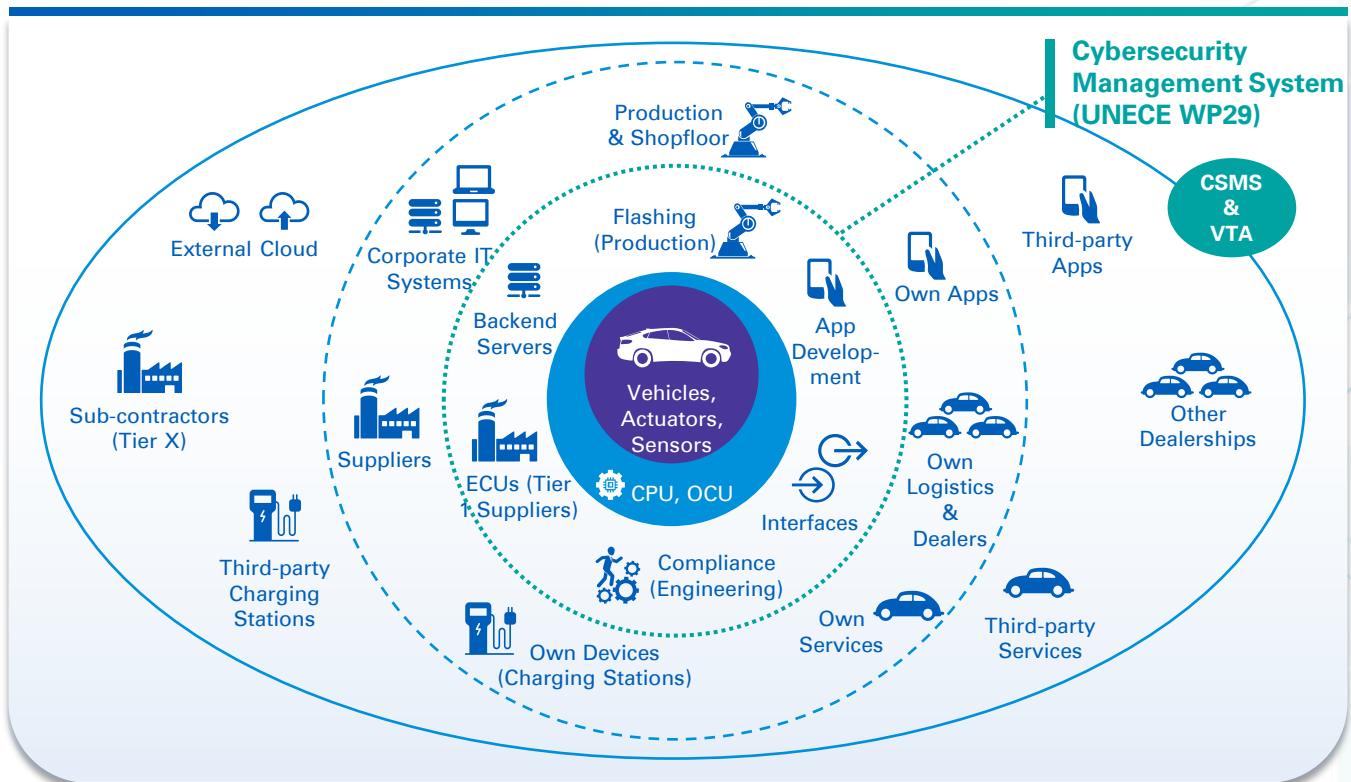
In the 20th century, automobile safety revolved around active and passive safety systems. Acronyms vary, but the four new modernizations (electrification, connectivity, intelligent, and shared) are now core to the automotive industry. Vehicles are no longer simply a means of transportation—they are becoming the next smart device. Just like computers and smart phones, smart cars and their applications are now susceptible to system vulnerabilities, data leakage and cyber attacks. All participants, including auto makers, suppliers, and product and service partners, understand that cybersecurity is as important as product quality and automobile safety, and that the issue is both unavoidable and challenging.

In this regard, the United Nations Economic Commission for Europe (UNECE) has issued a regulation (UNECE WP.29 TF-CS/OTA) that will have a significant impact on the entire industry. Starting from July 2022, vehicles will not be eligible for certification unless the auto maker maintains a certified cybersecurity management system. With this requirement in place, cybersecurity will be a pressing topic for every car manufacturer. Meanwhile, ISO/SAE 21434 (Road Vehicles - Cybersecurity Engineering) will be finalized by the end of 2021, at which point it will serve as a major standard of reference for automotive cybersecurity. To help companies meet this standard, KPMG has teamed up with [ESCRYPT](#) (link in English) to develop the CSMS Automotive Cybersecurity Solution: [PROOF](#) (link in Chinese).

In view of OEMs' stricter transparency requirements with respect to supplier information security, the German Association of the Automotive Industry (VDA) has compiled the Information Security Assessment (ISA) catalog, which provides guidance for the checking of supplier information security management and practices through third-party TISAX audits. This catalog is designed to ensure the cyber and information security of the entire automotive industry chain. Starting in 2021, an increasing number of suppliers in China have received requirements from German OEMs and first-tier suppliers with respect to TISAX certification. TISAX is compatible with ISO27001 and GDPR; and it requires companies to identify their countries' cybersecurity laws and regulations, conduct applicability assessments and take corresponding actions.



Autotech top trends - Cybersecurity focus



The development trend of the domestic V2X sector has resulted in specific regulatory requirements for automotive cybersecurity and data security. In April 2021, the Ministry of Industry and Information Technology (MIIT) issued the *Guidelines for the Management of Access for Intelligent Connected Automobile Manufacturers and Products (Trial) (Exposure Draft)*, which stipulates requirements on security assurance capabilities in three aspects: functional safety and expected functional safety assurance, cybersecurity assurance, and software upgrade management. The guidelines also require companies to establish a dedicated team to be responsible for security assurance during a product's entire life cycle.

In June 2021, the MIIT issued three major documents: the Notice on the Pilot Implementation of V2X Identity Authentication and Secure Trust, the *Guidelines for the Construction of the V2X (Intelligent Connected Vehicles) Cybersecurity Standard System*, and the *Notice on Strengthening V2X (Intelligent Connected Vehicles) Cybersecurity (Exposure Draft)*. In July 2021, the Cyberspace Administration of China enacted the *Certain Measures for the Management of Automotive Data Security (Exposure Draft)* with reference to the Cybersecurity Law of the People's Republic of China in order to strengthen the protection of personal data and important data, and regulate the processing of automotive data.

In view of the transformation and breakthroughs in the industry, we need to ask the following questions: What is an automobile? What are the boundaries of the automotive industry? What is automotive data? What is automotive safety? The promulgation of national and global regulations for automotive cybersecurity is pushing companies to define, evaluate, control, manage and improve cybersecurity across their organizations, including organizational culture, management processes, product life cycles, and ecosystems.

Note: The investment focuses and industry views described in this report are for the reference of readers only, and we make no implicit warranties in this regard.



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Contributors

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04

Appendices





Glossary

#	Abbreviation	Full name
1	3DSLAM	3D Simultaneous Localization and Mapping
2	5G	5th Generation
3	ADAS	Advanced Driver Assistance Systems
4	AI	Artificial Intelligence
5	AGV	Automated Guided Vehicle
6	AIoT	Artificial Intelligence & Internet of Things
7	API	Application Programming Interface
8	AR	Augmented Reality
9	B2B	Business-to-Business
10	B2C	Business-to-Customer
11	BI	Business Intelligence
12	BMS	Battery Management System
13	BRT	Bus Rapid Transit
14	C2M	Customer-to-Manufactory
15	CSMS	Cybersecurity Management System
16	CPU	Central Processing Unit
17	DMS	Driver Monitor System
18	EPC	Electronic Parts Catalog
19	EPS	Electric Power Steering
20	ESC	Electronic Stability Controller
21	GPU	Graphics Processing Unit
22	HMI	Human Machine Interface
23	HUD	Heads-up Display
24	ICT	Information Communications Technology
25	IGBT	Insulated Gate Bipolar Transistor
26	IoT	Internet of Things
27	LiDAR	Light Detection And Ranging
28	ISO/SAE 21434	Road Vehicles - Cybersecurity Engineering
29	IDV	Intelligent Digital Vehicle
30	MaaS	Mobility-as-a-Service
31	MPV	Multi-purpose Vehicle
32	MEC	Mobile Edge Computing
33	OCR	Optical Character Recognition
34	OEM	Original Equipment Manufacturer



Glossary

#	Abbreviation	Full name
35	OTA	Over-the-Air Technology
36	OTO	Online-to-Offline
37	PROOF	KPMG CSMS Total Solution
38	SaaS	Software-as-a-Service
39	SIP	KPMG Startup Insights Platform
40	SUV	Sport Utility Vehicle
41	SOA	Service-oriented Architecture
42	SoC	System on Chip
43	Tier 1	Tier One Supplier
44	TISAX	Trusted Information Security Assessment Exchange
45	TSP	Telematics Service Provider
46	T-Box	Telematics Box
47	TaaS	Transportation-as-a-Service
48	UBI	Usage-based Insurance
49	V2X	Vehicle-to-X / Vehicle-to-Everything
50	VIN	Vehicle Identification Number
51	VR	Virtual Reality





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