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Growth Opportunities in the Chinese Passenger Vehicle Navigate on Autopilot Market, 2025–2032

As NOA Scales beyond Differentiation, the Battleground Shifts from Highway Deployment to Urban Conquest

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SCOPE OF ANALYSIS

- Navigation on autopilot (NOA) in China's passenger vehicle market is shifting from early differentiation to widespread commercialization, with highway NOA becoming standard and urban NOA transforming into the next growth area due to advancements in vehicle architecture and rising consumer demand.
- Adoption is expanding from premium electric vehicles (EVs) to mid-priced segments as opportunities arise in modular NOA stacks and scalable platforms that enhance performance and reduce costs.
- China's regulatory framework is focusing on compliance, favoring Tier I system integrators and select technology providers, with an emphasis on software integration, life cycle management, and over-the-air (OTA) services supported by subscription models.
- This study explores the evolution, scale, and monetization of NOA in China from 2025 to 2032, assessing technology, regulations, and competitive dynamics while providing actionable growth strategies for OEMs and suppliers based on market sizing, cost structures, regulatory pathways, and model analysis across vehicle segments.

Scope	
Geographic coverage	China
Study period	2025-2032
Base year	2025
Forecast period	2026-2032
Monetary unit	US Dollar

Questions This Study Will Answer
• What is NOA? What is the NOA system value chain structure?
• What are the primary NOA market drivers and restraints?
• How will the NOA market grow? What is the adoption trend among regions? Which are the technology players?
• What are the growth avenues for the NOA market in China until 2032?

SEGMENTATION

The automotive industry describes ADAS and AD features by capability, such as hands-off or eyes-off driving, and references SAE J3016 automation levels. As a note, NOA is a commonly used term in china for advanced L2+ driving features, which are globally referred to as an L2+ system.

Advanced Driver Assistance Systems (ADAS)				Autonomous Driving (AD)		
L0	L1	L2	NOA	L3	L4	L5
Blind Spot Detection (BSD)	ACC	ACC with lane change assistance	NOA: a supervised, GPS-guided driving system that requires the driver to stay alert and ready to intervene at any time for safety and compliance	Slow-speed Piloted Driving	Automated Valet Parking (AVP)	No human driver needed
Lane Departure Warning (LDW)	Autonomous Emergency Braking (AEB)	Highway Assistance		High-speed Piloted Driving	Geofenced AD system (robotaxi/ shuttle)	Operates everywhere, always
Forward Collision Warning (FCW)	Lane-Keeping Assistance (LKA)	Automated Parking Assistance		City Pilot		Full-stack autonomous intelligence
Hands On and Eyes On			**Hands-Free capable, But Hands-On Due to Regulatory Pressure**	**Hands Off and Eyes Off**	**Mind Off**	**Nothing Required**
Hands On				**Eyes Off**	**Mind Off**	**Everything Off**
Supervised Driving				**Unsupervised Driving**		

Study focus

UNDERSTANDING NAVIGATION ON AUTOPILOT (NOA)

What is Navigation on Autopilot?

- NOA is an assisted driving feature classified under L2+ automation, enabling a vehicle **to follow a planned route under supervision** while managing complex longitudinal and lateral control tasks across freeways and designated roads.
- Technically, NOA systems can support hands-free driving under certain operational design domains, leveraging advanced perception, compute, and localization stacks. However, **in China, deployments remain hands-on and driver-supervised due to stringent regulatory requirements, safety compliance norms, and liability frameworks governing L2 autonomy commercialization.**
- In China, NOA has rapidly expanded from controlled-access highways to include urban roads (urban NOA), distinguishing it as a key feature for intelligent driving in passenger vehicles.

Core Features of NOA

Route-based navigation	Adaptive cruise control	Lane centering	Traffic jam alert	Traffic light response
Intersection handling	Ramp-ramp to driving	Automatic merge and exit	Highway/ urban lane change	Autonomous valet parking

Roles and Responsibilities

Driver/User

- Always remain attentive
- Actively monitor vehicle behavior
- Be ready to intervene immediately upon system prompts
- Understand system limits and operational design domain (ODD)
- Adhere to local laws and regulations
- Not treating navigate on autopilot (NOA) as full self-driving or hands-off autonomy

OEM/Manufacturer

- Compliance by design
- Clearly defined ODD
- OTA governance and traceability
- Marketing and claims compliance
- Data logging and accountability

NOA is not merely a feature; it is a comprehensive system architecture that integrates perception hardware, AI computing, multi-layer software, and cloud infrastructure into a continuously learning driving platform.

NOA CLASSIFICATION

Navigation on Autopilot

Highway Navigation on Autopilot (HNOA)

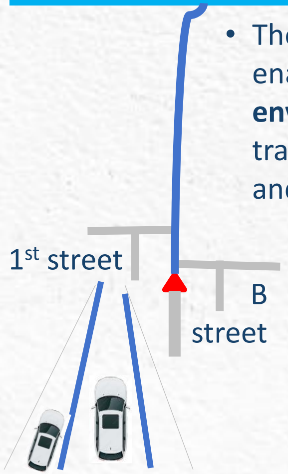
- The driver assistance feature that enables automated navigation on controlled-access **highways**—it handles lane changes, merges, exits, and overtakes based on the navigation route

Features

- Auto lane keeping
- Navigation-guided lane change
- Highway merging
- Exit ramp handling
- Overtaking slower vehicles
- Speed adaptation to traffic

City Navigation on Autopilot (CNOA)

- The driver assistance capability that enables automated navigation in **urban environments**—it handles intersections, traffic lights, pedestrians, two-wheelers, and mixed dense traffic



- Traffic light recognition and response
- Unprotected left/right turns
- Roundabout navigation
- Pedestrian and cyclist yielding
- Two-wheeler avoidance
- Complex intersection handling
- Stop-and-go dense traffic driving

Note: This forecast represents the overall NOA market and does not include individual segment breakdowns.

https://stock.adobe.com/images/car-top-view-vehicle-overhead-isolated-on-white-background-perfect-use-of-2d-floor-plans-and-any-design-project/237486871

Source: Frost & Sullivan

RECENT REGULATORY LANDSCAPE SNAPSHOT OF CHINA'S NOA MARKET

- Notice from **the Ministry of Industry and Information Technology (MIIT)** and the State Administration for **Market Regulation on Further Strengthening the Management of Product Access, Recall, and Online Software Upgrades for Intelligent Connected Vehicles**
- The MIIT has tightened regulations regarding autonomous driving features by banning key functions. Public beta testing programs and marketing terminology are now strictly regulated. Automakers are **prohibited from using terms such as "automatic driving," "autonomous driving," "intelligent driving," or "advanced intelligent driving"** in their marketing materials. Instead, they must use "L(number) assisted driving" and strictly adhere to automation level classifications.

- **Remote parking and summoning features banned. Functions that operate without driver supervision**—including **valet parking, one-touch summoning, and remote-control features—are now prohibited.**
- OTA updates are heavily restricted—MIIT **criticized frequent OTA updates**, stating that one goal of the new regulations is to "reduce frequent OTA updates and **improve version risk management**." Emergency updates will now require recall procedures and approval from the State Administration for Market Regulation.

- China released **draft guidelines** for regulating the **export of automotive data generated within its borders**. Jointly issued by eight agencies—including the MIIT, Cyberspace Administration of China (CAC), and the National Data Administration (NDA)—the draft guidelines mark China's most detailed effort to date to define and **restrict "important data" in the auto sector**.
- China has granted its first Level 3 autonomous driving permits for regular passenger vehicles, marking a major policy breakthrough in the smart driving sector.
- China's MIIT announced approval of two L3 autonomous driving models: one from Changan Automobile and another from Arcfox, the EV unit of Beijing Automotive Group (BAIC Group).

China's PV NOA market is moving into mass market penetration under formalized L2/L2+ regulations covering product access, OTA, and safety filings. Deployment is scaling from city pilots toward broader regional coverage via municipal permits. Regulatory clarity is enabling modular, OTA-scalable platforms across vehicle lines. In parallel, homologation pathways are supporting low-cost sensor stacks for wider commercialization within the supervised driving framework.

EVOLVING BUSINESS MODELS ARE REDEFINING NOA COMMERCIALIZATION IN CHINA

Business Model	Insight	Examples
One-time buyout	This model drives high upfront software price by positioning NOA as a premium autonomy upgrade, widely used in flagship trims where buyers prefer lifetime access over recurring payments. However, OEMs are gradually complementing with subscriptions.	Tesla, XPeng, Huawei ADS
Monthly subscription	Subscriptions lower adoption barriers by shifting NOA from a capex to an opex purchase. This model supports OTA-led feature upgrades and enables OEMs to build recurring SDV revenue streams. It is gaining traction as urban NOA functionality expands.	Tesla, NIO NOP+
Annual subscription	Annual plans improve retention while offering cost savings vs monthly pricing. OEMs bundle NOA with connectivity and digital services to integrate a complete ecosystem.	NIO NOP+
Hybrid model	Hybrid monetization maximizes attach rates by offering both on-time buyout and subscription options. Premium buyers opt for buyouts, while price-sensitive users subscribe. This flexibility makes this model the dominant NOA pricing structure in China.	XPeng, Tesla
Hardware-bundled/ Trim-based	NOA is packaged within higher trims, monetized indirectly via vehicle selling price uplift. This model simplifies purchase decisions and accelerates feature penetration. It is common among SUV and mass market EV OEMs.	BYD, Li Auto
Trial → paid conversion	Free trials allow OEMs to demonstrate real-world NOA value before monetization. OTA upgrade enables instant activation post-trial, improving conversion rates. This is a key growth lever for scaling urban NOA adoption.	NIO, Huawei programs

China's NOA monetization landscape is evolving from one-time autonomy buyouts toward hybrid and subscription-led software revenue models, with OTA trials and trim bundling accelerating feature penetration across the PV segment.

GROWTH DRIVERS

Passenger Vehicle NOA Driving Market: Growth Drivers, China, 2026–2032

Driver	1–2 Years	3–4 Years	5–7 Years
OEM competitiveness and feature bundling Intense competition among manufacturers in China is prompting OEMs to offer NOA features as standard equipment. This simplification of options accelerates NOA adoption, making it a baseline expectation for consumers.	High	High	Medium
Regulation, safety rating, and liability framework Evolving regulatory oversight around Level 2/NOA marketing, OTA governance, and driver monitoring is driving greater standardization across intelligent driving systems. Rather than constraining innovation, these frameworks are accelerating the development of safer, compliance-ready NOA platforms designed for mass market scalability. Further strengthening consumer trust and supporting sustainable commercialization.	High	High	Medium
NOA cost down and platform standardization Lower costs for computing, sensors, and software make NOA automation viable for mass market vehicles. Standardization enables manufacturers to utilize a single NOA system across multiple models, thereby boosting adoption and making it a key feature.	High	High	Medium
Urban NOA scaling via end-to-end AI Urban NOA provides daily benefits for city driving, which is where most Chinese users spend their time. Its AI and map-light approach facilitates quick city expansion and data-driven enhancements, making NOA a key differentiator for the brand and user experience.	Medium	High	High
Ecosystem maturity A developing domestic ecosystem reduces risks and shortens NOA deployment cycles. Improved chips and tools enable faster iterations, supporting reliable and cost-effective NOA expansion.	Medium	High	High

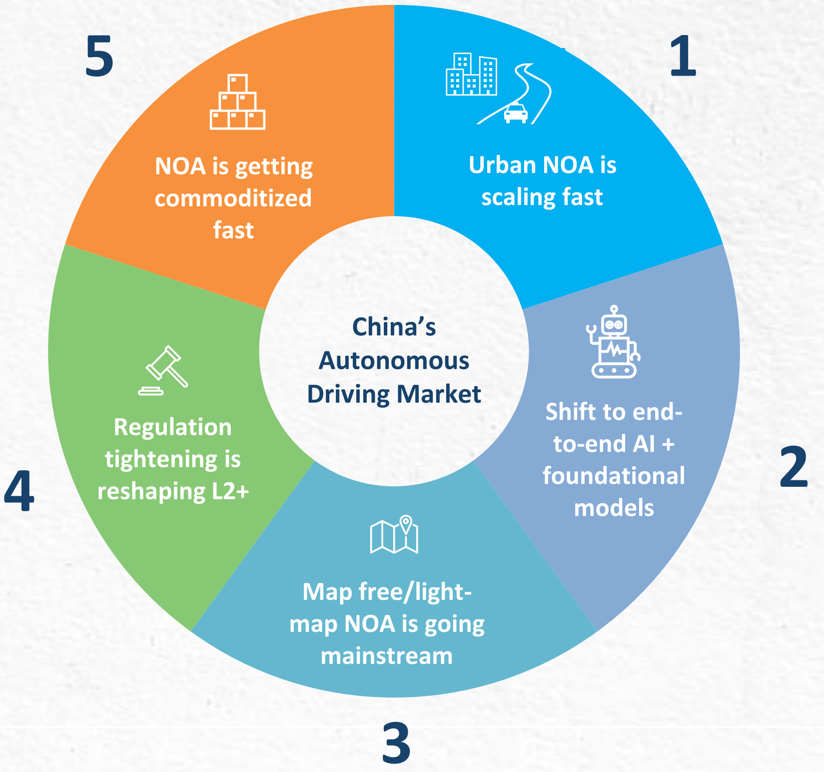
Source: Frost & Sullivan

GROWTH RESTRAINTS

Passenger Vehicle NOA Driving Market: Growth Restraints, China, 2026–2032

Restraints	1–2 Years	3–4 Years	5–7 Years
Regulatory tightening and approval uncertainty China is tightening regulations on NOA marketing claims, OTA updates, and driver responsibilities. Uncertainty in approvals slows feature rollouts, limits public beta testing, and raises compliance costs for OEMs, making rapid NOA expansion riskier, particularly in urban areas.	High	High	Medium
Cost pressure vs monetization limits Price competition is driving OEMs to bundle NOA with limited price uplift, restricting software monetization. Customer perception often equates L2 ADAS with NOA, reducing willingness to pay for advanced capabilities. Meanwhile, high software and validation costs continue to pressure margins despite declining hardware BOMs.	High	High	Medium
Safety incidents and consumer trust erosion Misuse of L2 and NOA systems can attract regulatory scrutiny and negative media coverage. Misunderstanding their limitations may lead to overreliance and stricter safeguards, eroding trust and reducing adoption, which ultimately hinders market growth despite available technical capabilities.	High	Medium	Medium
Urban complexity and long-tail scenario limits Chinese urban environments have dense traffic, scooters, pedestrians, and unpredictable behaviors. Long-tail edge cases are difficult to resolve consistently, hindering urban NOA reliability and delaying nationwide coverage.	Medium	High	Medium
Fragmented standards and ecosystem coordination gaps ADAS architectures, sensor configurations, and software stacks vary widely among OEMs, complicating integration and extending development timelines. This lack of unified standards hinders ecosystem efficiency and slows NOA deployment across the market.	Medium	Medium	Low

TOP TRENDS IN CHINA'S AUTONOMOUS DRIVING MARKET



BYD AUTONOMOUS DRIVING CAPABILITY

Model & Variant	Seagull	Dolphin	Qin Plus DM-i	Song Plus DM-i	Seal
Segment Type	Hatchback	Hatchback	Sedan	SUV	Sedan
Powertrain	BEV	BEV	PHEV	PHEV	BEV/PHEV
AD Driving Solution	God's Eye C (DiPilot 100)	God's Eye C	God's Eye C	God's Eye C	God's Eye C/B
HNOA	Yes	Yes	Yes	Yes	Yes
CNOA	-	-	-	-	-

BYD AUTONOMOUS DRIVING CAPABILITY (CONTINUED)

Model & Variant	Han	Tang	Denza N7	Denza N9	Yangwang U8	Fangchengbao Bao 5
Traffic Jam Pilot (TJP)	Yes	Yes	Yes	Yes	Yes	Yes
Auto Valet Parking (AVP)	Yes	Yes	Yes	Yes	Yes	Yes
Advanced LCC (Lane Centering Control)	Yes	Yes	Yes	Yes	Yes	Yes
Auto Lane Change (ALC)	Yes	Yes	Yes	Yes	Yes	-
Traffic Light Response (TLR)	Yes	Yes	Yes	Yes	Yes	-

- **Over 150,000 KMs of real-world NOA/autonomous validation testing completed across highway and urban scenarios**. Fleet learning scale reaches about 72 million KM/day via connected vehicle data for AI training.
- Tested and pilot-approved in Tier I regulatory zones, including Beijing, Shanghai, Shenzhen, Guangzhou, plus additional metro pilots. These cities function as supervised sandboxes for NOA validation and compliance trials.
- Highway NOA is commercially **deployed across 46 cities in early rollout phases**. Urban NOA expanded from 7 pilot cities toward nationwide map-free operational coverage on flagship platforms.

MOMENTA

Business Model	• It sells autonomous-driving software (ADAS, HD mapping, perception, planning, and end-to-end driving models) and engineering services to OEMs and fleets. It combines product sales for mass-production ADAS with R&D/Robotaxi deployments (a two-leg approach and a data-driven flywheel).
Ownership & HQ	• It is privately held with multiple strategic investors (past and current investors include General Motors, Mercedes-Benz, Toyota, IDG/VCs); headquartered in China (Beijing and Suzhou are cited locations).
Core Business Segment	• Its core is mass production ADAS and driver assistance platforms for OEMs; robotaxi/full-stack autonomy R&D; and fleet services, HD mapping and data services, and safety middleware (functional-safety certified components).
Key Models (Current & Future)	• Current: production ADAS stacks integrated into multiple OEM models (Momenta supplies software to >40 production models per industry reporting) • Near-future: flywheel big models/reinforcement learning-based stacks (Momenta’s flywheel model family/R6 and end-to-end models) targeted at higher autonomy and mass production robotaxi platforms
Global Presence	• It has a strong Chinese footprint via partnerships with major OEMs (such as SAIC, BYD, GAC/Toyota programs) and investor ties (GM, Mercedes). It is expanding internationally—robotaxi testing and collaborations announced for Europe (e.g., planned tests with Uber in Munich) and partnerships/investments in Southeast Asia (Grab).

Growth Opportunities in the Chinese Passenger Vehicle NOA Market, 2025–2032

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Appendix

How does your organization identify and prioritize Growth Opportunities?

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