ESCAP
Economic and Social Commission for Asia and the Pacific

Research Report on China's Autonomous Driving

Policy System and Commercialization Pathways

Presented by Prof. Chengliang Yin

Shanghai Jiao Tong University

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Prof. Chengliang Yin



Yin Chengliang, Professor at the School of Mechanical Engineering of Shanghai Jiao Tong University

Serving as the Executive Director of the China Society of Automotive Engineers, a member of the Program Committee of the **EVS International Electric Vehicle Annual Conference**, Vice Chairman of the China Association of Automotive Motor and Electronics Industry, and Expert Leader of the "Industrial Strong Foundation" in the field of intelligent connected new energy vehicles in Shanghai; **Expert reviewer from the Ministry of Science and Technology, Ministry of Industry and Information Technology, and Ministry of Human Resources**.

As a consultant for the automotive industry of relevant government departments in Shanghai, he led the development of the entire Shanghai intelligent connected new energy vehicle industry plan. Received the **2024 Shanghai Technology Invention First Prize**.

Introduction of the keynote speaker

Mr. Mohan YIN
Strategic Development Manager and Assistant to Prof. Chengliang Yin

Application for the autonomous driving "full travel chain" innovation pilot demonstration project, which passes the evaluation of Ministry of transport of China and the team leads the pilot project and operate intelligent and connected vehicle testing and demonstration zone in Fengxian District, Shanghai, China

Assistant to Professor Chengliang Yin in terms of the consulting services to United Nations ESCAP.



Hereby is the declaration that this document is just for team research results, which cannot represent the government and official opinions.

Agenda

01 Overview of Development

02 Governance & Policy Framework

03 Testing & Demonstration Cases

04 Commercialization Pathways

01. Rapid Development

China has developed one of the world’ s largest AV testing and commercial fleets, underpinned by a broad, dynamic ecosystem of tech innovators, automakers, and research hubs driving rapid iteration.

02. Innovative Governance

A "central-led, local pilot" model fosters innovation through real-world experimentation in designated zones, while effectively managing safety risks and ensuring regulatory alignment.

03. Evolving Legal Framework

The legal system is maturing from pioneering local legislation to unified national standards, clarifying rules for testing, road access, and liability to support industry growth.

04. Phased Commercialization Path

Progressing through three key stages: ① Technology Demonstration (validating core tech), ② Commercial Pilot (limited operational trials), and ③ Scalable Operation (large-scale deployment). This phased approach supports gradual market development while allowing regulatory and safety frameworks to evolve.

05. Global Standard Participant Role

China is actively shaping international AV standards by integrating its unique operational data and urban mobility insights into the participation of global rule-making, bridging domestic innovation with global best practices for a safer future.

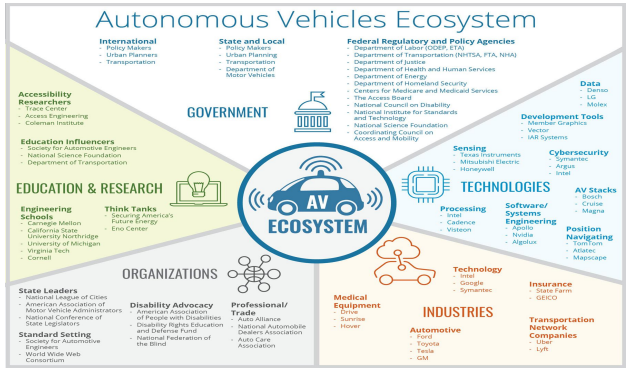
Key Takeaway: China is also actively participating in international AV standard-setting and regulatory discussions.

01

Overview of China's Autonomous Driving Development

Advantages, Market Scale, and Key Players







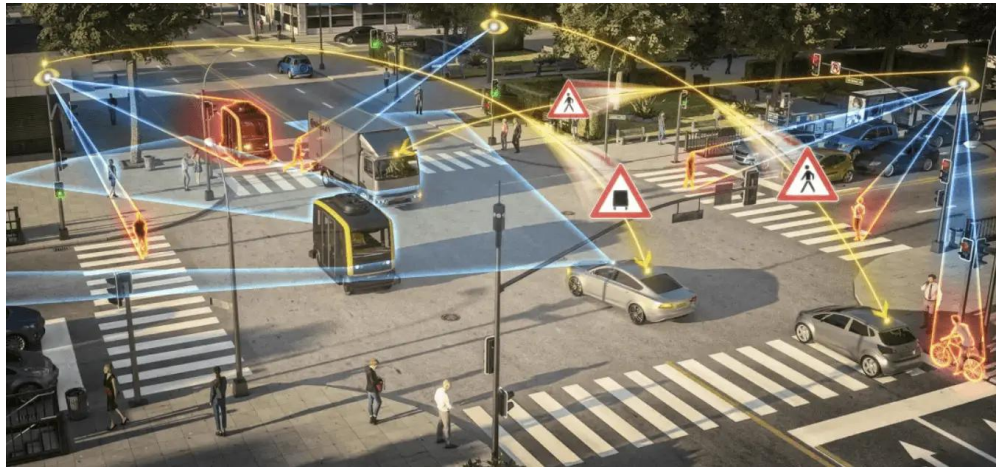
I. Large-scale testing and deployment

II. Diverse applications and industry ecosystem

III. Strong interaction between policy, local pilots and technological development

Parellel Technological Path





Single Vehicle Intelligence

The conception is led by the OEM, which is solely and logically self-consistent, without large-scale connected networks within the the auto industry chain. A single vehicle completes the closed-loop of autonomous driving. The intelligence of cars is the core.

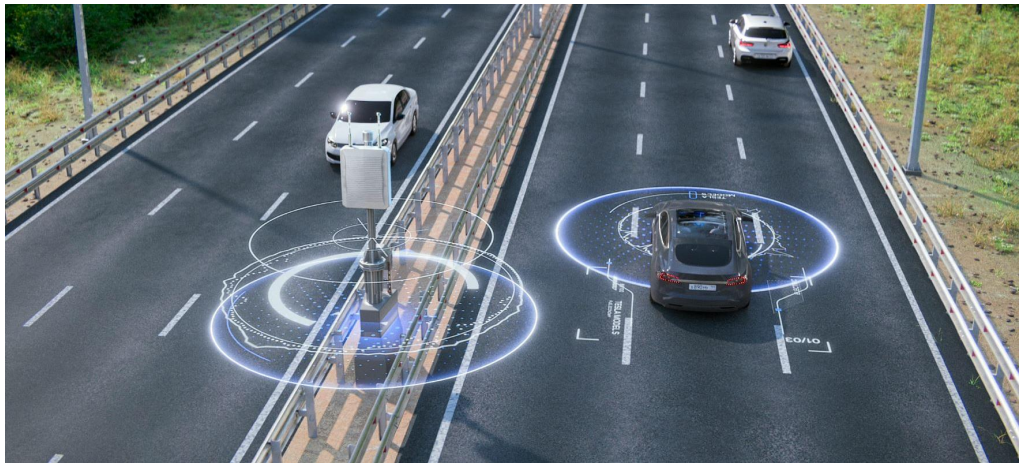
Vehicle-Road-Network-Cloud Integration

A car is just a node in the network. Large-scale urban transportation, traffic participant events, and other factors work together to build a massive network for collaborative development, which is a totally different route from single vehicle intelligence.

Feature of Chinese demonstration zone

Emphasizing on the diversification of technology and coordination across multiple fields, while also highlighting the strengthening of safety coordination and systematic scheduling and collaboration, to make the entire transportation system safer.

China's Autonomous Driving Market



Unprecedented Scale

Home to the world’ s largest AV fleets, spanning robotaxis, autonomous buses, and logistics trucks across diverse urban and highway scenarios.

Global Innovation Participants

Pioneered by Technology developers, OEMs, Robotaxi / mobility operators

Policy-Backed Ecosystem

Expanding open-road pilot zones, proactive regulatory frameworks, and smart city infrastructure investments fuel growth.

~3,000 Road Test Licenses

Issued nationwide by end-2025, enabling the deployment of large-scale testing fleets in over 50 cities.

200M+ Kilometers Tested

Cumulative autonomous driving test mileage, validating system robustness in complex real-world conditions.

Key Players in China's AV Landscape



Enterprise 01

Data-driven: the entire process is data-driven algorithms, which can achieve low-cost, high-speed system iteration.
massive data: Realize low-cost massive production data reflux through mass production cooperation and implementation.
Closed-loop automation: Efficient automated iterative toolchain for low-cost processing of massive data



Enterprise 02

Feature 1: Optimize vehicle dynamic performance (such as suspension, steering, and braking coordination) through its body motion collaborative control system.
Feature 2: Provides intelligent car cloud services, supporting functions such as data storage, remote diagnosis, OTA upgrades, etc.
Feature 3: As an intelligent cockpit module, it focuses on interactive experience (such as seven screen interconnection and seamless flow of multiple devices).



Enterprise 03

AI big model: Completed mass production of the 4nm car standard chip, upgraded the global intelligent architecture.
Large on-board data flywheel: with a daily average of 200 million kilometers of real road conditions.
Industry's first: city leading full safety guarantee policy.

02 Governance Framework and Policy System:

National Strategic Direction + Local Experimentation + Market Innovation

01. Central-Local Synergy



02. Legal & Institutional Innovation

Overview of China's Special Economic Zone Classifications

Type	Full Name	Representative Examples	Start	Focus
SEZ	Special Economic Zone	Shenzhen, Zhuhai, Xiamen, Suzhou	1979	FDI, Factories, Outsourcing
ETDZ	Economic & Technical Development Zone	Pearl, Yangtze, Min River Deltas	1984	Industrial Parks, Assembly, Finishing
HIDZ	High-Tech Industrial Development Zone	ZhongGuanCun, Nanjing, Tianjin	1988	Technology Transfer, R&D, Trade
FTZ	Free Trade Zone	Shanghai, Tianjin, Hainan	1990	Streamlined Shipping, Trade, FOREX
EPZ	Export Processing Zones	Kunshan, Jinqiao, Wenzhou	2000	Export Processing, Bonded Warehouses
FTP	Free Trade Port	Hainan	2020	HK, SP style International Trade & Finance Hub

For more information see: http://www.beltandroadadvisory.com

03. National Standards System



National direction→ Local experimentation→ Operational experience→
National standards / regulatory refinement→ Further local implementation
This integrated Governance Framework and Policy system acts as the backbone,
ensuring that strategic goals are transferred into tangible actions from the national to the local level.

The "Central-Led, Local Pilot" Governance Model

01. Central Strategic Guidance

The central government sets national strategies (e.g., "New Energy Vehicle Industry Plan") and coordinates policies through inter-ministerial conferences to ensure alignment with national development goals.

02. Local Real-World Pilots

Local authorities establish pilot zones (e.g., Beijing, Shanghai) to test innovative regulations and business models. Solutions are tailored to regional conditions, acting as real-world testing grounds.

03. Adaptive Feedback Loop

Data and successful practices from local pilots inform national legislation and standards. This iterative process mitigates risks, avoiding premature nationwide rollouts and ensuring robust policy design.

A dynamic ecosystem that combines centralized direction with decentralized innovation, enabling China to adapt policies efficiently to evolving realities.

Gradual Breakthroughs in Laws and Regulations







01 Local "Testing Grounds"

Shenzhen implements "comprehensive legislation" to clarify market entry rules and accident liability. Shanghai Pudong pioneers the "authorized pilot" model domestically, legally permitting driverless commercial robotaxi operations on public roads.

02 Regional Coordination

The Yangtze River Delta (YRD) region breaks down administrative barriers, achieving mutual recognition of autonomous vehicle test licenses and cross-provincial data sharing, creating a unified large-scale test environment.

03 National Legal Basis

Revisions to the "Road Traffic Safety Law" provide a preliminary national legal framework, standardizing the definition of autonomous driving and clarifying liability allocation principles, laying the groundwork for nationwide commercialization.

Evolution of China's AV Ecosystem

01. Electrification of Fleets

Aligns with national carbon neutrality goals and capitalizes on the mature EV industry chain, significantly reducing carbon footprints and long-term operational costs.

02. Hybrid Operation Models

Combines proprietary technology platforms with seamless integration into third-party Mobility-as-a-Service (MaaS) ecosystems to create a flexible, user-centric mobility network.

03. OEM Partnership Strategies

Co-develops customized autonomous vehicle models with traditional automakers, striking a balance between rapid technological innovation and cost-effectiveness for scalability.

04. Geographical Expansion

Gradually extends coverage from saturated first-tier cities to high-potential second/third-tier cities and international markets, unlocking new growth frontiers.

Change of Autonomous Driving Vehicle Testing and Demonstration Implementation Method amendment sugegestions Compared to the Year 2021

comparison categories	2021 version	2026 amendment suggestions
Business Chain	Testing, demonstration application, demonstration operation	Four- stage complete closed- loop: Testing → Demonstration Application → Demonstration Operation → Commercial Operation, with clear access conditions for commercialization
Regulatory Principles	No explicit classification and grading, focus on L3/L4	Classified and graded regulation, with differentiated access criteria set respectively for L2, L3 and L4
Change Management	One- size- fits- all review principle for changes	Distinguish review for major changes and filing for general changes; add rules for self- declaration extension
Cross- regional Mutual Recognition	Stated only in principle	implified application for out- of- region qualifications and national pilot vehicles with exemption from certain test items
Remote Safety Operators	Principle of 1:1 ratio, no lower- limit relaxation or response time limit	Ratio relaxation down to minimum 1:3 is permissible upon application; on- site response within 2- hours upon fault occurrence
Data Management	Embedded provisions without data- driven assessment	Separate appendix; submission of safety incident lists; phased assessment based on real- world road test data

Standardization & Market Access



Lab Insight: The intelligent driving remote cloud Control lab serves as a key validation hub, ensuring technologies comply with both national standards and international benchmarks before market entry.

01. Evolution: From Local Pilots to National Standards

A tiered development path: Starting with localized testing management in pilot zones, forming industry-wide technical consensus, and finally being consolidated into a unified national framework by authorities like SAC for nationwide adoption.

02. Global Synergy & Scenario Contribution

Aligns with SAE J3016 and ISO core definitions while actively shaping global rules in UN WP.29. It integrates unique Chinese scenarios—such as complex urban traffic and NEV ecosystems—into international standards.

03. Tiered Market Access Mechanism

L3:Regulated by national product certification (MIIT) for mass production and road legality.
L4:Managed via a "local pilot + supervision" model, focusing on safe, controlled commercial operation in designated areas.

03

Testing, Verification, and Demonstration

Case Studies from Beijing, Shanghai and Wuhan

Beijing • Infrastructure



Shanghai • Locally be authorized



Wuhan • IoT & Industry



Case Studies: Beijing, Shanghai and Wuhan



Beijing – Systematic Testing and Validation

Simulation → Closed-Site Testing → Open-Road Testing



Shanghai - Regional Coordination and Interoperability

- Earliest testing demonstration zone
- Established by MIIT and the Shanghai Municipal Government
- Earliest to issue local autonomous driving testing and management measures.



Wuhan - Driverless Commercial Operation

- Focused on large-scale commercial operation of fully driverless AVs.
- Pioneered a governance model with third-party supervision and graded licensing in China.

04 Commercialization Pathways: From Demonstration to Scalable Operation

01. Demonstration Phase

Validate technical feasibility and operational models via local pilot projects. Gather field experience, refine region-tailored solutions, and proactively spot potential bottlenecks.

Core Goal: Proof of Concept & Iteration

02. Scalable Expansion

Shift from standalone projects to standardized modular deployment. Use scale effects to cut construction and O&M costs, replicating proven solutions across provinces and wider markets.

Core Goal: Standardization & Cost Efficiency

03. Commercial Viability

Reduce costs and boost efficiency for mobility and logistics;
Improve traffic safety and inclusive mobility;
Shifting auto industry from hardware sales to mobility services.

Core Goal: Diversified Revenue & Profit

Strategic Insight:China’ s pathway moves beyond government subsidies to market-driven sustainability, ensuring clean energy transitions are both environmentally impactful and economically self-sustaining.

Three Phases of Commercialization



Autonomous truck platooning on the Beijing-Xiong’ an Expressway demonstrates the real-world feasibility of self-driving logistics, a key milestone in transitioning from demonstration to commercialization.

01. Demonstration Operation (2016-2020)

The first national demonstration zone was established in Jiading, Shanghai in 2016 with the approval of the Ministry of Industry and Information Technology. In 2017, Beijing followed closely behind, and since then from 2018-2020, four provinces and regions (Shanghai, Beijing, Zhejiang, etc.) have evolved nationwide.

02. Commercial Pilot (2021-2025)

China promote to 20 pilot cities across the country. But the progress varies in different regions, and early demonstration operations have been promoted towards commercialization. However, Hubei and Inner Mongolia Autonomous Region are still in the demonstration stage.

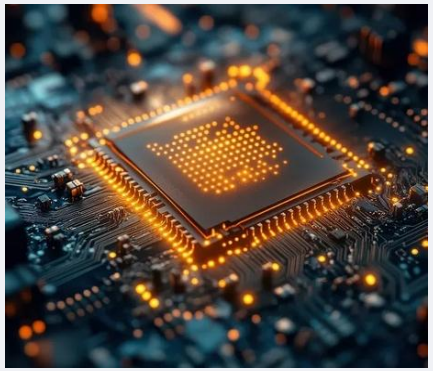
03. Scalable Operation (2026 Onwards)

Objective: Achieve full commercial application across regions and scenarios. Market Potential: Projected market size exceeds ¥2.5 Trillion, with L3+ autonomous features achieving over 20% penetration in new vehicle sales.

Different cities and use cases are progressing at different speeds.

Remaining Challenges

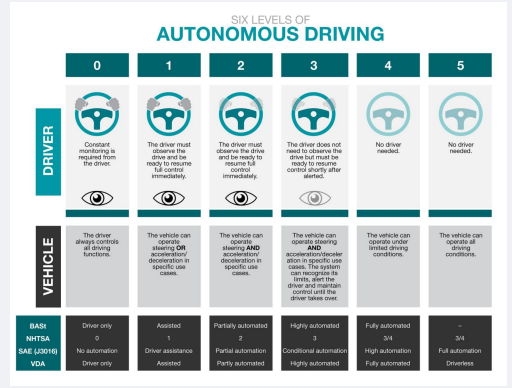
1. Insufficient maturity of automotive-grade software supply chain



2. The volume of algorithm edge-case processing has not matched with high requirement of complex and diverse domestic traffic scenarios



3. Incomplete unified national standards, testing specifications and liability-division rules for large-scale commercial roll-out



4. High costs of sensors, testing and data operation constrain mass-market commercialization



5. Uncertain cross-border compliance barriers for overseas promotion of domestic autonomous-driving solutions



Lessons and Implications

01. Unique Development Model

A distinctive "central-local" governance structure paired with parallel technological pathways creates a flexible and robust innovation environment, blending top-down guidance with bottom-up initiative.

02. Commercialization Momentum

Shifting from experimental demonstrations to large-scale deployment across diverse scenarios (e.g., robo-taxis, logistics). This transition unlocks significant economic value and operational efficiency.

03. Global Standard-Setting Role

Actively contributing to the formulation of international autonomous vehicle regulations and norms, bridging domestic innovation with global frameworks to ensure interoperability and safety.

04. Strategic Priorities Ahead

Key focus areas include refining national legal and regulatory frameworks, optimizing cross-provincial collaborative governance, and expanding pilot programs to more cities for inclusive growth.

“The convergence of policy, technology, and global collaboration will solidify China's position as a crucial player devoted to the global autonomous driving revolution.”

Thank you !!

Q & A



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