

China L2 Autonomous Driving Market Report, 2020

Jan.2021

STUDY GOAL AND OBJECTIVES

This report provides the industry executives with strategically significant competitor information, analysis, insight and projection on the competitive pattern and key companies in the industry, crucial to the development and implementation of effective business, marketing and R&D programs.

REPORT OBJECTIVES

- ◆ To establish a comprehensive, factual, annually updated and cost-effective information base on market size, competition patterns, market segments, goals and strategies of the leading players in the market, reviews and forecasts.
- ◆ To assist potential market entrants in evaluating prospective acquisition and joint venture candidates.
- ◆ To complement the organizations' internal competitor information gathering efforts with strategic analysis, data interpretation and insight.
- ◆ To suggest for concerned investors in line with the current development of this industry as well as the development tendency.
- ◆ To help company to succeed in a competitive market, and

METHODOLOGY

Both primary and secondary research methodologies were used in preparing this study. Initially, a comprehensive and exhaustive search of the literature on this industry was conducted. These sources included related books and journals, trade literature, marketing literature, other product/promotional literature, annual reports, security analyst reports, and other publications.

Subsequently, telephone interviews or email correspondence was conducted with marketing executives etc. Other sources included related magazines, academics, and consulting companies.

INFORMATION SOURCES

The primary information sources include Company Reports, and National Bureau of Statistics of China etc.

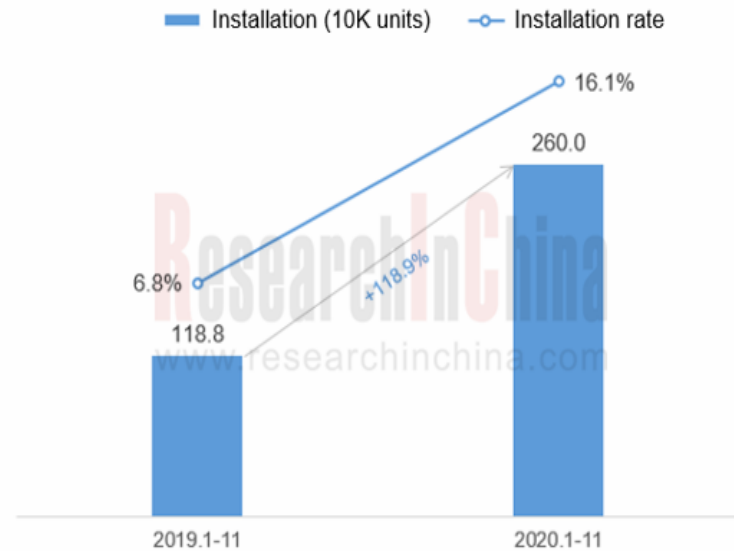
Abstract

Driven by market demand and policies, passenger cars equipped with L2 assisted driving functions have been mass-produced, which triggers enthusiastic market response and robust demand.

1. Installations of L2 autonomous driving functions increased by 118.9% year-on-year

In 2020, the automobile market was affected by the economic downturn and COVID-19. From January to November 2020, the number of passenger cars insured in China was 16.136 million, a year-on-year decrease of 7.5%. Among them, there were 2.60 million ones equipped with L2 autonomous driving functions, a year-on-year spike of 118.9%; the installation rate jumped 9.3 percentage points year-on-year to 16.1%. Plus multiple negative factors, installations of L2 autonomous driving functions bucked the trend to grow, with strong market demand.

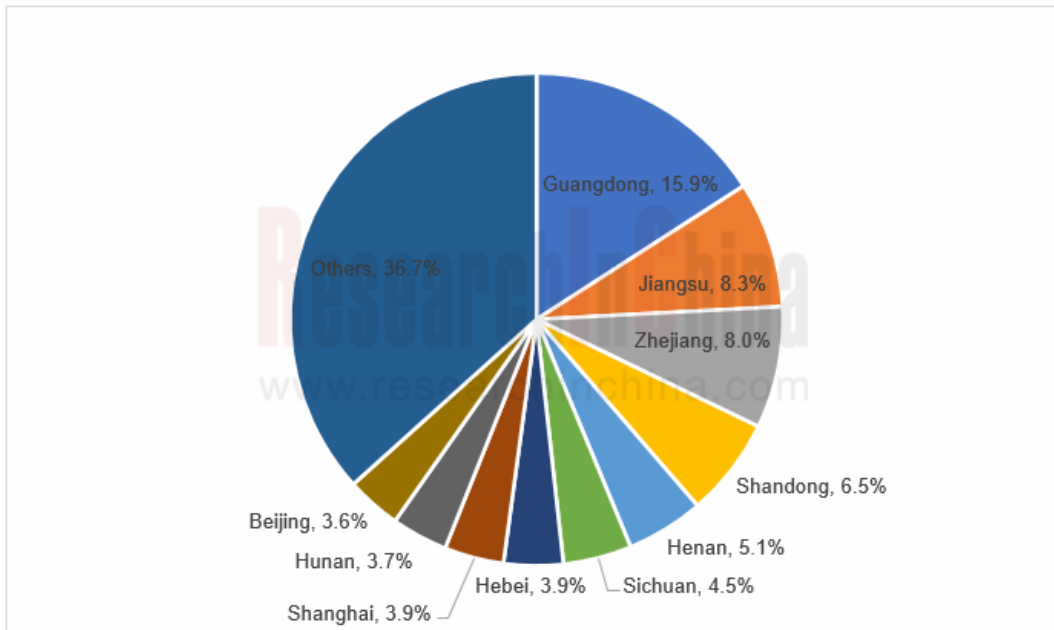
Installation and Installation Rate of L2 Models in China, 2019-2020(Nov.)



Source: ResearchInChina

In terms of regions, models equipped with L2 autonomous driving functions are mainly sold to economically developed regions such as Guangdong, Jiangsu and Zhejiang. Among them, installations in Guangdong accounted for 15.9%, much higher than other provinces.

Installation Distribution of Passenger Car Equipped with L2 Functions by Province/Municipality in China, 2020 (Jan.-Nov.)



Source: ResearchInChina

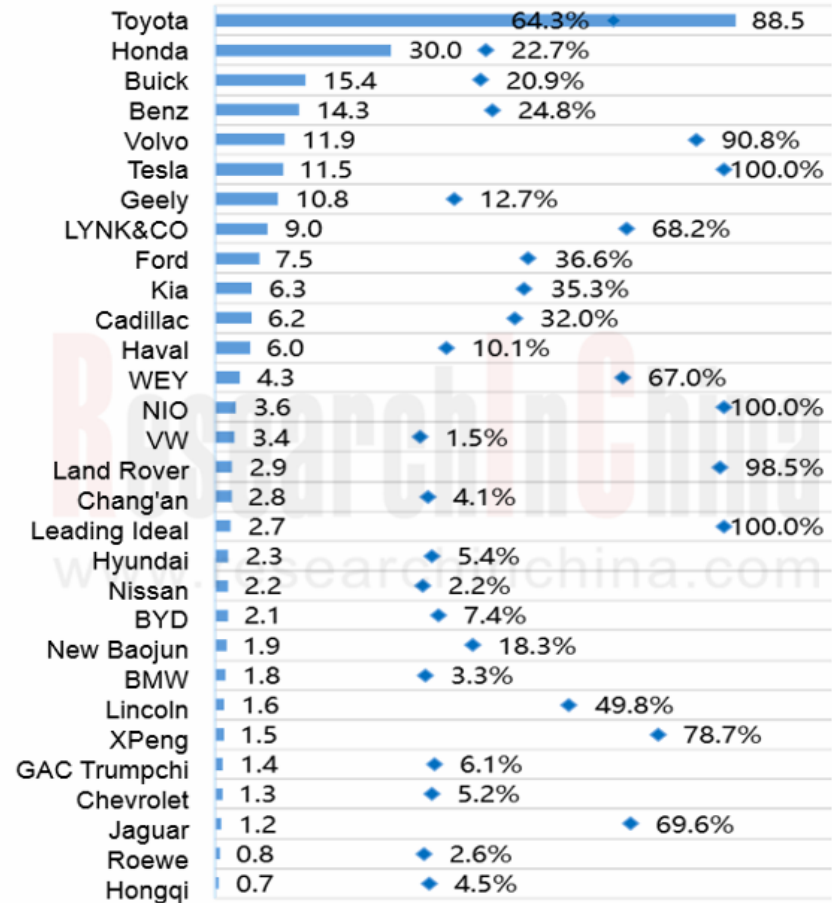
2. Emerging brands such as Tesla, NIO and Lixiang are more aggressive, with the L2 installation rate reaching 100%

From January to November 2020, a total of 57 passenger car brands (including 32 independent brands and 25 joint venture brands) in China launched L2 autonomous driving functions. Among them, 28 brands (including 11 independent brands and 17 joint venture brands) installed the functions on more than 10,000 cars.

From the perspective of installations, Toyota tops among the industry with 885,000 cars equipped with L2 autonomous driving functions. Its Toyota Safety Sense system has been installed on popular models such as Corolla, Levin, RAV4, AVALON, etc. to feature lane tracking assist (LTA), which can follow the preceding vehicle, provide some necessary steering operations, and keep the vehicle in the center of the lane when the lane line is difficult to identify in traffic jams, or follow the trajectory of the preceding vehicle at low speed.

Top 30 Brands by L2 Installations and Installation Rate in China, 2020 (Jan.-Nov.)

As for installation rate, emerging automakers represented by Tesla, NIO and Lixiang adopt advanced electronic and electrical architectures to enable vehicles to achieve L2 or L2+ assisted driving functions through OTA upgrades, and further develop toward intelligence.



Unit: 10K units

Source: ResearchInChina

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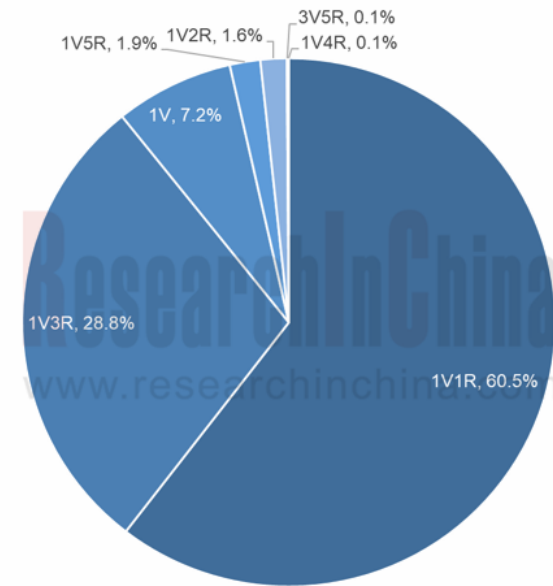
The current L2 autonomous driving functions are mainly divided into two categories: autonomous driving in a single lane, such as integrated adaptive cruise (ICA), traffic jam assist (TJA); autonomous driving that supports commanded lane changes, such as highway assist (HWA).

3. 1V1R is the mainstream sensor configuration solution

At present, the mainstream solutions of L2 autonomous driving include 1V1R (a camera + a forward radar) and 1V3R (a camera + a forward radar + 2 rear angle radar), which seize the combined market share of 89.3%; however, 1V1R enjoys the lion's share of 60.5%.

Given roadmaps or cost control, some automakers realize L2 autonomous driving through a single vision solution (1V). Some other manufacturers use 1V5R, 1V2R, 1V4R, 3V4R and the like to explore solutions and functions.

L2 Autonomous Driving Sensor Configuration Solutions and Their Proportion, 2020 (Jan.-Nov.)



Source: ResearchInChina

For example, NIO ES6 adopts the 3V4R solution

The 2020 NIO ES6 adopts a trinocular camera, 2 front-angle radars, 2 rear-angle radars, and a Mobileye chip to achieve Navigation on Pilot (NOP), Highway Pilot, and Traffic Jam Pilot (TJP), Auto-Lange Change (ALC) and many other L2 autonomous driving functions, and upgrade functions through OTA.

The trinocular camera used by NIO ES6 has wider field of view and higher accuracy than a monocular camera. The 52-degree camera detects general road conditions, the 28-degree camera detects long-distance targets and traffic lights, and the 150-degree camera detects the sides of the car body and cutting-in vehicles in short distance, with better front recognition performance.

In addition, ES6's NOP is based on the basic pilot functions, so that it can automatically switch high-speed lanes, enter or exit ramps according to navigation, and can intelligently adjust the cruising speed on the current road. Based on the realization of pilot lane keeping, ALC enables the automatic lane change of the vehicle by turning the turn signal lever.

4. L2 autonomous driving based on HD map is expected to prevail

With centimeter-level accuracy and rich road information, HD map has become an indispensable element of L3-L5 autonomous driving. But with the deepening of L2 autonomous driving, HD map is expected to find a new scenario.

Some top automakers have tried to apply HD map to L2 autonomous driving:

Tesla, NIO, Xpeng and other emerging automakers have launched L2+ highway cruise based on navigation/HD map, and enabled autonomous driving on highways through navigation path planning.

In July 2020, SAIC-GM Cadillac CT6 equipped with the Super Cruise driver-assistance feature officially debuted. With HD map, Super Cruise can control vehicles on highways and keep them within lanes.

Representative L2 Autonomous Models, Hardware Solutions and Functions Achieved (partial)

Brand	Model	Hardware Configuration							L2 Functions
		Front-view camera	Surround-view camera	Forward radar	Backward radar	Front angle radar	Rear angle radar	HD map	
LYNK&CO	LYNK01	Monocular	4	1	--	--	2	--	HWA, TJA, ACCQA
WEY	WEY VV7 technology version	Monocular	4	1	--	--	2	ADAS map (optional)	ICA, TJA, Intelligent dodge system, IACC, single-lane intelligent driving system(optional)
Chang'an	UNI-T	Monocular	4	1	--	2	2	--	IACC (automatic deceleration in corners)
AION	Aion LX	Monocular	4	1	--	2	2	Baidu (Optional)	ICA, TJA, HWA, HF (optional)
BYD	Han EV	Monocular	4	1	--	--	2	--	ICC, ICA, TJA, CSC
FAW Toyota	Corolla	Monocular	--	1	--	--	--	--	LTA (with following function)
GAC Honda	Accord	Monocular	4	1	--	--	2	--	ACC (with LSF function)
Volvo	S60	Monocular	4	1	--	--	2	--	Pilot Assist
Cadillac	CT6	Monocular	4	1	--	2	2	✓AMAP	Super Cruise, Blueline LKA
Ford	Mondeo	Monocular	4	1	--	--	2	--	LC
Benz	E class	Binocular	4	1	--	2	2	--	Intelligent pilot distance limit, intelligent pilot steering, intelligent pilot distance limit with intelligent pilot steering
Tesla	Model 3	Trinocular	4	1	--	--	--	--	NOA, automatic assisted steering, automatic assisted lane change
NIO	ES6	Trinocular	4	--	--	2	2	✓ Baidu	Pilot, NOP, HA, TJA, lane change by turn signal
XPeng	XPeng P7	Trinocular	4	1	--	2	2	✓ AMAP	NGP, ATC, ALC

Source: ResearchInChina

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Map suppliers have also introduced corresponding solutions.

Baidu released ANP, a high-level intelligent driving solution based on HD map

In December 2020, Baidu released ANP (Apollo Navigation Pilot), a high-level intelligent driving solution based on HD map.

ANP is a low-level Apollo Lite which is Baidu's L4 autonomous driving solution. Equipped with the HD map tailored by Baidu for autonomous vehicles, ANP not only supports highways and city loops, but also fits for urban roads. Through CVIS, the driving experience is close to the L4 Robotaxi.

NavInfo launched LitePilot, an HD map product for L2+ autonomous driving

NavInfo has launched HD map for L2+, L3, and L4-5 respectively. LitePilot, an HD map product for L2+ autonomous driving scenarios, can help vehicles drive through ramps, roundabouts and intersections, as well as prepare to turn right.

NavInfo HD map products for different scenarios:

Map data
HD Ultimate (L4/Robotaxi oriented)
Urban road L4 all elements
Boutique city center
HD Pro (L3 self-driving oriented)
National Highway
HD Lite™ (L2+ assistant driving oriented)
National highway and core cities
Lightweight elements

Focusing on L2+ autonomous driving, HD Lite is currently the main product of NavInfo. Compared with HD Pro, HD Lite has fewer map elements, but it can provide autonomous driving map services with lower cost, wider area coverage and higher update frequency, enable highway and city map services, and accelerate the implementation of L2+ autonomous driving technology.

Under the background that L3 autonomous driving features have not been mass-produced, OEMs, integrators, map vendors and other industry chain companies will strive to maximize the capability of L2 autonomous driving and move closer to L3. HD map is expected to find new market space herein.

1. L2 ADAS Market Overview

- 1.1 Definition of L2 Autonomous Driving
- 1.2 Function of L2 Autonomous Driving
- 1.3 Policy Environment
- 1.4 Development Trends and Impetus

2. L2 ADAS Market in China (2019-2025)

- 2.1 Installation of L2 Models
- 2.2 Brand Structure of L2 Models
- 2.3 Major L2 Models
- 2.4 Price of L2 Models
- 2.5 Installation of L2 Models by Province
- 2.6 Price Structure of Newly-launched L2 Models
- 2.7 Brands of Newly-launched L2 Models in 2020

3. L2 Mainstream Functions and Solutions in China

- 3.1 Sensor Configuration Solution
- 3.2 Comparison of L2 Solutions of Independent Brands
- 3.3 Comparison of L2 Solutions of JV Brands
- 3.4 Comparison of L2 Solutions of Emerging Brands

4. L2 Function Research of Major Brands

- 4.1 Geely (Geely, Geometry, LYNK&CO)
- 4.1 Installation, Installation Rate and Supporting Models of L2 Functions

- 4.1 L2 Functions and Suppliers
- 4.2 GreatWall (HAVAL, WEY)
- 4.2 Installation, Installation Rate and Supporting Models of L2 Functions
- 4.2 L2 Functions and Suppliers
- 4.3 Chang'an
- 4.4 New Baojun
- 4.5 GAC (Aion, Trumpchi)
- 4.6 BYD (BYD, DENZA)
- 4.7 FAW (Hongqi, Besturn)
- 4.8 SAIC (Rowe, MG)
- 4.9 Toyota (GAC Toyota, FAW Toyota)
- 4.10 Honda (GAC Honda, Dongfeng Honda)
- 4.11 Buick
- 4.12 Benz
- 4.13 Volvo
- 4.14 Ford (JMC FORD, Chang'an Ford)
- 4.15 KIA
- 4.16 Cadillac
- 4.17 VW (FAW VW, SAIC VW)
- 4.18 Tesla
- 4.19 NIO
- 4.20 XPeng

5. Solution Suppliers

- 5.1 Tier 1 L2 Autonomous Driving Development Planning
- 5.2 Bosch L2 Solution, Functions and Customers
- 5.3 Continental L2 Solution, Functions and Customers
- 5.4 ZF L2 Solution, Functions and Customers
- 5.5 Valeo L2 Solution, Functions and Customers
- 5.6 Aptiv L2 Solution, Functions and Customers
- 5.7 Veoneer L2 Solution, Functions and Customers
- 5.8 HiRain L2 Solution, Functions and Customers
- 5.9 Freetech L2 Solution, Functions and Customers
- 5.10 Baidu L2 Autonomous Driving
- 5.11 Desay SV L2 Autonomous Driving

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