

**Automotive OTA Research Report,  
2019-2020**

**June 2020**

## 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

**Automotive OTA Research: 3.838 Million Passenger Cars Packed OTA Capability in China in 2019, Soaring by 60.6% Year on Year**

Against all odds, controversial Tesla and NIO were eventually out of the woods. What they live on is FOTA (Firmware-over-the-air). Upgrading software and hardware provides new experience for car owners, making them more satisfied and very loyal.

## Upgrade Course of NIO, 2019-2020

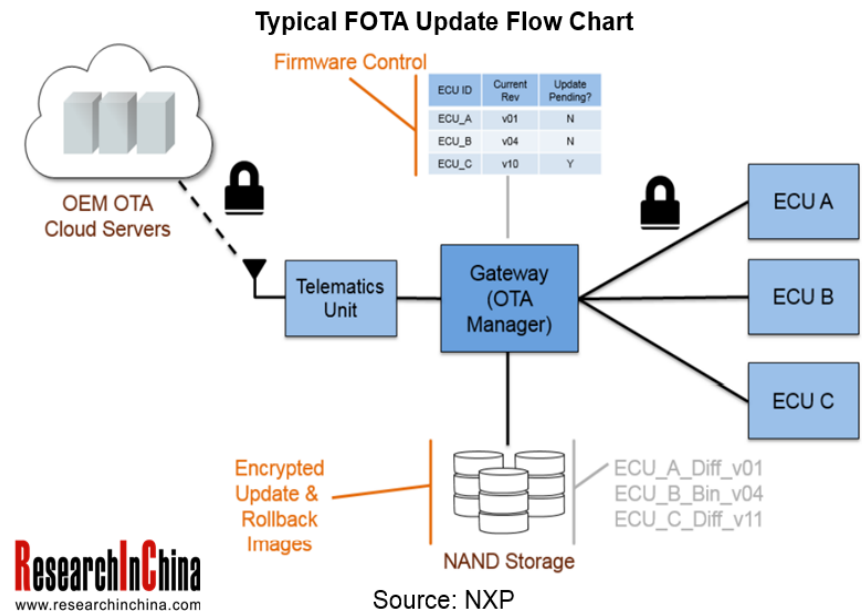
Time	Version	OTA Updates
Early Jan 2019	1.2.0	System basic upgrade, QQ Music lossless audio, interface/function upgrade, addition of power battery preheating system, open automatic emergency braking capability, NOMI capability upgrade
Mid Mar 2019	1.2.1	Addition of Baidu Map, NOMI Halo upgrade
Late Mar 2019	1.2.2	Addition of Bluetooth real-time information (RTI) option; door handle logic upgrade; anti-theft mode operating logic upgrade; turn signal lamp operating logic upgrade
Mid Apr 2019	1.2.3	Addition of adaptive cruise control (ACC)
Late May 2019	1.3.0	Addition of front row easy access capability, multi-account switch and driving record capability, and charging logic upgrade
Mid Jun 2019	2.0.0	Open main capabilities of NIO Pilot, enable all-new user interface
Late Jul 2019	2.1.0	Open automatic parking assist (S-APA), ACC/Pilot functional integration & energy recovery
Late Aug 2019	2.2.0	Open automatic rear wiper capability; vehicle kinetic energy recovery upgrade in full charge state
Late Oct 2019	2.3.0	Driving assistance simulation display system upgrade, gearshift prompt tone upgrade, power saving mode upgrade, driving recorder video memory expansion, narrow channel automatic activation, charge upper limit settings upgrade
Mid Dec 2019	2.4.0	Addition of driver's seat memory capability and snow mode, availability of manual shutoff of daytime running lights
Mid Feb 2020	2.5.0	Enhanced automatic emergency braking capability, addition of pedestrian and cyclist detection capability; addition of overtaking assist, remote heating of seat/steering wheel
Apr 2020	2.6.1	Addition of suspension easy access, chassis & suspension driving quality upgrade, addition of NFC card key, NOMI experience upgrade, and the experience upgrade and problem fixing for other features

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Even nowadays, few vehicle models enable FOTA, really a hard nut to crack.

OEM	FOTA-enabled Models
Tesla	Model S/X/3
NIO	ES8/ES6
Xpeng	G3/P7
Leading Ideal	Leading Ideal ONE
Weltmeister	WM EX5
BYD	Qin Pro
Cadillac	CT5
Buick	GL8
BMW	3 Series, 8 Series, X5, X7, Z4, etc.
Ford	Mustang MachE
VW	VW ID.3

Considering safety and FOTA challenges, traditional automakers mostly choose to tap into vehicle system SOTA (Software-over-the-air) and act prudently in FOTA promotion. Through the lens of a typical FOTA flow, realizing FOTA needs E/E architecture disruption, and the support of new technologies like automotive Ethernet, cyber security, intelligent gateway, great computing power, and large memory.



Conventional OEMs have made slow progress in FOTA development over the past several years. Yet they took a big step forward in 2019. It can be seen from the table below that there is a gap between main OEMs and Tesla. Success of Tesla Model 3 weighs so heavily on traditional automakers that they are highly endangered except sweating for rapid transformation.

OEM	Launch Time of OTA	OTA-enabled Models	Power System Domain	Cockpit & Entertainment Domain	Body Electronics Domain	Chassis Domain	Intelligent Driving Domain
<b>Tesla</b>	2012	All models	√	√	√	√	√
<b>BMW</b>	2018	3 Series, 8 Series, X5, X7, etc.		√	√		√
<b>GM</b>	2020	Cadillac CT5, Buick GL8	√	√	√	√	√
<b>Ford</b>	2017	Mach-E (not available yet)		√	√		√
<b>Toyota</b>	2016	Lexus (2020)		√	√		√
<b>Honda</b>	2017	ICE models e.g., Accord and Odyssey		√			√
<b>Hyundai</b>	-	Multiple models		√			
<b>Audi</b>	-	Multiple models		√			
<b>Mercedes-Benz</b>	-	Multiple models		√			
<b>Volvo</b>	-	Multiple models		√			

VW is the most aggressive among OEMs, while its counterparts are also working hard. The race to roll out intelligent gateway chip in early 2020 is a reflection of OEM's eager hoping to enable FOTA as early as possible just as Tesla has done.

Installation of SOTA easier to realize is soaring in both volume and rate. In 2019, 3.838 million passenger cars, or 19% of the total, were provided with SOTA, jumping by 60.6% compared with 2.39 million units, or 11.8% of the total in 2018, according to ResearchInChina.

Among typical OEMs, GM leads in OTA capability. Its new-generation electronic architecture enables FOTA updates on its ICE models, which means OTA is available to recalibrate or upgrade engine and transmission control modules, vehicle communication system, entertainment system, driving control and body control ECU at a later stage.

In 2020, Buick's latest interconnection system, eConnect3.0 enables OTA updates of 9 major models such as OnStar module, IVI system, intelligent driving control module, body control module, and iBooster brake booster.

In 2020, the latest Cadillac CT5 model will pack GM's new electronic architecture. CT5 allows OTA updates of more than 30 vehicle control modules including software modules (e.g., IVI and smart connectivity) and firmware electronic modules (e.g., powertrain, chassis and electrical control).

GM plans to apply its next-generation E/E architecture to most of its car lineups before 2023.

Chinese companies that excel in application layer innovation already make plenty of OTA micro-innovations. Examples include SAIC providing personalized OTA -- DOTA, and BYD and XPENG Motors both offering high temperature disinfection capability enabled by OTA updates.

In April 2020, BYD announced its new models like Tang added with “high temperature disinfection capability” enabled by OTA updates. This capability is not simple upgrade and introduction but involves a complete set of OTA-based working logic of multiple ECUs (e.g., multimedia, air-conditioner controller and PTC heater) in a safe way.



Five highlights of intelligent cockpit (5)

From FOTA to **DOTA** **1,000 persons, 1,000 personalized updates**

**DOT+OTA=DOTA, single point personalized push of capabilities, services and experience**

Pioneering single point upgrade of underlying layer controller not just single point upgrade of IVI OS APP

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