Digital Vehicle Key Industry Report, 2020

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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

Research into Digital Vehicle Key: Bluetooth Key Installations Soared by 244% in the First Seven Months of 2020

Our Digital Vehicle Key Industry Report, 2020 sorts out current digital key solutions and development trends.

In an era of intelligent vehicles, key is a new digital trait and has been not like what it used to be. Terminals like smartphones, smart watches and smart bracelets become carriers of vehicle keys, making people's lives more convenient and creating more room for digital car life.

1. The less than 5% installation leaves space for rapid adoption
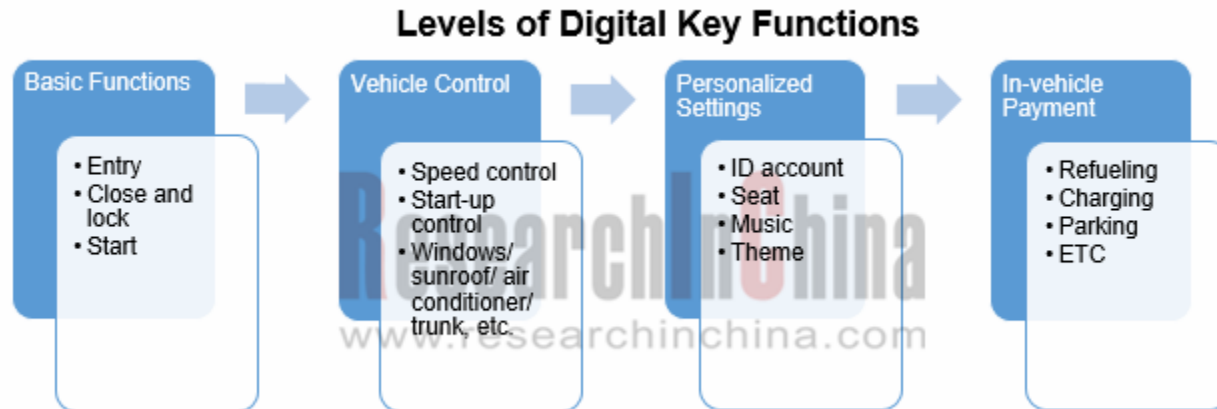
Digital key has three technology routes: Bluetooth Low Energy (BLE), Near Field Communication (NFC) and Ultra-wideband (UWB). Yet the overall installation is below 5%. Among them Bluetooth key finds broader application.

In the first seven months of 2020, Bluetooth key was mounted on roughly 220,000 passenger cars in China, a like-for-like spurt of 244%, with an installation rate of 3.3%, 1.6 percentage points higher than that in the prior-year period. Despite low installation in both volume and rate, Bluetooth key is roaring ahead.

Installations and Growth Rate of Bluetooth Key in Passenger Cars in China, 2019-Jul. 2020
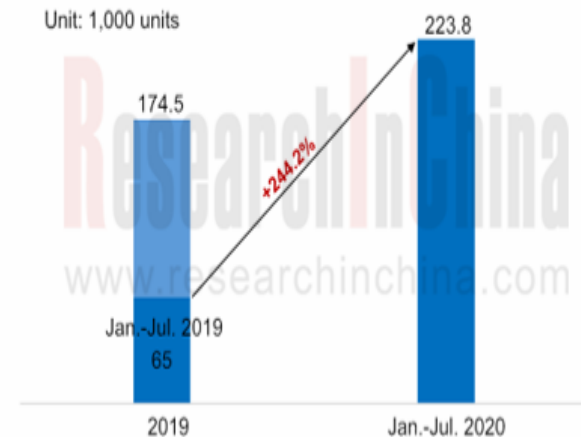
Apart from car lock/unlock and start-up capabilities, digital key enables personalized settings (e.g., seats, music and ID account), key sharing, vehicle trajectory record, and delivery to car. In future digital key will be an individualized element for cars and arouse much imagination.

Levels of Digital Key Functions

Basic Functions
- Entry
- Close and lock
- Start

→

Vehicle Control
- Speed control
- Start-up control
- Windows/ sunroof/ air conditioner/ trunk, etc.

→

Personalized Settings
- ID account
- Seat
- Music
- Theme

→

In-vehicle Payment
- Refueling
- Charging
- Parking
- ETC

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2. Digital key is so beloved by Chinese automakers

In China, local automakers more willingly embrace digital key. In Bluetooth key's case, there were a total of 14 passenger car brands using such a key in China between January and July in 2020, including 10 homegrown ones with a combined 70% share in installation.

In 2014, BYD first introduced smartphone Bluetooth-based digital key which can lock and unlock cars without network. GAC NE, Xiaopeng Motors, Geely and Changan Automobile followed and rolled out Bluetooth or NFC-based key.

In April 2019, GAC NE unveiled its Bluetooth key-enabled car models -- AION.LX and AION.S. The key solution is co-developed by GAC NE and Shanghai InGeek Cyber Security Co., Ltd..

In September 2019, Xiaopeng Motors released a Bluetooth-based "financial-grade secure digital car key" (the identity authentication technology is developed with Alipay, with security performance subject to financial-grade standards of the Internet Finance Authentication Alliance (IFAA).

In December 2019, BYD DiLink and Huawei Wallet jointly launched smartphone NFC-based car key.

Typical Models with Digital Key and Controlled Functions

Brand	Technical Solution	Controlled Functions	Partner (s)
BMW	NFC	Door unlock/lock Car start-up Key sharing	Apple
Mercedes-Benz (Outside China)	NFC	Door unlock/lock Car start-up	/
Beijing Hyundai	Bluetooth	Door unlock/lock Trunk open/close Car start-up Key sharing	Irdeto
BYD	Bluetooth	Remote driving Door unlock/lock Air-conditioner on/off Trunk open Flashing/honking ….	/
	NFC	Door unlock/lock Car start-up	Mainstream vendors like Huawei, Xiaomi and OPPO
GAC NE	Bluetooth	Door unlock/lock Car start-up Key sharing	Shanghai InGeek Cyber Security
Changan Automobile	Bluetooth	Door unlock/lock Car start-up Key sharing	Giesecke & Devrient
Xiaopeng Motors	Bluetooth	Door unlock/lock Car start-up Key sharing	Giesecke & Devrient
	NFC	Door unlock/lock Car start-up Key sharing	/
Leading Ideal	Bluetooth	Door unlock/lock Car start-up Trunk open/close Key sharing	/

Joint venture brands also followed suit. In particular, BMW and Beijing Hyundai, among others have stepped up efforts in digital key field in 2020, and plan adoption in full range of their future models.

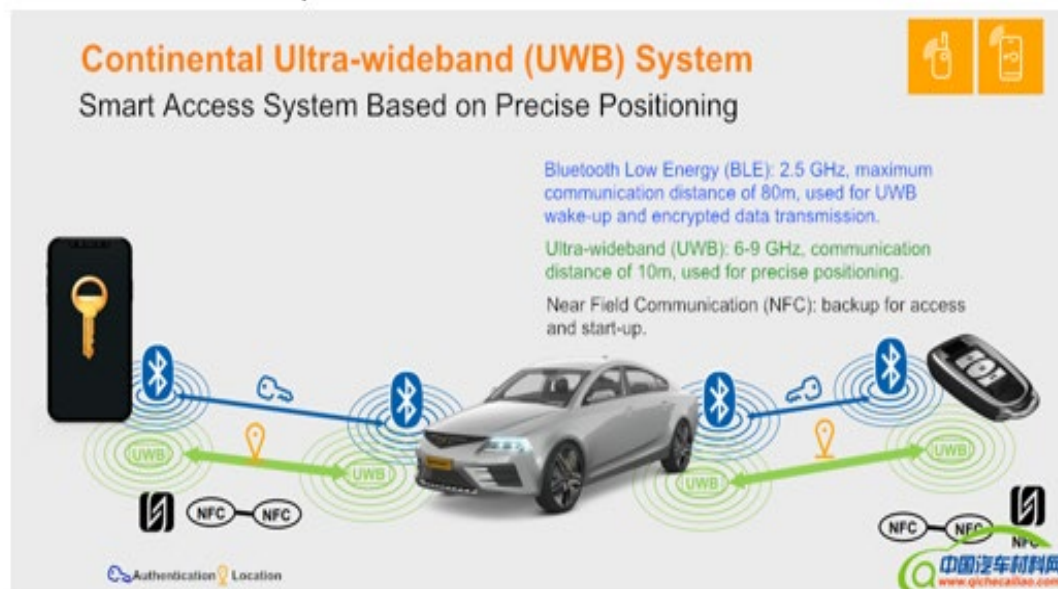In July 2020, BMW's models began to be equipped with Apple CarKey, a NFC-based key solution.

In September 2020, the full family of new vehicles under Beijing Hyundai was outfitted with Irdeto Keystone, a Bluetooth key solution.
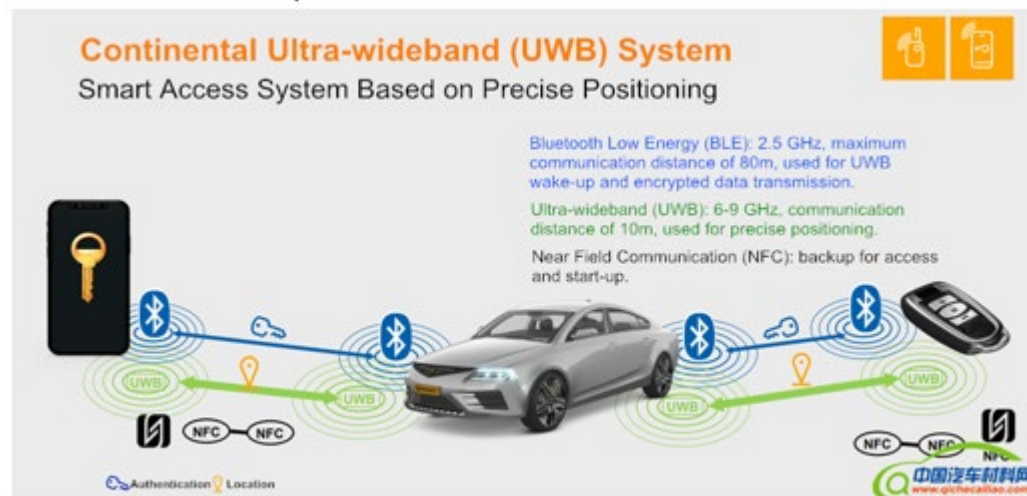
3. Established Tier1 suppliers and information security firms flock into the field

On the strength of technical expertise in common key, Tier1 suppliers like Bosch, Continental and Valeo have made a natural foray into digital key field.

In 2016, Valeo introduced InBlue, a smart virtual car key designed for shared mobility and fleet management and compatible with both Android and Apple phones.
In 2017, Bosch rolled out Perfectly Keyless, a digital key solution with which users can unlock, start or lock their cars via smartphone APP.

In August 2020, Continental launched new-generation CoSmA digital key based on ultra-wideband (UWB) technology. The system allows the car to be unlocked and the engine to be started without having to interact with the smartphone. It also enables remote control over the car via smartphone.

Continental Ultra-wideband (UWB) System
Smart Access System Based on Precise Positioning

Bluetooth Low Energy (BLE): 2.5 GHz, maximum communication distance of 80m, used for UWB wake-up and encrypted data transmission.

Ultra-wideband (UWB): 6-9 GHz, communication distance of 10m, used for precise positioning.

Near Field Communication (NFC): backup for access and start-up.

Source: www.qichecailiao.com

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While bringing diversified and convenient experience to users, digital key poses a non-trivial security problem. Hacking at any links such as identity authentication, encryption algorithms, key storage, and data packet transmission will lead to a crash of the entire digital vehicle key security system. As a result, internet firms that are rooted in cyber security find vehicle information security a way to enter OEMs' partnership system. Examples include foreign companies like Giesecke & Devrient (G+D) and Irdeto and Chinese peers such as Shanghai InGeek Cyber Security Co., Ltd. and Sichuan Zhongwang Safety and Environmental Protection Technology Consulting Co., Ltd..

4. BLE+NFC+UWB integrated solutions will come to the fore in future

Typical Digital Key Providers and Their Solutions

	Provider	Solution/Product	Technical Principle	Controlled Functions
Suppliers	Bosch	Perfectly Keyless	Bluetooth, UWB	Car lock/unlock/start-up, key sharing
	Continental	Continental Smart Access (CoSmA)	Bluetooth, UWB	Car lock/unlock/start-up, key sharing
		Virtual Key as a Service	Bluetooth	Car lock/unlock/start-up, key sharing
		Smart Access System (Virtual Key)	Bluetooth, NFC	Car lock/unlock/start-up, key sharing
		NFC Key	NFC	Car lock/unlock/start-up, key sharing
	Valeo	InBlue Smart Virtual Car Key	Bluetooth	Car lock/unlock/start-up, key sharing
Mobile Security Companies	Shanghai InGeek Cyber Security	InGeek Digital Key	Bluetooth	Car lock/unlock/start-up, key sharing
		Human-Car Digital ID Solution	Bluetooth	Car lock/unlock/start-up, key sharing
	G+D Mobile Security	Digital Car Key Solution	Bluetooth, NFC	Car lock/unlock/start-up, key sharing

In current stage, the three digital key solutions (BLE, NFC and UWB) can lock, unlock and start cars independently. Integrating them into one terminal (e.g., smartphone and smart wearable device) will hold the trend. In an integrated solution, BLE, NFC and UWB work together but also play their own part in different scenarios: BLE used for vehicle wake-up and transmission authorization, UWB for locating where the user is after wake-up, and NFC as an alternative solution for car unlock and start-up in the case that mobile phone runs out of power.

Car Connectivity Consortium (CCC) is dedicated to cross-industry collaboration in developing global standards and solutions for smartphone and in-vehicle connectivity. The Board of Directors of CCC comes from Apple, BMW, GM, Honda, Hyundai, LG, Panasonic, Samsung and Volkswagen.

In May 2020, CCC announced rollout of Digital Key Release 2.0 specification.

Iterations of CCC Digital Key Specifications

Version	Time	Technical Route	Core Contents
Digital Key 1.0	Jun. 2018	BLE/NFC	Define connectivity standards for turning a smartphone into a car key
Digital Key 2.0	May 2020	NFC	Leverage NFC technology to have compatible mobile devices like smartphones safely accessible to vehicles Provide a standardized authentication protocol between the vehicle and smart device to ensure interoperability between different smart devices and vehicles.
Digital Key 3.0	Under development	BLE, UWB	Leverage Bluetooth Low Energy and Ultra Wideband wireless connectivity to support passive, location-aware keyless access

As below are capabilities enabled by Digital Key Release 2.0:

•Security and privacy equivalent to physical keys;
•Interoperability and user experience consistency across mobile devices and vehicles;
•Vehicle access, start, mobilization, and more;
•Owner pairing and key sharing with friends, with standard or custom entitlement profiles;
•Support for mobile devices in Battery Low Mode, where normal device operation is disabled.

The next generation of Digital Key, the Release 3.0 specification, is under development. It will leverage Bluetooth Low Energy and Ultra Wideband wireless connectivity to support passive, location-aware keyless access, providing vehicle owners with more convenience and new features.

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