



Reimagining Mobility in the China Context

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Introduction

The traditional value chain of the automotive industry is being fundamentally transformed by a new wave of "digital disruptors". Unlike traditional automotive OEMs and suppliers, these digital disruptors are leveraging mobile internet technology to present new and innovative "Connected Mobility" services to users, and in the process challenging the business model of the automotive industry¹. The century old hardware-centric business model of individual car ownership and product-based segmentation is transforming into a new form which leverages internet technology to deliver a broader range of services to address mobility needs.

Such changes are happening faster in China than in the rest of the world, where the size and scale of the urban population and the sheer numbers of mobile internet users are much greater than other markets. In such an environment, China's Internet giants (Baidu, Alibaba, Tencent) along with mobility disruptors such as LeEco and NextEV are vying to deliver an increasingly connected, electrified, smart and personalized mobility experience. Coupled with the Chinese government's regulatory push on new-energy vehicle adoption and sustainable transportation infrastructure, China has demonstrated strong potential to become the breeding ground for the Connected Mobility revolution. As a result, Automotive OEM and supplier CEOs must learn to reimagine mobility in the China context in order to secure a strong position in this new competitive landscape.

¹ *How Connected Mobility Technology Is Driving The Future Of The Automotive Industry*, Gao Feng Viewpoint, by Bill Russo, Chee-Kiang Lim, Guy Pross and Uri Kushnir

The Mobility Revolution

Mobile connectivity has become increasingly prevalent in recent years. As of 2015, China has 620 million mobile internet users. The mobile internet not only connects people with information, but also provides convenient access to a wide range of online-and-offline services. This includes access to a new form of connected, on-demand, cost-effective and personalized mobility.

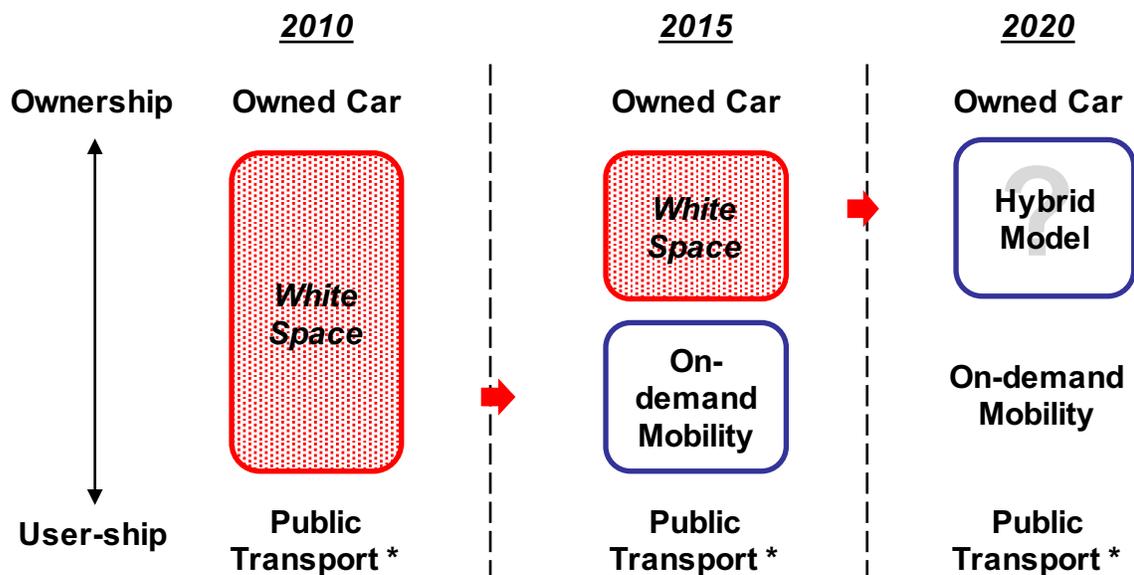
Before the advent of the mobile internet, mobility needs were served in a “binary” manner - either through **public transportation** services such as metro, bus, and taxi or **individually-owned mobility** devices such as bicycles or cars. Selection of a preferred mode of transportation was a decision based on

cost, convenience, comfort, distance of travel, and fit between the solution and the lifestyle aspirations of the mobility user.

With limited options, the pre-connected world encouraged middle-class wage earners with high lifestyle aspirations to own a car: it was simply more flexible and convenient than public transportation. In places where public transportation was not available, an individually-owned mobility solution became the only option in order to function in the economy.

Not often considered in this pre-connected world was the inefficiency of owning a mobility device which is used an average of 1 to 2 hours a day. Individual owners bear the burden of owning a depreciating asset for 24 hours a day and 7 days a week which sits parked approximately 95% of the time.

Exhibit 1: Mobility White Space



Source: Gao Feng analysis

* = Taxi, Metro, Bus

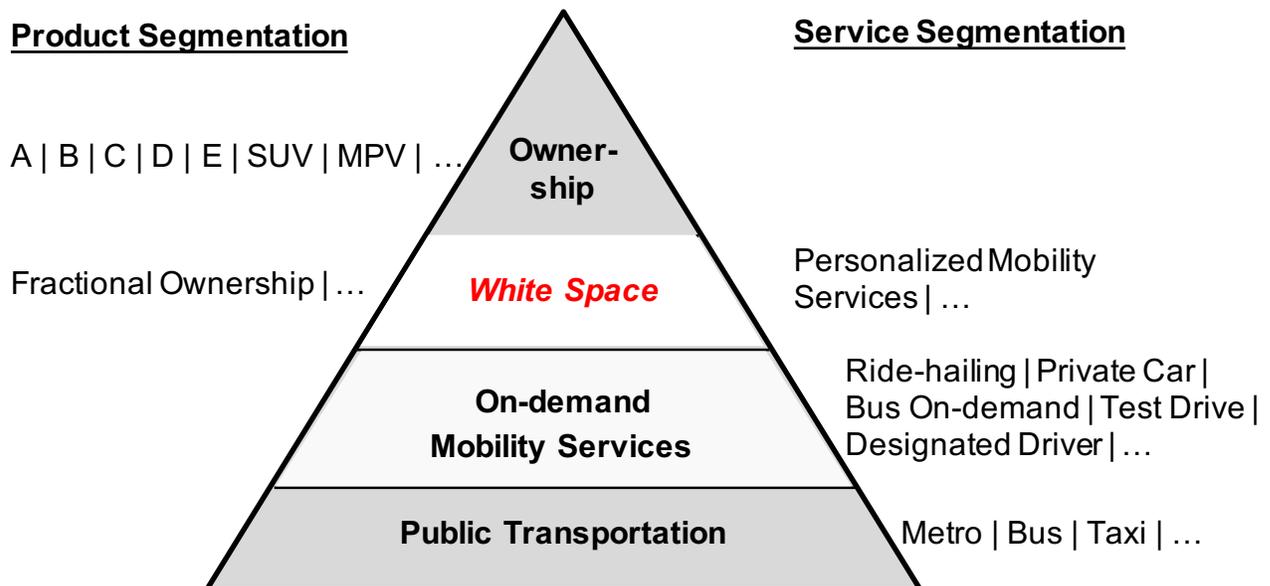
These developments are illustrated along the continuum depicted in Exhibit 1. Today's mobility revolution represents a disruption along the binary continuum between ownership and "user-ship": effectively attacking the "white space" of mobility needs between public transport and individual car ownership. In today's increasingly urbanized and connected world, fast-moving, and aggressive technology firms such as Uber and Didi Chuxing have disrupted this "binary" landscape by revealing the existence of an entirely new market segment, and in the process are challenging the inefficiency of 24/7 individual ownership.

In the connected world, **on-demand mobility** has emerged as a popular alternative for servicing mobility needs, especially in densely populated urban centers, where operating a vehicle on a daily basis is less convenient and more expensive.

The exponential nature of the growth of such services should therefore come as no surprise, given the numbers of people in each segment. Such services are appealing primarily to the (much larger) population of people who are seeking a more convenient alternative to public transportation and are willing to pay the extra cost to upgrade to more comfortable and exclusive rides.

This is effectively a new form of mobility services segmentation, filling the white space between ownership and public transportation, as illustrated in Exhibit 2. An increasing number of new players are now vying to participate in this new market segment. Rapid adoption of mobile internet, along with accelerated development of platform algorithms and cloud computing capabilities, have catalyzed experimentation in this mobility white space. These platform-based service solution providers are targeting the user with a wide portfolio of mobility services.

Exhibit 2: Mobility Segmentation Pyramid



Source: Gao Feng analysis

Reimagining Future Mobility

On-demand mobility services

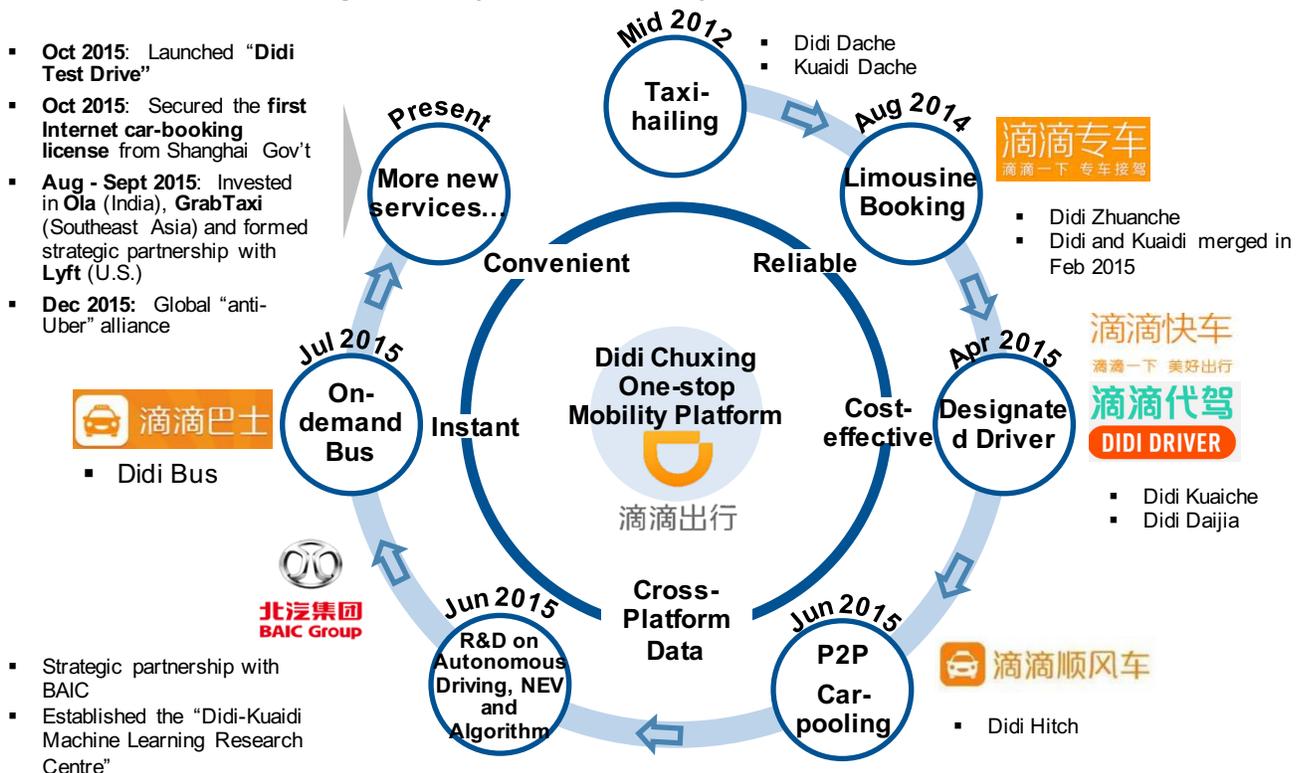
Our recent article described consumption-based services which have emerged, competing in a new segment occupied by mobility services solutions providers². These “digital disruptors” offer compelling value propositions including cost-effectiveness, convenience, freedom from ownership hassles (e.g. driving in city traffic and finding a parking space), and comfort (relative to public transportation). These benefits are accessible to users via a mobility services platform (typically a single app) that is accessible in just a few taps on a smart device. The platform automatically identifies location via GPS and offers a choice of drivers and cars

to the user. After arriving at the desired destination, the user pays for the service electronically using a mobile payment service which is linked to the mobility service platform.

China’s largest mobility services company is Didi Chuxing (created from a merger of competing taxi-hailing apps backed by Tencent and Alibaba). Didi has constantly expanded their service portfolio and explored new revenue streams by delivering innovative solutions in the white space between ownership and usership. Didi’s mission is to build a one-stop transportation platform across a wide range of mobility services, as shown in Exhibit 3.

²Digital Disruption in China’s Automotive Industry, Gao Feng Viewpoint, by Bill Russo, Edward Tse, Chee-Kiang Lim, and Alan Chan

Exhibit 3: Didi Chuxing’s Mobility Services Ecosystem



Source: Didi Chuxing, Gao Feng Analysis

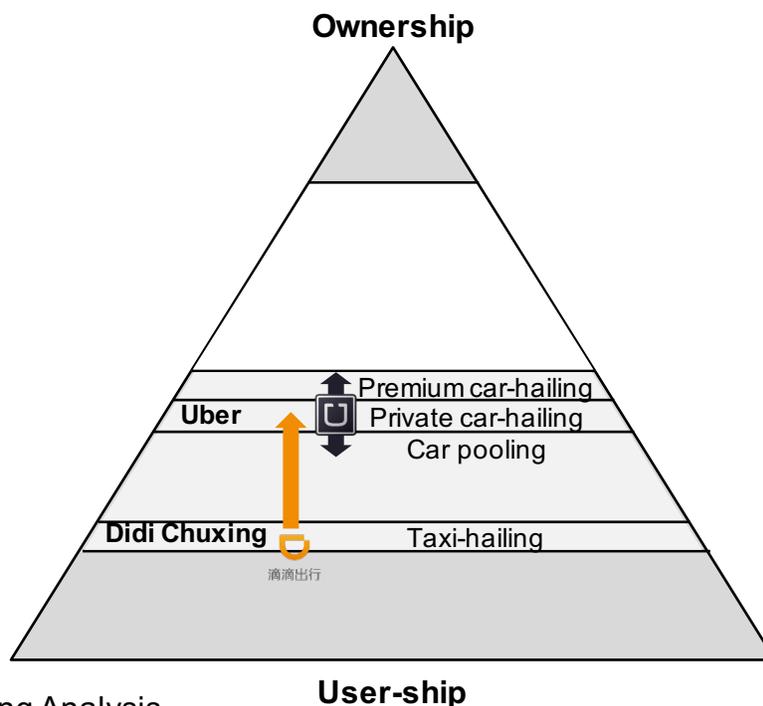
Recently, Uber has rapidly expanded its business internationally in an effort to become the premier on-demand mobility service brand in the world. Facing this emergent threat, Didi Chuxing has moved to build a global “anti-Uber alliance” by investing in Ola (India), GrabTaxi (South East Asia) and Lyft (USA) with a goal of consolidating resources and expanding market coverage. Didi and Lyft have also announced cross-platform collaborations including interlinking APIs so that customers of one service can hail cars in the other’s market.

Uber began its business by positioning itself as a private car hailing service, then expanding into more premium services such as UberBlack and UberSelect. To also capture the lower segment, Uber also launched People’s Uber and UberPool, peer-to-peer ride-hailing and car-pooling services respectively.

On the other hand, Didi started as a taxi-hailing service before jumping into multiple other domains, covering the needs of both high-end and low-end mobility users in China. Didi now covers over 400 cities with over 300 million active users. Didi’s platform leverages big data analytics of mobility usage patterns and real-time traffic conditions to recommend the best-fit mobility options to users of its platform for the best prices. Cheng Wei, the CEO of Didi Chuxing, has stated that the company provides a platform which “democratizes access to mobility”, clearly positioning the company as a better alternative for China’s huge population of urban residents who use public transportation.

The initial positioning and movements of Didi Chuxing and Uber along the mobility segmentation pyramid is illustrated in Exhibit 4.

Exhibit 4: Positioning of Uber and Didi Chuxing



Source: Gao Feng Analysis

Experimenting in the mobility white space

Recognizing the rapid emergence and popularity on-demand mobility services, several global OEMs have launched their own experiments in the “mobility white space”. Examples include Daimler’s Car2Go, Ford’s Go!Drive and Ford Pass, BMW’s DriveNow, Audi On-Demand and General Motors’ Open CarUnity.

Such mobility experiments aim to capture younger urban customers who are not sold on the economics of individual car ownership, but still require regular access to a mobility solution. While eliminating car ownership would certainly not be their preference, these OEMs recognize that hardware brands must remain relevant in a consumption-based economy.

Several OEMs also recognize the fundamental nature of the disruption of the automotive value chain. The entrance of several internet giants into the mobility white space signals what may become an existential threat to the economics of a hardware-centric business model. Tech giants including Apple, Google and China’s BAT (Baidu, Alibaba, Tencent) are experimenting in the mobility white space as a means to expand user enrollment in their platforms, which allow them to offer a wider portfolio of services beyond just mobility.

In an effort to address this disruption, leading automakers are expanding their focus beyond their core hardware business:

- BMW expanded its mission statement from “the world’s leading provider of premium products,” to include the words “and premium services for individual mobility.”
- In January 2016, GM invested USD 500M in Lyft which will include development of an on-demand network of self driving cars, an area where Uber, Google and Tesla have already invested heavily.
- Mark Fields, CEO of Ford Motor Company, has stated that “we need to keep investing in our core business, which is making and selling cars and trucks...but we’re also a mobility company, and that means encouraging an innovation mindset, challenging assumptions and moving fast.”

With 1.43 billion rides completed by Didi in 2015, China has clearly become the battleground for experimentation in the mobility white space. One of the most unique aspects of the landscape in China has always been the influence of government policy on the development of the market. Interestingly, the business of mobility services has developed largely free from government intervention. The BAT players and new mobility experimenters such as Didi Chuxing, LeEco (formerly LeTV), NextEV and others are all private companies.

However, we can expect that China government is closely following the mobility services landscape and will undoubtedly pursue policies that promote smart, sustainable urban transportation ecosystems³.

³An *Intelligent Urban Transportation Ecosystem for China*, Gao Feng Viewpoint, by Bill Russo, Chee-Kiang Lim, Kent Larson and Ryan CC Chin

The Chinese government has for many years invested in the development of new energy vehicles (NEV) and its relevant infrastructure, providing tax and license plate registration subsidies and other preferential policies to NEV buyers and manufacturers. Given the popularity of on-demand mobility services in China, the government has encouraged those fleets to be electrified. This will most likely accelerate the adoption of electric vehicles (EV) and development of charging infrastructure, thereby accelerating the path to electrification.

Consumer habits and their outlook on personal mobility are rapidly changing in China due to widespread availability and adoption of new mobility services. Experimentation in this new mobility white space has unleashed a wave of entrepreneurial activity and creative application of internet-based technology which will drive the commercialization of future automotive technology.

Smart, electric, autonomous vehicles

Beyond on-demand mobility services, automotive companies are also experimenting with advanced technologies to transform automobiles into smart, electric, and eventually autonomous vehicles. Examples include Tesla's electric car developments as well as the development of smart in-car connectivity and telematics solutions such as GM's OnStar and Ford's SYNC.

Virtually every major automaker and Tier-1 supplier is involved in various levels of advanced vehicle research and development. Traditionally, next generation automotive technologies are conceived and engineered from a hardware-centric business model perspective, and are offered to individual customers with a "cost plus margin" business model logic. New technology is incorporated into a car based on an estimation of a prospective owner's willingness to pay for the feature that is enabled by the technology.

However, the hardware-centric business model has inherent disadvantages of high investment and the need to price for innovation on a rather limited scale. Tech disruptors are taking a different approach to delivering solutions to the market. Rather than basing a decision to deliver innovative new technology on an estimation of a prospective owner's willingness to pay for the feature, they are pursuing a model that seeks to incorporate new technology based on the profits derived from services that are enabled by the feature. Willingness to pay for the feature, and even the concept of owning the end product are secondary to making the technology accessible to the largest possible number of users. US tech giants are clearly motivated to introduce Apple's CarPlay and Google's Android Auto on the basis of unlocking the revenue generating potential of users in the car.

Following this logic, many Chinese tech players are also expanding into the traditional domain of the automotive industry and bringing an entirely new business model logic into play. Chinese BAT giants and LeEco have all developed their own connected car platforms, including Baidu CarLife, Alibaba YunOS and AutoNavi A-link, Tencent Chelion and LuBao, and LeEco's Ecolink ecosystem.

In several cases, Chinese tech players are forming strategic partnerships with OEMs to leverage on each other's complementary capabilities in automotive hardware technologies and software engineering. For example:

- Baidu and BMW for autonomous cars
- Tencent, Foxconn and Harmony Auto for electric cars
- Alibaba and SAIC for telematics and infotainment
- LeEco and Aston Martin for smart connectivity

On the hardware side, we see Chinese players entering the space. For example, NextEV - a China-based global EV start-up, has emerged as a Tesla competitor. NextEV is backed by Tencent, Hillhouse Capital, Sequoia Capital and Joy Capital, with other major investors include Li Xiang (founder of Autohome), Richard Liu Qiangdong (founder of JD.com) and William Li Bin (founder of BitAuto and chairman of NextEV).

NextEV's credibility is borne from having hired some top names from the automotive and tech sectors. President Dr. Martin Leach was formerly the CEO of Maserati, President of Ford Europe, and Managing Director of Mazda Motor Company. Padmasree Warrior was formerly Cisco's Chief Technology and Strategy Officer, and is now NextEV's US CEO and Global Chief Development Officer.

Personalized mobility

As previously noted, the motivation for many tech disruptors to invest and compete in this market is to unlock the services revenue that encircles each mobility services user. It is not the mobility service itself that justifies the investment, but rather all the things that we (and our cars) do when mobile. Making such experiences feel more and more "personalized" to our individual needs and lifestyles, which become apparent based on our mobility habits, will ensure the loyalty of the user to the service provider's ecosystem.

Tech disruptors are experimenting in the white space and leveraging their core value propositions to deliver personalized mobility solutions. These disruptors do not see mobility as their destination, but are rather "travelling through mobility". They view mobility services as a channel for enrollment of users into their broader ecosystem-based platform offering a range of other services. Visionary companies that are aiming at this "personalized mobility" solutions space include Apple, Google, LeEco, and NextEV.

Table 1 offers a summary of how major Chinese players aim to leverage their core while expanding to and beyond mobility as a service. Beyond manufacturing smart, connected, electric vehicles or building technology-enabled infotainment systems and mobility services, these visionary companies are reinventing the mobility experience as a whole. Moreover, they are reimagining mobility as a transaction between a user and an ecosystem services

provider, which stands in stark contrast with the traditional model of a transaction between an owner and a manufacturer.

Disruption typically comes from outside an industry, which is clearly illustrated in this case. We are approaching an inflection point where the deployment of personalized mobility solutions will expand exponentially and thereby alter the competitive landscape and business models of several adjacent industries.

Table 1: China’s Mobility Platform Players

Company	Core Business	Mobility Play (select)	Visions in Mobility and Beyond
Baidu	Search	<ul style="list-style-type: none"> ▪ Mapping, navigation and telematics ecosystem ▪ Investment in Uber ▪ Autonomous car project in collaboration with BMW 	<ul style="list-style-type: none"> ▪ Location-based O2O aftermarket services ▪ Mobility services integrated with map service ▪ Smart vehicles with Baidu’s artificial intelligence capabilities
Alibaba	E-commerce	<ul style="list-style-type: none"> ▪ Ali Auto Division ▪ Tmall auto e-commerce ▪ SAIC partnership ▪ Yun OS ▪ Investment in Didi Chuxing 	<ul style="list-style-type: none"> ▪ In-car connectivity ▪ Full range auto e-commerce platform ▪ O2O aftermarket services
Tencent	Social	<ul style="list-style-type: none"> ▪ Chelian and Lubao telematics systems ▪ EV project with Foxconn and Harmony Auto ▪ Investment in Didi Chuxing and BitAuto 	<ul style="list-style-type: none"> ▪ In-car connectivity integrated with WeChat ▪ Virtual and augmented reality
Xiaomi	Smart devices	<ul style="list-style-type: none"> ▪ Ninebot Mini E-scooter 	<ul style="list-style-type: none"> ▪ Affordable, personal, electric and connected mobility device and gadgets
LeEco	Content	<ul style="list-style-type: none"> ▪ Investment in Yidao, Atieva ▪ Infotainment content ecosystem ▪ Partnership with Faraday Future, Aston Martin and BAIC 	<ul style="list-style-type: none"> ▪ Connected lifestyle services and loV technologies integrated with bespoke mobility service

New competitors are disrupting the business model that requires individual ownership to drive their economics. Whereas automotive OEMs' vision of future mobility is limited by their historical hardware-centric "lens", it remains to be seen whether the future belongs to this disruptive new breed of competitor, or whether traditional OEMs and suppliers can change their lens and reimagine their own role in the new mobility ecosystem.

Case Example: LeEco's Connected Mobility Ecosystem

From the many tech disruptors that are "travelling through mobility", LeEco (formerly named LeTV) has built its own Super Electric-car Ecosystem (SEE). LeEco's ecosystem is an ambitious concept which articulates a disruptive vision for the future of connected mobility. Recognizing that the capabilities needed to fulfill this vision are outside of the former LeTV business scope, LeEco is forming new ventures and collaborative partnerships with Faraday Future, Aston Martin, and others in order to fill capability gaps.

LeEco is a leading Chinese internet media company founded (as LeTV) in 2004, and currently employs 8,000 people worldwide. Leveraging a vertically-integrated ecosystem comprised of "Content, Devices, Platforms and Applications", LeEco has expanded its business scope to include mobile internet, e-commerce, sports, internet finance, and entertainment

by leveraging a network of global resources across the US, Europe, China and India. With its "Six Screens, One Cloud" strategic approach, LeEco aims to deliver the best value and premium user experience across multiple screens (i.e. mobile, tablet, computer, cinema, TV and cars), by covering all aspects of the consumer's connected lifestyle. The car, as the "third place" after home and office where users are connected to the internet, is viewed as a clear strategic opportunity for delivering content related services.

Faraday Future (FF), founded in 2014, is an EV start-up based in Gardena, California that has until recently operated under a shroud of secrecy. With currently 400 employees, it is now known to have been principally invested by LeTV's founder and CEO Jia Yueting. In December 2015, FF announced a USD 1Bn investment to build a 900-acre factory near Las Vegas, Nevada. In January 2016, FF unveiled its first concept car, FFZERO1, at the 2016 Consumer Electronics Show, featuring an innovative "variable platform architecture". Nick Sampson, a senior vice president at FF, has stated that the company will "produce EVs using a non-traditional sales model", alluding to the potential for a "subscription model" in which users can enjoy the flexibility and convenience of mobility on-demand, without the requirement of owning the car.

Several announcements have been made which give an indication of how LeEco is building its own Super Electric-car Ecosystem (SEE):

- In August 2014, LeTV became a shareholder in Atieva, a Silicon Valley-based high-tech start-up specialized in designing and building EVs such as Tesla Roadster and Audi R8 e-tron.
- In March 2015, LeTV announced strategic partnership with BAIC (Beijing Automotive Industry Holding Co. Ltd.), who is also an investor in Atieva, to jointly build the first smart, connected “internet vehicle”.
- In September 2015, LeTV invested in Beijing Dianzhuang Technology Co., a start-up that builds and rents charging stations.
- In October 2015, LeTV invested USD 700Mn in Yidao Yongche in return for a 70 percent stake of the major on-demand mobility service provider, to explore potential car-sharing and mobility service business models.
- In December 2015, LeTV signed a memorandum of understanding with Aston Martin to develop joint research projects around connected car technologies, engineering and manufacturing, starting from bringing LeTV's infotainment platform and connected technologies to Aston Martin's Rapide S.
- In January 2016, it became known that LeTV's founder and CEO is the key investor in Faraday Future and their first concept car was revealed. In the same month, LeTV was renamed LeEco to underscore the ecosystem-based strategy of their business.

- In February 2016, Aston Martin announced to set up a new joint venture with LeEco to develop and manufacture its first electric vehicle. The announcement also hinted the potential for the joint venture to collaborate with Faraday Future.

LeEco envisions that the future of mobility will be increasingly connected, social, and personalized. With their expanding ecosystem of services and collaboration partners, LeEco aims to leverage their capabilities to “jump” exponentially towards their strategic vision of enabling a fully-connected lifestyle.

Conclusion

Over the past few years we have witnessed how entrepreneurial companies have discovered the new white space, pioneered new business models and are in the process reimagining mobility as a service.

The emergence of Chinese disruptive mobility solutions players such as Didi Chuxing and LeEco, with their innovative ecosystem-based strategic approach, offers clear evidence that something new is happening. This, coupled with the Chinese government's determination to push new-energy vehicles and build a sustainable transportation infrastructure, demonstrates the potential for China to become the major breeding ground for automotive innovation⁴.

⁴ *China Drives the Future of Automotive Innovation*, Gao Feng Viewpoint, by Bill Russo and Alope Palsikar

Tech disruptors including Apple, Google, LeEco, NextEV, and others may be garnering the most attention, but as we have observed, they are typically “travelling through mobility” as a means to enroll users into their broader service ecosystems. On the opposite flank, traditional OEMs, who will not easily cede their over 100-year dominance in the auto industry, are pivoting into mobility services.

New players will inevitably join this emerging landscape of competition. Alliances are also being formed among new and traditional players seeking to access complementary strengths and seize a competitive advantage.

The battle will likely be won by those who understand the true potential of connected mobility services and thereby deliver value to the user in the most personalized, convenient, comfortable, and cost-effective manner. It is a battle where profits will be won by offering differentiated mobility-related services through a hardware platform that is most suited to the lifestyle of its end user.

Success will accrue to those companies that are best able to reimagine mobility in the context of a place like China: where mobility needs are uniquely challenging, where innovative mobility experiments are being driven by entrepreneurial activity, and where dreams of exponential business growth become reality.

About the authors

Bill Russo is Managing Director and the Automotive Practice leader at Gao Feng Advisory Company based in Shanghai. With 15 years as an automotive executive, including over 11 years of experience in China and Asia, Mr. Russo has worked with numerous multi-national and local Chinese firms in the formulation and implementation of their global market and product strategies. He was previously Vice President of Chrysler North East Asia, where he managed the business operations for the Greater China and South Korea markets. Prior to this, Mr. Russo was Head of Product & Business Strategy for Chrysler. He also has nearly 12 years of experience in the electronics and IT industry, having worked at IBM Corporation, and formerly served as Vice President of Corporate Development at Harman International.

Edward Tse is founder and CEO of Gao Feng Advisory Company. A pioneer in China's management consulting industry, Dr. Tse built and ran the Greater China operations of two leading international management consulting firms for a period of 20 years. He has consulted to hundreds of companies – both headquartered in and outside of China – on all critical aspects of business in China and China for the world. He also consulted to the Chinese government on strategies, state-owned enterprise reform and Chinese companies going overseas. He is the author of over 200 articles and four books including both award-winning *The China Strategy (2010)* and *China's Disruptors (2015)* (Chinese version «创业家精神»).

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