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How Connected Mobility Technology Is Driving The Future of The Automotive Industry

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Executive Summary

After over 20 years of advances in the world of mobile connectivity, big data and social networks, technology is now rapidly infiltrating the traditional realm of the automotive industry and shaping it to be at the forefront of global technology.

This new form of "connected mobility" is driving new technologies in the world of navigation, analytics, driver safety, driver assistance and information virtualization. The challenge of understanding the opportunities and the threats (both cyber and physical) of this new industry will set the scene for a new competitive environment for both traditional OEMs and non-traditional players looking to establish themselves as the global leader of connected mobility.

At the same time, the rapid emergence of markets like China has changed the nature of competition in the 21st Century global auto industry as well as the commercialization pathway for such technology frontiers. The rapid embrace of mobile connectivity by Chinese mobile device users, combined with the commercial aggressiveness of China's internet giants will create conditions conducive to the rapid commercialization of smart connected car technologies. As the leading automotive market, China is poised to revolutionize the global automotive industry, especially in the area of the Internet of Vehicles, making mobile vehicle connectivity the next great frontier of automotive innovation.

Traditional industries remain unchanged across 10 decades...

For over 100 years, our global economy has been reliant on traditional industries for fuelling our economies and for the production of goods and services. From energy, through water and resources we have seen little change in these sectors since their inception, many of them using the same fundamental technologies. However, in recent years we have seen technological advances slowly being deployed across these industries, a trend that we expect will impact the very foundation of these sectors.

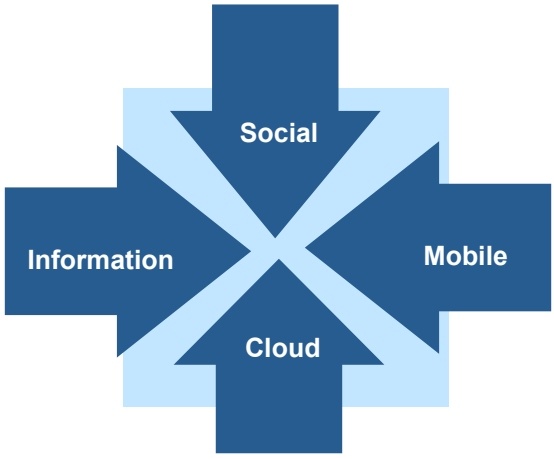
While much of our traditional industry backbone has been trapped in the industrial era of the early 1900's, more modern sectors have shifted through the Information Era of the mid 1900's to the knowledge era of the 2000's. This lack of progress can mostly be attributed to the conservative nature of traditional industries as well as the general lack of reform and cost and complexity for transitioning from old legacy platforms.

After 20 years of technological advances, traditional industries are shifting...

Following 20 years of significant advances in technology, the market conditions are now in place for a fundamental shift in industrial technologies.

Four key technological game changers are driving this transformation - cloud computing, big data, social networks and mobile/connected technologies. The convergence of these technologies is expected to revolutionize business, society and industry, disrupting old business models and creating new ones.

The Nexus of Forces: Social, Mobile, Cloud and Information



The nexus of forces describes the convergence and mutual reinforcement of four interdependent trends: social interaction, mobility, cloud, and information. The forces combine to empower individuals as they interact with each other and their information through well-designed ubiquitous technology

A transformational impact on the automotive industry

The industrial technology revolution is particularly visible in the automotive industry, an industry that for 100 years relied on engineering innovation and is rapidly becoming more dependent on digital demands and mobile connectivity. This is on top of traditional industry challenges such as cost pressures, diverging markets, and a shifting industry landscape.

There is also a growing sentiment that OEMs cannot simply turn to their traditional toolbox. OEMs will need to review and adjust their strategic priorities, deploy the appropriate investments and resources, and develop new skills to execute these strategic objectives. Accordingly, we have seen the automotive industry focusing on innovation more than ever before with fourteen automakers among the top 50 most innovative companies (in BCG's 2013 survey) with the focus on innovation in four areas: power train, lightweight materials, connectivity, and active safety/ assisted driving.

We have also seen OEMs working with open innovation as a paradigm to drive external ideas and internal incubation. Using open innovation platforms, OEMs are boosting innovation capacity and harnessing the talents of people outside their organisations. This method is enabling OEMs identify new requirements, unarticulated needs or existing market needs, accompanied by innovative solutions in the form of new technologies, new services or new uses of existing technology.

The challenge for OEMs will be to effectively develop processes for integrating technology into their product lines and through this to find new ways of achieving a competitive advantage in the marketplace. This will also uncover the need for supporting new business models and vehicle ownership trends (such as vehicle leasing models or car sharing schemes). One mega-trend we are seeing in the market is the development of connected car technology. This technology is already revolutionizing the auto industry and is likely to be one of the key differentiators in the auto industry of the next few years.

Four key trends of the connected car paradigm

The connected car is changing the way we perceive our driving experience. We have identified four key areas of connected car technology that are shaping the industry future, driving new business models and creating a new technology paradigm.

1. Navigation and parking

While navigation technology has become a standard feature in premium vehicles, the interactivity with other drivers and users is becoming more common and it is expected to be a standard feature in new vehicle models. Start-ups such as Waze were a key driver for the mass adoption of social platforms by drivers and it could be suggested that they were the pioneers of the connected car revolution for the wider industry. Waze was recently sold to

Google for over $1B and is being integrated into Google maps providing intelligent crowdsourced information to millions around the world. Connectivity is also changing the world of parking, with a number of start-ups using smart algorithms to predict parking behaviour in real time as well as providing availability maps for drivers and municipalities. One of the key challenges in both navigation and parking analytics is the monetization of these services and we can expect to see some business model innovation in this area.

2. Vehicle analytics

In-vehicle analytics is also creating significant opportunities for technology players. Initially this technology was mostly being used for large fleets in commercial vehicles making it possible to manage driver performance and vehicle diagnostics in real time and helping improve fleet safety and reduce maintenance costs significantly. The positioning of such an offering for the mass consumer market has not been established, but we can expect to see this technology impact the way we maintain and insure our cars as well as features for monitoring our own family driving patterns and behaviours.

3. Wearables

Another important factor in the connected car paradigm is the use of wearable devices and the information extracted from them. These items can be expected to assist in creating additional connectivity and in the short term will allow for connectivity for drivers in non-connected cars. For example the use of smart glasses can provide access to augmented reality navigation prior to the installation of a HUD or virtualization projector. Using data from wearable and mobile devices will provide a wealth of personalized data and will allow the vehicle to become contextually aware and therefore respond to specific driver needs better.

4. Driver safety and autonomous driving

In the world of sensors and driver safety we have seen companies using various technologies including laser, cameras, night vision and radars to create smart driver assistance and collision avoidance systems. While initially these systems have been used for parking assistance and collision warnings for premium models, we can expect mass adoption of these systems while gradually moving toward full autonomous driving. This area is likely to be heavily guided by regulation and government policy and we can expect the adoption of full autonomous driving to be gradual and limited to specific areas.

These four key trends are an indication of the wealth of opportunities in the connected mobility space, however, while connectivity provides multiple benefits, it is also a vulnerability to core vehicle systems through its multiple wireless entry points (RDS, GPS, cellular, IR, WiFi, etc.). As vehicles become ‘smarter’, all systems become interconnected via the vehicle CANbus providing direct access to critical vehicle systems. Most recently, there has been a significant amount of work conducted around understanding the future threats in this area from simple auto-theft to more advanced cyber terrorism. A number of automotive specific cyber firms have been setup in order to build up expertise for tackling such challenges and ultimately to provide us with vehicle firewalls and other cyber security mechanism.

Connectivity driving new players into the Auto industry

While vehicle connectivity has been relatively slow to enter the global auto sector, the Chinese auto industry has shown strong commitment and vision in this area. In fact, China has already made fundamental moves to ensure that it will be a global leader in the auto mobility paradigm.

The unique context of China's urban transportation challenge, the high rate of adoption of mobile device connectivity, combined with the rapid and aggressive introduction of alternative mobility and ownership concepts will compress the time needed to commercialize smart, connected car technology and related services.

However, while China holds a tremendous ability to scale the manufacturing of its auto industry, its corporate structures lack the flexibility required for the development of new 'out of the box' technology and therefore it requires an external source of innovation to support this area of growth.

Prof Steven Spiegel of UCLA presented a model of 'Importing Innovation' from small innovative nations to large industrial superpowers. He presents the notion of economic complementarity between the US and small countries such as Israel, Singapore or Finland as drivers of ideas and innovation.

By way of example, Israel, dubbed the start-up nation, is known for its disproportional number of successful start-ups, doctors, scientists, engineers, registered patents and NASDAQ listed companies and could offer a unique development platform for major industrial countries such as the US or China. Israel's experience in developing world class military technology combined with its leadership in mobile technology makes it a unique potential partner for the Chinese Auto industry in its quest for seamlessly integrating connectivity into cars.

Such collaborations could act as a powerful springboard for the Chinese industry in its path to establish global leadership in the auto industry.

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