



cutting through complexity

Self-Driving Cars: The Next Revolution

Los Angeles Auto Show

November 28, 2012

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Our point of view



Our point of view: Self-Driving cars may be here sooner than most people think

Section 1: Market Dynamics

Market dynamics examines the market dynamics and the social, economic, and environmental forces that are making change inevitable

Section 2: Convergence

Convergence discusses the ongoing convergence of key enabling technologies

The thesis
is outlined
in four
sections

Section 3: Adoption

Adoption focuses on the path to widespread adoption of advanced automated driving solutions, which we believe will take place in stages, leading over time, to increasingly autonomous or “self-driving” vehicles

Section 4: Implications for Investment

Implications for investment addresses the social, political, and economic implications of self-driven automobiles and their impact on the entire automotive ecosystem

Market dynamics: The marketplace will not merely accept self-driving vehicles; it will be the engine pulling the industry forward

The High Cost of Mobility

- The vehicle as a machine is utilized on an average for 2 hours a day
- The average American commuter now spends 250 hours a year driving a vehicle—resulting in lost productivity, lost time pursuing other interests, or lost serenity.
- The USDOT estimates that new urban area highways cost \$8 million to \$12 million per mile

Safety and the human toll

- In 2010, there were approximately six million vehicle crashes leading to 32,788 traffic deaths.
- More than 2.3 million adult drivers and passengers were treated in U.S. emergency rooms in 2009
- According to research from AAA, traffic crashes cost Americans \$299.5 billion annually.

Running out of space

- “In some U.S. cities, parking lots cover more than a third of the land area, becoming the single most salient landscape feature of our built environment.”¹
- By 2020, the UN estimates that 84.4 percent of Americans will live in urban areas, with more than 28 percent living in urban areas of more than five million people.

Driving demographics

- “Gen Now” generation and “Digital Natives” view driving as a distraction from texting, not the other way around
- Distractions account for 18% of crashes with injuries, and 11% of drivers under age 20 involved in crashes with fatalities were reported to have been distracted.
- Older adults face mobility challenges of age-related impairments and are unable to continue driving.

1. Ben-Joseph, Eran, Rethinking a Lot, MIT Press 2012, <http://mitpress.mit.edu/catalog/item/default.asp?type=2&tid=12874&mode=toc>, 7/20/2012.

Changing demographics: The market will want and be willing to pay for self-driving cars

Demographic breakdown		
Demographic	Population	Percentage of Total
Digital Natives (0–14 years)	 49 million	16%
Gen Now (15–34 years)	 84 million	28%
Gen X (35–44 years)	 43 million	14%
Baby Boomers (45–65 years)	 80 million	26%
Older Adults (66+ years)	 47 million	16%

-  Denotes segment of population that is untapped today due to being below driving age
-  A percentage of older adults are driving impaired. The trend of self-driving will provide them added mobility
-  A percentage of baby boomers will enter the older adults category when the trend of self driving sees market introduction

Self-driving will have far-reaching implications for stakeholders in the automotive ecosystem and beyond

The convergence of sensor-based safety systems and connected vehicle technology will have far-reaching implications as the technology matures and becomes pervasive. These are:



Crash elimination: Collision-free driving and improved vehicle safety could change the concept of a vehicle as we know it



Reduced need for new infrastructure: Self-driving can reduce the need for building new infrastructure and reduce maintenance costs



Travel time dependability: Convergence can substantially reduce uncertainty in travel times by providing a fair assessment of the travel time, independent of nonrecurring traffic jams



Productivity improvements: Convergence will allow travelers to make use of travel time productively



Improved energy efficiency: Reduced energy consumption in at least three ways: more efficient driving; lighter, more fuel-efficient vehicles; and efficient infrastructure



Data challenges: Issues related to data security, privacy, and data analytics and aggregation could crop up due to abundance of data in vehicles



New models for vehicle ownership: Self-driving vehicles could contribute to a significant redefinition of vehicle ownership and expand opportunities for vehicle sharing



New business models and scenarios: Convergence of technologies may lead to convergence of industries in which ecosystem participants will need to compete and collaborate at the same time

Business model implications: Who will make and sell cars in the future?

Who will design and manufacture automobiles? Who will get left behind? Will the automotive brands still matter? If so, how will they adapt to maintain competitive advantage?

The branded integrated lifestyle model

- A company with no traditional presence in the auto industry that is already an integral part of the consumer's life outside the vehicle could become a key participant in the ecosystem. Since self-driving vehicles will no longer need the same level of rigorous testing and validation, and manufacturing could potentially be outsourced, their emphasis would be on consumer research, product development, and sale of integrated lifestyle experiences
- **The branded integrated lifestyle model value proposition: Design, Technology, Software, Consumer experience**

The mobility on demand model

- Giant retailers with a core competence in managing complex distribution channels or fleet providers with the capability to manage the complexity of renting and allocation of fleets could enter the fray and accrue significant value in the new ecosystem. Success will be determined by efficiency, reliability, flexibility, vehicle maintenance, customer service, ease of human-vehicle interface, and integration with existing consumer devices
- **The mobility on demand model value proposition: Flexibility, Reliability, Convenience, Cost**

New business models

The open system model

- A major player in the data market might not want to manufacture vehicles, but could well design a vehicle operating system (OS). With more than a billion cars serving up trillions of data points about consumer behavior, traffic patterns, and topography, an operating system (OS) developer could afford to give away the OS but accrue significant value from the data they could aggregate. The OS provider could partner with any of the world's vehicle manufacturers—and not just the traditional automotive manufacturers.
- **The open system model value proposition: Utility, Technology, Customization**

The OEM model

- Incumbent original equipment manufacturers (OEMs) will have to move fast and must learn to evolve and stay ahead of the changing times. Vertical integration is an option for companies looking to bring a critical skill or technology in house. Some vehicle manufacturers have established venture capital subsidiaries to invest in promising new technologies as a means of bridging any skill or technology gaps.
- **The OEM model value proposition: Design, Technology, HMI, Supply Chain Management**



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