Self-Driving Cars: The Automotive Industry’s Next Frontier

Even now that military drones have become a familiar topic, the idea of self-driving cars sounds pretty far-fetched. But is it still just science fiction? Or are self-driving vehicles on the verge of becoming a viable form of personal mobility? Will the market accept them, want them, and pay for them?

We think the answer is a resounding yes: The marketplace will not merely accept self-driving vehicles; it will be the engine pulling the industry forward.

**Market dynamics will drive momentum behind self-driving cars**
A number of key factors point toward a strong adoption of self-driving vehicles, including demographics, safety, and space. Consumers are eager for new mobility alternatives that would allow them to stay connected and recapture the time and psychic energy they squander in traffic jams and defensive driving. But will people willingly cede control to a machine and give up driving their own cars? Let’s analyze…

**Shifting demographics and tendencies**
For baby boomers, especially, turning 16 and getting a driver’s license was a rite of passage. But demographics are changing, as are attitudes towards driving. Younger generations, (“Gen Now”), who grew up on game consoles and smart phones, are not rushing to get their driver’s licenses the way baby boomers did.

Self-driving cars open up new possibilities and new markets, and not just for those who are legally eligible to drive, but also for younger people, older people, and those with disabilities. For them, self-driving vehicles promise greater freedom and mobility and greater control over their lives.

**Safety**
The average American commuter now spends 250 hours a year behind the wheel of a vehicle; whether the value of that time is measured in lost productivity, lost time pursuing other interests, or lost serenity, the cost is high. And there are other costs. A 2011 AAA study found vehicle crashes are the leading cause of death for Americans aged 4–34. Ninety-three percent of all crashes are attributable to human error.

The pursuit of improved vehicle safety has spurred the National Highway Traffic Safety Administration to focus its attention on self-driving vehicles.

**Population density**
In the early days of the automobile, America was expanding, conquering the vast open spaces with a network of highways. We shaped our towns and villages around these highways, building vast suburbs miles beyond urban centers. But now, population density is increasing and the trend in the U.S. and worldwide is one of rapid urbanization. Over the past 50 years, increased population density in the United States has coincided with an increase in household wealth and growth in the number of multigenerational families.

Current trends are unsustainable over the long term, and new alternatives are emerging—not only from within the automotive sector, but also from a host of new players that are changing the shape of personal mobility—and could ultimately transform every aspect of how we use, purchase (or not), insure, and even finance our vehicles.

Can we build a safe, self-driving vehicle? Yes. In fact, Google has already logged more than 200,000 miles in a fleet of self-driving cars retrofitted with sensors. And Google is not alone; traditional automakers and suppliers have also developed self-driving functionality using sensor-based solutions and have a host of new applications in the pipeline. At the same time, a number of organizations, including automotive and high-tech companies and the U.S. Department of Transportation, have been focused on the potential for using connected-vehicle communication technologies for collision avoidance and traffic management. What’s missing, so far, is the convergence of sensor-based technologies and connected-vehicle communications that is needed to enable truly autonomous vehicles.
Convergence
The convergence of communications and sensor-based technologies offer the best model for a self-driving car, and ultimately will allow for vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communication. The convergence of communication- and sensor-based technologies could deliver better safety, mobility, and self-driving capability than either approach could deliver on its own. Convergence has many benefits: lower cost and complexity, less need for sophisticated artificial intelligence, more safety critical functionality, and fewer large-scale infrastructure investments. However, there are still significant hurdles to convergence, including the need for improved positioning technology, the need for high-resolution mapping, the existence of a reliable and intuitive human/machine interface, and the challenge of creating standardized communications systems.

Adoption
Assuming that self-driving vehicles hit the market, will consumers buy them? The adoption of most new technologies proceeds along an S-curve, and we believe the path to self-driving vehicles will follow a similar trajectory. While the available technology does not yet enable self-driving, it is moving in that direction. We believe that sensor and connected-vehicle technologies will continue to develop and converge, leading to an eventual inflection point beyond which it is likely that the driver will increasingly be taken out of the loop.

A confluence of multiple, interdependent activities and forces, including regulatory action, business cycles, technological advancements, and market dynamics, will ultimately determine the trajectory and speed of market adoption.

Implications for investment
Who will design and manufacture these automobiles of the future? Currently, some new entrants, as well as established players, have expressed interest. Intel recently launched a $100 million Connected Car Fund to develop smarter vehicle technologies. Robert Bosch LLC, the automotive parts manufacturer, is currently working on a next-generation driver assistance system that is part of its vision of collision-free driving.

In a crashless-car world, cars could be re-designed to be lighter, negating the need for a heavy steel layer of physical protection. Ultimately, the size, shape, and design of the vehicle will be different and will open up huge new business opportunities for a host of new and existing players—from software and electronics companies to design and manufacturing firms to the traditional car companies. While there is no clear leader, companies are trying to figure out how to compete and collaborate at the same time. Over the long term, it is likely that nontraditional firms may play a more significant role.

It is still too early to determine exactly what kinds of strategic alliances, joint ventures, or mergers will reshape the competitive landscape. However, we have identified four potential new business models.

I. The branded integrated life-style model: In this model, a company with no traditional presence in the auto industry and one that is already an integral part of the consumer’s life outside the vehicle could become a participant in the ecosystem. Imagine if Apple decided to design an iCar?

II. 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. The operating system (OS) provider, perhaps a company such as Microsoft, could partner with any of the world’s current car companies or with new players who might compete in the branded technology arena.

III. The mobility on demand model: Giant retailers with core competencies in managing complex distribution channels or fleet providers with the capability to manage the complexity of distributing a fleet of cars could enter the fray and accrue significant value in the new ecosystem. Could you sign up for a rental plan from Costco? Under this model, success will be determined by efficiency, reliability, flexibility, vehicle maintenance, customer service, ease of human vehicle interface and integration with existing consumer devices.

IV. The OEM model: Traditional automotive manufacturers have decades of experience in designing and manufacturing vehicles and creating an emotional connection with consumers. Many consumers would feel more comfortable getting into a driver-less car designed by Ford or General Motors.

Conclusion
Despite their fantastical connotation, self-driving cars are not that far from becoming a reality. Current automotive technology involving sensors and communication devices allows drivers to improve their driving and reduce collisions. As issues around convergence and adoption are met, driverless cars will become more and more prevalent. The advantages of driverless cars in terms of safety, increased productivity and pure pleasure make it likely that new technologies and business models will continue to develop. Numerous investment opportunities are likely to be created in this fast-paced and highly evolving area of the automotive and technology industries.

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