



# The driverless-car revolution

*These new vehicles will drive massive disruption, forcing real estate investors to re-examine their strategies*

by Jeffrey Kanne and Darob Malek-Madani

Real property is an enduring asset not significantly affected by fads and short-term trends, and typically it can afford to adapt gradually to technological advances. But occasionally a new technology emerges that dramatically affects real estate usage and values. History is filled with examples: Railroads paved the way for the creation of new cities, enabling the trans-continental delivery of produce; air conditioning triggered a mass migration to the South; and the Internet allows tens of millions of office workers to stay home every day rather than occupy skyscrapers in center cities. But the automobile has disrupted the use and intrinsic value of real estate more than any other invention, reshaping cities, countrysides and cultures — and this past disruption foreshadows another looming transformation in how and where we live and work. That change will be propelled by driverless vehicles.

A few years ago, most people dismissed the idea driverless cars would be on highways any

time soon. Today, an alert student of technology and economics knows driverless vehicles will become completely integrated into our society in the not-too-distant future. Driverless cars in test mode already have logged millions of miles in both highway and city driving environments. Google announced in 2015 its driverless car program had logged more than a million miles of safe driving. Google's and other companies' autonomous cars use technology that is largely available on cars being driven on roads today. GPS and way-finding technologies are already ubiquitous. In addition, automatic braking, cameras and systems that not only can detect lane lines, other cars and pedestrians but also actively avoid accidents are all available today. Regulators are working at both the state level in California, Florida and Nevada as well as the federal level to regulate and allow driverless cars on public roadways.

An examination of how the automobile affected real estate historically will be helpful

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in understanding the magnitude of the changes to come.

### How the automobile radically disrupted real estate

In 1900, New York City's booming population of 3.4 million residents lived together with 200,000 horses, which powered almost all transportation on the city's streets — buses,

taxis, delivery wagons, snowplows and garbage-removal vehicles, to name a few. Each horse produced 24 pounds of manure daily, much of it landing on city streets. To make matters worse, horses often were worked to death and then simply abandoned to decompose along sidewalks. In short, the benefits of horsepower were outweighed by unpleasant and unhealthy side effects. In 1898, an International Urban Planning Conference was held in New York City specifically to address these problems but was abandoned after only three days without generating any viable solutions. Little did the planners know the solution was about to go into mass production. It was called the automobile.

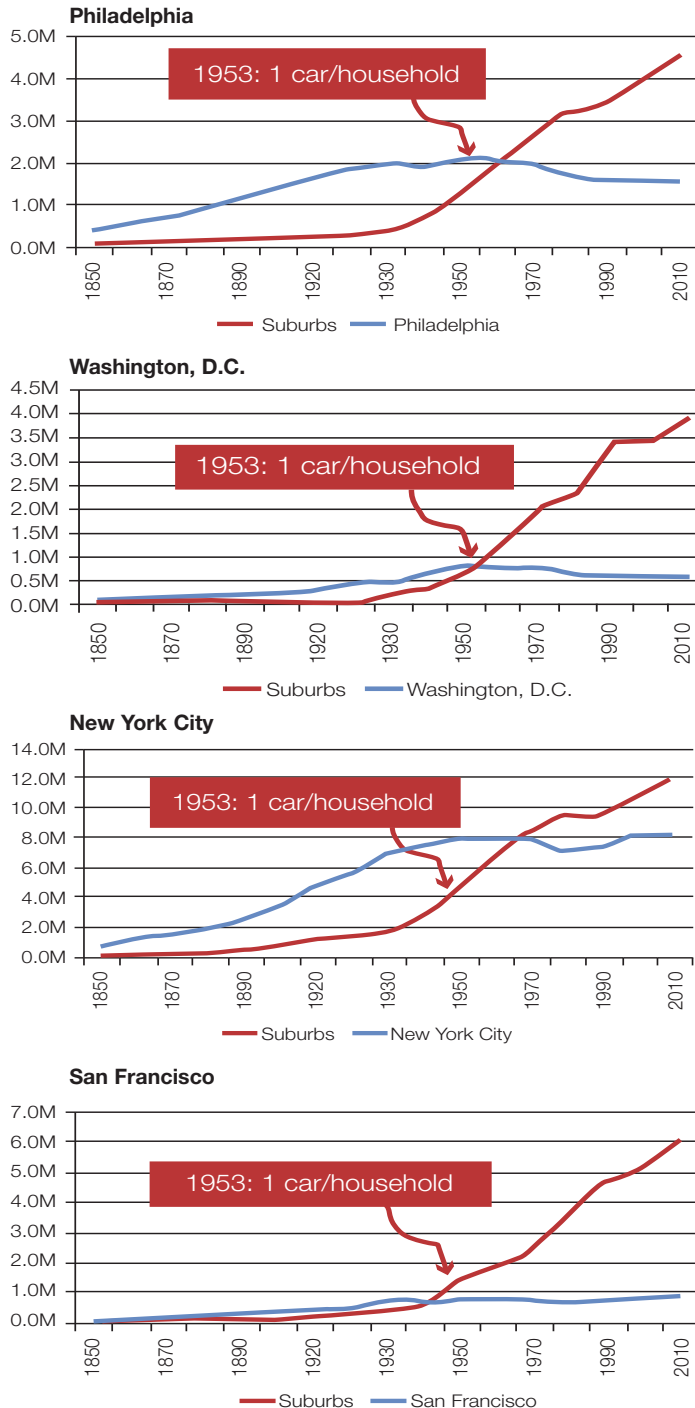
A novelty available to the very wealthy, only 8,000 cars were registered in the United States in 1900. By 1915, there were 2.3 million registered vehicles in the country, and every horse-drawn bus and streetcar in New York City had been rendered obsolete. Not only was the horse manure problem solved, automobiles were dramatically altering the urban landscape and American culture — changing land uses and upending land values in the process. These changes were abrupt, tremendously disruptive and anticipated by virtually no one.

The adoption of the automobile steadily advanced, and by 1953 there were as many cars as households in America. The desire for open spaces, cheap housing and convenient transport fueled the growth of the suburbs, creating a new frontier in real estate. Between 1950 and 1990, for example, the population of Washington, D.C., fell by 24 percent while its suburbs quadrupled in population, fueled by the automobile and enabled by the building of highway infrastructure.

The automobile not only changed the location of development, but also drastically reshaped the designs of buildings and development sites. Today, an extraordinary portion of developed land in the United States is devoted to cars. The typical suburban shopping center, for example, consists of an island of relatively small, low-lying buildings surrounded by a vast expanse of black-topped parking spaces. On average, only about 20 percent of a typical shopping center's land area serves buildable space, with the rest allocated for parking and driveways. This massive amount of space devoted to accommodating cars has not been limited to the suburbs. Parallel parking along urban streets often takes up two lanes, leaving only half the street for driving.

According to the Old Urbanist blog, Houston's central business district is comprised of 65 percent streets and surface parking, with only 35 percent for buildings and parks. Even in a city with a significant mass transit system such as

### Growth in the suburbs made possible by growth in automobile ownership



Source: U.S. Census Bureau

Washington, D.C., streets and parking take up close to 45 percent of downtown. In addition, cars occupy substantial space within buildings — upward of 30 percent of the space and cost of Washington, D.C., buildings is dedicated to vehicle parking.

The first minimum parking requirements by cities were introduced in the 1920s and became widespread in the 1950s. Almost every jurisdiction in the United States currently requires a minimum amount of parking for any new construction. The result: More than 1 billion parking spaces exist in the United States — about five for every car. The area covered by parking spaces is estimated to be larger than Connecticut, Delaware, Rhode Island and Vermont combined.

And cars have created many other issues begging for solutions:

- Most cars sit idle 95 percent of the time, slowly deteriorating and losing value. The cost to own and operate a typical new car is more than \$45,000 in its first five years, according to Edmunds.com.
- Long and stressful commutes from the suburbs waste enormous amounts of time for drivers, often in congestion-related delays.
- Commuting or traveling on clogged arterials requires an enormous amount of energy (mostly carbon dioxide-producing fossil fuels). The U.S. Energy Information Administration calculates 73 percent of oil is used for transportation, much of that in cars idled on clogged freeways or circling the block in search of parking spaces. According to research analyzed by Donald Shoup at the University of California Los Angeles, in CBDs as much as 30 percent of the cars on the street are actually looking for parking rather than driving to their destinations.
- People without access to vehicles are isolated and highly disadvantaged in many places without mass transit. A large impediment to employment of low-wage workers is their inability to access jobs, most of which are located far from their residential neighborhoods.
- The sixth-leading cause of death in the developed world is car accidents, which result in \$242 billion in direct economic costs or approximately \$800 per person in the United States. In addition, \$23.4 billion of U.S. health-care costs directly result from automobile accidents. About 90 percent of these accidents are caused by driver error.

Driverless vehicles should address many of these problems, reducing the need for car-related space, relieving congestion, reducing



In the above image of downtown Houston, red and yellow represent surface and structured parking; green depicts parks. Everything else is streets or buildings.

fuel use and lowering the number of accidents. The likely advent of these vehicles means real estate owners and investors should start paying attention now.

### The impact on real estate

The big question is: How will driverless cars affect real estate usage and values? We likely will experience highly disruptive changes, and many commercial real estate investors could be caught flat-footed.

**The need for parking will drop.** Private vehicle ownership will dramatically decline, decreasing the need for all types of parking. Values of parking garages and parking lots will plummet. Some above-ground parking structures will be repurposed, but most will become obsolete. The need for parking along roads will decline, making many neighborhood streets twice as wide as they need to be. Parking components for high-rise apartment buildings — comprising as much as 15 percent of construction costs — will become unnecessary, increasing developer returns or reducing rents by as much as 30 percent. Any developer who overbuilds parking could be at a huge disadvantage when the demand for parking diminishes.

**We will see more bike lanes and urban green space.** Parking lanes on streets will be converted to bicycle and scooter lanes, reducing dangers from incompatible uses. Some streets will be adapted into green spaces, decreasing water runoff and heat buildup. San Francisco, for example, already has a program that allows residents or businesses to repurpose street parking into public spaces, such as very small parks, patios or even additional restaurant seating. Converting even a fraction of San Francisco's 280,000 parking spaces, representing more than 40 million square feet, could result in significant changes in the constrained residential and retail



## How we will use the driverless car

Initially, consumers looking for additional safety, freedom to read and sleep on the way to work, and nondrivers will be the primary users of autonomous cars. Then the nation's two largest demographic groups — aging baby boomers who do not want to give up their freedom to get around and young adult millennials who are comfortable with the new technology — will be at the forefront of growing demand. Let's take a look into the not-very-distant future.

The daily routine of a typical family of four revolves around the automobile. When cars drive themselves, one parent can leave early for the office in the car, reading and/or working along the way. When the rest of the household is finished with breakfast, the same car will return home to pick up other family members, then stop by school and the second parent's workplace. With some time to kill, the car could take itself to a repair shop or car wash, and then transport an elderly or blind neighbor somewhere. Before the workday is over, the car will swing by school and pick up the kids, dropping one at the soccer field and another at a piano lesson. By early evening, the car picks everyone up at appointed times and brings them home for dinner. While the family enjoys the evening, the car will go off to earn some money running a taxi service. Instead of several cars moving family members around for short periods, staying parked in expensive, environmentally-damaging parking spaces for most of the day, the car is on the move most of the time.

But why purchase and maintain even one car and schedule everyone's activities around its availability? Driverless technology will make it significantly easier to pay only for a car while you are using it. Instead of owning a car, a family could have an account with a rental car company and let someone else (or a computer) worry about maintenance, scheduling and filling up the tank. This service would essentially be a taxi but because there would be no driver and the asset would be used much more than an owned car, it would cost significantly less per mile driven and involve much less hassle (no insurance payments to make, no repair visits or bills, no teenage drivers to fret about). Driverless cars combined with logistical



software would make it extremely easy to set up systems that would enable a passenger to choose to ride alone, with another passenger or with many others, each option presenting less cost and greater use of resources.

Automobile manufacturers will transition from selling cars to creating and maintaining fleets of vehicles rented on demand. Manufacturing cars will be important to them, but the strength of their product also will be in the software they develop to best meet the needs of the consumer. Mercedes Benz's Car2go service using its Smart Cars is a forerunner, while Ford Motor Co. is not far behind, deploying multiple mobility models in anticipation of the driverless car.

Not only will renting a car be more convenient generally, but various cars for different uses will be available. Commuting could be done primarily in single- or double-occupancy vehicles that are cheap to operate, while weekend outings could be done in minivans. As car sharing becomes popular, with fewer interior safety restrictions, cars can be built suitable for any activity, season or number of passengers. Most significant, consumers can escape the trap of owning a car that sits unused for more than 22 hours each day, on average, taking up space and slowly losing value while ever more advanced vehicles are manufactured.

— Jeffrey Kanne and Darob Malek-Madani

markets of San Francisco. In urban centers, more green space will make urban living more attractive and desirable, encouraging residential and retail development.

**Office landlords with tenants who depend on conventional vehicles will lose out.** An enormous number of U.S. workers have jobs related to the infrastructure for nonautonomous

vehicles. Aside from the approximately 3 percent, or 4.5 million people, in transportation such as truck drivers and cab drivers (as tracked by the Bureau of Labor Statistics), a large white-collar workforce — including auto insurers and brokers — will face dramatic declines as driverless cars reduce or eliminate the number of traffic accidents from human error. The consequential drop

in insurance premiums and profits could lead to widespread job cuts and the need for less office space. Landlords should be examining their tenant rosters to identify the victims of driverless vehicles.

**Demand will increase for data centers and creative office space.** As our fleet of hundreds of millions of vehicles transitions into sophisticated, mobile, computer-driven telecommunication devices, the already extraordinary demand for data-center space will grow, as will office needs from high-tech and creative professionals who create the software and designs for the new vehicles.

**Prime real estate will become available.** Autonomous cars, operating as fleets and maintained and refueled at central locations, will make the now ubiquitous corner gas station/convenience store obsolete. Even privately owned autonomous cars will be programmed to refuel on their own. As of 2012, the United States had 125,000 gas station/convenience stores, many sited on busy intersections, which will be suitable for redevelopment.

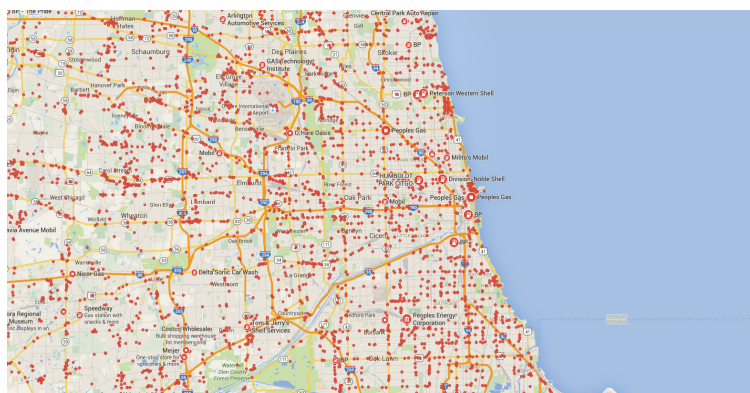
**Certain not-so-prime real estate will need to fulfill other purposes.** Fleet ownership and maintenance will be the rule. Private vehicle dealerships, repair facilities and car washes will become superfluous and require repurposing.

**Demand will lessen for transit-oriented property.** As cities expanded subway and light-rail systems, they encouraged extremely dense development around stations and less density elsewhere. Under the existing paradigm, values increase with proximity to transit centers. A CBRE study determined office towers adjacent to subway stations in Manhattan receive up to a 19 percent rent premium over buildings only two blocks away. These premiums could diminish, and some transit station properties may lose their relative value edge entirely or become less valuable.

**Demand for transit-oriented property will increase.** Yes, we know this prediction directly contradicts the previous prognostication, illustrating how difficult it is to forecast the changes to come. At least initially, the desirability of living close to mass transportation may increase because many people may be more willing to abandon their cars and depend on the ready availability of driverless cars if they know they are able to conveniently move around on subways, light rail or buses.

**Demand for suburban and rural residences will increase.** While driverless cars may make urban life more attractive, long-distance commutes from the suburbs also could become more feasible because of faster drive

times and more efficient use of time in the car. A driverless-car rider will be able to work, sleep, play or dine while the GPS-based software systems find the fastest routes and eliminate accident tie-ups. Tomorrow's 100-mile commute with cars traveling mere inches apart could take as long as today's 25-mile trip, with far less stress and greater productivity. In the past, as transportation became cheaper and more convenient, people moved farther away from their places of



In the above image of Chicago, every red dot signifies a gas station, convenience store or auto repair shop.

work. If that phenomenon holds true following the introduction of autonomous vehicles, some urban centers could suffer population reductions as exurbia rebounds. The standard urban economic model predicts, as transportation costs fall, cities will expand outward because people are willing to commute farther. This result has been consistent over the past century in the data; commuting distances have greatly increased as both incomes have risen and transportation costs have fallen with the development of streetcars, mass transit, automobiles and the interstate highway system. Today, fewer people live in Manhattan than in 1900, despite the population of the metropolitan area more than quintupling.

### Down the road

Driverless vehicles will be here before we know it. The current Transportation Secretary Anthony Foxx has said fully autonomous cars will be available to consumers within the next 10 years and will dominate the roadways in the years to follow. A tsunami of economic and cultural change will arrive with the driverless car, and real estate lies directly in its path. Smart investors will begin analyzing their portfolios now. ♦

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**Jeffrey Kanne** is president and CEO of **National Real Estate Advisors**, and **Darob Malek-Madani** is head of research and analysis with the firm.

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