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In the throes of an evolution, retail is forging new paths.

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Capital markets signal caution ahead.

Driverless vehicles shift property paradigm.

CCIM 50 YEARS

EXCELLENCE IN COMMERCIAL REAL ESTATE

Cultural Revolution

Driverless vehicles will dramatically change the commercial real estate landscape.

by Jim Winter

Driverless vehicles are coming, and coming fast. Many of the world's largest and most prestigious corporations are investing billions in the technology.

Google has been testing a self-driven Toyota Prius in California since 2009 and has logged more than two million miles after expanding its operation to Arizona, Texas, and Washington. Uber began an autonomous vehicle pilot program in Pittsburgh in September 2016, while a start-up called nuTonomy is running public trials in Singapore and Boston.

Tech giant Apple is pursuing driverless vehicle opportunities, as are Ford, General Motors, and the majority of automobile manufacturers. Electric car innovator Tesla Motors already has partial driverless technology available; its "Autopilot" software upgrade is part of a $4,250 technology package available for several of its vehicles.

The public sector also is paying attention. In 2016, the U.S. Department of Transportation announced a 10-year, $3.9 billion investment "to accelerate the development and adoption of safe vehicle automation through real-world pilot projects."

Nearly 80 years after General Motors' Futurama exhibit at the 1939 World's Fair foretold "fine green parkways upon which cars would drive themselves," autonomous vehicle technology is poised to be our next cultural revolution.

$168 billion in potential savings for the U.S. freight transportation industry.

Major Shifts in CRE

Estimates vary as to when driverless vehicles will dominate the landscape, but many experts believe that they will be a major presence on U.S. roads and in individuals' lives by 2025. Should this happen, the changes to U.S. businesses and people's daily lives will come swiftly.

"It's going to require a major shift in human behavior," says Gunnar Branson, CEO of the National Association of Real Estate Investment Managers. "But change takes a really long time until it doesn't. When the shift happens, it's going to happen very quickly. Sometimes change defies our human attempt to control it."

There are many examples of technology that existed, but took decades to become widely adopted. Branson cites MP3 technology, which was patented in the late 1980s. Not until a couple of decades after its development did MP3 technology transform the music industry.

When the change comes, some aspects of the commercial real estate industry seem primed to benefit greatly, while others are likely to suffer. Where will be the greatest changes?

"A less car-centric world will affect all sectors of commercial real estate, especially multifamily, office, and retail," says Todd Clarke, CCIM, president of NM Apartment Advisors in Albuquerque, N.M. "Mass transit is coming faster to urban centers because many millennials view cars as a waste of resources. It's not a social activity, and they cannot text while driving.

"Two years ago, I would say the transition would take a long time. Now I think the transition will be pretty quick, as in the next 10 to 20 years. I ask myself: What will things be like if I don't need four lanes of road? It's amazing to think what the redevelopment potential of a four-lane road could be."

Changing Property Valuations

One probable result of these and other changes triggered by the large-scale adoption of driverless vehicles is that property value will be judged by different criteria.

"Some areas currently do really well because they're easy to get to by car, or it's cheap to park," Branson says. "Those benefits are less valuable in an environment where people can hail a robot car and get where they want to go."

As an example, Branson points to the impact that the automobile had on real estate at the turn of the 20th century. "There will be new winners and losers, just as there has been during any other significant transportation technology shift that occurred during the past couple of hundred years," he says. "When we switched from horses and trolleys to automobiles and electric trains, the impact was profound. It had a significant effect on our cities and our real estate values."

While Tom Bothen, CCIM, looks forward to a future of less congested roads and more space with fewer parking lots, he thinks the transition will take longer — 2050s or 2060s for substantial adoption — because the current cost for adding driverless technology to a car is about $75,000 to $100,000 extra. However, a semi-autonomous Honda Civic is about $20,000 total, indicating that prices will drop substantially.

"Changes will happen more gradually on the roads, but the big push for public transportation is happening already," says Bothen, owner of Bothencharles Real Estate Group, LLC, in Willowbrook, Ill. "Urban planning, zoning, and building codes will drive the impact of driverless vehicles. Globally, the population trend is that 70 million people annually are moving to cities. We have to find more efficient ways to move those people around, which will be some combination of driverless cars and public transit."

In April 2016, six of the largest manufacturers in Europe completed a test in which convoys of semi-automated smart trucks arrived at a port in The Netherlands. One of the convoys traveled more than **1,200 miles.**

tiler84; DeCe_X

States with Autonomous Vehicle Legislation

Enacted

- Alabama
- California
- Florida
- Louisiana
- Michigan
- North Dakota
- Nevada
- Pennsylvania
- Tennessee
- Utah
- Virginia
- And the District of Columbia

Executive Order

- Arizona
- Massachusetts

Source: National Conference of State Legislatures

A major question is how the onset of autonomous vehicles will affect the urban-suburban dynamic. People may be drawn to the suburbs because commuting in a driverless vehicle would be less stressful and more productive, while the cost and headache of urban parking would no longer be an issue.

On the other hand, as parking garages and other automobile-related space are converted to residential, recreational, or commercial uses, could cities become less expensive and more attractive to newer demographics?

"The world is never a simple binary yes and no," Branson says. "I think the effects will vary. There will be interesting winners in the suburban environment and in the urban environment."

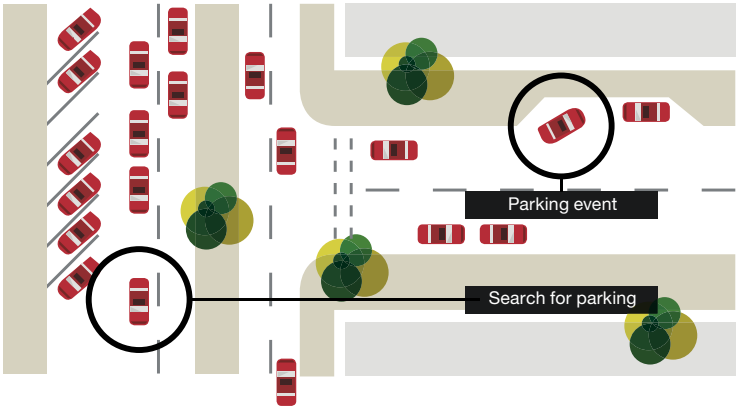
Rapid Technology Breakthroughs

Autonomous vehicle technology comes in many different forms, some of which many individuals may already be using in their personal vehicles. New models of popular cars increasingly include features that help drivers brake, park, and avoid collisions.

A study by the U.S. Department of Transportation's John A. Volpe National Transportation Systems Center identifies 13 different autonomous vehicle concepts, ranging from near-term automated technologies (such as, traffic jam assist) to fully automated vehicles that lack any mechanism for human operation.

"Some of the concepts represent automated vehicle features that are likely to be introduced within a few years," the U.S. Transportation study authors wrote. "More advanced concepts, on the other hand, may not be available for a decade or more (if ever), but the concepts represent plausible applications of automated vehicle technology in light of the current pace of technological development."

Self-driving Technology Could Eliminate the Hassle of Human-Powered Parking.



Source: *Consumers Electronics*

Pros, Cons, and Obstacles

Proponents of driverless vehicle technology contend that removing humans from the traveling equation will make roads safer and more efficient. When machines do the driving, they assert that individuals will live in a happier, more productive, and less energy-dependent society.

Myriad studies have found that human error or deficiencies contribute to about nine of every 10 automobile accidents. With computers at the wheel, traffic jams caused by crashes would diminish, and cars could conceivably travel closer together in narrower lanes. Delays resulting from distracted drivers, hesitations at traffic signals, and many other efficiency drains would disappear.

Skeptics worry about the loss of human control and argue that the technology isn't sophisticated enough for everything that goes into driving. Case in point: Tesla's Autopilot was involved in a fatal crash in Florida on May 7, 2016. With the autonomous feature engaged, the car drove directly into a tractor-trailer at 65 miles per hour.

Other resistance may be motivated by the threat to certain professions, such as truck and taxi drivers, and even entire industries such as automobile insurance and car dealers. Regulatory and transportation infrastructure limitations also exist.

Regulators are trying. According to the National Conference of State Legislatures, nine states and the District of Columbia had enacted legislation related to autonomous vehicle operations, and two had issued an executive order on driverless vehicles as of year-end 2016. Several others continue their debate on the matter.

In conjunction with its funding news, the U.S. Department of Transportation released a set of federal guidelines

intended to establish standards for autonomous vehicle lawmaking to avoid drastically different rules from state to state.

Industry Adaptation

The freight industry's transition toward greater automation is already underway in the age of e-commerce, but it is certain to accelerate and expand with the widespread use of driverless vehicles. Ultimately, logistics companies such as DHL and FedEx foresee a future in which driverless vehicles can fully automate deliveries.

The trucking industry is in the crosshairs of driverless technology, as executives and investors envision fleets of trucks absent the cost of drivers' salaries. Financial services company Morgan Stanley offers the conservative estimate of $168 billion in potential savings for the freight transportation industry when autonomous trucks are rolling on U.S. highways.

Truckers may fight it, but their position is weakened by the chronic driver shortage, and an annual turnover rate at U.S. trucking companies hovering around 71 percent for large truckload fleets, according to the American Trucking Association. The U.S. deficit of truck drivers could potentially climb to 175,000 by 2024.

Many European companies anticipate worsening driver shortages. Several major corporations have set their sights on autonomous trucks. In April 2016, six of the largest manufacturers in Europe completed a test in which convoys of semi-automated smart trucks arrived at a port in The Netherlands. One of the convoys traveled more than 1,200 miles.

In October 2016, self-driving truck company Otto completed a fully autonomous delivery in Colorado. The San Francisco-based company, started by former Google engineers and executives and acquired by Uber in August 2016, still had a driver along for the ride. But the successful point-to-point delivery was likely a glimpse into the trucking industry's future.

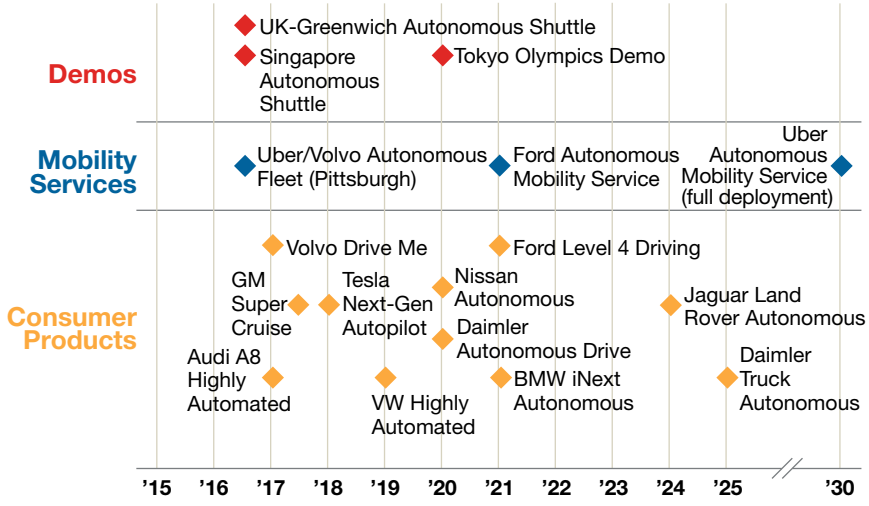
Driverless trucking proponents argue that autonomous technology will benefit truckers by allowing them to focus on higher-function tasks. This remains to be seen.

Paradigm Shift

Uber CEO Travis Kalanick took some heat for a statement he made at the 2014 Code Conference, noting that the cost of taking a self-driven Uber will be cheaper than owning a vehicle. "You basically bring the cost below the cost of ownership for everybody, and then car ownership goes away," he said. What also goes away are Uber drivers. Despite the blowback, Kalanick countered that the future he addressed is inevitable, albeit years away.

Top Companies Engaged in Driverless Vehicles

Timeline of events from 2015 through 2030 projections



Source: Press search; Company websites

On another front, transportation infrastructure has made less progress. Some experts say that the solution to our crumbling highways, bridges, and railways lies in embracing new technologies — autonomous vehicles in particular — rather than investing in roads built for vehicles that may soon become obsolete.

Also in conjunction with the decline in car ownership, the parking garage is likely to be a relic of the automobile age. This is not only because fewer people would own vehicles, but because self-driving cars don't need to park near the humans they transport. They could simply keep going, moving from passenger to passenger, stopping only to refuel or for repairs.

When autonomous vehicles do need to park, they can do so with more precision. This would require less space for occupant entry and exit, thus reducing the size of the average parking spot.

In this version of the future, the concept of traveling for work or leisure is likely to be entirely different than it is today. This, in turn, could affect where individuals live, what people buy, how the society designs and constructs buildings, transportation infrastructure, and many other components of daily life.

Ultimately, human hearts and minds may be the greatest obstacle to the adoption of driverless vehicles. Even the most avid technophile must admit that a fully autonomous vehicle requires a major leap of faith for people accustomed to doing the driving.

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