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Parking

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The Human Code

Developing Parking Leaders for Success

Mobility Trends

The Future of Driving: What We Know, What We Should Know, and What's Next

We are living in strange and exciting times.

Technology enabling the possibility of driverless vehicles is coming. Electric vehicles and technology-enabled ridesharing are already here.

The Dream of AVs

Daily, we see predictions that autonomous vehicles (AVs) will eradicate parking, expand mobility to the masses, and serve as an ecological panacea.

Supposed experts' hypotheses about this improved future detail a vision of perfect communities served by roving shuttles whisking us to and from destinations.

These predictions are not baseless. Technological advancement absolutely can improve safety and enhance mobility for underserved people.

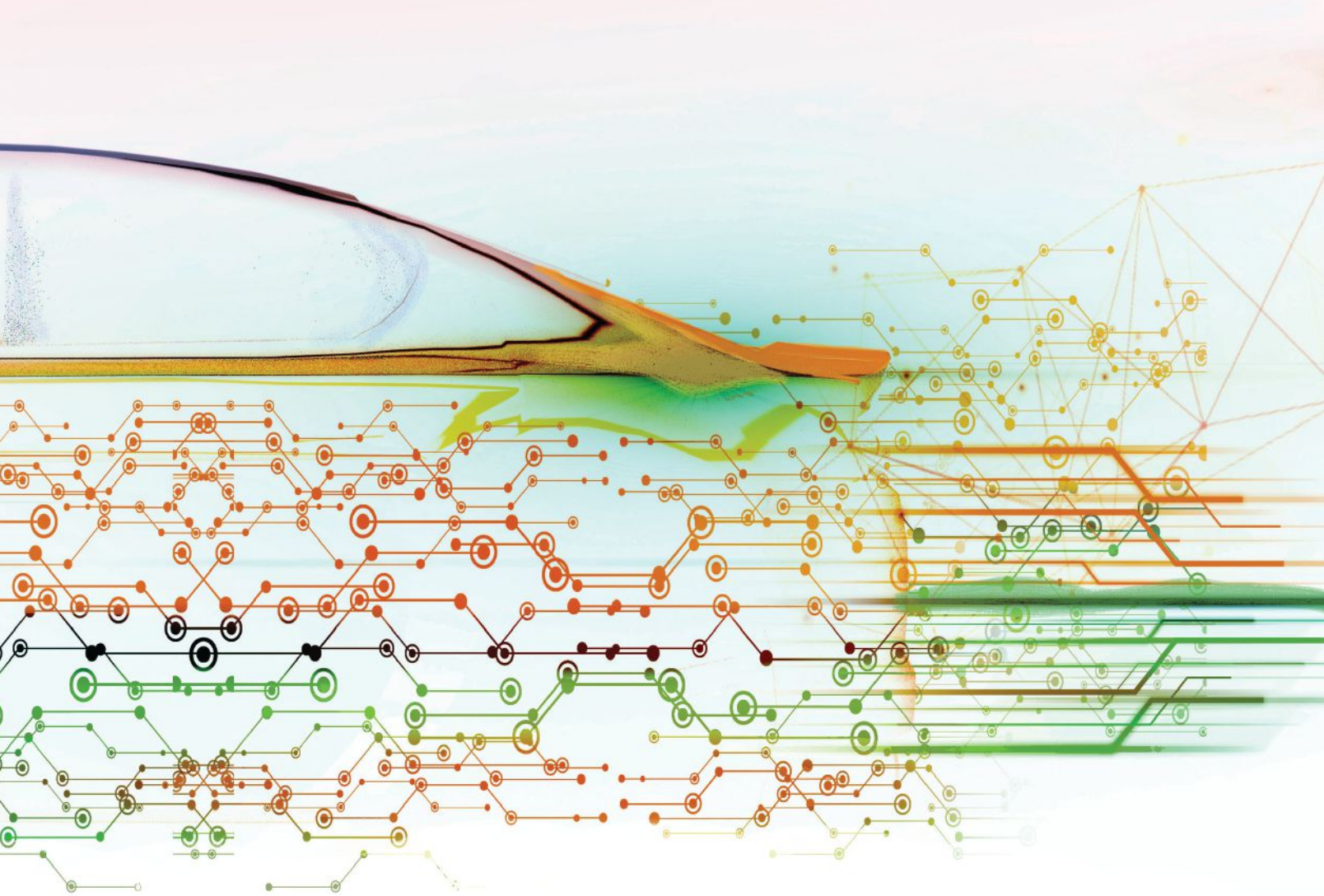
The convergence of autonomy, electrification of the vehicle fleet, and the sharing economy all bring various benefits.

Replacing internal combustion engines with electric drivetrains will yield lower operating costs for many people.

Electric engines also promise to reduce transportation's environmental impact.

Changes Already Happening

The explosion of mobile connectivity solutions has already reshaped industries and helped reach consumers in new ways.



Taxis have seen the greatest impact, being substantially replaced by transportation network companies (TNCs) like Uber or Lyft in many markets.

The rise of sharing markets and idea platforms like Pinterest, VRBO, and Airbnb all give consumers access and information in broader and convenient ways.

Having a tool to pilot the vehicle during congestion or the daily commute is appealing to many people.

The Stats Behind Electric Vehicles

With so many claims out there, what do we know is true?

Based on the sales numbers, there is a demand for electric vehicles. However, without incentives or regulation, there has been little sign of market growth.

Plug-in electric-vehicle sales have increased nearly fourfold in the past five years, but in 2017, they only made up 1.17 percent of all light-vehicle sales.

Adding hybrid electric vehicles grows the proportion to 3.4 percent, but this has held steady in recent years.

In fact, sales of hybrids have declined nearly 15 percent since a peak of 495,529 hybrids in 2012, according to 2019 data from the Alternative Fuels Data Center.

Declining incentives might have influenced these recent sales, but without high gas prices or regulation, a shift to electric vehicles probably won't happen on its own.

Challenges for AVs

The development of AVs seems to have hit hurdles lately as well.

Major influencers have conceded that true autonomy is more difficult and costlier to reach than expected.

LIDAR and other tracking systems are complex and expensive.

The infrastructure necessary to support truly autonomous systems will need major and wide-scale updates.

American roads have been deteriorating for decades. The country needs a reliable and consistent road network, not only for today's vehicles but crucially for AVs.

3/4 of transportation network company (TNC) trips happen outside of peak travel hours.

38–45% of TNC trips are on Fridays and Saturdays.

Most TNC trips are within a **single ZCTA** (ZIP code tabulation area), between nearby ZCTAs, or to/from a ZCTA with an airport.

11% of vehicles are "in use" during the day, even at peak travel hours (this rises to 16% considering only newer vehicles).

Weather, affordability, insurance, and liability all will slow implementation and may also have unintended consequences.

Finally, studies have found that AVs may hurt transit ridership, and they can encourage sprawl.

How TNCs Affect Driving

TNC behavior *is* changing. However, many users prefer the convenience of TNCs for only select types of trips.

While TNC usage is increasing overall, more people use TNCs for infrequent or special trips (airport, sporting events, etc.) rather than for reoccurring trips such as commuting.

Many downtown areas have also experienced growth in congestion as municipalities struggle to manage this increase in traffic, according to a Jan. 12, 2018, article from CityLab on the "Uber effect."

There haven't been many constructive solutions for congestion.

A 2018 Transportation Research Board study on the interplay among public transit, shared mobility, and personal automobiles recently confirmed that most TNC trips are into downtown cores.

The study also found that usage is heaviest at night and on weekends.

TNCs are not replacing commuting trips, supporting the idea that Americans want the independence of their cars.

Joining All Three Elements

The synthesis of autonomy and electrification offer potential, but they need to be coupled with a shared usage of vehicles.

Three elements working in unison – electric, shared, *and* autonomous – would reduce costs lower than that of a personal car.

Electrification should reduce cost of operation, but this would hold true for both personal and commercial use.

Without the shared component, the cost of operating electric AVs would be simply comparable to personal cars, according to a 2016 report on peak car ownership by the Rocky Mountain Institute.

The Challenge of Change

Given equivalence in choice, change will be difficult for many people.

In the near term, TNC usage will continue to be supplemental for most users.

TNCs replacing nonautomobile trips – such as transit, walking, or biking – will normalize over time.

However, projections of a future dominated by shared AVs are optimistic at best.

Convenience is paramount for most users. Cost alone is unlikely to push most people to share AVs.

The Role of Behavior

However, there are some interesting shifts in personal automobile behavior at play.

Millennials are getting driver's licenses later in life compared with their predecessors, but single-occupant vehicle commuting rates have not declined, according to 2014 statistics from the Federal Highway Administration.

Carpooling participation has remained constant since the 1980s, as have other commuting modes.

The trend toward carless and single-car households may also be reversing, possibly as the younger generations transition from urban living to suburban families, according to 2006-16 data from the U.S. Census Bureau.

"Three elements working in unison – electric, shared, *and* autonomous – would reduce costs to lower than that of a personal car."

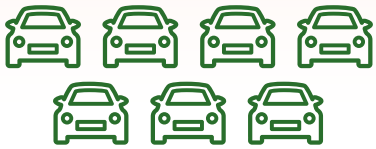
Implications for Parking

Predictions of 90 percent reductions in parking have been repeatedly made, but often, these claims are misrepresented or used out of context.

As early as 2013, a study from PricewaterhouseCoopers discussed a 90 percent reduction in car ownership. This was reportedly intended as a wake-up call to automobile manufacturers.

Eighty-four percent of trips originating in an area could be replaced by shared AVs, according to a 2015 article by Daniel J. Fagnant and Kara Kockelman for *Transportation Research*.

Each new autonomous vehicle (AV) could result in **$250** in parking savings, assuming 10% of AVs are publicly shared.



There should be **7 shared AVs per 100** clients.

At least **50%** of a population must be willing to rideshare to fully maximize the benefits of a dynamic ridesharing AV system.

Shared AVs could replace parking demand by 90 percent, but only for those who use shared AVs all the time.

This is according to a 2015 study by Wenwen Zhang, Subhrajit Guhathakurta, Jinqi Fang, and Ge Zhang on the impact of shared AVs on urban parking demand.

This predicted 90 percent reduction is in trips or car ownership – not parking – by those whose trips stayed inside the area. The reduction assumes everyone who can *will* use shared AVs.

It simply is not everyone who parks today.

Realistic Expectations for AVs

To be clear, advances in autonomy, electrification of the vehicle fleet, and shared trips will usher in changes for parking.

Not everyone enjoys driving, and many people use alternative modes when convenience or cost compel them to.

However, only about 20 percent of Americans live in urban areas conducive to regular AV trips, and city center populations are not growing.

Rather, urban populations are holding relatively constant, while the suburbs are gaining population, according to Jed Kolko's analysis of U.S. Census data.

If the urban segment of the population *did* replace their trips with shared AVs, there could conceivably be an 18 percent reduction in parking. However, this is far from the 90 percent claimed.

The likelihood of even this reduction is still slim. Most households in dense urban areas are not yet carless and are most likely to use available transit services.

The National Vehicle Fleet

The reality is that most Americans live outside areas conducive to AV trip usage.

This fact, along with the size of the present vehicle population and the aforementioned challenges to change, mean that a much more modest change in behavior can be expected.

The present personal vehicle fleet in the U.S. is somewhere near 250 million vehicles.

A substantial number of non-AVs will continue to be sold for the next decade or more.

Assuming substantive growth in AV sales between 2020 and 2030, there could be a modest softening in overall parking demand in cities starting around 2030.

However, this is more likely true in 2040 or beyond.

Inconsistent Change Across the Board

Additionally, any effects will be nonuniform. Local density, weather, and the like will affect any change.

Certain land uses, such as hotels catering to business travelers or airports, may see more pronounced effects.

In fact, they already are being affected by growing TNC usage.

Over time, other uses may see a decrease in parking demand, but it is simply unrealistic to project any substantive reductions in the next few decades.

Guidance for Parking Owners

So, what should parking-company owners do today? As with all good planning, provide just enough parking for commerce to thrive.

The growing popularity of mixed-use developments over single-use or isolated development is encouraging.

However, municipalities should be encouraged to provide flexibility in parking planning. Owners should develop appropriate shared parking models to plan their parking investments sensibly.

A Look to the Future

Over time, the parking market will adapt to changing conditions.

Infill development of existing campuses, downtowns, and urban centers will continue. Antiquated parking garages will be torn down. Parking lots will be replaced by new buildings with innovative parking options for all types of transportation methods.

In many cases, the existing parking market will absorb changes, adding and improving service as the market demands.

Change is coming, but those who carefully and strategically plan for change will be rewarded. ■

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