Faster, cheaper, cleaner, safer?
Autonomous vehicles, shared transportation, and the future of mobility

September 2018
Converging forces are transforming longstanding industry structures and dynamics

**Maturing powertrain technologies**

- Electric vehicle battery costs have fallen ~80% in 7 years.¹
- China, India, the UK, France, and others plan to limit sale of new ICE vehicles in the next 10-20 years

**Lightweight materials**

- Stronger and lighter materials are reducing vehicle weight without sacrificing passenger safety

**Rapid advances in connected vehicles**

- New vehicles are being outfitted with vehicle-to-infrastructure (V2I), vehicle-to-vehicle (V2V), and communications technologies, so every car can know precisely where every other car is on the road

**Shifts in mobility preferences**

- Younger generations are leading the way toward pay-per-use mobility in place of owning a car. Half of US-based ride-hailing users say it has caused them to question their need to own a car in the future²

**Emergence of autonomous vehicles**

- Autonomous drive technology is no longer a case of science fiction; the question is when and how will it become more mainstream and widely adopted

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¹ Bloomberg New Energy Finance ² Deloitte Global Automotive Consumer Study, 2017

Source: Deloitte analysis
Stakes are high – with approximately **$2 trillion** in revenues collected annually by the current extended auto industry

**Current extended automotive industry revenues**

- **$735B** Automotive
- **$101B** Finance
- **$205B** Insurance
- **$573B** Energy
- **$251B** Public sector
- **$24B** Retail
- **$59B** Transportation
- **$16B** Media
- **$35B** Medical & Legal

**Wholesale and dealer vehicle sales and service; suppliers; and mechanics**
**Auto insurance**
**Fuel, licensing, and auto sales taxes; traffic enforcement; tolls; public transportation; parking**
**Oil companies and gas stations**
**Radio advertising; outdoor advertising**
**Rental vehicles; taxi and limo services; private parking garages**
**Aftermarket parts and service channel**

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1Total revenue is $1.99T.

The result could be a new mobility ecosystem that provides substantial benefits

- Vehicles operate autonomously and nearly never crash
- Vehicles are consumed through end-to-end mobility providers and less likely to be personally owned assets
- Taxation and public revenues shift from a fixed model to a more dynamic one
- Seamless multi-modal transportation becomes the new norm
- New predominantly “driverless” cargo transportation and delivery systems emerge
- Consumer data provides the highest sources of value in the system
Converging forces will give rise to the emergence of four future states of mobility, which will exist in parallel.

**Extent to which autonomous vehicle technologies become pervasive:**
- Depends upon several key factors as catalysts or deterrents—e.g., technology, regulation, social acceptance.
- Vehicle technologies will increasingly become “smart”; the human-machine interface shifts toward greater machine control.

**Extent to which vehicles are personally owned or shared:**
- Depends upon personal preferences and economics.
- Higher degree of shared ownership increases system-wide asset efficiency.

**Fully autonomous drive** means that the vehicle has full responsibility for controlling its operation. It is fundamentally different from the most advanced form of driver assist.
Our forecasts estimate an increase in total miles traveled, a decline in overall vehicle sales, and faster shifts in urban centers towards AVs and shared vehicles.
Easter Sunday, Fifth Ave., New York City, 1900

Tony Seba, tonyseba.com, 2014
Easter Sunday, Fifth Ave., New York City, 1913
There are a number of forces that will influence the rate at which the new mobility ecosystem takes shape.

**Forces of Delay or Acceleration**

- **Regulation & Government**
  Federal, state and local policies

- **Public Attitudes**
  Human-machine interface, safety, shared economy

- **Technology Development**
  Early experiments, pilot programs

- **Privacy and Security**
  Cyber-security, communication protocols

- **Wall Street Valuations**
  Technology investments, cost of capital projections

- **Employment Changes**
  Dislocation effects, reactions, job retraining

Source: Corwin, Vitale, Kelly, Cathles, *The future of mobility.*
Let us explore how people will likely experience a seamless intermodal journey in the future

Meet Ben...

...he is a millennial living just outside the city

...he wants to pick up groceries

...he is ready go home after a long day at work

Let’s explore his journey home and the supporting ecosystem
The future of mobility: Ben’s journey
The Deloitte City Mobility Index – A global initiative covering 54 cities in 2018

Three key themes: Performance & Resilience, Vision & Leadership, and Service & Inclusion
Across our 54 cities, several key points stood out in the initial findings

1. What’s past is prologue
History plays a role—but is not destiny

- Current transport systems are a result of decisions made over years
- Authorities must tackle and transform existing systems
- Cities can overcome past legacies with innovative approaches

http://www.deloitte.com/insights/city-mobility-index
2. Integration is key

Include a wide range of players

- Good coordination should exist between different players:
  - central/local,
  - public/private,
  - suburb/city,
  - regulator/operator

- This makes it easier to join up
  - Timetables
  - Transport modes
  - coverage
  - payment systems
Across our 54 cities, several key points stood out in the initial findings (cont.)

3. Cars do have a role
But they must be managed
• Can be utilized as part of wider, integrated system
• Can play an important role in first-mile/last-mile journeys
• They must be “right-sized” for the local conditions:
  – infrastructure,
  – commuter culture,
  – who they share the road with

http://www.deloitte.com/insights/city-mobility-index
Chicago has an extensive and affordable public transport system that is well-integrated, secure, and easy to use. Still, the majority of Chicagoans choose to drive. It has strong leadership that promotes public transport as the preferred mode and ambitious targets for digital and technological options.
To date, congestion and pollution have been managed, but with a growing population this will not always be the case. Columbus already scores poorly on quality-of-life indicators, and these problems are likely to be exacerbated in the future absent investment in more accessible and active modes of transport. The award of the Smart City Challenge fund has the potential to transform Columbus’s transport system.
A new mobility ecosystem will emerge delivering seamless intermodal transportation faster, cheaper, and safer than today.