SHIFTING FROM TRANSPORTATION 1.0 TO TRANSPORTATION 2.0

What's around the corner?

March 22, 2018

Who am I?

I'm a developer.
Only the paranoid survive.

It's tough to make predictions, especially about the future.
1886: From Horses to Horsepower

Karl Benz Patented First Gasoline Powered Automobile

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OPENING THE HIGHWAYS TO ALL MANKIND

“Block out all the roads of the Ford Motor Company is the slogan of 20 years ago — a whole
hundred years from now the road on the people’s highway should be within easy reach of all the people.
As transportation, to make any service or widely useful, must be large in scope as well as
great in purpose. To unmake the high cost of making and to unmake the fiction of pro-
duction — that is a great purpose. Naturally it has a large program to carry it out.
And yet, this thought has been the principal and inspiration to the two organization’s
program. That road has been extended to the barriers of the world. In the world’s commerce and
the world’s labor and its natural resources, it has expanded to the limits of the world’s commerce and
its natural resources. In accomplishing its aim the Ford motor has never been defeated by the size or
difficulty of the task. It has opened the road in breaking the way of doing each task first.
It has blazed the trail with consummate success.

The effort has been greatly successful. For through this organization, the motor car
which is contributing so much to make the world easier, practical and
manly while it has been made available to millions.

The Ford Motor Company views its situation today in the light of great achievement, with
its success and future possibilities of new and larger opportunities for service to mankind.

Ford Motor Company

Development and operating coal and iron mines; steel mills; blast furnaces; smelters;
smelting; manufacturing; transport, warehousing, sales, accounts, sales
departments, advertising; transportation; industrial research, and sales
organizations; construction and design services; plant research, sales.

4,071,000
Transportation 2.0

Sharing Economy

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The Evolution of Shared Mobility Services

- **Carsharing 1.0** Station Based
  - Early model of carsharing where vehicles are picked up and returned to the same location, typically through an hourly rental.

- **Carsharing 2.0** One-to-Many
  - Second generation of carsharing where vehicles can be picked up and dropped off in different locations (possibly by zone vs. designated parking spots) typically charged by minute.

- **Carsharing 3.0** P2P
  - Poor-to-peer sharing where individuals can rent out their personal vehicles to others when not in use.

- **Ride-hailing**
  - Platform where individuals can hail and pay for a ride from a professional or part-time driver through an app.

- **Shared Ride-hailing**
  - Extension of ride-hailing where individuals can be matched in real-time to share rides with others going on a similar route.

- **Microtransit**
  - App and technology-enabled shuttle services, typically in a van-size vehicle, some with dynamic routing, others with semi-fixed routes.

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MOBILITY IN CHINA

THE SHARED ECONOMY FOR CARS IS BOOMING

- **Car Ownership is Rare**
  - China: has only 1 car for every 7 people.
  - USA: 1 car per 1.25 people.
  - Western Europe: 1 car per 2 people.

- **Renting is Still Uncommon**
  - China: has just 0.4 rental cars per 1,000 people.
  - USA: 3 cars per 1,000 people.

- **Sharing in General is Huge**
  - Sharing apps for just about everything – rides, umbrellas, battery packs, books and even folding chairs – are flourishing.
  - Roughly 10% of the Chinese vehicle fleet is "shared" in the form of taxis, rental cars, ride-hailing etc.

- **Taxi and Limousine Use is Widespread**
  - China has about 12 times as many taxis as the USA (adjusted for the ratio of taxis to the total car park).

- **Car Sharing Could Be Even Bigger**
  - Vast potential for car sharing business (hourly- or shared) through both organic growth and conversion from other mobility segments.
  - Taxi rides in Beijing and Shanghai cost about half what they do in New York (adjusted for purchasing power).

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Autonomous Vehicle

September 13, 1899

August 31, 1869
[Human] driving is the new smoking.

Gabe Klein, 2016
You trust someone you’ve never known to...

• Know all the rules of the road
• Not be on a call and distracted
• Not be distracted by the radio
• Not be on opiates
• Have taken their meds

• Not be drunk
• Not be tired
• Not be texting
Electric Vehicle
**Fuel Economy Improvement vs. U.S. CAFE**

- **Actual MPG (EPA Sticker)**
- **Required**

**2008** 20.8
**2015** 25.3
**2020** 30.0
**2025** 43.6

**2025 CAFE = 54.5 MPG**

- 0.65 MPG/yr for 7 yrs
- 1.8 MPG/yr For 10 yrs

*2.8 Times Faster!*

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Electric Cars Will Win on Price

Falling battery prices undercut gasoline cars by mid-2020s

Electric Car Costs:
- Battery
- Powertrain
- Vehicle
- Gasoline Car

<table>
<thead>
<tr>
<th>Year</th>
<th>Battery</th>
<th>Powertrain</th>
<th>Vehicle</th>
<th>Gasoline Car</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>48%</td>
<td>31%</td>
<td>27%</td>
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<tr>
<td>2018</td>
<td>42%</td>
<td>24%</td>
<td>21%</td>
<td></td>
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<tr>
<td>2020</td>
<td>36%</td>
<td>18%</td>
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<td>2022</td>
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<tr>
<td>2030</td>
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</tbody>
</table>
Note: Selected US battery electric vehicles (BEV) only. Positions are representative and do not indicate exact prices or range. Back labels = currently available, green labels = forthcoming models with specifications and timeline released. Blue labels = announced but limited details confirmed. Range is based on manufacturers statements, not on any specific test cycle.

End of the road for fossil fuel vehicles by 2030, says Stanford study

- German Government Votes to Ban Internal Combustion Engines by 2030
- Norway to ‘completely ban petrol powered cars by 2025’
- UK bans sale of diesel and petrol vans and cars from 2040
- India bans sale - 2030
- China enacts ban on fossil fuel vehicles by 2030
- France bans sale - 2030
California Considers Following China With Combustion-Engine Car Ban
Acceleration: 0-60
- Normal: 5.9s
- Sport: 4.4s
- Insane: 3.2s / 3.1s
- Ludicrous: 2.8s
- Ludicrous+: 2.27507139s

Ionizer hardware
Replacement key fobs
Screen cleaning mode
Improved power management when not in use
Vehicle sleep
Alarm system
Range driving mode
Charge limit
Traffic-aware cruise control
Forward collision warning
Auto high beam
Trip energy prediction
Reverse camera backup guides
Software update 8.0 kicks off a significant over-the-air overhaul of the Tesla touchscreen and introduces the biggest UI revamp since the launch of Model S. Customers who purchased their car in 2012 will receive the same value of functionality and improvement as customers who purchased vehicles last month.

30 releases!!
Tesla Model 3 Left Drivers
Without FM Radio, Bluetooth
or USB Audio.

Are you sure you want to push the limits?
This will cause accelerated wear of the
motor, gearbox and battery.

No, I want my Mommy
Yes, bring it on!
Video redacted due to size. See Information Cited document for the original video sources.
The arrival of Smart City innovations has added new urgency and opportunity for cities to achieve long-held goals to reduce single occupancy driving.
The Reimagined Car
Disruption, Implications and Choices
Rethinking Transportation 2020-2030
The Disruption of Transportation and the Collapse of the Internal-Combustion Vehicle and Oil Industries
A Rabobank Sector Disruption Report
May 2017
James Ask & Tony Inaba

The CONVERGENCE

UBER
ELECTRIC FLYING TAXI
Impact to Repair

The New York Times

New Cars Are Too Expensive for the Typical Family, Study Finds
July 1, 2016
Just a few of the safety features

- Adaptive Cruise Control
- Lane Change Assist
- Park Assist
- Collision Avoidance
- Vehicle Stability Control
- Back-up Assist
- Pre-Safe
- Blind Spot Detection
- Cross Traffic Alert
- Back up Camera
- Birds Eye View Camera
- Night Vision Camera
- Side Impact
- Heads- up Displays
- Lane Departure Control
- Self Parking
- Attention Assist
- Incline/ Decline Assist

Sample Repair – LED Lighting

A8 LED HEADLIGHT ASSY.
$2,765.00 Housing w/o modules
$275.00 Cooling Fan
$298.85 Daytime Running
$292.00 Directional Beam
$292.00 Turn Signal
$530.00 Mail Light Control
Total $4452.85 W/O Calibration

BMW LED turn signal bulb – $201.61
Standard signal bulb – $3.22
Sample: Zero Point Calibration

Front Bumper Camera: $647.50
(Mandatory after bumper R&I)

Adaptive Cruise $1,205.50
(Inc. 4 wheel Alignment)

Night Vision: $1,480.00

Blind Spot: $462.50

IIHS: In just 2 years, percentage of vehicles with front crash protection has crossed 50%
— August 26, 2015
In 2013, when the Insurance Institute for Highway Safety first started rating models for front crash prevention, 69 percent of them lacked even the simplest anticrash tech as an...

Reuters: OEMs producing 99% of vehicles to install autobraking by 2022
— March 16, 2016
GM said it will commit to installing autobraking in every vehicle it builds by 2022, Reuters reported Wednesday, citing unnamed...

Automotive News: IIHS head says adaptive headlights could be required soon for Top Safety Pick+
— December 1, 2015
A top Insurance Institute for Highway Safety executive said that a good adaptive "steerable" headlight option might be necessary for a Top Safety Pick+ rating...
Replacement emblem on some 2015 Toyota leaps in price — but could save your life

— February 10, 2016

Some late-model Toyota Avalons, Camrys and Highlanders with certain advanced safety options see the MSRP price of a

When is a collision repair ‘done’ on electronics-intensive car? Group working on question

— March 14, 2016

Saying he was “hopeful” but not positive a document could be ready by the 2016 SEMA, an electronics expert said a group is working on best...
A final prediction: The end of an era… As a result of this changing competitive landscape, we fully believe that in 10 years, many of the major automakers will no longer be around, at least not as independent companies. The companies that thrive in the future will likely be those that are nimble, future oriented—and prepared to invest in new technologies, new talent, and new strategic alliances.”

KPMG SPECIAL REPORT Nov. 2015

“…the end of the car industry is near.” -- Quartz

“People Will No Longer Drive Cars in 20 Years.” -- Motor Trend

“…cars are over.” -- Business Insider

73% of all interviewed executives rated collaboration with other industries as the best opportunity for industry growth as we progress toward 2025

75% of all executives we spoke with expect non-traditional industry participants to have a key role in the automotive ecosystem by 2025

PREPAREDNESS FOR 2025

Only 19% of interviewed auto executives describe their organizations as prepared for challenges on the way to 2025; 71% as somewhat prepared; and 10% as not prepared.

Exacerbating this limited readiness, just 33% said their organizations are adaptable to face challenges, 59% somewhat adaptable and 8% not adaptable.

IBM INSTITUTE FOR BUSINESS VALUE Jan. 2015

“Automotive 2025: Industry Without Borders”

“The key question is: Do you sell cars or do you sell mobility?” said Tim Ryan, New York-based vice chairman of markets and strategy for consultants PricewaterhouseCoopers LLP. “If you miss these megatrends, you run the risk of becoming irrelevant.”

BLOOMBERG Feb. 2014

“Woes of Megacity Driving Signal Dawn of ‘Peak Car’ Era”
We tend to **overestimate** the effect of a technology in the short run and **underestimate** the effect in the long run.

--- Roy Amara
What to Do?
What to do?

1. Get comfortable being uncomfortable
2. Think of yourselves as a technology company that owns real estate to deliver repair as a service
3. Co-creation (aka “separate sucks”)
4. Prepare for the Passenger Economy
What to do?

1. Get comfortable being uncomfortable
2. Think of yourselves as a technology company that owns real estate to deliver repair as a service
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Most companies die by suicide rather than homicide.

– Paul Graham
What to do?

1. Get comfortable being uncomfortable
2. Think of yourselves as a technology company that owns real estate to deliver repair as a service
3. Co-creation (aka “separate sucks”)
4. Prepare for the Passenger Economy

“THE BEST WAY TO PREDICT THE FUTURE IS TO CREATE IT.”
Software is eating everything.
   -- Marc Andreessen

Every company is now a software company.
   -- David Kirkpatrick

We can evade reality, but we cannot evade the consequences of evading reality.
   -- Ayn Rand

May you live in interesting times.
   -- Purported Chinese Curse
THE ZERO DOLLAR CAR
Available now
#1 Amazon Best Seller (Auto Industry)

www.JohnTEllis.com

LET’S TALK:
@JohnTechEllis
@JohnTechEllis
@JohnTEllis

#ZeroDollarCar

In essence, the same company (Motorola) that gave the world the first car radio, the first mobile phone, and the first walkie-talkie also produced John Ellis.

-- Roger Lanctot, Strategy Analytics

Worth a look, as John Ellis is one of the most provocative and knowledgeable thinkers I have met in the auto space.

-- Don Abraham, Kantar Futures

Whether you like it or not, John Ellis tells it like it is.

-- Regina Hopper, Former CEO, ITS America