Case Study: Disruptive Technology
Replacement of Bill of Materials

Easter morning 1900: 5th Ave, New York City. Spot the automobile.

Source: US National Archives.

Easter morning 1913: 5th Ave, New York City. Spot the horse.

Source: George Grantham Bain Collection.
Where are Vehicle Materials Going?
*Emphasis on Mass/Weight Reduction*

Both OEMs and suppliers are working on all parts of the vehicle to reduce mass/weight – with the focus on improving fuel economy, to be competitive and meet regulatory requirements.

% Impact on Fuel Efficiency

- Engine: 50%
- Transmission/Driveline/Axle: 15%
- Wheel / Tire: 10%
- Aerodynamics: 10%
- Auxiliary Units: 5%
- Weight: 10%

Where are Vehicle Materials Going?
*Emphasis on Mass/Weight Reduction*
Significant Weight Loss…
2019 Silverado models will be up to 450 lbs lighter, even though the length, interior space, and truck bed are all larger than the 2018 model…is the Result of Significant Investment
GM reportedly spent $3B updating its factories in Fort Wayne, IN and Mexico to produce the new truck. By comparison, Ford spent about $2B on investment for the Aluminum F-150

Majority of weight savings comes from frame and body

GM’s Mixed Materials Strategy
Right material in the right place for the right use

80% of the frame is high strength steel

Body in white products doors, hood, tailgate are made of aluminum.

...is the Result of Significant Investment
GM reportedly spent $3B updating its factories in Fort Wayne, IN and Mexico to produce the new truck. By comparison, Ford spent about $2B on investment for the Aluminum F-150
Where is the Automotive Industry Going?

*Longer Term Megatrends*

1. Autonomy
2. Mobility
3. Electrification
4. Manufacturing the Vehicle
Future Transportation Model

Vehicle Requirements will Radically Change

**TODAY’S Transportation**

- **EXPENSIVE**
  - Rental services
- **INEXPENSIVE**
  - Fleet sharing
  - P2P car sharing
  - Private Ownership

**DRIVE YOURSELF**

- **GET DRIVEN**
  - Taxi
  - Chauffeur Services
  - Ride-hailing (personal)
  - Ride-hailing (pooled)
  - P2P Carpooling
  - Public Transport

**TOMORROW’S Transportation**

- Privately Owned
  - Private Autonomy
- Personal/Pool Taxi
  - Autonomous Taxi
- Public
  - Public Autonomous Transport

(*) AUTONOMOUSLY DRIVEN
U.S. Mobility Direction

*Vehicle Miles Traveled will Drive Vehicle Requirements*

- Growth in miles traveled will be driven by autonomous vehicles capturing competitive and untouched markets
- Vehicles in Operation decrease over time due to the increased utilization and efficiency of shared autonomous vehicles
- Introduction of autonomy increases annual sales and shifts customer base from private ownership to shared ownership

![Vehicle Miles Traveled](chart1)

![Vehicles in Operation (VIO)](chart2)

![Annual New Vehicle Sales](chart3)
Case Study: Evolution of the Automobile Chassis
Changing Materials Requirements

- Vehicle differentiation requirements for end customers decline
- Utilitarian applications provide broader, common customer experience through autonomous, shared, electrified vehicles
# Future Automotive Supplier Model

**Manufacturing Relationships will Radically Change**

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<th>Current State</th>
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About Plante Moran

94
Years serving clients
(founded in 1924)

2,500+
Manufacturing &
distribution clients

100 BEST

20
Years on FORTUNE’s Best
Workplace list

39,000
Professionals worldwide

3,000+
In U.S.

Comprehensive Services

- Audit and Accounting
- Tax Compliance and Consulting
- Strategy and Operations Consulting
- Information Technology Consulting
- Cyber Security
- Transaction Advisory Services
- Human Capital
- Government & Infrastructure
- Wealth Management
- Life Insurance
- Investment Banking (PM Corporate Finance)
- Real Estate Development (Plante Moran CRESA)