The automotive industry on the brink of a new paradigm?

European Economic and Social Committee (EESC)
Brussels, 3 November 2016

Threats and opportunities for the supply chain owing to the integration of CLEPA new devices into cars, electrification, transition to self-driving cars

Alessandro Coda, Chief Technology Officer - CLEPA
Two big trends affecting the automotive supply chain: electrification and automated driving

1. Automotive supply chain in Europe – who does what where

2. Two big trends affecting the automotive supply chain: electrification and automated driving

3. Electrification – outlook and potential impact
   - Electrification scenarios and technologies
   - Impacts on the automotive supply chain

4. Automated Driving/Autonomous Vehicles – outlook and potential impact
   - Automated Driving scenarios and technologies
   - Impacts on the automotive supply chain
Automotive Suppliers – Global Players

EUR$^{1,2}$

~ 1,400 billion

was the size of the worldwide automotive supplier market in 2014

~ 4.5 million

people are employed by top 100 automotive suppliers alone

~ 390 billion

in value added generated by the automotive supplier industry in 2014

~ 110 billion

total investment (capex) in 2014 in the automotive supplier industry

~ 50%$^3$

of automotive innovations in the past decade were (co-)developed by automotive suppliers

~ 40 billion

invested in research and development by top 100 suppliers in 2014 alone

1 Estimates based on gross output and net operating profit of following industries: parts and accessories for motor vehicles, 36.7% of rubber products, 3.2% of paints and varnishes, 5.4% of glass and glass products, and 10% of wire, cable, and batteries
2 Dec 2014 exchange rate: USD 1 = EUR 0.81
3 68 out of 144 automotive innovations developed or codeveloped by suppliers

Source: McKinsey
The automotive supply chain in Europe – who does what where
Engine and transmission production in Europe

Source: Automotive News Europe

83 locations
21 OEMs and suppliers
Two big trends affecting the automotive supply chain: electrification and automated driving

**Electrification**
Stronger regulations on CO2 emissions, rising consumer demand, and government incentive programs for electric vehicles will boost electrical powertrain sales

**Automated Driving**
The technological advances and growth pockets for autonomous vehicles will drive increasing levels of autonomous vehicle features, leading to new market entrants, e.g., Google, and mergers and acquisitions

### Market share of electric vehicles¹ (incl. hybrids) / Percent of units produced

<table>
<thead>
<tr>
<th>Year</th>
<th>2014</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2</td>
<td>65</td>
</tr>
</tbody>
</table>

### Lines of software code per vehicle²

<table>
<thead>
<tr>
<th>Year</th>
<th>2015</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>100</td>
<td>300</td>
</tr>
</tbody>
</table>

Source: McKinsey
Electrification
Powertrain Scenario – electrification 48V

Vehicle sales PC incl. LCV<6t¹

<table>
<thead>
<tr>
<th>Year</th>
<th>Units [m vehicles]</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>0.0</td>
</tr>
<tr>
<td>2020</td>
<td>6.3</td>
</tr>
<tr>
<td>2025</td>
<td>15.2</td>
</tr>
</tbody>
</table>

BRS 48V – Boost Recuperation System

¹ Estimation Bosch
Powertrain Scenario – electrification >60V

Vehicle sales PC incl. LCV<6t\(^1\)

**total market**

- **2015**: 0.3 EV, 1.9 PHEV, 2.6 HEV, 0.4 total
- **2020**: 2.2 EV, 3.9 PHEV, 11.3 HEV, 18.5 total
- **2025**: 6.9 EV, 7.1 PHEV, 4.5 HEV, 18.5 total

EV – Electric Vehicle, PHEV – Plug-in electric vehicle, HEV – Hybrid electric vehicle

\(^1\) Estimation Bosch
# The impact of electrification on the automotive supply chain

## Key disruptive trends for suppliers

<table>
<thead>
<tr>
<th>Impact dimensions</th>
<th>Electrification</th>
<th>Connectivity</th>
<th>Autonomous driving</th>
<th>Advanced manufacturing</th>
<th>Advanced materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requirement of new capabilities</td>
<td>The battle for talent</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resource reallocation</td>
<td>The portfolio optimization challenge</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Change in roles</td>
<td></td>
<td>The battle for new profit pools</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Competitive landscape</td>
<td>New players entering with lasting impact</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New business models</td>
<td></td>
<td></td>
<td></td>
<td>The shift in successful business building</td>
<td></td>
</tr>
<tr>
<td>Shift of processes</td>
<td></td>
<td></td>
<td></td>
<td>Industry 4.0 entering the production process</td>
<td></td>
</tr>
<tr>
<td>Acquisitions</td>
<td>The race for the attractive targets</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: McKinsey
The impact of electrification on the automotive supply chain

<table>
<thead>
<tr>
<th>Component groups</th>
<th>Key disruptive trends</th>
<th>Connectivity</th>
<th>Autonomous driving</th>
<th>Advanced manufacturing</th>
<th>Advanced materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interior</td>
<td></td>
<td>2</td>
<td>4</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>Exterior</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>Chassis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Powertrain</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E&amp;E</td>
<td></td>
<td>3</td>
<td>5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Examples**

1. Complete change of powertrain from mechanical clutch to gearless e-engines
2. Large screens for the interaction between user and car
3. New onboard architecture and cloud connectivity required
4. Complete change of interior design possible, e.g., turning seats
5. Computer will control all electric components of the car
6. 3-D printing of complex new design elements
7. From classical punching and welding to backing and gluing
8. Lightweight materials, e.g., carbon will change shape of the car as well as composition and setup of chassis

Source: McKinsey
How automotive suppliers are answering to the electrification challenge

...to infrastructure
Connected charging infrastructure

...to software...
Microchips and sensors
Apps and data portals

...from hardware...
Low-voltage hybrid configurations (entry level)
High-voltage technologies such as plug-in hybrid systems and all-electric drives
Downsizing solutions, turbochargers, fuel direct injection and water injection (advanced ICE)
Power electronics and power management systems: electric superchargers, recuperation systems
Automated Driving / Autonomous Vehicles
Automated Driving and Autonomous Vehicles Scenario

New vehicle market share of fully autonomous vehicles

Percent

- High-disruption scenario entails
  - Regulatory challenges overcome in key markets
  - Safe and reliable technical solutions fully developed
  - Consumers enthusiastic and willing to pay

Source: McKinsey
The impact of automated driving on the automotive supply chain

3 groups of new players will become increasingly important in the value chain of autonomous driving focusing on future control points. In order to keep up, traditional automotive players need to become active to position themselves correctly within the value chain.

1. Incl. apps, app store, OS/platform, RE-signaling software
2. Incl. steering, engine, axles, etc., and car manufacturing as such
3. Dedicated short-range communication such as transmitter and receiver
4. Cellular connectivity device incl. 3G and 4G communication

Source: McKinsey
The impact of automated driving on the automotive supply chain

**Level of disruptiveness of major automotive trends on suppliers by component group**

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<th>Advanced materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interior</td>
<td>Green</td>
<td>Red</td>
<td>Red</td>
<td>Red</td>
<td>Red</td>
</tr>
<tr>
<td>Exterior</td>
<td>Green</td>
<td>Medium</td>
<td>Red</td>
<td>Medium</td>
<td>Red</td>
</tr>
<tr>
<td>Chassis</td>
<td>Green</td>
<td>Medium</td>
<td>Green</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Powertrain</td>
<td>Red</td>
<td>Green</td>
<td>Red</td>
<td>Medium</td>
<td>Green</td>
</tr>
<tr>
<td>E&amp;E</td>
<td>Yellow</td>
<td>Yellow</td>
<td>Yellow</td>
<td>Yellow</td>
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**Examples**

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Source: McKinsey
How automotive suppliers answer to the automated driving challenge

...to software as well as infrastructure
Sensors and micro-electromechanical systems (MEMS)
Connectivity solutions such as mobility apps and data platforms

...from hardware for partly up to highly automated driving
systems and sensors that enable
360 degree surround view for cars and trucks
pedestrian / cyclist identification,
automatic emergency braking,
lane change warning,
speed detection,
parking assistance
automatic parking,
blind spot detection
Electrification and Automated Driving – (r)Evolution ahead?

Electrified powertrains will play an important role in Europe’s mobility going forward:

- After an initial electrification „hype“, the next years will be a period of further maturation of technologies.
- As a result of EU regulation, automotive powertrains are likely to further diversify, resulting in a portfolio of powertrains.
- (Advanced) ICE will dominate the EU’s powertrain portfolio for the coming years, while EVs are likely to claim an increasing share.

Many of the automated driving technologies that will ultimately enable autonomous vehicles are already contributing to increasing levels of road safety:

- Increasing levels of automated driving will bring challenges especially with regard to data access, data privacy and ITS/ICT standards.
- Automated Driving for trucks (truck platooning) and smart logistics are top trends: a complex web of relationships between e-commerce, vehicle technology and connectivity will evolve.
Thank you for your attention

http://clepa.eu/

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