Presentation to MBS 2017 – Forecast Panel

Michael Robinet
Managing Director, Automotive Advisory Solutions
AUTOMOTIVE

The automotive sector is one of the biggest and most competitive markets in the world and relies on in-depth analysis for its daily operations.

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IHS Markit automotive solutions span the entire value chain, from product inception to sales, marketing and the aftermarket.

We scale our insights to address virtually any domain or enterprise, improving the speed, accuracy and impact of business strategy and tactics.
Past IHS Markit Forecast Panel Themes

• 2012: Constant Structural Change
  > Global platforms, pressure to add capacity while building profitability

• 2013: Opportunities and Bottlenecks
  > Rise of non-Detroit 3, need to look outside the traditional structures

• 2014: A Proactive Supplier
  > No longer wait for RFQs and ‘innovation ideas’ from customers – find the right business

• 2015: The Next Stage
  > Describing a market with faster cadence, driven by regulations and production localization

• 2016: Foresight Reigns
  > Need for suppliers to take greater control of their destiny

• 2017: Focus On The Journey ....
  > Level 5 & BEVs are the destination – The journey will separate winners from losers
Focus on the Journey

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Improving US Economy Will Keep Vehicle Market Steady

- Real GDP – Economic signals mixed; Consumer confidence and many sectors improving, but strong dollar hurting trade. Growth improving this year, 2.2%, and next year towards 3% before declining.
- Monetary Policy – FED expected to continue to raise interest rates, weak global conditions causing delays. US labor market key; do rising wages support tightening?
- Fiscal Policy – Spending will rise in 2017 thanks to proposed infrastructure and military outlays, contributing to growth for first time in years. Impact of 2017 Tax rate cut viewed as positive though replacing declining revenues will be an issue.
- Consumption – Real consumer spending improving – stronger labor markets, falling energy prices and improved household balance sheets all contributing.
- Housing – Plenty of recovery left to go, Housing Starts only at 2/3 of pre-crash averages. Sector will gain momentum as household formation and labor markets improve.
- Employment – The good times of monthly job gains averaging 200,000 or better are probably over; the rest of this year and next should be more moderate than the past couple of years.
- Foreign Trade – Strong dollar is hurting trade balances, a drag on the US economy through 2018. Recent yuan devaluation, coupled with already weak euro and yen, will impact OEM sourcing decisions.
- Investment – Strong profits, stock prices, suggest business fixed investment will accelerate; low oil prices are a “surprise” cost savings, but within the oil sector a major pullback is occurring.
Crude Slowly Recovers Amid New Supply

• In a six-month accord that took effect in January 2017, OPEC agreed to cut its production 1.2 million barrels per day. Russia’s energy minister announced a reduction of 300,000 barrels per day.

• The US onshore oil industry is proving effective at cutting costs and achieving efficiencies. US crude oil production bottomed in fourth-quarter 2016 near 8.6 MM b/d and will increase about 400,000 b/d during 2017.

• Under the Trump administration, reduced regulation, fewer hurdles for pipeline construction, and an opening of public lands to exploration and production could lead to higher-than-expected oil and gas supplies.

• The price of Dated Brent crude oil is projected to increase from USD44/barrel in 2016 to USD54 in 2017 and USD57 in 2018.
Market peaks in 2018 – weaker buying conditions, slower job creation, rising oil prices start next cycle. Successful tax reform required …. 

Pre-Crash
40 year trend: +140k annually

<table>
<thead>
<tr>
<th>Model Count</th>
<th>2010</th>
<th>2016</th>
<th>2023</th>
</tr>
</thead>
<tbody>
<tr>
<td>335</td>
<td>371</td>
<td>409</td>
<td></td>
</tr>
</tbody>
</table>

Source: IHS Markit Automotive, current light vehicles sales forecast

Car – sales flatten - rises as affordability declines

LT – peaks in 2018, weaker housing, higher fuel & regulations force decline

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Global LV Production Outlook
Over 70% of Total Growth From Emerging Asia

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>27.4</td>
<td>27.6</td>
<td>27.9</td>
<td>29.4</td>
<td>30.5</td>
<td>31.9</td>
<td>33.1</td>
<td>37%</td>
<td>• Tier 3 &amp; 4 city growth</td>
</tr>
<tr>
<td>Europe</td>
<td>21.5</td>
<td>22.1</td>
<td>22.4</td>
<td>22.5</td>
<td>23.0</td>
<td>23.6</td>
<td>24.0</td>
<td>16%</td>
<td>• Slow rebound of Russia and shift from West EU</td>
</tr>
<tr>
<td>NA</td>
<td>17.8</td>
<td>17.4</td>
<td>17.5</td>
<td>17.7</td>
<td>18.4</td>
<td>18.1</td>
<td>18.0</td>
<td>1%</td>
<td>• D3/A4/G3 Realignment</td>
</tr>
<tr>
<td>South Asia</td>
<td>8.4</td>
<td>8.7</td>
<td>9.2</td>
<td>9.7</td>
<td>10.7</td>
<td>11.9</td>
<td>13.3</td>
<td>31%</td>
<td>• India domestic &amp; export, ASEAN rise</td>
</tr>
<tr>
<td>Japan/Korea</td>
<td>12.9</td>
<td>13.4</td>
<td>13.0</td>
<td>12.7</td>
<td>12.6</td>
<td>12.5</td>
<td>12.4</td>
<td>-3%</td>
<td>• Slow domestic mkts, production co-location</td>
</tr>
<tr>
<td>South America</td>
<td>2.7</td>
<td>3.1</td>
<td>3.4</td>
<td>3.5</td>
<td>3.8</td>
<td>4.3</td>
<td>4.7</td>
<td>13%</td>
<td>• Well below 2013 record of 4.5 mil</td>
</tr>
<tr>
<td>Middle East/Africa</td>
<td>2.3</td>
<td>2.5</td>
<td>2.7</td>
<td>2.9</td>
<td>3.1</td>
<td>3.3</td>
<td>3.2</td>
<td>6%</td>
<td>• Focus of more attention by OEMs</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>93.1</strong></td>
<td><strong>94.9</strong></td>
<td><strong>96.1</strong></td>
<td><strong>98.4</strong></td>
<td><strong>102.0</strong></td>
<td><strong>105.6</strong></td>
<td><strong>108.7</strong></td>
<td></td>
<td>Over 70% of Total Growth From Emerging Asia</td>
</tr>
</tbody>
</table>
Top OEM Cooperative Groups by Production Volume 2024

Top-15 OEM Groups

Global Production Volume

- **Detroit 3**
- **Asian 4**
- **German 3**
- **Other**

Top-15 OEMs Total Volume:
- A4: 44.6 M
- D3: 21.8 M
- G3: 20.2 M
- Others: 12.0 M
Global Program Launches by Region

Increased Launch Activity Raises Risk

Increased industry pace places pressure on talent, resources and infrastructure.

North America | Europe | Japan/Korea | China | Other

2010: 21, 33, 17, 22, 22, 17
2011: 27, 37, 19, 23, 23, 21
2012: 33, 16, 41, 25, 27, 24
2013: 22, 29, 12, 15, 11, 22
2014: 25, 22, 18, 17, 17, 17
2015: 30, 27, 15, 18, 11, 19
2016: 36, 24, 15, 18, 18, 25
2017: 25, 24, 12, 24, 22, 32
2018: 41, 31, 16, 22, 22, 45
2019: 51, 39, 19, 22, 19, 175
2020: 45, 39, 16, 22, 16, 124
2021: 39, 31, 13, 23, 13, 32
2022: 23, 23, 11, 23, 9, 32
2023: 39, 31, 8, 26, 30, 32
2024: 41, 31, 18, 29, 11, 41

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NAFTA Production
Customer Dynamics Changing ...

• Rise in Mazda, Fuji Heavy, Volvo and Tesla underscores ‘Other’ OEM rise – Supply base shifts.
• Detroit 3 output declines due to new competition, comparative lack of exports and inflexibility to shift to CUVs from sedans.
NA Regional Shift
Logistics and Supply Structure Under Pressure

**Midwest/Ontario**
- Mix towards D/E-segment and Full Frame
- Detroit 3 still account for +60% of MW/ONT volume by 2024

**Southeast**
- Remarkable stability – newer facilities w/export focus
- Higher concentration on C & D-segment CUVs

**Mexico**
- Mid-Mexico now accounts for ~70% of Mex volume
- Rise of B & C-segment products with increasing luxury focus for export

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Detroit Three Volumes Peak ...

Quarterly NA Light Vehicle Production

- General Motors
- Ford
- FCA

Millions

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SUV/CUVs Dominate Production – Flexibility in Question

Quarterly NA Light Vehicle Production

<table>
<thead>
<tr>
<th>SUV Run Avg</th>
<th>Sedan Run Avg</th>
<th>All Other Run Avg</th>
</tr>
</thead>
<tbody>
<tr>
<td>SUV Peak</td>
<td>Sedan Trough</td>
<td>Pickups Peak</td>
</tr>
</tbody>
</table>

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U.S. Production In Decline as Mexico Steadily Grows

Quarterly NA Light Vehicle Production

- United States
- Canada
- Mexico

Peak shows no signs of slowing.
EPA vs. NHTSA vs. CARB vs. the EU vs. China – Many Considerations ...

Two key milestones for the future are the 2016 requirement and then the more difficult 2022-2025 requirement

- US Administration is in the midst of a mid-term review with a recent note that standards may be reduced or frozen as of Model Year 2021.
- Complicating factors include the California Exemption, the ‘177’ states which follow California as well as emission reduction/electrification efforts of China, EU and Quebec.
Global & NA Electrification Trends

Led by EU & China, Global has higher ‘electrification’ share, while North America will be slower.
ADAS – Several Strategies Toward a Common Goal

Blue = Full Autonomy

- Paving the way: Tesla Autopilot 2.0 Hardware suite
- Autopilot Expected 10% market share by 2022
- Autonomy hurdles: 50% Auto expertise, 50% tech expertise
- OEMs strategy: fund 3rd parties, opposed to in-house
- Essential tech investments
  > Autonomous Software
  > Cybersecurity
  > Driver safety tools
  > Connected vehicle, V2V, V2X, data management
  > Fleet telematics

### Features currently

- Intuitive pedestrian detection with steering
- Lane change/evasive steering
- Remote control parking
North American Engine Launches
Combination of Engine Family, Displacement and Engine Plant

OEMs are spending a greater share of resources on electrification, batteries and power structures.
The Journey to Level 5 & Battery Electric

<table>
<thead>
<tr>
<th>Substantial Change/New</th>
<th>Modest Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thermal</td>
<td>Propulsion (Engine/Trans)</td>
</tr>
<tr>
<td>Electrical/ Power Supply</td>
<td>Fuel</td>
</tr>
<tr>
<td>Body In White</td>
<td>Exhaust</td>
</tr>
<tr>
<td>Steering</td>
<td>Suspension</td>
</tr>
<tr>
<td>Braking</td>
<td>Interior</td>
</tr>
<tr>
<td>Aerodynamics/ NVH</td>
<td>Seating</td>
</tr>
<tr>
<td>Driveline</td>
<td>Exterior</td>
</tr>
<tr>
<td>Electronics</td>
<td>Passive Safety</td>
</tr>
<tr>
<td>Battery</td>
<td></td>
</tr>
<tr>
<td>Vision/Lighting</td>
<td></td>
</tr>
<tr>
<td>ADAS/ Active Safety</td>
<td></td>
</tr>
<tr>
<td>Wheels/Tires</td>
<td></td>
</tr>
</tbody>
</table>

- Shift towards soft from hard parts
  - Many suppliers focus resources on mechatronics, electric actuation, software and system integration
  - Share of ‘value’ devoted to hard parts decline – the pie slices thinner
- System shifts will be rampant
  - Major transitions in body, braking, chassis, steering and thermal as electrification and autonomy have a profound impact.
  - Increase in 48 volt systems and the need for efficient distribution systems all underscore looming change.
A Looming Cost Cliff Alters The Ecosphere
OEMs, Suppliers, Regulators and Customers Are All Impacted

~2020
- L3 Autonomy, More ADAS Content, Warranty Visibility
- Mild Hybrid Rise Starts in Larger Segments, 48V
- Mass Reduction Shifts Beyond The ‘Edge Segments’

~2025
- L3/4 Autonomy, Global influences, System Profit Pools Shift
- Full Hybrid, BEV and Alternative Drive Formats Rise
- Integration of ‘Non-Standard Materials’ & Joining Methods

~2030
- Level 5 Emerges, New Content Suppliers/Integrators
- Optimization of BEV Packaging – Vehicle Longevity Extends
- Competitive Dynamics Shift – ‘Old’ Industry versus ‘New’ Industry

Success in a Rising Cost Environment
- Understand your costs, markets & risk profile
- Your systems in the new structure?
- Hedge technologies
- Smart vertical integration
- Proactive engagement
- Today’s differentiators are not tomorrow’s

Today
- ADAS & Connectivity Content Rises, Warranty Costs
- Down Displacement, Multi-speed Trans & S/S
- BIW & Chassis System Lightweighting Begins
Summary

• Plateauing volumes alter the landscape
  > OEMs feeling the pressure of increased incentives, warranty exposure and competition – i.e. enhanced productivity/currency ‘adjustment’ requests
  > Existing suppliers begin to cannibalize as new suppliers enter the market
    – Indian & Chinese-owned concerns, Tier II Japanese/Korean and EU suppliers (following expanding Tier Is) and Silicon Valley entities

• Looming cost cliff drives urgency into system cost reductions
  > Increased evidence of incremental cost transparency driven by OEMs

• Supplier strategies vary by system
  > Vertical integration to offer enhanced capability to blunt margin erosion
  > Smart capital deployment, priority opportunity targeting, less may be more
Thank You

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