BMW GROUP PRODUCTION NETWORK.

JÜRGEN MAIDL
SENIOR VICE PRESIDENT PRODUCTION NETWORK, SUPPLY CHAIN MANAGEMENT.
PILLAR 1. THE BMW GROUP’S GLOBAL PRODUCTION NETWORK PROVIDES STABILITY IN A WORLD OF VOLATILITY.
THE AUTOMOTIVE PREMIUM SECTOR IS A WORLDWIDE GROWING MARKET. THE BMW GROUP´S MARKET SHARE AND SALES VOLUME ARE INCREASING.

<table>
<thead>
<tr>
<th>Premium segment [in units]</th>
<th>2007</th>
<th>2017</th>
<th>projection 2025 *</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales Volume/Share BMW Group</td>
<td>1,500,678</td>
<td>2,463,526</td>
<td>&gt; 10,900,000</td>
</tr>
<tr>
<td>Percentage</td>
<td>24.6%</td>
<td>28.1%</td>
<td></td>
</tr>
</tbody>
</table>

*data from IHS
EXTERNAL CONDITIONS ARE CHANGING FASTER THAN EVER. THE ONLY CONSTANT WE CAN RELY ON IS OUR STRATEGIC FOCUS.

In volatile times, **profitability, flexibility, and a consistent strategic direction** are key.
THE BMW GROUP STRIVES FOR A ROBUST PRODUCTION NETWORK TO BALANCE CUSTOMER FOCUS, RISK-EVALUATION AND TOTAL COSTS.

Premises for the allocation of models within BMW Group’s global production network

- Customer
  - Production follows the market
  - Time to market
  - Flexibility
  - Quality

- Cost
  - Minimizing Invest
  - Optimal operating point
  - Bundling Synergies
  - Integration

- Risk
  - Tariffs
  - Regulations
  - Natural Hazards
  - Natural Hedging
THE BMW GROUP PRODUCTION NETWORK IS GLOBAL. ESTABLISHING PROXIMITY TO OUR CUSTOMERS AND RESILIENCE TO COPE WITH CHANGES ARE KEY TO OUR PRODUCTION/BUSINESS.
THE CORNERSTONE OF A SOLID PRODUCTION NETWORK IS A WELL BALANCED RELATION BETWEEN SALES VOLUME AND PRODUCTION CAPACITY.

Sales vs. production volumes

<table>
<thead>
<tr>
<th>Region</th>
<th>2017 Production</th>
<th>2017 Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>North &amp; South America</td>
<td>384</td>
<td>450</td>
</tr>
<tr>
<td>Europe &amp; RoW</td>
<td>1,725</td>
<td>1,419</td>
</tr>
<tr>
<td>China</td>
<td>397</td>
<td>594</td>
</tr>
</tbody>
</table>

BMW / MINI* [in thsd. units]
WE IMPLEMENTED ALREADY IMPORTANT STRATEGIC STEPS TO COUNTER PROTECTIONIST ACTIONS: THE 3SERIES & THE X3 SERVE AS PRIME EXAMPLES.

Important localized models in the three world regions

North & South America

BMW 3-series Sedan

from 2019 on

Europe & RoW

BMW X3

No tariffs for all major markets.
DECISION FOR NEW PLANTS & PLANT EXPANSIONS IN LINE WITH THE TREND OF A GROWING PREMIUM AUTOMOBILE SECTOR.

**San Luis Potosí Plant in Mexico**

The plant will offer production capacity of up to **150,000** units a year.

**Total production capacity increases to **450,000** units per year.**

**Spartanburg Plant in USA**

The plant will offer production capacity of up to **150,000** units a year.

**Debrecen Plant in Hungary**

Total production capacity increases to **650,000** units per year.

**Tiexi / Shenyang Plants in China**

News in the BMW Group's Production Network

BMW Group production network, December 2018 // J. Maidl - Senior Vice President Production Network, Supply Chain Management
PILLAR 2.
A FLEXIBLE PRODUCTION SYSTEM PROVIDES ROOM FOR ADJUSTMENT.
OUR FLEXIBILITY TOOLBOX ALLOWS US TO REACT TO SHORT AND LONG-TERM FLUCTUATIONS IN DEMAND (UP/DOWN).

Flexibility in terms of operating hours

<table>
<thead>
<tr>
<th>PLANT OPERATING HOURS/WEEK</th>
<th>TIME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gear 1</td>
<td></td>
</tr>
<tr>
<td>Gear 2</td>
<td></td>
</tr>
<tr>
<td>Gear 3</td>
<td></td>
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<tr>
<td>Gear 4</td>
<td></td>
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<tr>
<td>Gear 5</td>
<td></td>
</tr>
<tr>
<td>Gear 6</td>
<td></td>
</tr>
<tr>
<td>Gear 7</td>
<td></td>
</tr>
</tbody>
</table>

Toolbox
(Design, notice period, cost)

- GEAR
  shift patterns

- RPM (~revolutions per minute)
  Modular Capacity Components (MCC)

in average
+/- 25%
volume adjustments can be covered by flexible plant operating hours and shift models
SPLIT PRODUCTION OFFERS FLEXIBILITY TO STEER THE PRODUCTION NETWORK AND ENABLES A BALANCED VOLUME ALLOCATION.

Flexibility regarding split production

90% of our BMW and MINI production plants are connected through split-production*  

*excluding China (China for China)
FLEXIBILITY BETWEEN CONCEPTS, ARCHITECTURES AND DRIVETRAINS ENABLES THE FULFILMENT OF CUSTOMERS’ PREFERENCES.
PILLAR 3.
FLEXIBILITY COMPLEMENTED BY LEAN THINKING: „MEASURES TO RESPOND“ COMBINE FEASIBILITY, SHORT LEAD TIMES AND PROFITABILITY.
**EVEN WITH PREDICTIVE ANALYTICS, VOLATILITY AND UNCERTAINTY REMAIN IN VARIOUS FIELDS OF OUR DAILY BUSINESS.**

Exemplary factors of volatility – relevant for the production network

The environment is getting more and more volatile. “**Measures to respond**“ are our key answer to this volatility.
“MEASURES TO RESPOND” ENABLE A DEMAND-ORIENTED EXTENSION OF CAPACITIES IN THE PRODUCTION NETWORK.

Flexibility regarding customer’s request

Pre-Thinking & anticipation of „measures to respond“

- + cost
- + lead time

Investment only for necessary measures

Tracking the trend

Acting on demand and implementation

Pre installed (investment)

Future elements on hold as „measures to respond“ (no investment yet)

Avoids over-investment in advance. Provides options for the future.
THE CONCEPT OF MEASURES TO RESPOND IS HOLISTICALLY IMPLEMENTED AT BMW GROUP.
PILLAR 4.
THE ABILITY OF HOLISTIC INTEGRATION IS AN IMPORTANT COMPETITIVE ADVANTAGE IN THE PRODUCTION OF TECHNOLOGICALLY COMPLEX PRODUCTS.
IT IS THE AUTOMOBILE INDUSTRY’S CHALLENGE TO OVERCOME THE TECHNOLOGICAL CHANGE AND CREATE THE FUTURE OF MOBILITY.
HOLISTIC INTEGRATION IS THE BIGGEST TECHNOLOGICAL CHALLENGE FOR THE PRODUCTION IN THE FUTURE. THE FUTURE STARTS NOW.

Assembly
(Ford, F. Taylor)

Variation
(GM, A. Sloan)

Efficiency
(Toyota, T. Ohno)

Holistic Integration
Alternative drivetrains with autonomous functions and product digitalization

Start of large scale production
Variety in features and derivatives
Optimizing of workflows, Zero Waste, Value Chain, Just-in-Time, Just-in-Sequence
Connected Technologies, Smart Data, Coverage of complex functions

1908-1930
1920-1960
1960-2000’s
Today
OUR COMPETITIVE ADVANTAGE IS OUR EXPERIENCE WITH A DEDICATED E-MOBILITY ARCHITECTURE. WE MANAGE THE ICONIC CHANGE CONSCIOUSLY WITH INTEGRATION.

### Internal combustion vs. electric vehicles

- **Petrol**
- **Diesel**
- **BEV/PHEV**

**Iconic Change** – when do electric vehicles replace internal combustion engines

**Enabling of our production plants for all drivetrains**

- Conventional and electric drivetrains in one plant

**High flexibility and utilization**
FIVE MAIN FACTORS ARE KEY TO A SUCCESSFUL HOLISTIC INTEGRATION.
THE BMW GROUP PRODUCTION NETWORK IS LEADING BECAUSE OF ITS…

… PRINCIPLE TO BALANCE “CUSTOMER – COST - RISK”.

… MULTI-DIMENSIONAL FLEXIBILITY.

… MEASURES TO RESPOND.

… HOLISTIC INTEGRATION CAPABILITIES.