Shaping the Future of Sustainable Transportation

Capital Markets Day (November 29, 2021)
Knorr-Bremse AG
## Agenda

| Time (CET) | Presentation                                           | Speaker                                                        |
|-----------|--------------------------------------------------------|                                                               |
| 2:00pm    | Welcome and Introduction                               | Andreas Spitzauer, Head of Investor Relations                  |
| ~2:05pm   | Shaping the Future of Sustainable Transportation        | Dr. Jan Mrosik, CEO                                           |
| ~2:35pm   | Financial Strategy                                     | Frank Weber, CFO                                              |
| ~3:00pm   | Q&A Session I                                          | Executive Board                                               |
| ~3:30pm   | Rail Vehicle Systems                                   | Dr. Jürgen Wilder, Member of the Executive Board              |
| ~4:00pm   | Commercial Vehicle Systems                             | Dr. Jan Mrosik, CEO                                           |
| ~4:30pm   | Q&A Session II                                         | Executive Board                                               |
| ~5:15pm   | Key Takeaways                                          | Dr. Jan Mrosik, CEO                                           |
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Shaping the Future of Sustainable Transportation
Dr. Jan Mrosik, CEO of Knorr-Bremse AG
Key takeaways

KB is in excellent shape – We outperform even in challenging times

KB capitalizes on favorable megatrends

Sustainability is core of KB’s markets, products and organization

KB continues profitable growth path through technology leadership

KB drives operational excellence to create shareholder value

KB continues its successful strategy
Reflections after the first 11 months
Global market & innovation leader in systems for rail & truck

Market leadership

A global market leader
~50% market share\(^1\) in RVS brakes
~23% market share\(^1\) in CVS brakes

Market outperformance

Track record of above industry growth: 10% historic revenue CAGR\(^2\)

Innovation edge

Shaping industry trends by focusing on safety and mission critical applications

High safety requirements

Key supplier with global core technology know-how and capabilities
Clearly ahead in global homologation processes

Resilience

37% aftermarket share\(^1\)
Well-balanced portfolio
Cost-efficient operations

Profitability

\(\bar{\text{EBIT}}\) margin of \(~16\%\)^3
Focus on attractive rail and truck end markets

1) In 2020    2) 1989-2019    3) 2015-2019
Global market & innovation leader in systems for rail & truck

Market leadership
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~50% market share\(^1\) in RVS brakes
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Track record of above industry growth: 10% historic revenue

Innovation edge
Shaping industry trends by focusing on safety and mission critical applications

High safety requirements
Key supplier with global core technology know-how and capabilities
Clearly ahead in global homologation processes

Sustainability is part of our DNA
Our technologies are the foundation for sustainable and safe transportation

Profitability
\(\bar{\text{EBIT}}\) margin of ~16\(^{\%}\)
Focus on attractive rail and truck end markets

1) In 2020  2) 1989-2019  3) 2015-2019
KB has maintained and expanded its market leading positions

1) 2020 estimates for OE and aftersales without labor; Wabtec includes Faiveley; For competitor, an estimate was used; Market shares rounded to the nearest multiple of 5%

2) Heating Ventilation Air Conditioning

3) For 2020 global addressable Truck, Bus and Trailer OE market, excl. aftermarket

4) Air disc brake, valves / pedal unit, actuators, foundation drum brake, steering, brake control (ABS, EBS, ESP), ADAS, ELC, others

5) Compressors, air treatment

6) Vibration dampers, engine air control, transmission – gear and clutch actuation / control;

Source: internal market research

Example global market leader for brakes

~50%

~15%

~3.3x

Global brakes market shares

Example global market leader for brake systems & vehicle dynamics

~23%

~15%

~1.5x

Global brakes market shares

Market positions key product groups

Brake systems

Entrance systems

HVAC systems

Market positions key product groups

Brake systems & vehicle dynamics

Energy supply & distribution

Fuel efficiency

Capital Markets Day – 11/2021
KB is an indispensable part of sustainable & safe transportation

Every day more than one billion people worldwide put their trust in KB systems

<table>
<thead>
<tr>
<th>RVS</th>
<th>CVS</th>
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</thead>
<tbody>
<tr>
<td>CO₂ Emission (g/km) per passenger (long distance)¹</td>
<td>% of new EV Heavy Duty Commercial Vehicles worldwide²</td>
</tr>
<tr>
<td>214</td>
<td>~98</td>
</tr>
<tr>
<td>143</td>
<td>~14</td>
</tr>
<tr>
<td>29</td>
<td>~22</td>
</tr>
</tbody>
</table>

1) 2019, reference for Germany, Sources: https://www.allianz-pro-schiene.de/themen/umwelt/daten-fakten/ (accessed on September 8, 2021), based on Umweltbundesamt
2) EV incl. BEV & FCEV (HD only), study by McKinsey & Company Inc., published in Handelsblatt on September 16, 2020
3) Total Cost of Ownership
4) Internal Combustion Engine

- Enabling CO₂ neutral transportation
- Promoting efficiency and TCO³ improvements via automated driving
- Ensuring highest safety standards globally
- Growth opportunity: only minor part of CVS portfolio dependent on ICE⁴
Innovation is the basis of KB’s technology leadership and long-term success

True Scale:
- 3,800 R&D employees
- Thereof 740 software engineers
- 5 global R&D centers (3 co-located)

Agile R&D methods implemented

Extensive partnership network & collaboration with tech players

In-house incubator eCUBATOR eMOBILITY INITIATIVE

Pioneering innovations (examples)

**RVS**
- Digital automatic coupler for freight (DAC)
- Reproducible braking distance
- LIFEDrive sliding doors

**CVS**
- Electric power steering
- Electronic parking brake
- eCompressor

Long-term R&D ratio: 6 – 7%
KB’s successful path continues

Outperforming markets
Mastering external challenges
Focusing on profitability and continued investments

<table>
<thead>
<tr>
<th>Time of investment</th>
<th>Accelerated growth &amp; margin expansion</th>
<th>Continued growth, safeguarding returns &amp; resilience</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revenue CAGR</td>
<td>Ø EBIT margin</td>
<td></td>
</tr>
<tr>
<td>~0.2%¹</td>
<td>~9%¹</td>
<td>~4.5%²</td>
</tr>
<tr>
<td>~8.8%¹</td>
<td>~12%¹</td>
<td></td>
</tr>
<tr>
<td>~16%²</td>
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</tr>
</tbody>
</table>

Revenue (€bn)

- 2005: 2.7
- 2010: 3.7
- 2015: 5.8
- 2020: 6.2

1) HGB  2) IFRS

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KB’s successful path is driven by four megatrends

- Urbanization
- Sustainability
- Digitalization
- Mobility

Societal changes and global trends fundamentally transform the economic environment
Positive trends will drive market growth and overcompensate headwinds

- Long-term growth supported by megatrends and governmental initiatives
- Aftermarket as continuous growth driver (incl. China)
- New technologies to improve availability, lifecycle costs, and capacity
- OE China business with headwinds and opportunities
- OE market recovery slower than initially expected

Content per vehicle growth through regulation and new technology
Shift to higher technology standards in emerging markets
Increase of installed base as basis for aftermarket growth
Limited growth of truck production rate
Changing Tier-1 supplier landscape
Supply shortages a challenge for the truck market

+ ~4% p.a.
Market (OE+AM)
CAGR 2020-2025e

~0% TPR p.a.
CAGR 2020-2025e

CVS relevant market CAGR
+ ~6% p.a. 2020-2025e¹
+ ~3% p.a. 2021-2025e

1) Normalized CAGR excl-Covid from 2021 onwards of ~3%; Source: internal market research
Moving forward – KB’s strategic priorities

1. Systematically develop base portfolio
2. Focus on attractive segments for future outperformance in rail and truck
3. Drive innovation & digitalization
4. Clear M&A strategy
5. Operational excellence
6. ESG and sustainability
7. Strong financial performance

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KB will continue to grow its core business further …

Established and strong foundation
- Leading market position
- Above market growth rates
- Resilient profitability
... and will also develop new levers of growth
... and will also develop new levers of growth
KB continues to systematically develop its portfolio of mission critical products and digital solutions

<table>
<thead>
<tr>
<th>Mechanical products</th>
<th>Mechatronic products</th>
<th>Smart &amp; digital products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pneumatic brake system</td>
<td>Electronically controlled pneumatic brake</td>
<td>Smart brake control (Cube Control)</td>
</tr>
<tr>
<td>Air disc brake</td>
<td>ABS &amp; EBS</td>
<td>GSBC &amp; rGSBC</td>
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</table>

**Strong basis**
### Build new business in RVS

#### Industry trends

<table>
<thead>
<tr>
<th>Digital Services</th>
<th>Automation</th>
<th>Energy &amp; Eco Efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Availability</td>
<td>Lifecycle Management</td>
<td>Transport Capacity</td>
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<tr>
<td></td>
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<td>Eco Friendliness</td>
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</tbody>
</table>

#### Applications (examples)

<table>
<thead>
<tr>
<th>Condition-based/predictive maintenance</th>
<th>Aftermarket</th>
<th>Automation</th>
<th>Energy savings / metering</th>
</tr>
</thead>
<tbody>
<tr>
<td>European train operator use case</td>
<td>HVAC monitoring &amp; energy saving</td>
<td>Investment into Railnova</td>
<td>RailServices portfolio for optimized LCC¹</td>
</tr>
<tr>
<td>Investment into Railnova</td>
<td>RBD² Increased train density</td>
<td>Environment sensing</td>
<td>Driver advisory system</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Smart metering</td>
</tr>
</tbody>
</table>

1) Lifecycle costs 2) Reproducible Braking Distance
# Build new business in CVS

## Industry trends

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<th>Energy &amp; Eco Efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Connectivity/ Digital Truck</td>
<td>Automated Driving</td>
<td>E-Mobility/ Emission Reduction</td>
</tr>
</tbody>
</table>

## Applications (examples)

- Driver safety management
- ADAS
- HAD actuation & motion control
- Electrification

## CVS solutions (examples)

- Collecting safety data and video for coaching & evaluation
- ADAS offering with strong partners
- Combining steering, braking, and motion control

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*CVS strongly positioned to innovate products for the E-Mobility age (BEV and FCEV) Only minor part of CVS portfolio affected by electrification*
KB Group with its resilient and diversified business outperforms the markets

- Systematically develop market share in every region and across all product groups
- Drive growth in aftermarket business by leveraging KB’s large installed base and new service offering
- Innovate solutions for eco friendliness, efficiency and capacity increase

Gain market share with particular focus on growth markets, e.g., North America and Asia
- Drive content per vehicle growth to continue with above market performance globally
- Develop new portfolio beyond safety fostering our technology leadership

1) Normalized CAGR excl.Covid ~4%  2) Normalized CAGR excl-Covid from 2021 onwards of ~3%; Source: internal market research

RVS Revenue CAGR 2020 – 2025e

- KB market outperformance ~5-6%
- RVS relevant market growth ~4%

CVS Revenue CAGR 2020 – 2025e

- KB market outperformance ~1%
- CVS relevant market growth ~1%

- GB 7-8%1
- 2021 – 2025e 20% ~3%
KB drives digitalization in two dimensions

Digital products and services

Solution portfolio
- From mechatronic to smart & connected products
- New capabilities (e.g., analytics) and platforms for new products and services
- Build digital business models

Internal digitalization

Inhouse operations
- Standardized end-to-end processes
- Digitalization

Product enhancement with digital technology

Condition Monitoring
Remotely monitor condition of KB products

Digital business models

Predictive Maintenance
Optimize operations and maintenance process together with customers

Solution Examples
Clear M&A strategy

Priorities

Pursue attractive and selective segments in rail and truck for future outperformance

Focus on bolt-on acquisitions in rail and truck, no focus on third pillar

Strengthen our core business with new capabilities

Continue active portfolio management along stringent strategic and financial criteria

Strategic Principles

Markets & Segments

- Highly attractive growth segments with strong entry barriers
- Technological differentiation

Business Model

- Leading market position and/or leading technology
- Sustainable competitive advantage
- Resilient business model

Synergies

- Best owner principle
- Tangible and realistic synergies
- Easy to integrate with high cultural fit

Latest investments (2021)

- Acquisitions / JV
- Start-up Investments (minority)

1) Subject to merger control approval

Components
Focus on operational excellence

Global platforms
Process digitalization and standardization
Footprint optimization
Continued “local for local“ set-up and value chain
Cost improvements
KB’s strong commitment to ESG and sustainability

KB: Shaping the Future of Sustainable Transportation

**Environmental**
- 2030 Climate strategy and renewable energy target

**Social**
- Social projects and employee volunteering with Knorr-Bremse Global Care e.V.

**Governance**
- ESG targets as part of management incentive
Ambitions for 2025

Favorable mega trends in truck and rail fully intact

Focus on two-pillar strategy in rail and truck

Capture market share through innovation

Profitable growth & strong ROCE

2025e

Revenues\(^1\)
€ 8.1 – 8.6bn

EBIT margin (ROS)\(^1\)
14.0 – 16.0%

1) Operating margin shown; based on market expectations mirrored in other CMD presentation parts
Financial Strategy
Frank Weber, CFO of Knorr-Bremse AG
Success factors for future profitable growth fully intact

- Focus on attractive market segments
- Technology and market leadership
- Entrepreneurial culture
- Strong bottom-line/-cost focus with lean set-up
- Efficient capital allocation
- Pricing power
- High aftermarket exposure and resilience

Profitable growth
KB’s outstanding financial excellence today proven in multiple dimensions

**FINANCIAL STATUS QUO**

**Market outperformance and high resilience**

- **Revenues** CAGR ~5%
- **AM share** ~37%

**Superior profitability and shareholder value**

- **EBITDA margin** ~18%
- **EBIT margin (ROS)** >13%
- **ROCE** >25%
- **EPS** >€3

**Strong cash conversion**

- **Cash conversion rate** >100%

**Rock-solid and highly resilient balance sheet**

- **Equity ratio** ~30%
- **Liquidity** ~1.8bn
- **Net debt**^1 ~0x
- **Gross debt**^1 ~1.5x

Note: P&L figures 2020/2021 and balance sheet figures as of Sept 30, 2021; CAGR 2015-2019

1) Leverage, in relation to annualized EBITDA
Clear priorities to lift finance excellence to the next level

1. Continuation of profitable growth
2. Further enhance cash generation
3. Financial policy of resilience and robustness
4. Efficient capital allocation and M&A strategy
5. Fostering ESG and benefitting from global sustainability push
Aftermarket and Europe as main growth drivers, profitability to improve from 2021 levels

Revenues (€bn)

<table>
<thead>
<tr>
<th>Year</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>2021e</th>
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<tbody>
<tr>
<td>Revenue</td>
<td>3.0</td>
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<td>3.5</td>
<td>3.7</td>
<td>3.3</td>
<td>3.3 - 3.4</td>
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<tr>
<td>Profitability / EBIT margin (ROS) (€m)</td>
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<tr>
<td>2016</td>
<td>1.2</td>
<td>1.4</td>
<td>1.4</td>
<td>1.5</td>
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<td>2017</td>
<td>1.8</td>
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<tbody>
<tr>
<td>Revenue</td>
<td>548</td>
<td>523</td>
<td>585</td>
<td>697</td>
<td>637</td>
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<tr>
<td>Profitability / EBIT margin (ROS) (€m)</td>
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<tr>
<td>2016</td>
<td>18.4%</td>
<td>16.1%</td>
<td>16.9%</td>
<td>19.1%</td>
<td>19.1%</td>
<td>17.5 - 18.0%</td>
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</table>

Note: Operating margins shown 2021 and 2025; 2016 & 2017 sales split acc. to German GAAP (HGB)
PROFITABLE GROWTH CVS
Content per vehicle and aftermarket as key growth drivers supporting significant profitability increase

Revenues (€bn)

<table>
<thead>
<tr>
<th>Year</th>
<th>OE</th>
<th>AM</th>
<th>China</th>
<th>Europe</th>
<th>NA</th>
<th>APAC w/o China</th>
<th>CPV</th>
<th>Pricing</th>
<th>AM</th>
<th>Trucks population</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>2.5</td>
<td>0.8</td>
<td>2.1</td>
<td>2.4</td>
<td>0.8</td>
<td>0.8</td>
<td>0.8</td>
<td>0.8</td>
<td>2.1</td>
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Profitability / EBIT margin (ROS) (€m)

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<th>Europe</th>
<th>NA</th>
<th>APAC w/o China</th>
<th>CPV</th>
<th>Pricing</th>
<th>AM</th>
<th>Trucks population</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>14.4</td>
<td>14.6</td>
<td>13.7%</td>
<td>12.3%</td>
<td>10.5 - 11.0%</td>
<td>8.3%</td>
<td>358</td>
<td>422</td>
<td>434</td>
<td>404</td>
</tr>
<tr>
<td>2017</td>
<td>14.6</td>
<td>13.7</td>
<td>12.3%</td>
<td>8.3%</td>
<td>8.3%</td>
<td>8.3%</td>
<td>235</td>
<td>404</td>
<td>434</td>
<td>422</td>
</tr>
<tr>
<td>2018</td>
<td>13.7</td>
<td>12.3</td>
<td>8.3%</td>
<td>8.3%</td>
<td>8.3%</td>
<td>8.3%</td>
<td>404</td>
<td>434</td>
<td>422</td>
<td>235</td>
</tr>
<tr>
<td>2019</td>
<td>12.3</td>
<td>8.3%</td>
<td>8.3%</td>
<td>8.3%</td>
<td>8.3%</td>
<td>8.3%</td>
<td>434</td>
<td>422</td>
<td>235</td>
<td>2021e</td>
</tr>
</tbody>
</table>

Note: Operating margins shown 2021 and 2025; assumed TPRs see CVS chapter; 2016 & 2017 sales split acc. to German GAAP (HGB)

1) Operating, reported EBIT € 374m (11.4%)
2) Normalized CAGR excl. Covid ~4%  3) TPR + CPV market

Capital Markets Day – 11/2021
 Effective levers implemented to further improve cashflow generation

### Levers
- **Prioritization**
  - Limit R&D capitalization
  - Expansion of business / growth
- **Close regional monitoring**
  - Inventory optimization
  - Reduction of overdues
  - Payment terms
- **Optimization and flexibility**
  - Group hedging policy
  - Secure and optimize cashflows
  - Financing conditions
- **Optimization**
  - Tax optimization

### Goals
- **CapEx. 5-6%²**
- **~20% R&D capitalization over cycle**
- **Depreciation: 4.5-5.0%²**
- **Scope of days: 45-50 days**
- **Stable results**
- **27-28%¹**

---

¹ Based on current tax country rates, 2025 target
² Of revenues

---

Free cashflow

EBIT

Profitable Growth

CapEx (Depreciation)

Working capital

Financial result

Tax

Cash conversion
Target: 80-90%
Floor: 70%

New KPI
in mgmt. compensation system as of 1.1.22
(20% STI weight)

---

KNORR-BREMSÉ

Capital Markets Day – 11/2021
Necessary cost measures initiated taken to counteract market challenges

Market Environment

- Rail
  - China flattish
  - Project postponements
  - Growing other regions

- Truck
  - Flat TPR (EU, NA, China)
  - CPV in the market
  - Regular annual price reductions

- Supply chain
  - Semiconductor shortage and tightness of other components
  - Freight costs, extra costs
  - Broker parts prices

- Inflation
  - Increasing raw material and energy costs
  - Higher labor costs

Proactive Response

1 | Measures from the past

- Covid measures: ~€ 160m
- CVS „Organizational restructuring measures“: ~€ 15m
- RVS „Fitness brakes Europe“: ~€ 14m

2 | Continuous measures going forward (no restructuring costs related)

- Expected headwinds
  - Variable costs
  - Fix costs

- Fixed costs
  - White collar linked to revenues 25-40%
  - Structural improvements
  - Fix cost ratio reduction

- Prioritization and optimization of projects

Annual basket: ~€ 100m gross savings → ~€ 400m sustainable cost savings in 4 years

Note: Cost measures not all sustainable, partly one-offs
Continuous investment into innovation and state-of-the-art industrial setup

CapEx (€m)

- Capacity to secure growth
- Focused capital employed
- Implementation of S4 Hana

R&D (€m)

- Innovation as basis of KB’s financial success
- R&D + technology portfolio to increase
- Global set-up of R&D hubs with close contact to customers
- Sophisticated products and technological systems

ROCE ≥30%

CapEx, R&D with Financial Discipline  ➔ Technology Leadership  ➔ Market Share, Pricing Power and Margins  ➔ Profitable Growth
CAPITAL ALLOCATION PRIORITIES
Clear framework with focus on organic growth and bolt-on M&A

- **6 – 7%**
  - R&D ratio
- **5 – 6%**
  - CapEx ratio
- **40 – 50%**
  - Dividend payout ratio

- **Bolt-on M&A**
- **Share buybacks**

- **High priority**
- **Low priority**

- **Organic**
- **In-organic**

Capital Markets Day – 11/2021
Clear financial aspirations defined as M&A guardrails

Priorities

- Attractive segments
- Bolt-on acquisitions
- Strengthen core business
- Active portfolio management

Financial principles for larger transactions

- Value accretive for KB
- Strong cash generation
- High profitability (ROS + ROCE)
- High aftermarket revenue base
- Asset-light business model

- Portfolio management, if needed
- Start-ups with clear plan for strong financial profile / accretive cooperation potential
- Stringent post merger integration to ensure deliverables
FOSTERING ESG AMBITIONS
High ESG commitment embedded in newly defined strategy and remuneration

**Environmental**
- **Climate strategy**
  - Carbon neutrality (incl. off-setting) at KB sites by 12/21
  - Triple own photovoltaic capacity by 2030
  - Extend to Scope 3 target setting
- **Circular economy**
  - Higher share from remanufactured/recycled products (currently: ~10% of revenues)

**Social**
- **Diversity**
  - Improve gender balance in global workforce and mgmt. (current share of women: 13% in mgmt., 20% overall)
- **Safety at work**
  - Workplace accidents <1 per 200,000 hours worked
- **Social projects**
  - Global Care: Strengthen strategic partnerships
  - Local Care: Increase employee engagement

**Governance**
- **Compliance**
  - Global anti-corruption training for high-risk employee groups; certification of CMS design and effectiveness; strengthen Human Rights processes
- **Mgmt. remuneration**
  - Stringent cascading of ESG targets

**RATINGS:**
- Current: top 25 percentile
- Goal: at least top 25 percentile

**Future objectives**
- RATINGS: A- MSCI ESG RATINGS A ISS ESG C+ S&P Global Ratings 52 SUSTAINANLYS 18.9

Note: KPIs and targets based on existing definitions
**SHORT-TERM OUTLOOK**

Profitable growth despite continued supply chain constraints and inflation

<table>
<thead>
<tr>
<th>Revenues (€bn)</th>
<th>Guidance FY21e</th>
<th>First indication FY22e</th>
<th>Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group</td>
<td>6.6 – 6.8</td>
<td>Slight to solid</td>
<td>■ Stable economic environment in important markets</td>
</tr>
<tr>
<td>RVS</td>
<td>3.3 – 3.4</td>
<td></td>
<td>■ No major FX changes FY22 vs. FY21</td>
</tr>
<tr>
<td>CVS</td>
<td>3.3 – 3.4</td>
<td></td>
<td>■ No additional major negative impact from Covid pandemic</td>
</tr>
<tr>
<td>Op. EBIT margin (ROS)</td>
<td></td>
<td></td>
<td>■ Continued slow recovery in rail</td>
</tr>
<tr>
<td>Group</td>
<td>13.0 – 13.5%</td>
<td>Slight</td>
<td>■ Supply chain constraints and increased inflation</td>
</tr>
<tr>
<td>RVS</td>
<td>17.5 – 18.0%</td>
<td></td>
<td>■ Further investments in R&amp;D</td>
</tr>
<tr>
<td>CVS</td>
<td>10.5 – 11.0%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Guidance 2022 24.02.22 (Annual Press Conf.)
MID-TERM OUTLOOK
Signals set for continued profitable growth of KB towards 2025

Organic revenues in €bn

<table>
<thead>
<tr>
<th>Year</th>
<th>2020</th>
<th>2021e</th>
<th>2022e</th>
<th>2025e</th>
</tr>
</thead>
<tbody>
<tr>
<td>13.2%</td>
<td>6.2</td>
<td>6.6 – 6.8</td>
<td>8.1 – 8.6</td>
<td></td>
</tr>
</tbody>
</table>

**Revenue CAGR**
- RVS: 5 – 6%
- CVS: 7 – 8%
- Group: ROCE ≥30%

**EBIT margin (ROS)**
- RVS: 18.0 – 19.5%
- CVS: 12.0 – 13.5%
- Group: CCR over cycle 80 – 90%

**EBITDA margin**
- 17.5 – 18.0%
- 19.0 – 21.0%

Note: Operating margins shown 2021 and 2025; based on market expectations mirrored in other CMD presentation parts.
Rail Vehicle Systems
Dr. Jürgen Wilder, Member of the Executive Board of Knorr-Bremse AG
RVS capital market guidance fulfilled until Covid with persistent strength

Market leadership
Global #1 market leader across products and regions (e.g. ~50% market share in brake systems)

Strong growth profile
RVS with long track record of outperforming underlying markets

Technology innovation
- Strong technology innovator shaping industry standards
- Continuation of R&D investments

High barriers to entry
- Safety-critical products with significant homologation barriers
- RVS only supplier certified for all standards and norms globally

Resilience
- Expansion of business through customer-region-product mix
- Strong aftermarket (~45% revenue share)

Profitability
Outstanding profit margins with track record of margin expansion and disciplined cost management (EBIT margin ~19%)

Notes: Based on 2020 figures
Megatrends and related initiatives supportive for the rail industry and RVS

Supporting trends & programs

- Climate related regulations
- 2021 Year of Rail
- Green deal
- Societal change

Financial support programs

- Stimulus programs > € 100bn
- Covid compensation > € 40bn
- Shift2Rail / ERJU\(^1\) > € 900m

---

1) Europe’s Rail Joint Undertaking
**CO₂ emission targets not achievable in transportation without rail**

**Greenhouse gas emissions from transport\(^1\)**

- **Passenger transport – long distance** [in g/pkm]
  - 214
  - 143
  - 29
  - 7x

- **Passenger transport – local transport** [in g/pkm]
  - 143
  - 80
  - 55
  - 3x

- **Freight transport** [in g/tkm]
  - 111
  - 30
  - 17
  - 7x

1) 2019, reference for Germany, Sources: [https://www.allianz-pro-schiene.de/themen/umwelt/daten-fakten/](https://www.allianz-pro-schiene.de/themen/umwelt/daten-fakten/) (accessed on September 8, 2021), based on Umweltbundesamt
Long-term growth in global rail will continue, despite Covid U-shape

Development of relevant sub-systems market volume¹ (OE + RS in €bn)

<table>
<thead>
<tr>
<th>Year</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
<th>2023</th>
<th>2024</th>
<th>2025e</th>
</tr>
</thead>
<tbody>
<tr>
<td>OE</td>
<td>10.3</td>
<td>9.5</td>
<td>11.7</td>
<td>11.7</td>
<td>11.7</td>
<td>11.7</td>
<td>11.7</td>
</tr>
<tr>
<td>RS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

¹ Big Five - Brakes, Doors, HVAC, Power Electrics, TCMS; Source: Knorr-Bremse information and internal market research

Non-Covid-impacted CAGR ~2%

Covid-impacted CAGR ~4%

U-shaped development of sub-system market

Regions:
- Asia Pacific
- North America
- South America
- Europe / Africa

Covid-impacted CAGR ~4%
9 – 18 months time shift between OEMs order intake and recognition at sub-systems suppliers

### Time

<table>
<thead>
<tr>
<th>OPERATOR</th>
<th>OEM CAR BUILDER</th>
<th>SUB-SYSTEMS-SUPPLIERS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) Source: OEM reporting, only OEMs with publication of financial figures rail considered and respective KB business; KB internal market research

### Incoming orders

<table>
<thead>
<tr>
<th>Q1/17</th>
<th>Q1/18</th>
<th>Q1/19</th>
<th>Q1/20</th>
<th>Q1/21</th>
<th>Q1/22</th>
</tr>
</thead>
<tbody>
<tr>
<td>OEMs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knorr-Bremse</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**OEM IO recognition**
- e.g., Metro UK (NTfL), R&C UK, S-Bahn Hannover

**RVS IO recognition**

**Q2/21**

**e.g., Amtrak, Danish State Rail, Paris RER Mi Ng, SBB**

approx. 9 – 18 months
KB will continue to grow its core business further

Today

- Leading market position
- Above market growth rates and profitability levels

Time

New growth market
Leverage strong position
Established and strong foundation
RVS grew within each business unit, despite Covid impact, AM outperformed

### Revenue development

<table>
<thead>
<tr>
<th>Business Unit</th>
<th>Index 2012</th>
<th>Index 2020</th>
<th>CAGR 2012-2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brakes</td>
<td>x1.2</td>
<td>2.3%</td>
<td></td>
</tr>
<tr>
<td>Doors</td>
<td>x1.1</td>
<td>1.7%</td>
<td></td>
</tr>
<tr>
<td>HVAC</td>
<td>x1.1</td>
<td>1.6%</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>x1.8</td>
<td>7.2%</td>
<td></td>
</tr>
</tbody>
</table>

### Constant increase in the installed base...

...drives the profitable Aftermarket
RVS holds global #1 position across key product categories

Global market share 2020¹ (% of sales)

**Brake systems** (~68% of RVS sales)
- Knorr-Bremse: 50%
- Wabtec/Faiveley: 15%
- Others: 35%

Market size ~€ 4.5bn

**Entrance systems** (~9% of RVS sales)
- Knorr-Bremse: 25%
- Kangni: 20%
- Wabtec/Faiveley: 15%
- Others: 40%

Market size ~€ 1.1bn

**HVAC** (~7% of RVS sales)
- Knorr-Bremse: 20%
- King: 15%
- Wabtec/Faiveley: 10%
- Others: 55%

Market size ~€ 1.1bn

Notes: Based on German GAAP (HGB); Market share estimates are rounded to the nearest multiple of 5%; For competitors, a price estimate was used;
1) Market share estimates for OE and AM without labor. Source: Knorr-Bremse information and internal market research.
Aftermarket business will continue to be an important growth engine

Opportunities
- Use installed fleet
- Modernization
- New service models & digital solutions

Challenges
- Competition by OEMs, focussing more on service
- Insourcing and lifecycle costs optimization, incl. stretching overhaul cycles
Ridership strongly impacted by Covid, but fleet utilization at high level

Source: M-Brain & SCI market news, Eurostat, official operator data, KB internal market research and estimations
Future growth will come from markets in Europe, Asia and North America

**Market development OE**
in €m, CAGR in %

<table>
<thead>
<tr>
<th>Selected biggest growth markets</th>
<th>CAGR ‘19-’25</th>
<th>Market position</th>
</tr>
</thead>
<tbody>
<tr>
<td>North America &amp; Mexico MT</td>
<td>~11%</td>
<td>#2</td>
</tr>
<tr>
<td>Austria</td>
<td>~27%</td>
<td>#1</td>
</tr>
<tr>
<td>France</td>
<td>~6%</td>
<td>#1</td>
</tr>
<tr>
<td>Russia &amp; CIS (High Grade)</td>
<td>~4%</td>
<td>#1</td>
</tr>
<tr>
<td>Scandinavia</td>
<td>~10%</td>
<td>#1</td>
</tr>
<tr>
<td>Spain &amp; Portugal</td>
<td>~26%</td>
<td>#1</td>
</tr>
<tr>
<td>India (High Grade)</td>
<td>~5%</td>
<td>#1</td>
</tr>
<tr>
<td>South East Asia, HK, TW</td>
<td>~14%</td>
<td>#1</td>
</tr>
<tr>
<td>Selected biggest growth markets</td>
<td>~9%</td>
<td>#1</td>
</tr>
<tr>
<td>RoW²</td>
<td>~3%</td>
<td></td>
</tr>
</tbody>
</table>

table 2019 OE market development in €m and CAGR 2020e:

<table>
<thead>
<tr>
<th>Market</th>
<th>2019</th>
<th>2025e</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>~1,350</td>
<td>~1,300</td>
</tr>
<tr>
<td>India</td>
<td>~1,100</td>
<td>~1,800</td>
</tr>
<tr>
<td>Russia &amp; CIS (High Grade)</td>
<td>~8.5%</td>
<td></td>
</tr>
</tbody>
</table>

Source: KB internal market research; Values recognize FX rates

1) Brakes, Doors, HVAC, rounded to the nearest 50
2) Rest of World w/o selected biggest growth markets & w/o China
3) High Grade only, w/o conventional market

Capital Markets Day – 11/2021 53
China business faces challenges, but will continue to contribute to KB success

RVS revenue development in China (in €m)

- **2010 – 2016**: >1,000
- **2017 – 2021e**: Increasing installed base, Price pressure & stretch of overhaul cycles
- **2022e – 2025e.. trends**: Aftermarket, Others, Metro, High Speed

- **Highspeed peak due to catch-up effect after Wenzhou accident in 2011**
- **Introduction CSEMU**
- **Increasing installed base**
- **Price pressure & stretch of overhaul cycles**

**Within 15-years from zero to biggest High Speed fleet in the world**
- Central decision making, attracting best-in-class technology to fulfill ambitious plans
- **RVS significant market share for brake systems in High Speed**

**Control of key technologies through Chinese Autonomous & Controllable Policy**
- New CSEMU¹ with Chinese owned technology
- **RVS delivering components and modules**
- **Biggest metro market in the world (start 1970s)**
- More decentral / local decision making focusing on best solution
- **RVS significant contribution with brake systems**

**Market volume on high level with no further increase**
- Introduction of Standard Metro with increased Chinese localized technology
- Decentralized decision making
- Focus on cost & performance
- **RVS contribution with all sub-systems**

---

¹ CSEMU (China Standard Electric Multiple Unit)
Secure Aftermarket business through expansion of service center footprint

Seize opportunities in High Speed to re-strengthen position through partnership and innovative technology

Strengthen Metro business through innovative technologies and a localized footprint

Efficiency program put in place to safeguard profitability
RVS will further grow from new industry trends

- Leading market position
- Above market growth rates and profitability levels

Safety & mission-critical vehicle systems

Digitalization

Sustainability

Urbanization

Mobility

Availability
Lifecycle Management
Transport Capacity
Eco Friendliness
Reproducible Braking Distance (RBD) to increase transport capacity

- REDUCED TRAIN HEADWAYS

Field trials / pilot applications
- **Deceleration Control:** NEWAG Demonstrator, 1 year test in passenger service – ongoing
- **Adhesion Management and WheelGrip Adapt:** Function testing @ advanced TrainLab VT605, tests start May 2022
For increasing transport capacity IFE LIFEDrive optimizes passenger flow

IFE LIFEDrive for mass transit sliding door applications in case of door failure

Knorr-Bremse solution

60 seconds time loss

only 10 seconds time loss
RVS supports the freight train evolution to the digital freight train

- slow manual & risky coupling (not by KB)
- Standard brake (by KB)
- freight car automation not possible

Low tech, manual, unpowered freight car not able to compete as mean of transport

Efficient Digital Freight Trains & cars with several RVS solutions on board
Clear RVS focus on new industry trends and growing the core business further

- **Digitalization**
- **Sustainability**
- **Urbanization**
- **Mobility**
- **Safety & mission-critical vehicle systems**

- **New growth market**
- **Leverage strong position**
- **Established and strong foundation**

- Leading market position
- Above market growth rates and profitability levels
Key takeaways

RVS #1 market position in key markets
stable market share in Brakes and market share opportunities in Doors, HVAC and other products

Dense service network & new service models offer Aftermarket growth opportunities

RVS quality, service and technology leadership maximize eco-friendliness, efficiency and capacity in partnerships across the rail business
Commercial Vehicle Systems
Dr. Jan Mrosik, CEO of Knorr-Bremse AG
CVS is a market and technology leader with a robust business model and continuously outperforms markets.

**Market leadership**
- A global market leader increasing market share (~25% for brake systems & vehicle dynamics)

**Strong growth profile**
- Continuously outperforming markets with rising content per vehicle (7% sales CAGR vs. ~3% TPR growth between 2012-2019)

**Technology innovation**
- Technology leader with continuous significant investment in innovation and R&D

**High safety requirements**
- Global key supplier with system know-how and vehicle dynamics capabilities

**Resilience**
- Strong aftermarket share (~26% revenue share), cost efficiency, regional diversification as well as track record in strong cost management execution

**Profitability**
- Technology differentiation, superior products, systems approach, scale advantage and consequent cost management (operating EBIT margin ~12%)

Notes: Based on 2019 figures, market share shown for 2021e
CVS strongly outperforms the market – with revenue growth beating market growth

Revenue by region\(^1\) in €m

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>SA</td>
<td>2,085</td>
<td>2,058</td>
<td>2,227</td>
<td>2,490</td>
<td>2,491</td>
<td>2,891</td>
<td>3,159</td>
<td>3,280</td>
</tr>
<tr>
<td>Asia / Pacific</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EU</td>
<td>2,085</td>
<td>2,058</td>
<td>2,227</td>
<td>2,490</td>
<td>2,491</td>
<td>2,891</td>
<td>3,159</td>
<td>3,280</td>
</tr>
</tbody>
</table>

CAGR 2012 – 2019: +7%

Covid influence:

<table>
<thead>
<tr>
<th>Region</th>
<th>2020</th>
<th>9M/20</th>
<th>9M/21</th>
</tr>
</thead>
<tbody>
<tr>
<td>SA</td>
<td>2,819</td>
<td>2,026</td>
<td>2,549</td>
</tr>
<tr>
<td>Asia / Pacific</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EU</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1) Region = domicile of entity  
2) Based on German GAAP

2012-2019
Market outperformance with 7% CAGR vs. 3% TPR growth in the same time frame

FY19
Strong performance and growth

FY20
Sharp decrease in volume due to Covid pandemic

9M/21
V-shaped recovery started, but is set back by semiconductor and raw material shortages

2021-2025 expectation
Market outperformance with ~4% CAGR driven by content per vehicle vs. flat TPR in the same time frame
CVS is market leader in all major product fields

Global market share 2021¹ (% of revenues)

2) Air Disc Brake, Valves / Pedal Unit, Actuators, Foundation Drum Brake, Steering, ABS, EBS, ESP, DAS, ELC; incl. segment Others
3) Compressors, Air Treatment
4) Vibration Dampers, Engine Air Control, Transmission – Gear and clutch actuation

º Knorr-Bremse
#1 joint

Market size
~€ 5.5bn

Brake Systems & Vehicle Dynamics²


Others 56%

ZF/Wabco 19%

Market size
~€ 0.7bn

Energy Supply & Distribution³


Others 24%

ZF/Wabco 27%

Market size
~€ 1.4bn

Fuel Efficiency⁴

Knorr-Bremse 23% Since 2017: unchanged

Others 55%

ZF/Wabco 22%
CVS proved resilient during Covid pandemic

While truck production decreased globally in Q1/20 CVS could rely on:

**Regional diversification in revenues and production**
- Strong market position in China balanced market decrease in other regions
- Diversified production footprint beneficial during lockdowns

**Strong aftermarket**
- Stable aftermarket revenue share of 25-30% mitigated revenue decrease through truck production decrease during the crisis
- Strong dealer network and increasing aftermarket market volume

**Countermeasures**
- Cost adaption program quickly and strictly installed in early 2020

Positive EBIT margin during crisis

Fast recovery of demand in H2/20 well managed

Market share gains
Strong management execution during material shortages led to solid H1/21 results for CVS

**Current supply challenges**

- Semiconductor shortage
- Raw material tightness
- Freight market crisis
- Further local crises

**Situation**

**Today**
- V-shaped recovery of customer demand since Q4/20
- Current supply challenges create disbalance: demand > supply
- In-bound delivery times to KB prolonged globally
- Net cost burden expected in FY21: € ~60m

**Counter-measures**
- Task force with ~200 employees set up
- Close collaboration with suppliers and customers
- Short-term pass-through for price increases in place

**Mid-Term: 2022ff.**

- Tight supply situation is expected to last well into 2022, further shortages expected, e.g. aluminum
- Long-term elevated price levels for certain components due to sustained bottlenecks expected
- Review of product designs (e.g. semiconductor platforms, alternative electronic components)
- Review of sourcing strategies (e.g. increase dual sourcing)
- Pass-through mechanism for material price increases

1) e.g. flooding in Germany, Malaysian Covid-outbreaks, current power cut offs in China
CVS leveraging potentials in Chinese market

Chinese market is maturing with higher content per vehicle, longer vehicle lifetime and a changing end-customer structure

Selected examples for technology shifts driving content per vehicle:

- **Current** – Manual Transmission vs. Automated Manual Transmission
  - AMT actuator

- **Mid-term** – Drum Brake vs. Air Disk Brake
  - Air Disk Brake

CVS in China

| 6 locations\(^1\), 4 plants and >1,700 employees. |
|---|---|
| 2015 | 2020 |
| Revenues in €m | 140 | 490 |
| Market share\(^2\) | 14% | 24% |

Measures for further growth in China

- Technologies first **launched in Europe** are now brought to the Chinese market
- Advanced technologies creating **barriers to entry**
- **Strong partnerships with Chinese top OEMs and further cooperations with key industry players**
- Strengthen **local R&D capability**
- Expansion of **local footprints** and strengthening of **local supply chain**

---

1) Controllable legal entities  
2) Market share in China OE HDT+MDT+Bus market, excluding FDB business

---
Industry trends in the global commercial vehicles market

<table>
<thead>
<tr>
<th>Megatrends</th>
<th>Industry Trends</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urbanization</td>
<td>Traffic Safety</td>
</tr>
<tr>
<td>Sustainability</td>
<td>Emission Reduction &amp; E-Mobility</td>
</tr>
<tr>
<td>Digitalization</td>
<td>Automated Driving</td>
</tr>
<tr>
<td>Mobility</td>
<td>Connectivity</td>
</tr>
</tbody>
</table>

- **Advanced safety systems**
  - and reduction of human error risk

- **Battery-electric or fuel cell vehicles**
  - >20% of new commercial vehicles sold in 2030

- **Autonomous trucks**
  - >15% share by 2030

- **Connected vehicles**
  - enabling improved operations & predictive maintenance
CVS growth opportunities driven by higher CPV despite limited volume growth

**Truck production is flat and does not contribute to growth**
Growth driver will be the current content per vehicle (CPV) with **traffic safety technologies until mid 2020s**
In the long run, CPV must be driven by technologies for **new trends automated driving, e-mobility and connectivity**

<table>
<thead>
<tr>
<th></th>
<th>Global&lt;sup&gt;1&lt;/sup&gt;</th>
<th>North America&lt;sup&gt;2&lt;/sup&gt;</th>
<th>Europe&lt;sup&gt;3&lt;/sup&gt;</th>
<th>China</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Truck production</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAGR</td>
<td>Mid-term until mid-20s</td>
<td>Long-term until 2030</td>
<td>Mid-term until mid-20s</td>
<td>Long-term until 2030</td>
</tr>
<tr>
<td></td>
<td>0%</td>
<td>0%</td>
<td>-1%</td>
<td>0%</td>
</tr>
<tr>
<td><strong>Growth in KB CPV</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>with traffic safety</td>
<td>~ +4%</td>
<td>&lt;4%</td>
<td>&lt;4%</td>
<td>&gt;4%</td>
</tr>
<tr>
<td>solutions</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td><strong>Growth in KB CPV</strong></td>
<td></td>
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<tr>
<td>focus on technologies for automated driving, e-mobility &amp; connectivity</td>
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</tr>
</tbody>
</table>

1) Incl. Turkey & Korea  2) Class 6 – 8  3) West & East Europe

Source: Knorr-Bremse analysis, IHS Markit, McKinsey analysis
New growth areas for CVS

Illustrative growth potential

Growth contribution of industry trends

- World’s leading supplier of safety relevant CV systems
- Grow in current portfolio
- Generate new business by optimizing TCO and emissions along the truck lifecycle
- Automated driving
- Emission Reduction & E-Mobility
- Connectivity

Traffic safety

Today

2025

2030

Time

Current CVS portfolio with focus on traffic safety perfectly fits market demands

In the future however, CVS will gain more content per vehicle growth with solutions for Automated Driving, Emission Reduction & E-Mobility and Connectivity
Automated driving functions will hit the roads in trucks earlier than in passenger cars

<table>
<thead>
<tr>
<th></th>
<th>Automated driving functions</th>
<th></th>
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<tbody>
<tr>
<td>0</td>
<td>0: driver only</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>1: assisted</td>
<td>2</td>
</tr>
<tr>
<td>2</td>
<td>2: partial automation</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>3: high automation</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>4: full automation</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>5: driverless</td>
<td></td>
</tr>
</tbody>
</table>

- **Driver fully responsible**
- **Driver not permanently responsible**

1) 2025 first applications expected to be applied in public traffic
CVS offers both driver assistance and automated driving solutions

<table>
<thead>
<tr>
<th>Driver Assistance</th>
<th>Automated Driving</th>
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<tbody>
<tr>
<td><strong>0</strong> driver only</td>
<td><strong>1</strong> assisted</td>
</tr>
<tr>
<td></td>
<td><strong>2</strong> partial</td>
</tr>
<tr>
<td></td>
<td><strong>3</strong> high</td>
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<td><strong>4</strong> full</td>
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<tr>
<td></td>
<td><strong>5</strong> driverless</td>
</tr>
</tbody>
</table>

**Degree of Automation**

**Driver Assistance**
- Braking
- Steering
- Sensors
- Level 1 and 2 functions

**Automated Driving**

**CVS as Vehicle Dynamics Supplier**
- Braking
- Steering
- Vehicle dynamics
- Related redundancy

**CVS as System Supplier**
- Braking
- Steering
- Sensors
- Air Disc Brake Control
- Braking (related redundancy)
- Autonomous Yard Maneuvering
- Traffic Jam Pilot
- Parking Pilot
- Full Pilot

**CVS as Vehicle Dynamics Supplier in Consortium/Partnership Approach**
- Braking
- Steering
- Vehicle dynamics
- Related redundancy

**CVS System Competence**
- Vehicle dynamics / Truck Motion Control

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Capital Markets Day – 11/2021
CVS offers automated driving solutions in a partnership approach - Actuation, Truck Motion Control and Redundancy are CVS’ core competencies.

**Perception**
- Complete environment perception of truck & trailer
- Software: Provided by partner
- Sensor Hardware: Provided by partner

**Decision**
- Continuous situation analysis, motion planning and definition of driving path
- Software (driver stack): Provided by partner

**Actuation**
- Coordinated interaction of actuators for vehicle dynamics
- Braking system, steering system incl. redundancy system
  - Provided by Knorr-Bremse

---

Redundancy system

**Truck Motion Control**
- Provided by Knorr-Bremse
- Provided by partner

---

Big OE or system supplier as system integrator
Truck Motion Control combines braking, steering and vehicle dynamics

**ROADMAP ADAS\(^1\) AND HIGHLY AUTOMATED DRIVING**

- **Braking**
- **Stability control**
- **Driver assistance Longitudinal control**
- **Driver assistance Lateral control**
- **Automated driving functions**

**KB CORE**

**Brake system**

**Combined steering and braking**

**Truck Motion Control**

→ Successful M&A strategy
→ KB global #2 steering supplier

- **KB driving steering innovation and vehicle content growth**
- **Base steering gear**
- **Torque overlay steering (TOS) for ADAS\(^1\) functions and Automated Driving**
- **Electric Power Steering**

**Combined competencies enable Truck Motion Control for safe vehicle control under all conditions**

1) ADAS = Advanced Driver Assistance Systems
Different offerings for automated driving in a partnership approach

**Stand-alone KB offering:**
- Actuation, Truck Motion Control and Redundancy supplied by CVS

**In partnership as a consortium:**
- System with actuation, TMC, perception & hardware for the decision layer together with Continental as sensors and hardware partner
- Complete system including driver stack in collaboration with an AI partner in addition to the sensors and hardware partner

---

CVS fosters system competency and future content per vehicle increase potential

- General requirement for redundant Electric/Electronics architecture increases content per vehicle → redundancy ensures the safe vehicle movement even in case of the failure of a system relevant component
- The addition of torque overlay steering to CVS’ portfolio adds content to the vehicle, more advanced steering solutions at higher price further increase content per vehicle
CVS will benefit from transition of integrated combustion engine trucks towards electrified trucks

Value structure of a truck

Illustrative

- Internal Combustion Engine Vehicle
- Battery Electric Vehicle
- Drivetrain
- Energy storage
- Other systems

Impact for CVS

- Shift from ICE to EV vehicles offers **first mover advantage**
- More complex Electrics/Electronics architecture in electric vehicles **increases content per vehicle**
- KB products in “other systems” and in energy storage offer **growth potential for CVS**
- Value reduction in drivetrain **does not affect CVS significantly**
- Potential content per vehicle increase via **electric vehicle adapted products** and **completely new product fields**
CVS has founded an internal incubation unit for e-mobility solutions

Defining our role in the environment of the e-mobility ecosystem for commercial vehicles

Internal incubation unit set up for solutions for e-mobility

- Adaptation of existing product portfolio towards EV
- Definition of new product fields
- First product concepts already transferred to CVS business units
- 52 patents applications have been generated out of the CVS e-Cubator until today

<table>
<thead>
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<th>Key Focus Areas</th>
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<td>1. Adaptation of existing product portfolio towards EV</td>
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<tr>
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</tbody>
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- KB CVS focus
- Commercial vehicle specific systems
- Carry over products from passenger cars
- OEM inhouse systems
CVS is offering a broad product portfolio for electric trucks

**EV adapted portfolio**

**eCompressor**
- Electric screw compressor
- Mid air demand eCompressor (rotary vane)
- Low air demand compressor for future EV requirements

**EV brake control & vehicle dynamics**
Optimized and scalable holistic EV motion control, including energy recuperation

**New EV product fields**

**Redundant power management system**

**EV brake resistor**

**Opportunities in fuel cell electric vehicles in assessment**

**Selected Examples**
- On the market
- Market launch soon
- In development
- In assessment
Key takeaways

Increase of **content per vehicle** in all markets mitigating TPR stagnation

**Market share** increases in growth markets

Fostering of **technological leadership** through consequent invest in R&D

**Resilience and operational excellence**

Targeted **cost optimization programs** to protect margins

Excellent **customer relationships**

Strong focus on managing **supply chain and logistics**

**CVS is market leader and well prepared for the future**
Key takeaways
Dr. Jan Mrosik, CEO of Knorr-Bremse AG
Key takeaways

KB is in excellent shape – We outperform even in challenging times

KB capitalizes on favorable megatrends

Sustainability is core of KB’s markets, products and organization

KB continues profitable growth path through technology leadership

KB drives operational excellence to create shareholder value