GROUP MANAGEMENT REPORT

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Note: Information referring to related links are not part of the audited Group management report.
OPERATING ACTIVITIES AND STRUCTURE

Global technology solutions provider focused on mobility
ZF Friedrichshafen AG is a global technology company supplying advanced mobility products and systems for passenger cars, commercial vehicles and industrial technology. Our comprehensive technology portfolio is aimed primarily at established vehicle manufacturers, mobility providers and start-up companies in the fields of transportation and mobility.

Alongside our core markets – passenger cars and commercial vehicles – we also serve market segments such as wind power, marine propulsion, aviation technology, rail drives, special drives and test systems.

The ZF Aftermarket Division provides our OEM expertise for the aftermarket through a relevant product and service portfolio. Our spare parts business encompasses the ZF, TRW, Lemförder, Boge and Sachs brands. Our service portfolio covers workshop concepts and intelligent connectivity solutions along with maintenance and repair services, plus conversions and retrofitting to enhance efficiency, comfort and safety.

Our workforce worldwide comprises around 148,000 employees at 241 locations in 41 countries. Our main sales markets are Europe, North America and the Region of Asia-Pacific, with China as the core market and India as the growth market.

A focus on four technology fields
Our strategic focus is digital networking and automation. In line with this we are developing our product portfolio around four technological fields, systematically combining them through integrated solutions: Vehicle Motion Control, Integrated Safety, Automated Driving and Electromobility.
Corporate structure
ZF Friedrichshafen AG is a corporation headquartered in Friedrichshafen (Germany). The Zeppelin Foundation owns 93.8% of the company. These shares are managed by the city of Friedrichshafen. The remaining 6.2% is owned by the Dr. Jürgen and Irmgard Uelderup Foundation, Lemförde (Germany). The shareholders exercise their voting rights at the annual shareholders’ meeting.

A matrix organization links the Group-wide competencies of the corporate functions with the global business responsibility of the divisions and business units. Operational topics are mainly addressed in the divisions, and are assigned directly to the members of the Board of Management.

The headquarters are managed by the Board of Management. The same applies to the responsibilities with regard to the Regions of North America, South America and Asia-Pacific. The regions provide local guidelines as well as corresponding services for the business activities in their regions.
CORPORATE MANAGEMENT

Board of Management
ZF Friedrichshafen AG and the ZF Group are led by the Board of Management, which runs the business independently and sets the company’s strategic direction. The strategy is implemented in close coordination with the Supervisory Board, which monitors the Board of Management’s activities and receives regular management updates concerning business performance, strategy and potential opportunities and risks.

In line with our matrix organization, in addition to strategic and functional management, the Board of Management has responsibility for the divisions and regions.

In the 2019 fiscal year, the Board of Management initially comprised seven members, and later, eight: Chief Executive Officer Wolf-Henning Scheider, Dr. Konstantin Sauer, Michael Hankel, Sabine Jaskula, Dr. Holger Klein, Dr. Franz Kleiner and Wilhelm Rehm. Dr. Martin Fischer was appointed to the Board of Management on November 1, 2019. As of 2020, he took charge of the responsibilities previously managed by Dr. Franz Kleiner, who stepped down on December 31, 2019.

Supervisory Board
The Board of Management is overseen by the Supervisory Board, whose members are appointed with equal representation. In the fiscal year, the Supervisory Board comprised 20 members under the leadership of Dr. Ing. Franz-Josef Paefgen. It is supported by an Executive Committee and an Audit Committee which are both composed of members of the Supervisory Board.

Corporate Governance
The Board of Management and the Supervisory Board are committed to managing and monitoring the company responsibly in accordance with the principles of good corporate governance. These are a prerequisite for sustainable business success and the fundamental standard on which our day-to-day management is based. The Board of Management and the Supervisory Board share a firm conviction that acting according to the principles of responsible corporate management geared to sustainable value creation is an all-encompassing requirement across the whole business.

Enterprise Risk Management
Over the past two years, the Group has gradually enhanced its enterprise risk management, which entails defining and regulating clear roles and responsibilities along with a standardized Group-wide risk management process. A key aspect of the revised Enterprise Risk Management is an integrated approach to governance, risk and compliance distinguished by improved interfaces between the Internal Control System, Compliance, Corporate Audit and Corporate Risk Management. Our risk situation is now more transparent. We document, monitor and manage risks in a structured way, taking account of both strategic and operational risks, and – going forward – aggregating the overall risk landscape.

Risk management system with structured interfaces
Compliance
The company is committed to dealing with customers, business partners, employees and the environment in a reliable and respectful manner. This implies lawful, honest, responsible behavior at every level and in all areas as the core value of our corporate culture.

We promote professional conduct and minimize the risks of misconduct through a Group-wide compliance management system focused on preventing and detecting compliance cases as well as on responding quickly and effectively to potential violations.

ZF’s Code of Conduct lays down mandatory Group-wide principles for correct, legally compliant and ethical behavior. The code requires legal compliance and fair competition, and addresses key issues such as human rights, anti-corruption activities, economic and social responsibility, product compliance, workplace safety, data privacy and transparency. The code is incorporated in our Compliance Management System and is available in more than 25 languages.

We do not tolerate violations of applicable legislation, our Code of Conduct, internal guidelines or, above all, our values.

Internal control system
ZF’s internal control system (ICS) aims to guarantee that we achieve our objectives in terms of relevant business activities (effectiveness/efficiency), reliable financial reporting and compliance. Our standardized ICS method applies company-wide and is implemented accordingly throughout the Group. It is based on the tenets of transparency, the four-eyes principle and the separation of duties. The ICS helps to monitor control procedures and documentation.

Equality and equal opportunities
Equality and equal opportunities are vital for our company’s success. We support the wide variety of social cultures in our company and nurture our employees regardless of their personal attributes. ZF promotes an integrative working environment and an open work culture that respect, value and encourage individual differences.

With due consideration for German legislation governing equal representation of women and men in managerial positions in the private and public sectors, ZF Friedrichshafen AG has discussed and set targets for the relevant managerial levels to be achieved by June 30, 2022.

- For vacancies regarding the Supervisory Board, a target quota of 30% female supervisory board members was set. The quota is currently 10%.
- For vacancies regarding the Board of Management, a quota of 10% female Board of Management members is envisaged. The appointment of Sabine Jaskula as member of the Board of Management for the HR and Legal Corporate Function means that this target has been met.
- At the first managerial level (executive vice president/senior vice president) and the second managerial level (vice president) below the Board of Management, the percentage of women is planned to increase to 15% each.
NON-FINANCIAL KEY PERFORMANCE INDICATORS

Alongside financial indicators, non-financial KPIs are also very important for our future business success. For a deeper insight into these topics, ZF publishes a separate Sustainability Report at the same time as the Annual Report. This report is available on the website at www.zf.com

Research & Development

Our objective: new mobility
Implementation of our corporate strategy “Next Generation Mobility” also extends to our global network of research and development centers. Accordingly, we drew on the corporate strategy to develop our “Next Generation Technology” strategy.

Our goal is technology leadership within our industry. Our roadmap to that goal consists of four technology clusters that we have defined as follows:

- **Vehicle System & Functions**: In the future, vehicles will increasingly be controlled by system functions. This cluster is developing the necessary architectures and software methods as well as the structure of these complex system functions.
- **Data Handling & Analytics**: This cluster focuses on vehicle connectivity and communication with the infrastructure, from embedded components to the IoT platform necessary for data analysis, and algorithms including artificial intelligence.
- **Efficient Energy Conversion**: We are researching and developing the efficient storage (batteries, hydrogen/fuel cell) and conversion (frequency changers, electric motors, DC/DC converters) of electrical energy as well as systemic algorithms for optimized vehicle control.
- **Advanced Base Technology**: This cluster deals with basic technologies that make complex vehicle functions possible, including modern, high-resolution sensors, artificial intelligence, powerful central electronic controls, and cutting-edge materials for efficient power electronics.

Within these four clusters are 18 key technologies that we are pursuing in global research and development.

R&D expenditure and staff increased
In 2019, we invested €2,652 million (2018: €2,501 million) in research and development, which is 7.3% of sales (2018: 6.7%). R&D expenditure is defined as research and development costs according to the statement of profit or loss plus capitalized development costs, less their depreciation.

In the past fiscal year, the Group employed around 19,400 people in R&D (2018: 17,100). Of that number, around 3,140 (2018: 2,520) engineers and technicians were working in the Group’s basic research and divisional project development departments. ZF’s Research and Development Departments have 16 main development locations around the world.
including Friedrichshafen, Koblenz, Schweinfurt, Alfdorf, Düsseldorf, Dielingen, Passau and Auerbach in Germany, as well as Detroit (USA), Shanghai (China), Hyderabad (India), Częstochowa (Poland), Pilsen (Czech Republic), Solihull (UK), Vigo (Spain) and Yokohama (Japan).

Patent applications up significantly
In the year under review, our company units submitted a total of 3,007 patent applications – a significant increase on the previous year. Of these inventions, 1,979 were first-time patent applications.

R&D delivering basic technologies for future-proof products
Our technology strategy is designed to ensure that the technologies we need for future product development are available across the Group. The future of mobility will largely be determined by complex system functions and software. Consequently, in 2019 we laid the groundwork for faster and more comprehensive software development in R&D. Going forward, ZF will also be supplying the automotive sector with software-only products.

Our Software Competence Center, set up in April 2019, brings together all the relevant topics. This new unit is developing basic modules for complex technical functions in a range of applications – for example, a fully automated forklift truck with a barcode-based guidance system. Software will be one of the biggest influencing factors in the future development of vehicle systems, and a key differentiator in achieving higher levels of automation. We intend to help drive that trend.

ZF is also stepping up its attention to data analysis. The first functional version of our IoT cloud platform went live last October, with data storage and analytics functions that network our developers around the world, as well as the use of state-of-the-art development tools.

Since the beginning of 2019, ZF has been investing heavily in setting up centers for artificial intelligence (AI) and cybersecurity in Friedrichshafen and Saarbrücken (Germany). We also established cooperations with the Helmholtz Center for Information Security (CISPA) and the German Research Center for Artificial Intelligence (DFKI). As part of the “Quality 360” project, we are using artificial intelligence, for example, to set up a predictive model (digital twin) based on real processes so that we can optimize them and detect deviations at an early stage.
Technological foundations
Our technology strategy leverages four strategic technical fields: Vehicle Motion Control, Integrated Safety, Automated Driving and Electromobility – all connected by the common thread of digitalization. In 2019, we laid further foundations in research & development for new products in these fields. Specific examples include:

Automated Driving
In the “ADAS.AI” project, we use artificial intelligence to make the test kilometers driven usable for other test scenarios. This means that camera images can be used for validation in other applications, even if the position of the camera on the vehicle has changed. This can reduce the cost of test kilometers by around 90% for each additional variant, with a corresponding reduction in validation time.

Electromobility
Our new two-speed electric drive for passenger cars integrates a newly developed electric motor with a shift element and appropriate power electronics. The improvement in energy conversion efficiency compared to previous e-drives extends the driving range for each battery charge. And its compact design also makes this new drive system of interest for passenger cars in the compact class.

Integrated Safety
A new pre-crash safety system prototype developed by ZF uses an external side airbag deployed milliseconds before a collision. It provides an additional lateral crumple zone, which can help reduce occupant injury severity by up to 40 percent. To make this possible, ZF has linked the airbags with the vehicle’s environment sensors. Algorithms can determine if a crash is imminent and decide whether or not to deploy the airbag.

Vehicle Motion Control
“cubiX” is a central software component that gathers sensor information from the entire vehicle and prepares it for optimized control of active systems in the chassis, steering, brakes and propulsion. Designed with a vendor-agnostic approach, cubiX will support components from ZF as well as third-party components. By connecting multiple vehicle systems such as electric power steering, active rear axle steering, the sMOTION active damping system, driveline control and integrated brake control, cubiX can optimize the behavior of the vehicle from one central source.

Accelerating development through strategic partnerships and investments
Establishing strategic partnerships and equity stakes continues to play a decisive role in our development work – especially in automated driving technologies.

We expanded our skills base again in 2019 with targeted investments, acquiring a 60-percent share of 2getthere B.V. Based in Utrecht (Netherlands) with offices in San Francisco, Dubai and Singapore, the company supplies fully automated transport systems. It is working on applications ranging from automated guided electric vehicle systems for airports, business and theme parks through to dedicated urban transport infrastructures. The company has more than three decades of experience in the autonomous passenger transport market as well as unique engineering and software skills.

In 2019 we entered additional strategic partnerships with technology companies to continue expanding our electromobility and artificial intelligence development network.

Employees
Number of employees remains stable
As of December 31, 2019, ZF employees worldwide numbered 147,797 (2018: 148,969). While additional employees were hired in the research and development area, employee numbers in production and production-related fields were adjusted as a consequence of the market development in the automotive industry. Contrary to our expectations, employee numbers slightly declined compared to the prior year. The largest share of employees work in Europe, most of them in Germany (50,864). On the key date, the percentage of women in the ZF Group amounted to 27 percent. Temporary workers numbered 12,429 in the year under review (2018: 12,421).

At the end of 2019, we employed some 2,500 apprentices worldwide. This young target group can choose between 25 apprentice professions and ten dual work-study courses. With roughly 2,000 apprentices and students in the
dual program in Germany (2018: approximately 2,100), ZF Friedrichshafen AG ranks among Germany's largest providers of training and apprenticeship opportunities. In the year under review, some 628 young people started an apprenticeship or dual work-study program at ZF in Germany.

Continued focus on employee qualifications
Due to progressive digitalization, employees and graduates specializing in software and IT are becoming increasingly important for the automotive industry. In order to develop and manufacture intelligent mechanical products, we need workers not only from traditional occupations, but also employees who can meet entirely new job specifications. This is also enabled by a global qualification program which is based on the corporate strategy. Key subjects include artificial intelligence, electromobility and autonomous driving functions.

Activities to retain and attract employees
In order to hold on to our existing employees and attract new recruits, we offer various incentives to our staff. Apart from an international work environment and attractive social benefits, our employees can also use options such as flexible hours and sabbaticals. Enjoying a good reputation both with existing staff and potential recruits, we were able to further increase our attractiveness as an employer in the year under review. This is confirmed by the current ranking established by Universum’s market researchers. In the Engineering category for Germany, ZF climbed from position 14 to 11 in the external professionals ranking.

Procurement, production, sales
Procurement: global network of suppliers
As a manufacturer, ZF generates a large part of its value creation with the production and supply of components. Correspondingly, a major focus once again in 2019 was on systematically securing supplies. For the procurement process, our Group maintains a global network of suppliers of different sizes. Our partners supply raw materials as well as producing basic components and component products. They also develop systems which we integrate into ZF solutions. We regularly check our suppliers for compliance with our quality requirements. Furthermore, we require all suppliers to comply with our Business Partner Principles (BPP). These define basic sustainability requirements for cooperation and among other things address human rights, working standards, environmental protection, responsible raw materials procurement, business ethics and compliance.

Production: compliance with quantity and quality criteria
Our production network includes 161 production plants at 137 production locations in 27 countries. Europe is the largest production region. Processes and materials must comply with all of our quality, safety and environmental protection standards. All production locations use the EHS Management System (Environment, Health and Safety) to manage environmental protection and occupational health and safety, thereby ensuring that production in the plants is environmentally compliant in line with defined targets.

Sales: new structure strengthens customer proximity
Our components and systems increasingly offer our customers ever more complex vehicle functions. In response to these requirements and with the participation of our key accounts, we restructured our sales organization in 2019. In this global key-account management organization, Key Account Executives (KÄEs) manage their customer accounts with an entrepreneurial approach. They are responsible for customer-specific results and function as sparring partners for the divisions. Our internal Sales Academy supports the establishment of the new key-account management organization by providing corresponding training.

Our Aftermarket Division draws on an international service network of around 130 service locations and 650 service partners. Our offers include services for fleets, exchange units and maintenance, as well as intelligent connectivity solutions plus upgrades and retrofits for more efficiency, comfort and safety. In addition, we develop workshop concepts that provide the technical know-how needed for diagnosis, maintenance and repair of our components.
Environmental protection, occupational health and safety

Commitment to sustainable occupational safety and health and environmental protection
Responsibility for environmental protection as well as the safety of our employees and partners is reflected in the Environment, Health and Safety (EHS) Policy approved by the Board of Management as well as the corresponding targets.

Systematic environmental management according to ISO 14001 is the standard for all production and main development locations. External expert audits confirm that the participating locations conform to current environmental, occupational health and safety legislation as well as certification standards. When it comes to production processes, new manufacturing technologies with a focus on energy efficiency as well as product-related environmental concerns are gaining in importance.

Through innovative products and state-of-the-art production technologies with a special focus on energy efficiency, ZF has succeeded in sustainably reducing the unfavorable environmental impacts resulting from its business activities and the use of ZF products. High technical environmental standards have been implemented at all production plants. Product-related environmental issues are gaining in importance and an internal development directive guarantees that environmental protection procedures are integrated into all product development processes.

Climate protection strategy developed
In 2019, we developed a climate protection strategy for our Group based on the corporate carbon footprint (CCF) principle. This commits ZF to significantly reducing greenhouse gas emissions, especially CO₂, from our plant operations by 2040. Our concrete goal is that we will be climate neutral according to the criteria of the UN Intergovernmental Panel on Climate Change by 2040. To achieve this, we will expand our existing energy efficiency programs as well as strategically enhance the in-house generation of renewable energies and the transition to green energy.

We have already achieved absolute reductions in energy consumption and CO₂ emissions from our plant operations. This is a good starting point for our future adherence to the new climate protection strategy, which takes into account the 1.5 degree target of the Paris Climate Agreement.

CCF footprint reported for the first time
The reporting year was the first time the upstream and downstream processes (purchased items, product utilization etc.) were reported in the form of a corporate carbon footprint (CCF). In this context, the current supplier evaluation is being enhanced to incorporate the CO₂ strategy.

As part of the Carbon Disclosure Project (CDP), ZF was able to report on progress in reducing greenhouse gas emissions in 2019, and achieved a rating of Level B-. With the emissions evaluation, the Group is helping to improve CO₂ emissions transparency in vehicle manufacturing. As part of the CDP project, ZF also reported on projects for conserving water at production locations suffering from water shortages, like South Africa.

Certification projects strengthen occupational safety and health
All ZF locations use a systematic occupational safety and health management system in line with the corporate standard. ZF customers are consistently pushing for certifications of occupational health and safety, for instance, according to the ISO 45000 standard. To continue to ensure that ZF meets the requirements of certifiability, further certification projects were initiated, continued and completed at various locations.

Since 2017, and especially true in 2019, ZF has been focusing on behavior-related workplace safety and the role executive managers play in influencing the behavior of employees. A workshop concept was designed on this topic and rolled out at all locations. Last but not least, these efforts helped ZF to again significantly reduce the frequency of accidents in LTAR (Lost Time Accident Rate). You can also find further information on environmental protection, occupational health and safety in ZF’s Sustainability Report under www.zf.com
ECONOMIC REPORT

MARKET AND INDUSTRY ENVIRONMENT

Global economy losing momentum

In 2019, global economic growth witnessed a widespread downturn with the growth rate slumping to 3.0%. This has been the lowest recorded growth since the financial crisis in 2008/2009. The reason behind the stagnation was that the economic climate has remained subdued over the last two years in face of a decline in trading and investment activities alongside increasing political uncertainties.

In most industrialized countries, GDP growth in 2019 was down on last year, particularly in the eurozone with growth at 1.2% and in the United States at 2.3%. China’s growth also weakened to 6.2% where political interventions to curb the country’s debt burden and the economic consequences of growing trade tensions have been felt on the overall demand.

Growth in India dropped to 5.0% in 2019. Here, a corporate and environmental regulatory uncertainty coupled with doubts about the strength of the financial sector have burdened domestic demand. Other emerging countries – including Russia with a GDP growth of 1.4% and Mexico with –0.1% – saw significantly less growth in 2019 than in the previous fiscal year and were below their previously generated average growth rates.

The decline in industrial production partly due to global trade tensions and political uncertainties in many areas are to blame for this sluggish economy, coupled with a significant drop in global vehicle production. Investment activities were also hampered by the continued absence of a clear political strategy on how to tackle climate change.

In 2019, international financial markets were impacted by shifting political risk assessments as well as the monetary policy decisions of the central banks. In the U.S., the Federal Reserve cut interest rates three times over the course of the year by a total of 0.75 percentage points. The European Central Bank also reacted in the fall by slashing interest rates to –0.5% while also resuming bond purchases.

ZF markets under pressure

After the previous high of 95 million cars and light commercial vehicles in 2017, production in 2018 was already down slightly by –1%, largely due to a sharp final-quarter slowdown in China in 2018, the first market to show a negative trend.

The worldwide production of passenger cars faced an even stronger decline in 2019. The number of vehicles produced worldwide dropped by 6% to 89 million vehicles, causing virtually all markets to see a recession. While Europe and North and South America recorded relatively moderate recession rates of –5% and –4% respectively, the demand of end customers in the world’s largest markets, India and China, slumped more sharply by –12% and –8% respectively.

The start of 2019 also saw the market for HCVs over 6 tons shift into reverse. Following years of growth (2017: +16%; 2018: +3%), vehicle production fell by 4% to 3.6 million units, 160,000 units less than in the previous year. India recorded the worst downturn with –33%. Key factors influencing this decline included the precarious financing conditions, high stocks and pending emission control regulations. In Europe, production dropped by 7%. China was far more resilient than expected. Despite predictions of a decline, China had generated a 3% increase by the end of the year. North and South America recorded above-average results, with an increase in production of 6% and 4% respectively.

Sources: Ifo, IWF, OECD, FERI

GDP growth 2018–2019 in %

<table>
<thead>
<tr>
<th></th>
<th>USA</th>
<th>China</th>
<th>India</th>
<th>Japan</th>
<th>Germany</th>
<th>Eurozone</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>2.9</td>
<td>6.5</td>
<td>7.4</td>
<td>0.9</td>
<td>1.5</td>
<td>1.9</td>
</tr>
<tr>
<td>2019</td>
<td>2.3</td>
<td>6.2</td>
<td>5.0</td>
<td>1.0</td>
<td>0.6</td>
<td>1.2</td>
</tr>
</tbody>
</table>

Sources: Ifo, IWF, OECD, FERI

Development of ZF’s industries 2018–2019 in %

<table>
<thead>
<tr>
<th></th>
<th>Cars and commercial vehicles &lt; 6t</th>
<th>Commercial vehicles &gt; 6t</th>
<th>Tractors &gt; 75 kW</th>
<th>Construction machinery</th>
<th>Wind power</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>-0.8</td>
<td>-5.6</td>
<td>-4.1</td>
<td>-2.1</td>
<td>29.0</td>
</tr>
<tr>
<td>2019</td>
<td>-5.6</td>
<td>-4.1</td>
<td>-5.0</td>
<td>-2.1</td>
<td>-1.1</td>
</tr>
</tbody>
</table>

Sources: Ifo, IWF, OECD, FERI
The markets in the non-automotive sector proved relatively stable over the course of 2019. The global production of agricultural machinery above 75 kW was on a par with the previous year, although both China and Europe saw a negative development of −3% and −2% respectively. In contrast, North America sustained the previous year’s level while South America even recorded double-digit growth. Production of construction machinery dropped on a global scale by 1%, with a 5% growth on the Chinese market, a marginal 1% drop in Europe and a sharper decline of 8% in North America. The wind power segment gained considerable momentum with a year-on-year increase of one third in installed gigawatts. Only Germany and India were forced to accept significant losses; all other key markets, including Europe and North America, grew exponentially by 30% to 40%. China, too, developed positively with growth of over 30%.

**OVERALL DEVELOPMENT OF THE GROUP**

**Overview of the business trend and overall statement on business performance from the Board of Management**

For ZF, 2019 was dominated by the rollout of its “Next Generation Mobility” strategy and the economic development in the automotive industry. The global decline of markets and uncertainties attributed to Brexit and trade conflicts led to sales and profits for the fiscal year falling below the initial expectations.

Despite facing complex market developments, ZF was able to continue advancing its strategy in 2019 and increased investments in future technologies, especially in electromobility and autonomous driving. One key milestone in pursuit of this development was the acquisition of WABCO Holdings Inc. (WABCO) initiated in 2019. The acquisition of this company will enable ZF to become the leading systems supplier in the commercial vehicle segment. The financing of this planned company takeover was secured by several transactions made in 2019.

The forecast for the last fiscal year issued at the start of 2019, which predicted sales between €37 and €38 billion, an adjusted EBIT between 5% and 5.5% and an adjusted free cash flow of approximately €1 billion was adjusted at the start of August 2019 in line with the altered economic situation.

In the face of a difficult market environment for the automotive industry, ZF managed to achieve its adjusted sales target (between €36 and €37 billion). As regards sales, ZF’s figure of €36.5 billion was slightly below last year’s result. After adjusting for exchange rate influence and M&A activities, sales decreased by 1.9%. In spite of this drop, sales are still above the average development of the markets and specifically of the automotive market.

The adjusted EBIT of €1.5 billion is attributed to investments in the future with increased costs for research and development as well as the establishment of new locations specializing in future technologies. The effects of the economic downturn in the automotive industry are also leaving their mark on the result. The adjusted EBIT margin of 4.1% is at the bottom end of the adjusted forecast (between 4% and 5%).

The adjusted free cash flow amounted to €0.8 billion and was therefore within the adjusted forecast (between €0.5 and €1.0 billion).

Against the backdrop of the market environment in the automotive industry, the establishment of new locations particularly in the electromobility segment as well as a further increase in research and development costs, we concentrated our attention in the Group on stabilizing the profit situation. Another focus was the planned acquisition of WABCO and its financing.

The drop in equity ratio to 22.0% was largely driven by the increase in total assets resulting from capital market transactions. The ZF Group rests on a solid financial foundation thanks to its long-term oriented financing, cash and cash equivalents of €2.3 billion, current securities of €2.6 billion as well as affirmed and unused credit lines of €6.1 billion at Group level.

ZF’s credit rating agencies, Moody’s and Standard & Poor’s, affirmed the investment grade ratings on the announcement of the WABCO transaction. The agencies rated the transaction to be positive from a strategic perspective. The rating agencies have taken account of the higher debt burden expected from the acquisition by adjusting the company’s rating outlook to “negative”.

Against the backdrop of a secured liquidity and financial basis as well as stable business performance, the Board of Management considers the economic situation of the consolidated ZF Group to be positive on the whole.
RESULTS OF OPERATIONS, NET ASSETS
AND FINANCIAL POSITION

Preliminary remark
The intention to acquire WABCO was confirmed by the WABCO shareholders with an approval rate of 68.44% on June 27, 2019. The financing of the purchase price was secured initially by concluding a credit line. In the second half of 2019, this credit line was replaced in part by two large successful capital market transactions. These transactions comprised the issue of bonded loans as well as the issue of a corporate bond denominated in euros.

In the wake of the strategic reorientation of the consolidated ZF Group, the Group’s structure was adjusted as of January 1, 2019. For this purpose, the Active & Passive Safety Technology Division was divided into three Divisions: Passive Safety Systems, Active Safety Systems, and Electronics and ADAS.

The first-time application of the financial reporting standard IFRS 16 (Leases) led to an increase of total assets as a result of the capitalization of right-of-use assets from previously unrecognized lease agreements and the associated liabilities. In addition, the recognition of long-service awards was changed in the fiscal year. Right from the beginning, these awards are recognized as pension provisions to the extent that they include retirement benefit elements.

The effects on the consolidated financial statements are explained in detail in the notes to the consolidated financial statements in the “Accounting policies” section in the paragraph “Changes in accounting policies.”

The previous year’s comparative figures in the group management report were adjusted to provide for a better understanding.

Results of operations
Group sales almost on prior-year level
In the fiscal year 2019, the ZF Group generated sales of €36,518 million (2018: €36,929 million). Accordingly, sales were within the range of the forecast revised in mid-year. The decline in sales of around €400 million compared to the prior year is mainly attributable to the economic slowdown in the automotive industry, the uncertainties surrounding Brexit as well as the trade disputes between the USA and China. Adjusted by M&A activities as well as positive exchange rate effects, this leads to an organic sales decline of 1.9%.
Sales development by division

<table>
<thead>
<tr>
<th>Division</th>
<th>2019</th>
<th>2018 adjusted</th>
<th>Changes compared to 2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Car Powertrain Technology</td>
<td>7,312</td>
<td>7,775</td>
<td>−6.0%</td>
</tr>
<tr>
<td>Car Chassis Technology</td>
<td>7,684</td>
<td>7,876</td>
<td>−2.4%</td>
</tr>
<tr>
<td>Commercial Vehicle Technology</td>
<td>3,701</td>
<td>3,720</td>
<td>−0.5%</td>
</tr>
<tr>
<td>Industrial Technology</td>
<td>2,990</td>
<td>2,782</td>
<td>7.5%</td>
</tr>
<tr>
<td>E-Mobility</td>
<td>2,346</td>
<td>2,195</td>
<td>6.9%</td>
</tr>
<tr>
<td>Active Safety Systems</td>
<td>6,303</td>
<td>6,559</td>
<td>−3.9%</td>
</tr>
<tr>
<td>Passive Safety Systems</td>
<td>4,337</td>
<td>4,125</td>
<td>5.1%</td>
</tr>
<tr>
<td>Electronics and ADAS</td>
<td>1,848</td>
<td>1,666</td>
<td>10.9%</td>
</tr>
<tr>
<td>Aftermarket</td>
<td>2,929</td>
<td>2,975</td>
<td>−1.5%</td>
</tr>
<tr>
<td>Corporate Functions</td>
<td>327</td>
<td>321</td>
<td>1.9%</td>
</tr>
<tr>
<td>− Consolidation</td>
<td>−3,259</td>
<td>−3,065</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>36,518</strong></td>
<td><strong>36,929</strong></td>
<td><strong>−1.1%</strong></td>
</tr>
</tbody>
</table>

Sales development by division

Divisions develop differently
Sales in the Car Powertrain Technology Division amounted to €7,312 million (2018: €7,775 million) in the fiscal year 2019. The decline by approximately €460 million is attributable to the reduced global vehicle production. The lower demand in the passenger car market also had an effect on the Car Chassis Technology Division. The annual sales of €7,684 million (2018: €7,876 million) are 2.4% below the previous year’s level.

Sales in the Commercial Vehicle Technology Division amounted to €3,701 million (2018: €3,720 million). The weaker demand in the second half could be largely offset by the roll-out of a joint venture in China as well as by a higher demand for bus technology. Accordingly, sales were roughly on the prior-year level.

In the fiscal year 2019, sales of the Industrial Technology Division amounted to €2,990 million, representing an increase of 7.5% (2018: €2,782 million). The main reason for this increase is a stronger demand for wind power technology and off-highway systems.

Despite the negative market environment, the E-Mobility Division continued to grow and recorded sales of €2,346 million (2018: €2,195 million).

Due to the effects of a decline in production in the passenger car market, sales in the Active Safety Systems Division in the fiscal year 2019 amounted to €6,303 million (2018: €6,559 million).

Both the Passive Safety Systems Division and the Electronics and ADAS Division grew despite the market decline. The driver for this development was, among other things, the rise in demand for airbags and camera systems. The Passive Safety Systems Division generated sales of €4,337 million, representing an increase of €212 million over the prior-year sales of €4,125 million. With sales of €1,848 million, the Electronics and ADAS Division achieved growth of around 11% (2018: €1,666 million).

In the past fiscal year 2019, the sales of the Aftermarket Division amounted to €2,929 million (2018: €2,975 million), thus almost reaching the previous year’s level.

Regional distribution of sales
The economic slowdown, the uncertainty surrounding Brexit as well as the trade disputes between the USA and China also had an effect on our regional sales development.

The market development in Europe varies depending on country and segment. While the passenger car production in the fiscal year 2019 fell by approximately 5%, accumulated production figures for heavy commercial vehicles declined by around 7%. Overall, ZF’s organic sales in Europe decreased by 3% to €16,698 million (2018: €17,390 million).
In North America, sales declined organically by 1.9%. In the USA, the light vehicle market declined by around 4% in the year under review. Thus, ZF achieved an outperformance in the overall declining passenger car market.

With sales of €7,847 million (2018: €8,008 million), the Asia-Pacific Region declined organically by around 3% over the previous year. In China, the country with the largest market share in the region, the production of passenger cars in the entire fiscal year 2019 fell by approximately 8% year-on-year. The consumer restraint, which had already started in the fourth quarter of 2018, continued in 2019.

Sales in South America amounted to €1,068 million in the year under review, which is above the previous year’s level of €1,034 million. The recovery of the markets, especially in Brazil, led to a positive organic growth in this region of 9%.

The distribution of sales by region only showed minor changes compared to the sales in the prior year. The top-selling region was again Europe, accounting for 46%, followed by North America with 29% and Asia-Pacific with 21%. The Region of South America with a sales share of 3% and the Region of Africa with a share of 1% remained unchanged from the prior year.

Gross margin of around 16%

Gross profit on sales amounted to €5,750 million (2018: €6,102 million), which is equivalent to a gross margin of 15.7% (2018: 16.5%). This decline is above all the result of lower sales due to the weakened markets. In addition, higher depreciation as a result of the increased investing activities had an effect. Furthermore, structural costs, which were catered to growth, affected the gross margin. The implementation of the measures to adjust costs led to an improvement of the earnings quality, especially in the second half of the year. Research and development costs amounted to €2,270 million (2018: €2,158 million). The increase by €112 million compared to the prior year highlights the implementation of the corporate strategy to strengthen the defined future technologies.

Selling and administrative expenses changed only slightly compared to the previous year, with an overall ratio to sales of 7.1% (2018: 7.0%).

The net result from participations amounts to €43 million in the year under review (2018: €147 million). In the prior year, the measurement of participations at fair value had a notable effect.

Adjusted EBIT margin at 4.1%

EBIT totaled €927 million in the year under review (2018: €1,537 million). Adjusted by extraordinary items relating to the purchase price allocation from the TRW acquisition in the amount of €531 million, restructuring costs of €34 million and M&A costs of €11 million, the adjusted EBIT margin was 4.1% (2018: 5.6%). Accordingly, the margin was at the low end of the 4–5% range expected at mid-year, mainly due to higher research and development expenses, start-up costs for new plants especially for E-Mobility and the cost structures, which were defined by growth at the beginning of the year.

The net financial result fell from €–309 million to €–387 million, largely due to higher loss allowances for financial assets.

Tax expenses amounted to €140 million in 2019, compared with €261 million in the previous year. This corresponds to an income tax rate of 25.9% (2018: 21.3%).
Net assets and financial position

IFRS 16 affects the presentation of property, plant and equipment and financial liabilities

The financial reporting standard IFRS 16 (Leases) required to be applied as of January 1, 2019, leads to the recognition of previously unrecognized right-of-use assets from leases under property, plant and equipment in the amount of €625 million and the recognition of the corresponding liabilities under financial liabilities.

Slight increase in total assets

The increase in total assets to €32,350 million (2018: €27,720 million) is primarily attributable to capital market transactions carried out in the year under review to finance the planned acquisition of WABCO.

Current assets increased by €4,081 million to €14,816 million (2018: €10,735 million) due to the cash inflow from capital market transactions and the related increase in cash and cash equivalents to €2,302 million (2018: €922 million) as well as in current financial assets to €2,824 million (2018: €84 million). The payment of the purchase price for the WABCO acquisition will be made upon closing, which is expected for spring 2020.

Trade receivables amounted to €5,041 million as of December 31, 2019, thus only slightly below the prior-year level.

Non-current assets increased by €549 million to €17,534 million (2018: €16,985 million). Apart from deferred tax assets, property, plant and equipment rose by €414 million due to the intensified investing activities. In contrast, intangible assets declined to €6,841 million (2018: €7,205 million). This reduction is primarily attributable to amortization of hidden reserves identified within the framework of the purchase price allocation concerning the TRW acquisition.

Investment ratio climbs considerably

In the past fiscal year, investments in property, plant and equipment amounted to €1,879 million (2018: €1,586 million). The investment ratio of 5.2% of sales was clearly above the prior-year level (4.3%).

Of the capital expenditure, 44.5% was spent on payments in advance and construction in progress, 34.1% was spent on technical equipment and machines, 12.1% on other equipment, factory and office equipment, and 9.3% on land and buildings.

In geographical terms, capital expenditure focused on Europe (59%), followed by North America (21%) and Asia-Pacific (18%).

Capital expenditure related to the expansion of capacities for existing products and the ramp-up of new products. It also related to the traditional businesses such as transmission applications (including hybridization), chassis systems, electronics, damper modules, brakes, steering systems and additional safety technology as well as to new technological areas such as electromobility and autonomous driving. In addition,
capital was spent on the construction or the expansion of production and development buildings in existing locations (e.g. Pilsen (Czech Republic)).

The planned acquisition of WABCO was secured by concluding a credit line in the amount of €7.3 billion. The credit line originally consisted of three tranches in the amount of €4.8 billion (term until 2021 at the maximum), €1.0 billion (term until 2022) as well as €1.5 billion (term until 2024). The €4.8 billion tranche has already been largely replaced through the issue of bonded loans as well as euro bonds. As of December 31, 2019, the tranches remaining under the credit line remained fully unused. The bonded loans had a nominal amount totaling €2,057 million and were issued in October 2019 by ZF Friedrichshafen AG. The total amount includes forward tranches amounting to €382 million, which were disbursed in January and February 2020, respectively. The bonded loans are divided into fixed and variable rate tranches with terms of three, five, seven and ten years from disbursement. The euro bonds that were also newly issued in October 2019 have a nominal amount of €2,700 million and are entirely fixed rate bonds. The terms of the tranches amount to four, six, eight and ten years. The bonds were issued via ZF Europe Finance B.V., a wholly-owned subsidiary of ZF Friedrichshafen AG.

The additional financial liabilities primarily result from the financing of the TRW acquisition in 2015. The financial instruments issued in this context are euro and U.S. dollar-denominated bonds with final maturities from 2020 to 2025 and a nominal amount outstanding as of the reporting date of €1,075 million for the euro bonds and $2,247 million for the US dollar bonds (2018: €1,075 million and $2,247 million, respectively) and bonded loans with final maturities in 2020 or 2022, respectively, and an outstanding nominal amount of €755 million (2018: €894 million). Both the bonds mentioned and the bonded loans bear fixed interest.

In addition, a variable interest-bearing loan in the amount of €500 million was taken out at the European Investment Bank in the fiscal year 2018. The loan has to be repaid in 2024 at the latest. The syndicated loan that was refinanced in 2016 and had a remaining amount of €3.0 billion in the form of a revolving credit line was unused as of the reporting date. The credit line has a residual term until July 2023.

Against the backdrop of the corporate goal to be financially independent, ZF is aiming at a stable investment grade rating. As of the reporting date, ZF had company and bond ratings of Baa3 with a negative outlook from Moody’s and BBB- from Standard and Poor’s, also with a negative outlook. Compared to the previous reporting date, the ratings continued to be in the investment grade area, however, the outlook was changed by each of the rating agencies from stable to negative. The background for this is primarily the increased indebtedness in connection with the planned WABCO acquisition as well as the agencies’ reduced expectations for growth for the automotive industry as a whole.

Trade payables amounted to €5,462 million as of the reporting date, hence roughly on the previous year’s level (2018: €5,507 million). Provisions for pensions amounted to €5,348 million as of December 31, 2019 (2018: €4,389 million). The increase largely resulted from the reduction of the discount rate in Germany used for the measurement of the pensions to 1.2% (2018: 2.0%).

**Equity ratio amounts to 22.0%**

As of December 31, 2019, Group equity, including non-controlling interests, amounted to €7,106 million (2018: €7,106 million). Dividends paid to the shareholders of ZF Friedrichshafen AG (€162 million, 2018: €195 million) and to holders of non-controlling interests (€37 million, 2018: €66 million) reduced equity. In addition, there are actuarial losses from the measurement of provisions for pensions in the amount of €647 million. In turn, equity mainly increased due to the net profit after tax in the amount of €400 million as well as the foreign currency translation differences of €151 million. Another positive effect came from the mark-to-market of financial instruments in the amount of €133 million, primarily relating to the currency hedge of the US dollar purchase price for WABCO. The equity ratio declined to 22.0%, above all due to the increase of total assets (2018: 26.2%).

**Gross debt rises**

Current and non-current financial liabilities amounted to €9,689 million as of December 31, 2019 (2018: €5,731 million). Without considering the change of derivative financial instruments, there was an increase in gross debt year-on-year by €3,966 million due to the capital market transactions carried out during the year under review.

The planned acquisition of WABCO was secured by concluding a credit line in the amount of €7.3 billion. The credit line originally consisted of three tranches in the amount of €4.8 billion (term until 2021 at the maximum), €1.0 billion (term until 2022) as well as €1.5 billion (term until 2024). The €4.8 billion tranche has already been largely replaced through the issue of bonded loans as well as euro bonds. As of December 31, 2019, the tranches remaining under the credit line remained fully unused. The bonded loans had a nominal amount totaling €2,057 million and were issued in October 2019 by ZF Friedrichshafen AG. The total amount includes forward tranches amounting to €382 million, which were

**Investments by region**

<table>
<thead>
<tr>
<th>Region</th>
<th>2019</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asia-Pacific</td>
<td>20%</td>
<td>24%</td>
</tr>
<tr>
<td>Europe</td>
<td>60%</td>
<td>53%</td>
</tr>
<tr>
<td>North America</td>
<td>20%</td>
<td>24%</td>
</tr>
<tr>
<td>Others</td>
<td>2%</td>
<td>3%</td>
</tr>
</tbody>
</table>
The cash flow from investing activities amounted to €– 4,183 million (2018: €– 842 million). The previous year benefited particularly from the cash inflow from the sale of the Global Body Control Systems Business Unit. The operating drivers in the current reporting year are higher investments in property, plant and equipment. A negative effect came from investments in securities in the amount of approximately €2,500 million, reflecting the cash inflow from the capital transactions in connection with the planned WABCO acquisition which was used for short-term investments in special funds, as well as capital expenditures for future technologies such as the acquisition of SIMI Reality Motion Systems GmbH. The sale of Haldex shares in September 2019 had a positive effect.

As a result, the free cash flow amounts to €– 1,744 million compared to €1,547 million in 2018. The free cash flow, adjusted by cash inflows and outflows in connection with M&A activities in the amount of €47 million and investments in securities in the amount of €2,500 million, amounts to €803 million (2018: €891 million).

The cash flow from financing activities amounted to €3,211 million in the past fiscal year (2018: €– 1,942 million). The cash inflow in the fiscal year 2019 primarily results from the financing instruments taken out in connection with the planned WABCO acquisition. The balance from repayments and new borrowings of financial debt amounted to €3,718 million (2018: €– 1,485 million). Of that amount, €1,675 million are attributable to the bonded loan issued by ZF Friedrichshafen AG in October 2019 and €2,700 million to the euro bonds which were newly issued also in October. Interest paid and transaction costs rose from €230 million to €298 million in the fiscal year 2019, primarily due to the financing transactions in the context of the planned WABCO acquisition and the initial application of IFRS 16.

The net financial position was €– 4,748 million (2018: €– 4,759 million) as of the reporting date. It consists of current and non-current financial liabilities excluding derivative financial instruments, less cash and cash equivalents as well as securities recorded as financial assets.
OPPORTUNITIES AND RISKS

OPPORTUNITY AND RISK MANAGEMENT

Opportunity and risk management system

Our corporate management is geared toward generating added value, by which we mean sustaining the continued existence of the Group and its business units, and increasing their value. To achieve this, we weigh the opportunities and inherent risks that arise in the complex business environment we inhabit. ZF defines risk as any event that may result in a negative deviation from the business plan. In contrast, opportunities are events that may result in the Group exceeding its targets.

Our risk management system aims to identify and take opportunities as early as possible while preempting risks that could adversely affect the value of our activities by identifying them early, assessing them appropriately and initiating suitable measures with which to manage them.

The framework conditions for this, as well as the responsibilities and processes of the risk management system, are laid down in a Group-wide directive approved by the Board of Management. It is accessible to all employees and is subject to regular review by Group Risk Management, which also ensures compliance with the directive.

Group Risk Management provides the structure, methods and techniques for the risk management process and coordinates it at Group level. This means that the opportunity and risk management system is integrated in the strategic, planning, management and reporting processes of all corporate functions and operational units.

The Board of Management has overall responsibility for the risk management system and reports at least quarterly to the Supervisory Board about the main opportunities and risks identified. The Supervisory Board is responsible for monitoring the Board of Management and, as part of that remit, oversees the effectiveness of the risk management system.

At Group level, the Risk Committee, chaired by the board member responsible for finance, IT and M&A, is tasked, among other things, with evaluating ZF’s cross-divisional and cross-functional risk situation.

Corporate Audit regularly reviews the implementation and effectiveness of risk management. In addition, the external auditors check our early risk detection system as part of the annual Group audit.

Risk evaluation and reporting

The Board of Management and the Risk Committee continuously monitor ZF’s opportunity and risk situation based on quarterly risk identification, evaluation and reporting by the corporate functions and operational units. The identified risks are summarized at division and Group level and tracked in coordination with the corporate functions involved.

The three-year review period for the risk assessment is based on operational planning, with the focus on the current year. Risks and their impacts are chiefly assessed using quantitative criteria based on the gross principle, i.e., before operational risk treatment. Taking all the reported risks and based on their probability of occurrence and the potential extent of the losses relative to the planned profit indicators in the
period under review, we identify the major individual risks to the Group. Major risk criteria are defined by thresholds set by the Board of Management. We include opportunities if they have a direct material link to a risk.

In addition to this quarterly reporting, the risk management system is an established, continuous task within the Group. For example, risk managers at division and Group level have an immediate (ad hoc) obligation to report both reputational risks, and emerging individual risks whose impact on earnings exceeds a threshold defined by the Board of Management. This process enables us to initiate effective risk control measures in a timely manner.

Risk management

We aim to avert or reduce risks by taking appropriate countermeasures. For each individual risk classified as major, the risk managers in the corporate functions or operational units initiate measures. These are documented and tracked centrally by Group Risk Management. Group Risk Management and the Risk Committee continuously monitor the development of all identified major risks and the status of the risk treatment measures initiated. The ongoing Group-wide analysis of identified risks and opportunities increases risk awareness inside the organization and establishes the framework for our corporate risk culture.

KEY RISKS COMMENTARY

Based on our current assessment, the risks classed as significant to the future development of the company are described below. The reporting here generally covers a whole year. Risks that are subject to regular reporting essentially arise in the areas of quality and sales. Risks that arise out of transactions relevant under taxation law and other legislation are also reported. We also identify latent risks for the ZF Group. Major opportunities are also listed and analyzed. They are then actioned if substantiated. Risks and opportunities are not set off against each other.

Industry environment risks

As a global player we face risks arising from overall economic developments. General economic conditions have a major influence on the ZF Group’s commercial success.

Political upheaval in individual countries and diplomatic tensions between them can lead to turbulence on the financial markets and to unfavorable global market developments. Two such examples are the uncertainty around Brexit plans and the ratification of the new NAFTA (United States-Mexico-Canada Agreement USMCA). Given the ongoing conflict in Ukraine, there is a risk that Russia will respond to European Union and U.S. sanctions with counter-sanctions, which in turn may have a negative impact on demand for our products. We are also seeing an increase in protectionist measures in individual countries trying to protect or improve their competitiveness on the global markets, such as the introduction and expansion of firm market access barriers, industrial policies and additional certification processes.

We view the escalating trade conflict between the USA and China and the increasing trade tensions between the USA and Europe as major risks. Impeding U.S. tariffs on vehicle and parts imports from global markets may significantly affect our value chains as well as those of our customers and suppliers and could be detrimental to our sales, profitability and financing conditions. Moreover, fiercer competition, especially in our key sales markets in Europe, the USA and China, may also adversely affect sales development and sales prices.

In the overall economic environment we are seeing a global shift from an expansionary monetary policy to one that is tighter and more conservative, potentially affecting inflation, interest rates and general funding policies.

We also face location- and country-specific risks. In addition to activities in the traditional markets, ZF is operating more widely in growth markets. Structural deficits and economic downturns in these countries – especially Argentina, Brazil, Russia, India or China – may lead to declining sales and payment defaults.

We have dedicated cross-functional projects in place to continuously monitor the developments surrounding U.S. trade policy and Brexit and to introduce countermeasures where required. If necessary, market slowdowns in individual regions and countries can be counteracted by volume shifts to other markets. ZF decisively limits these kinds of market risks by specifically promoting a broader, more diverse product portfolio.

Sales risks

As a global supplier, primarily for the automotive and industrial sectors, demand for our products and services is largely determined by the global economic conditions and developments described above. At the same time, demand in these sectors is subject to cyclical fluctuations.
Risks may ensue not only from the various market developments in the product segments and regions, but also from the ramp-up of new products and the breakthrough of disruptive technologies. In addition, as an automotive supplier we are faced with high capital investments as well as high price pressure from vehicle manufacturers.

Consumer behavior in mobility is changing. In Europe, there is a risk that cities will ban diesel vehicles. There is also the "new-energy" vehicle quota in China, under which battery electric vehicles, plug-in hybrids and fuel cell vehicles must account for a certain share of manufacturers’ new vehicle fleets. Uncertainties about the future of the traditional combustion engine – especially diesel technology and its unknown legal implications – may reduce sales of vehicles and parts in this business area, with a resulting decline in ZF’s earnings.

The large number of economic factors influencing automotive demand exposes global production to high volatility, which makes it difficult for us to predict sales accurately. If markets and consequently our sales develop differently than expected, our production facilities may be left underutilized, resulting in idle costs, impairment losses and falling sales prices.

Low growth rates in the Chinese market are among the volume risks in the Car Powertrain Technology, Car Chassis Technology and Active Safety Systems Divisions. A fall in orders due to customer insourcing coupled with increasing price pressure call for the systematic implementation of cost-cutting measures in the Commercial Vehicle Technology Division. Accelerated consolidation of the customer base and the availability of new technological alternatives for core products is exacerbating the already high price pressure in the Aftermarket Division, especially where merchandise is concerned.

We resolutely combat these sales risks by continuously monitoring sales markets, conducting market research and exchanging information with the regional and local contacts in order to identify changes in market structures and consumer behavior at an early stage. The planned takeover of brake specialist WABCO will substantially expand our commercial vehicle expertise and technical aftermarket portfolio. Requirements-oriented production planning and the logistics early-warning system also help us respond flexibly to fluctuations in demand.

To guarantee compliance with emissions requirements we are stepping up our operational strength in electromobility. Through a network of partnerships and alliances, we are constantly adapting our product range to market conditions and significantly expanding our activities in this pioneering field. In the event of an unpredictable drop in prices, we try to mitigate the losses through systematic renegotiations with our suppliers.

**Quality risks**

If products fail to meet customer specifications or (allegedly) malfunction, ZF may incur considerable costs from warranty and product liability claims. This particularly applies to very high-volume products such as the 8HP and 9HP automatic transmissions. ZF is also exposed to this risk in the field of safety-related products such as brake systems, seat belt anchorage systems and airbags.

Supplier quality issues and non-compliant supplier components installed in our products may also require modifications and reworking, which in turn may entail significant costs.

Quality risks are potentially damaging not just financially but also as a serious threat to our reputation.

We take responsibility for our products and thus for their impact on society, our business partners and the environment. That is why, despite the increasing complexity of those products, we continually strive to maintain the best possible quality with the help of a certified ZF quality management system, consistent quality checks and regularly optimized process workflows. Furthermore, in 2019 we set up a Product Safety and Regulatory Office to analyze, evaluate and track all relevant quality incidents and their associated risks. Findings are reported directly to the board member responsible for quality.

**Procurement risks**

As a manufacturer, our earnings performance – particularly in the automotive business units – is exposed to raw material and energy price trends. Along with volatile steel and aluminum prices, raw material and component price trends are an increasing challenge where our electronics applications and components are concerned. Tighter protectionist measures in individual countries plus fundamental political developments such as Brexit also pose risks. These may take the form of additional or higher tariffs, and thus costs, for products and parts that we buy or sell. Unless we compensate for this by improving productivity and establishing synergies, demand for ZF products may decline. In addition, risks may arise due to financial problems affecting key suppliers, capacity shortages caused by supply disruptions, and the underutilization of supplier production capacity.

To counter these risks, our sophisticated supplier risk management aims to prevent any hiatus in supplies due to a supplier’s financial instability or market launch, quality and logistics problems, to provide supply alternatives and to minimize our general risk position in relation to suppliers. We review key suppliers at regular intervals based on solid criteria, and define appropriate measures to mitigate the identified risks. In addition, constant market investigation and regular, targeted analyses help ZF respond early to unfavorable index developments on the raw materials and energy markets.

**Research and development risks**

Due to ever-increasing technical complexity, rapid technological progress, and stringent emissions, consumption and safety regulations, product introduction and manufacture,
especially in the automotive sector, always involves development and technology risks. The Group currently generates a substantial proportion of its sales with products based on the combustion engine driveline. The rapid progressive electrification in the passenger car and commercial vehicle drive segment may jeopardize our strong market position. We also note a gradual shift from components to systems business, which may reduce our share of value added.

To counter these risks, we are strategically increasing product and production enhancement based on the modular principle, expanding our strategic partnerships as well as acquiring equity stakes in the area of future technologies. Since 2019 we have been aligning our skills and capabilities across the Group with four technology fields. At the same time, we are operating cross-divisionally via agile system houses. This allows us to provide both established and new customers with system solutions for any application in line with their needs and with market requirements. We are also strengthening our position in this promising area through targeted expansion of our electrification and hybridization activities and a consistent focus on investment in interface and forward-looking technologies.

Cyber and information technology risks

Cyber and information technology (IT) risks ensue from digitalization and the increasing technical complexity in terms of connectivity between machines, products, systems, services and partners. To provide appropriate protection for people, commercial and personal information and data, and tangible and intangible assets, we have an integrated cybersecurity policy. Our comprehensive integrated Information Security Management System (ISMS) covers not only IT but also development, production, staff security, compliance, physical security and legal and customer requirements. Corporate Security advises and supports the corporate functions and the business in implementing and enhancing the ISMS. Our key information security processes were audited and certified both externally and internally under the international ISO 27001 standard.

Data protection and security requirements have increased significantly since the EU General Data Protection Regulation came into force in May 2018. Data protection is a top priority in all ZF Group application areas from driver assistance systems and autonomous or automated driving systems to sensor and vehicle data.

We combat cyber and IT risks with technical and organizational measures designed to safeguard the availability of our production, development and IT infrastructure and to maintain the strictest confidentiality in dealing with corporate, partner and employee information and data. The security infrastructure protects data streams and processing both on premise (operated on site) and off premise (e.g. in the cloud). Alongside these technical measures, ZF’s security culture plays a key role in the company’s resilience. Consequently, we roll out regular, mandatory awareness-raising measures to our workforce worldwide. Internal and external information sources are used to monitor ZF’s security situation. Alarm and emergency systems are in place for security incidents, allowing us to react immediately with corresponding contingency plans and clearly identified crisis response teams.

Financial risks

Liquidity, foreign currency, interest rate and counterparty risks as well as credit risks are monitored and controlled as part of central risk management in order to safeguard our financial stability. Where necessary, we hedge these risks using appropriate instruments. Guidelines and provisions regarding the individual risk types have been put in place which determine how to assess and manage the particular risk. Wherever possible and expedient, we use derivative financial instruments to manage interest and currency risks in particular, as well as existing underlying or planned transactions. Only hedges that refer to a specific underlying transaction are allowed, using spot transactions, forwards, swaps and options. We also use hedge accounting if the prerequisites are met. Our acquisition of TRW permanently increased our currency risks, in particular due to changes in internal financing requirements and a significant increase in activities in Eastern Europe and Asia. In order to manage these risks more effectively, a new Group strategy was developed in 2017 to hedge currency risks and has been implemented gradually over the last few years. Since January 1, 2020, we have been managing and hedging currency risks with a standardized cash flow hedging model and system environment.

In order to reduce counterparty risks within finance, we only transact with banks having a first-class credit rating and within centrally stipulated limits. The necessary financial flexibility is guaranteed by means of central cash pooling with sufficient cash and committed credit lines with matching maturities. The financial stability of our suppliers and customers is continually checked; if necessary, measures are initiated to safeguard the supply chain or receivables. There are risks to recognize impairments on financial assets particularly in connection with ZF’s investments in equity stakes in the area of future technologies as well as their financing.

Risks are also associated with the syndicated loan agreement of ZF Friedrichshafen AG and the loan agreement with the European Investment Bank. These agreements comprise not
only obligations but also financial covenants which have to be complied with at all times. A breach of these financial covenants would mean that, in the event of a respective claim, the creditor could demand immediate repayment of the loan or terminate the credit line. ZF Friedrichshafen AG has complied with the financial covenants at all times, including as of the reporting date. From a current perspective, ZF has no reason to believe that these obligations will be breached in future.

The necessary financing of the anticipated purchase price for the WABCO acquisition was initially secured through a syndicated loan agreement with our 15 core banks. Parts of this financing package have since been refinanced on a long-term basis via the capital market. The currency risk from the transaction is hedged with one of our core banks under a forward contract that only triggers an obligation for ZF if the acquisition project is successfully closed.

Legal and other risks

As a global company, ZF is bound to comply with a variety of regional and national legislation and regulations. We make every effort to minimize and control the legal risks. To this end, ZF has precautions and structures in place to detect potential threats as early as possible and, if necessary, to defend our rights. Nevertheless, we remain fundamentally exposed to the risk of legal disputes in areas such as product liability, competition law, environmental protection and taxation.

Unlawful conduct could harm the company’s reputation, weaken our market position and result in a loss of earnings due to payment or other liabilities.

In particular, national antitrust authorities continue to focus on investigating infringements of competition rules in the automotive supplier industry, which may result in fines or obligations by civil law. Despite diligent compliance with national laws, the company may potentially infringe applicable legislation. In the event of ongoing or future investigations, we cooperate fully with the relevant authorities. Accounting provisions for legal risks are made in accordance with the applicable accounting regulations.

The ZF Group is subject to worldwide audits in the various countries in which our reporting units operate. In current or future audits, tax laws and relevant facts or circumstances, especially in relation to acquisitions, could be interpreted and assessed in a different manner by local tax authorities than by ZF. This poses the risk of a claim for back taxes based on an adjustment to the tax base.

Unlawful conduct could harm the company’s reputation, weaken our market position and result in a loss of earnings due to payment or other liabilities.

The current spread of the coronavirus poses a risk for our employees and our value chain, which we need to reevaluate and manage correspondingly each day. Corporate Health Services is monitoring the situation in close cooperation with Corporate Security. We are observing the development from a medical point of view to evaluate the situation for our employees and derive protective measures. Together with the divisions, the corporate functions are evaluating the repercussions of the coronavirus on sales, the supply chain and production and launching countermeasures. Moreover, as a member of the VDA (German Association of the Automotive Industry), ZF is part of a task force which aims to pool information on the coronavirus available in our industry and on its consequences in order to achieve solid evaluation and a more effective handling of the related risks.
KEY OPPORTUNITIES COMMENTARY

Industry environment opportunities

As a global player in an industry where disruption is on the rise, we see a steady flow of new opportunities. Systematically leveraging these is a key element of ZF’s sustainable growth policy. Using our market investigation and environmental analyses, we take a structured approach to carving out opportunities with the potential to improve our product design, production efficiency, market performance and cost structure. Opportunities with a high probability of occurrence are taken into account in our plans and forecasts.

Our presence in almost every mature industrial market means that we are well-placed to pick up on dynamic growth trends in emerging markets and capitalize on these by stepping up market development. For example, we tapped into a new market by opening a production site in Hai Phong, North Vietnam. The Vietnamese automotive industry is one of the fastest growing markets in Southeast Asia. Positive economic developments in this territory as well as other emerging regions in which we are active would result in additional sales potential. Our business model and strategy are producing a raft of opportunities from different regions, customer industries and highly diversified product groups and customers.

Company-specific opportunities

Our business activities in today’s highly dynamic market environment are a constant source of performance-related opportunities. Systematically identifying and implementing these to enhance our processes, products and services is an essential part of our long-term corporate strategy “Next Generation Mobility”. Our ongoing aim is to play an active role in shaping the megatrends of the mobility industry – digitalization, electrification and urbanization. As a systems supplier with a wide range of products and services in vehicle motion control, integrated safety, automated driving and electromobility, we are very well-placed to succeed in the market for these technology fields.

Increasing pressure to meet emission standards coupled with growing demand for clean mobility are intensifying the need for energy-efficient and low-emission drive solutions. Vehicle manufacturers are required to reduce fleet consumption through their vehicle mix. These factors are reinforcing the trend toward electrification. If electric and hybrid drive were to become cheaper alternatives earlier than expected, as a systems supplier we would benefit from this. We are laying the groundwork for solid organic growth through strategic acquisitions and equity stakes.

In the commercial vehicles sector, the planned WABCO acquisition is an opportunity for us to shape the future of commercial mobility as a systems supplier for commercial vehicle technology. By joining forces we will improve our position to capitalize on future demand for autonomous, efficient and connected commercial vehicles.

Lower material price structures and the expansion of our global value chains open up the opportunity for us to improve operational performance even further.

Enhanced standardization and a decrease of complexity in our internal processes facilitate the fast and flexible adaptation of our organizational structure to market demands. Our new, unified Group sales structure is designed to boost cooperation and coordination between the divisions and the company organization, making the business more customer-oriented.

To optimize the way in which we meet our various customer groups’ expectations, we employ a dual operating system. Depending on the area and the market situation, we use two different but complementary practices: Efficiency Backbone and Agile.

The Efficiency Backbone method focuses on efficiency, scalability and reliability, with standardized processes that enable high productivity and optimal use of resources for mature products. This practice is essential, especially when productivity pressure is high, for ZF to secure income by using proven, efficient processes. The Agile method is more goal-oriented. It enables us to react quickly and adapt flexibly to new conditions such as the rapidly changing market requirements of the industry. An agile corporate culture with a focus on collaboration and continuous improvement lays the foundation for increasingly effective, efficient systems and processes, and prompt reaction to sudden changes.

Research and development opportunities

New technology trends like the connected car and ADAS (Advanced Driver Assistance Systems) are increasingly marketable and open up new opportunities, as do the advancing developments in driveline electrification. ZF plans to invest a double-digit billion amount in electromobility and autonomous driving as well as other interface and forward-looking technologies, underlining the strategic importance of these areas of expertise for the Group.

In 2019 we founded our Innovation Factory, aimed at accelerating ideation and development from day one. A young team in Germany and the USA is tasked with global scouting, preparing and selecting the best ideas at pitch events, developing minimum viable products (MVPs) and running proofs of concept (PoCs). A further team in China is planned for 2020.

Our #MobilityLifeBalance campaign offers the public solutions to the challenges of future mobility in every aspect of life. The campaign’s approach is in line with our overriding objective: to enable a form of mobility that chimes with people’s current and future aspirations, bringing us closer to the customer and opening up additional sales opportunities.

Opportunities also arise from continuously developing new and existing products, expanding development expertise and setting up new locations both at home and abroad, which in turn consolidates and boosts our global competitiveness. Hence, ZF is building a third research and development center in Guangzhou, southern China. It is scheduled to go operational in 2023 and will develop key technologies and system solutions for ZF that we can also use in other market regions.
Digitalization and information technology opportunities

Digitalization and the Internet of Things (IoT) make it possible for us to increase the connectivity between our mobility and industrial applications and to expand our services. Accordingly, we are adding new digital products and services to our existing business model. Opportunities will arise from scaling up our mobility concepts and the services based on them.

We are expecting significant improvements in productivity and processes thanks to new applications in the area of artificial intelligence. We also continue to enhance our capabilities in digital connectivity and automation, both of which are prerequisites in enabling tomorrow’s vehicles to see, think and act. To this end, we are also building on our internal resources with partnerships with start-ups.

OVERALL STATEMENT ON THE OPPORTUNITY AND RISK SITUATION

The ZF Group works to counter the above risks using an established risk management system. The Opportunities Report represents a consolidated observation of significant opportunities in the period under review. Wherever cost-effective and within the Group’s sphere of influence, we do our best to develop these.

The risk management system is integrated in our operational and strategic business activities. The risk management method is subject to a continuous improvement process.

Based on information available at present as well as the individual risks illustrated in the financial statement and set out in this report, we can identify no additional market-related opportunities and risks which may substantially influence the ZF Group’s results of operations, net assets and financial position in fiscal year 2020. The Group’s financial situation is stable; the need for financial means is covered by existing liquidity and available credit lines.

Given our market position and the precautions we have taken, we are confident in our ability to control these risks and meet the resulting challenges. We can therefore state that, from our point of view, when analyzing the overall picture, no major risks can be identified which may jeopardize the company’s continued existence, either alone or in combination with other risks.
FORECAST REPORT

INDUSTRY ENVIRONMENT TRENDS

Prognosis subject to uncertainty
After a noticeable economic slowdown in 2019, global growth is expected to stabilize at 3.1% during the current year. Both the newly industrialized countries responsible to some extent for the decline in 2019 and the developed economies that have underperformed in recent years will make a significant contribution to this.

The prediction for 2020 is stable growth of 1.5% in the developed economies. While the eurozone is forecast to remain stable at 1.1%, the U.S. economy is set to experience a gradual slowdown to 1.7%. In the medium term, growth in the industrialized countries is likely to remain subdued owing to moderate productivity growth and slower growth in the labor force due to demographic trends.

China’s growth will fall well below 6% in 2020, partly as a result of the coronavirus. In certain newly industrialized countries, such as Brazil and Mexico, growth is set to recover slightly at 1.8% and 0.9% respectively.

Persistent political uncertainty may continue to weigh on global growth and ultimately result in lower growth rates, lower productivity growth and disruptions in industrial supply chains.

The main factors jeopardizing the economy are a possible escalation of trade conflicts, a no-deal Brexit and a prolonged spread of the coronavirus. In this respect, long-term economic forecasts are subject to increasing uncertainty due to the number of unpredictable factors involved.

Central banks’ current monetary policy is boosting employment and propping up demand, but equally, dampening expectations around inflation. Financial risks are increasing, which could result in a sustained economic downturn. Moreover, a worsening of the mood on the financial markets would exacerbate general financial conditions, particularly for economies that are already struggling.

No signs of an upward trend in the industry
The market for passenger cars and light commercial vehicles is experiencing a lull. Uncertainty around regulations, trade conflicts, customs duties and the economic situation, but also around various technologies (gas, diesel, battery, PHEV, MHEV, biofuel and fuel cell) and a noticeable downturn in demand in China in the first quarter due to the coronavirus are stifling end users’ willingness to buy. All major markets are expected to continue on a downward trend. Production in Europe and North America will remain under pressure and is expected to fall by 2% and 1% respectively, while vehicle production in China is set to decline by 6%. The few positive signs in newly industrialized countries like Brazil are too weak to change the global picture.

In the market for heavy commercial vehicles over six tons, the outlook is equally pessimistic. Incoming orders in the sector point to an stronger decline in volume in 2020, with production expected to fall by a further 8%. The U.S. market stands to lose the most in this respect. After several years of very healthy growth, production peaked in 2019. Given the economic slowdown, the outlook indicates the possibility of a 20% fall in the Class 8 trucks, which are most heavily affected. A double-digit volume decline is also feared in Europe. The largest market, China, is also in reverse and could contract by 7%.

Nor are the industrial markets entirely immune to the general trend. The global market for agricultural tractors, down 1%, remains relatively stable. While Europe and North America are expected to decline by 2–3%, the Asian markets appear steady compared to 2019. The prospects for construction machinery are somewhat more downbeat: Global production could see a further slowdown of 3%, driven mainly by shrinking markets in Europe and China. In contrast, the wind power market is set to experience another year of growth; installed global capacity in gigawatts will increase by a further 15% in 2020, with the USA, China and, to a lesser extent, India as the main growth drivers.

THE OUTLOOK FOR ZF

Sales forecast
Assuming the above-mentioned market developments and stable currency exchange rates, ZF is expecting Group sales of around €35–37 billion for 2020. The sales forecast is based on flat development in the markets relevant to the Group. The planned acquisition of WABCO is excluded from the forecasts provided here.

Our current-year expectations for the divisions are as follows:

Sales for the Car Powertrain Technology and Car Chassis Technology Divisions will remain at the previous year’s level, assuming stable demand in both existing and new customer business given steady passenger car production.
Despite the forecast decline in demand in the commercial vehicle sector, we expect our Commercial Vehicle Technology Division to be able to sustain last year’s sales level, buoyed up in particular by new customer business in Asia.

We anticipate a slight increase in sales for the Industrial Technology Division, mainly in Asia-Pacific and India. This dynamic growth is being driven particularly by the Off-Highway Systems and the Wind Power Technology Business Units. The Wind Power Technology Business Unit is profiting from the further global expansion of wind power as an alternative to fossil fuels for generating electricity.

The E-Mobility Division will benefit significantly from the rising demand for products in conjunction with electrification of the driveline. Different product ramp-ups, including electric axles, power electronic applications and electric shift systems will drive sales growth.

The Aftermarket Division anticipates that sales of spare parts and services will match last year’s level in all regions.

In the Active Safety Systems and Passive Safety Systems Divisions, we expect a slight decline in sales owing to general market developments in the passenger car sector, particularly in the Asia-Pacific Region.

The Electronics and ADAS Division is set to see a slight increase in sales based on increased demand for our advanced driver assistance systems.

**Adjusted EBIT margin stable**

In light of predicted market developments, market upheavals and intense competition, the Group anticipates an adjusted EBIT margin of between 4% and 4.5% (before the WABCO acquisition) in the coming fiscal year.

Based on the planned development of the operating business, the intended investments as well as the continuation of consistent working capital management, the aim is to achieve free cash flow adjusted for company acquisitions and disposals of between €0.5 billion and €1 billion for 2020.

If the coronavirus persists to spread worldwide, there is a risk that the forecast financial figures cannot be achieved.

**Overall, ZF is heading in the right direction**

Given the different development of the regional markets and divisions, ZF demonstrates sound, sustainable growth in the short and medium term when analyzing the overall picture. The Group is tapping into new markets, rolling out new future-oriented products and underpinning its technology leadership through ongoing investment in research and development.

Supported by the trust of customers and cooperative collaboration with suppliers and business partners as well as committed, qualified employees willing to deliver outstanding performance and embrace change, ZF can rise to the upcoming challenges and look into the future with optimism.

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Friedrichshafen, March 2, 2020
ZF Friedrichshafen AG
The Board of Management