Annual Report

2019

Science for a **better life**

Five-Year Summary

€ million	2015	2016	2017	2018	2019
Bayer Group					
Sales	46,085	34,943	35,015	36,742	43,545
EBITDA[1]	9,573	8,801	8,563	9,695	9,554
EBITDA before special items[1]	10,256	9,318	9,288	8,969	11,503
EBITDA margin before special items[1]	22.3%	26.7%	26.5%	24.4%	26.4%
EBIT[1]	6,241	5,738	5,903	3,454	4,189
EBIT before special items[1]	7,060	6,826	7,130	6,013	7,007
Income before income taxes	5,236	4,773	4,577	1,886	2,880
Net income (from continuing and discontinued operations)	4,110	4,531	7,336	1,695	4,091
Earnings per share (from continuing and discontinued operations) (€)[1]	4.97	5.44	8.29	1.80	4.17
Core earnings per share (from continuing operations) (€)[1]	6.82	6.67	6.64	5.60	6.40
Net cash provided by operating activities (from continuing and discontinued operations)	6,890	9,089	8,134	7,917	8,207
Free cash flow (€)	3,827	5,806	5,202	4,652	4,214
Net financial debt	17,449	11,778	3,595	35,679	34,068
Capital expenditures (as per segment table)	2,554	2,627	2,418	2,368	2,920
Bayer AG					
Total dividend payment	2,067	2,233	2,402	2,611	2,751
Dividend per share (€)	2.50	2.70	2.80	2.80	2.80
Innovation					
Research and development expenses	4,274	4,405	4,504	5,105	5,342
Ratio of R&D expenses[2] to sales – Crop Science (%)	10.7	11.7	11.7	13.0	11.7
Ratio of R&D expenses[2] to sales – Pharmaceuticals (%)	16.0	16.7	16.2	15.5	15.4
Ratio of R&D expenses[2] to sales – Consumer Health (%)	3.8	3.9	3.9	4.1	4.2
Employees in research and development	14,753	14,213	14,041	16,835	16,006
Employees					
Number of employees[3] (Dec. 31)	116,600	99,592	99,820	107,894	103,824
Personnel expenses (including pension expenses) (€ million)	11,176	9,459	9,528	10,778	11,788
Proportion of employees with health insurance (%)	96	98	98	98	98
Fluctuation (voluntary / total) (%)	5.0 / 13.9	4.8 / 13.2	4.8 / 10.4	5.5 / 14.8	6.6 / 15.0
Hours of vocational and ongoing training per employee	20.0	23.0	23.4	17.1	22.6
Safety & Environmental Protection					
Recordable Incident Rate for Bayer employees (RIR)	0.43	0.40	0.45	0.40	0.46
Process Safety Incident Rate (PSI-R)[4]	–	–	–	–	0.10
Total energy consumption (terajoules)	24,677	26,243	25,832	28,903	38,744
Energy efficiency (kWh / €1,000)[5]	200	209	205	219	247
Total greenhouse gas emissions (CO_2 equivalents in million t)[6]	4.62	4.64	3.63	2.88	3.71
Hazardous waste generated (thousand t)	431	428	485	303	316
Water use (million m^3)	110	93	98	42	59

2018 figures restated; figures for 2015 – 2017 as last report; proportion of employees with health insurance: 2018 figures as last reported

[1] For definitions of the indicators see A 2.3.

[2] R&D expenses before special items

[3] Employees calculated as full-time equivalents (FTEs)

[4] In 2019, we changed over to the reporting criteria of the International Council of Chemical Associations (ICCA) and now report the discharge of chemical substances or utilities as Process Safety Incidents (PSI). Previously we reported according to the criteria of the European Chemical Association (CEFIC).

[5] Quotient of total energy consumption and external sales

[6] Direct emissions from power plants, waste incinerators and production plants and indirect emissions from external supplies of electricity, steam and refrigeration (according to the market-based method)

Fiscal 2019:

Bayer strategically and operationally successful

// Group sales up by 3.5% (Fx & portfolio adj.) to €43.5 billion

// EBITDA before special items increases to €11.5 billion (+28.3%)

// Core earnings per share significantly up by 14.3% to €6.40

// Net income increases to €4.1 billion (+141.4%) – €1.6 billion gain on sale of Currenta stake

// Free cash flow of €4.2 billion above expectations

// Net financial debt declines to €34.1 billion

// Proposed dividend of €2.80 per share

// Crop Science with solid performance in challenging environment, substantial increase in earnings due to acquired business

// Pharmaceuticals shows encouraging business development

// Sales growth at Consumer Health, earnings at prior-year level despite divestments

// Ongoing portfolio, structural and efficiency measures implemented successfully

// Glyphosate's positive safety profile confirmed – appeal and mediation proceedings moving forward

// Outlook for 2020: increase in sales, earnings and free cash flow

// Ambitious sustainability targets set

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Chairman’s Letter

We’ve delivered

Dear stockholders and friends of Bayer:

I'm pleased to present to you Bayer’s Annual Report for fiscal 2019, a year characterized by significant social and political developments. We saw increasing trade disputes put a strain on the economy. And we saw the social debate on climate change conducted with growing passion around the world, driven in part by an increase in extreme weather such as droughts and floods.

For Bayer, it was ultimately a successful year. We achieved our operational objectives, pressed ahead diligently with the announced efficiency and structural measures, and completed the planned portfolio changes. And, as promised, we defined ambitious sustainability goals to further boost our efforts in this area. In short: We’ve delivered.

Of course, this was only possible thanks to the exceptional dedication and personal commitment shown by our employees, for which I wish to express my sincere gratitude on behalf of the entire Board of Management. I would also like to extend a special thank you to the members of the Supervisory Board for their support and for the good and trustworthy working relationship we shared at all times.

As you know, the glyphosate lawsuits in the United States also cast their shadow over the past year. The number of plaintiffs has grown further, which does not come as a surprise in view of the huge rise in anti-Roundup advertising spend from the plaintiffs’ side. However, we remain firmly convinced that our glyphosate-based herbicides are safe and are not carcinogenic.

Bayer CEO Werner Baumann

That view is supported by a large body of scientific studies and is shared by leading regulatory authorities worldwide. The U.S. Environmental Protection Agency (EPA) and Department of Justice reaffirmed that view in an official statement on an ongoing appeal proceeding at the end of last year. And after conducting a new review, the EPA said in January that it "did not identify any human health risks from exposure to glyphosate."

We are confident that science will prevail in the end, and we'll continue to defend the safety of glyphosate and our glyphosate-based products vigorously. Meanwhile, we continue to pursue mediation in good faith to explore whether we can reach a solution. One thing is clear, however: Bayer will only accept a mediation outcome that is financially reasonable and is structured in a way that will bring the matter to a reasonable conclusion, including in the long term.

Another crucial factor here is that regulatory authorities worldwide can make decisions on the basis of facts and science – as the EPA in the United States has done. We would like to see more resoluteness and support from policy-makers in Europe in particular – for the good of our customers, the farmers. They have been using glyphosate all over the world for decades because it controls weeds effectively, protects harvests and enables more sustainable farming methods.

We completely understand the criticism voiced in relation to the glyphosate legal proceedings – in particular at our Annual Stockholders' Meeting last year. It goes without saying that the continuing uncertainty over the outcome of the product liability suits still weighs on our company. Our share price recovered somewhat over the course of the year and stood at around €73 at the end of 2019, some 20 percent up on its closing price the year before. But we can't, and won't, stop at that. I assure you that we continue to do all we can to find an appropriate solution here and regain the trust we've lost.

As part of these efforts, we will continue to work closely with the Supervisory Board, which has itself taken concrete measures. These include establishing a new committee to intensively oversee the glyphosate lawsuits and retaining U.S. lawyer John H. Beisner as an advisor to provide additional expertise on this matter. In addition, Ertharin Cousin, an American citizen and internationally recognized expert in nutrition and agriculture, is now also a member of our Supervisory Board.

In the meantime, we'll continue to devote all our efforts and undiminished enthusiasm to focusing on what really matters for Bayer: driving our operational business and strategic alignment, research and innovation, and the topic of sustainability and responsibility.

Despite facing a very challenging environment, we achieved our operational targets for the year in 2019: with sales of €43.5 billion and record EBITDA before special items of €11.5 billion.

Sales at our Crop Science Division came in a little lower than forecast – mainly due to the extreme weather in some regions and the negative impact this had on our agriculture business. However, this was offset by our pharmaceuticals business, which turned in an encouraging performance and posted sales above expectations. We also surpassed our target at Consumer Health.

We can therefore be very pleased with our operational performance last year. And, of course, we want you, our shareholders, to share appropriately in our company's success once again this year. We are therefore proposing to the Annual Stockholders' Meeting a dividend of €2.80 per share as in the previous year.

We've also made major advances strategically. At the end of 2018 we announced a package of measures aimed at further strengthening our core life science businesses, enhancing productivity and innovation, and significantly improving our competitiveness. This package included a raft of portfolio measures. We've been able to implement them – both ahead of schedule and with very attractive proceeds from the divestments. The sale of our 60% stake in Currenta and divestment of Coppertone™ and Dr. Scholl's™ brands have already closed, while the sale of our Animal Health business to U.S. company Elanco is expected to close in mid-2020.

This package also included a range of efficiency and structural measures, and we likewise pressed ahead diligently with their implementation in the past year. As part of this program, the size of the Board of Management was reduced from seven to five members as of January 1, 2020.

These efficiency and structural measures will make our company leaner, more agile and more focused. And we will also continue to strengthen our innovation capabilities – partly by deploying some of the freed-up resources for this very purpose. We plan to invest well over €30 billion in our future from 2019 to 2022 – and more than two-thirds of that will be channeled into research and development.

In 2019, sustainability became a key strategic lever for Bayer, representing a further milestone. When acquiring Monsanto, we always said we would do all we can to live up to our heightened responsibility. Here, too, we're walking the talk: In December, we announced a comprehensive package of measures and new sustainability targets. As a result, we're making sustainability an even stronger part of our strategy and operations. That means we're setting new standards and also laying the foundation for long-term business success – while also making a positive contribution to society and the environment.

And we'll pursue our sustainability targets with the same vigor and dedication as we devote to achieving our financial targets. They will be integrated into our decision-making processes and management compensation. We'll also establish an independent Sustainability Council consisting of external sustainability experts. Advising the Board of Management, the council will monitor and challenge the further development of our sustainability efforts.

But above all, we're also setting ourselves ambitious concrete targets. By 2030, we aim to support 100 million smallholder farmers in low- to middle-income countries by giving them access to innovation, knowledge and partnerships. Over the same period, we aim to provide 100 million women in low- to middle-income countries with access to responsible family planning by funding multi-stakeholder aid programs and by ensuring the supply of affordable modern contraceptives. In addition, we intend to improve access to everyday health products for 100 million people living in underserved regions worldwide.

And on top of that, we intend to intensify our commitment to protecting the climate even further: We have set ourselves the concrete goal of becoming carbon neutral in our operations by 2030. To achieve this, we will implement energy efficiency measures and switch to renewable electricity. We also intend to offset the remaining emissions through biodiversity-enhancing carbon capture.

The most recent ratings released by the prestigious rating organization CDP also show that we're on the right track: Bayer was again one of the few companies worldwide – and the only DAX-listed company – to be awarded the highest rating of "A" when it comes to protecting the climate and water resources.

We firmly believe that we can do a great deal to really make a difference to people's lives with our products, scientific expertise and innovative capabilities. That's why we again invested substantially in research and development to the tune of €5.3 billion last year.

And we're making concrete progress in delivering innovations. To name just two highlights: At Pharmaceuticals, our new cancer drug Vitrakvi™ became the first-ever tumor-agnostic treatment to be approved in Europe last year. Vitrakvi™ is an innovative high-precision drug that targets specific genetic mutations found across completely different types of cancer. It can therefore be used to treat different types of tumor.

In the field of agriculture, we intend to launch short-stature corn for the first time in Mexico as part of a commercial pilot project this year. This corn plant has a more compact structure, making it able to better withstand difficult environmental conditions such as strong wind and require less water. These new varieties also enable better cultivation of the crop through the targeted use of fertilizer and crop protection products, for example. Those advantages mean short-stature corn can deliver far higher yields.

However, innovation requires staying power. That's why we've also initiated many exciting projects that may only reap success a few years down the road. Our organizational unit Leaps by Bayer, where we are driving groundbreaking innovation in the areas of health and nutrition, is one such example. The goals here include using innovative technologies to, for example, improve treatments for cancer or Parkinson's disease or reduce the need for additional chemical fertilizers and thus contribute to sustainable agriculture.

As you can see, Bayer is continuing on its path with resolve and purpose. We're on track operationally and strategically and are implementing planned measures resolutely. We are firmly focused on living up to our responsibility toward nature and society and are working tirelessly to enhance our long-term prospects.

What drives us? We want to make advances in areas that matter to us: nutrition and health, sustainability and responsibility, science and innovation – and above all people's well-being. We want to make a contribution to achieving the Sustainable Development Goals for 2030 set by the United Nations – especially to ensure healthy lives for all and to end hunger. "Health for all, hunger for none" is our vision, the great goal behind our work. Backed by our scientific expertise and innovations, we help prevent and heal diseases, improve everyday health and feed the world's growing population.

That's what we mean by "Bayer – Science for a better life."

I wish to thank you, our shareholders, for continuing to place your trust in us during difficult times. I promise we won't let you down.

Sincerely,

Werner Baumann
Chairman of the Board of Management of Bayer AG

Board of Management

Werner Baumann[1]

Chairman

Werner Baumann studied economics in Aachen and Cologne, joining Bayer AG in 1988. After holding positions of increasing responsibility in Spain and the United States, he became a member of the Board of Management of Bayer HealthCare. He was appointed to the Bayer Board of Management in 2010, first as Chief Financial Officer and then as Chief Strategy and Portfolio Officer. Baumann has been Chairman of the Bayer Board of Management since May 2016. Alongside this role, he became Bayer's Chief Sustainability Officer in January 2020.

[1] Labor Director

Wolfgang Nickl

Finance

Wolfgang Nickl studied business administration in Stuttgart and Los Angeles. Following numerous roles in Europe and the United States at Western Digital Corporation, Nickl was appointed Chief Financial Officer in 2010. In 2013, he joined Netherlands-based ASML N.V. as Executive Vice President and Chief Financial Officer. Nickl has been a member of the Bayer Board of Management since April 2018.

Liam Condon

Crop Science

Liam Condon studied international marketing in Dublin and Berlin. He held various positions of increasing responsibility with the former Schering AG, Berlin, Germany, and with Bayer HealthCare in Europe and Asia, including as Managing Director of Bayer HealthCare China and head of Bayer HealthCare in Germany. Condon became Chief Executive Officer of Bayer CropScience in 2012. He was appointed to the Bayer Board of Management and head of the Crop Science Division in January 2016.

Stefan Oelrich

Pharmaceuticals

Stefan Oelrich joined Bayer as a commercial trainee. After qualifying as a commercial assistant, he held a number of positions of increasing responsibility in Bayer's HealthCare business. In 2011, Oelrich joined Sanofi, where he held numerous roles before being appointed Executive Vice President Diabetes & Cardiovascular in the company's Executive Committee. Oelrich has served as a member of the Bayer Board of Management and head of the Pharmaceuticals Division since November 2018.

Heiko Schipper

Consumer Health

After completing his studies in business economics in Rotterdam, Heiko Schipper acquired experience at Heineken before joining Nestlé in 1996, where he held various sales and marketing roles in Bangladesh, Indonesia and Switzerland. Schipper took on general management roles with increasing responsibility in the Philippines and Greater China. He was later appointed CEO of Nestlé Nutrition and a member of the Nestlé Group Executive Board. Schipper has been a member of the Bayer Board of Management since March 2018.

Report of the Supervisory Board

Dear stockholders:

During 2019, the Supervisory Board monitored the conduct of the company's business by the Board of Management on a regular basis with the aid of detailed written and oral reports received from the Board of Management, and also acted in an advisory capacity. In addition, the Chairman of the Supervisory Board maintained a constant exchange of information with the Chairman of the Board of Management and with the other Management Board members. In this way the Supervisory Board was kept continuously informed about the company's intended business strategy, corporate planning (including financial, investment and human resources planning), earnings performance, the state of the business and the situation in the company and the Group.

Where Board of Management decisions or actions required the approval of the Supervisory Board, whether by law or under the Articles of Incorporation or the rules of procedure, the draft resolutions were inspected by the members at the meetings of the full Supervisory Board, sometimes after preparatory work by the committees, or approved on the basis of documents circulated to the members. The Supervisory Board was involved in decisions of material importance to the company. We discussed at length the business trends described in the reports from the Board of Management and the prospects for the development of the Bayer Group as a whole, the divisions and the principal affiliated companies in Germany and abroad.

Changes on the Supervisory Board

Thomas Ebeling resigned from his office as a member of the Supervisory Board with effect from September 30, 2019. Ertharin Cousin was appointed by a court as his successor with effect from October 1, 2019. Detlef Rennings stepped down from the Supervisory Board effective midnight on November 29, 2019. Robert Gundlach was appointed by a court as his successor with effect from December 18, 2019.

Work of the Supervisory Board

The Supervisory Board convened 11 times in 2019. No member of the Supervisory Board attended only half or fewer than half of its meetings or those of the committees on which they served. The average attendance rate by Supervisory Board members at the meetings of the full Supervisory Board and of its committees held in 2019 was approximately 92 percent. Attendance was down slightly compared with 2018 as a result of an illness affecting one of its members over the course of several months. A detailed overview of the attendance of the individual members of the Supervisory Board at the meetings of the Supervisory Board and its committees is shown in the "Further Information" section under "Governance Bodies."

The members of the Board of Management regularly attended the meetings of the Supervisory Board. Where necessary, the Supervisory Board met without the Board of Management or with only the Chairman of the Board of Management present.

The deliberations of the Supervisory Board focused on questions relating to Bayer's strategy, portfolio and business activities. The work of the Supervisory Board focused particularly on three main areas that were each addressed at several meetings: First, the conclusions to be drawn from the Annual Stockholders' Meeting not ratifying the actions of the Board of Management, and the measures needed to regain stockholders' trust. Second, the glyphosate litigations, which the Supervisory Board and several of its committees dealt with intensively. And third, the divestment of several businesses and the "Bayer 2022" efficiency program. Between the meetings of the Supervisory Board, these issues were also the subject of extensive dialogue between the Chairman of the Supervisory Board and the Chairman of the Board of Management, as well as further members of the Board of Management.

The discussions at the meetings held in 2019 centered on the following topics:

At its February meeting, the Supervisory Board dealt with the Annual Report 2018, the agenda for the Annual Stockholders' Meeting 2019, the risk report, the corporate strategy, the planned divestment of the stake in Currenta and the conclusions drawn from the efficiency audit conducted in 2018, and adopted resolutions on the compensation of the Board of Management. Following deliberations in the Audit Committee, the Supervisory Board also dealt intensively with the procedures related to the capital expenditure for the construction of the Factor VIII facility in Wuppertal, which ultimately was not utilized. The Supervisory Board came to the conclusion that there was no indication of possible breaches of duty by the Board of Management in this regard. Finally, the Supervisory Board once again resolved on the further reduction of the interest in Covestro.

At its April meeting, the Supervisory Board discussed the business performance to date in 2019 and the upcoming Annual Stockholders' Meeting. The meeting dealt with the legal opinion drawn up by Professor Mathias Habersack according to which the members of the Board of Management did not violate their duty of care responsibilities when taking the decision to enter into and close the agreement to acquire Monsanto. The opinion also reexamined whether the purchase price paid for Monsanto was appropriate based on updated information.

Werner Wenning, Chairman of the Supervisory Board of Bayer AG

At an extraordinary meeting that took place immediately after the Annual Stockholders' Meeting, the Supervisory Board discussed the conclusions to be drawn from shareholders not ratifying the actions of the Board of Management and from the actions of the Supervisory Board being ratified by a smaller-than-usual majority. Following an extensive discussion of the views expressed by investors at and prior to the Annual Stockholders' Meeting and of the legal opinion evaluating whether Board of Management members had acted in line with their duty of care responsibilities in connection with the Monsanto transaction, the Supervisory Board unanimously expressed its confidence in the Board of Management and resolved to continue supporting its strategy. The Supervisory Board also agreed on topics that would be discussed in detail at an extraordinary meeting to be convened at short notice. For the most part, the meeting took place without the participation of members of the Board of Management.

At an extraordinary meeting in May, the Supervisory Board approved the sale of the Coppertone™ business to Beiersdorf. At an extraordinary meeting of the Supervisory Board in June, the Supervisory Board approved the acquisition of the remaining shares of BlueRock Therapeutics, approved capital expenditures for a dicamba production facility and established a special Supervisory Board committee to oversee the glyphosate litigations. At a subsequent full-day workshop, the Supervisory Board dealt at length with the status of the glyphosate litigations, the development of Bayer's reputation and the communication and sustainability strategy, as well as the development of the company's share price and interactions with investors. In each case, the Supervisory Board sought input from internal and external experts. At an extraordinary meeting in July, the Supervisory Board approved the sale of the Dr. Scholl's™ business.

At an extraordinary meeting in August, the Supervisory Board approved the sale of the 60% stake in Currenta and discussed in detail the status of the divestment process for the Animal Health business. The Supervisory Board also approved the repurchase of the existing hybrid bond and the issuance of a new hybrid bond. At another extraordinary meeting in August, the Supervisory Board approved the sale of the Animal Health business.

At its regular September meeting, the Supervisory Board resolved on the mutually agreed early termination of Kemal Malik's appointment to the Board of Management and of his service contract effective December 31, 2019. It also resolved on the distribution of responsibilities within the Board of Management with effect from January 2020, and discussed the realignment of the compensation system for the Board of Management. The meeting also dealt in detail with the corporate strategy, the strategy of the individual divisions and the sustainability strategy, as well as with the Bayer 2022 efficiency program and the financial outlook. At an extraordinary meeting in November, the Supervisory Board approved the outsourcing of IT activities and the divestment of the stake in CRISPR Therapeutics AG.

At its regular meeting in December, the Supervisory Board approved the future compensation system for the Board of Management and undertook the routine adjustment of the compensation of the members of the Board of Management and the pensions of the former members of the Board of Management. The meeting dealt at length with the glyphosate litigations, the planning for 2020 – 2022 and matters related to the rating and financing, as well as with the possible acquisition of a local business by the Consumer Health Division. The Supervisory Board discussed personnel development within the company, particularly with regard to future candidates for the Board of Management and taking into account diversity aspects. It also resolved to issue an unqualified declaration of future compliance with the German Corporate Governance Code and adjusted the wording of the Articles of Incorporation. Finally, the Supervisory Board dealt with the future legal requirements with regard to related parties' transactions and the voluntary special audit planned to be agreed with a stockholder. A training and discussion event planned to take place following the meeting had to be postponed due to time constraints and is now scheduled to take place in April.

Committees of the Supervisory Board

The Supervisory Board has a Presidial Committee, an Audit Committee, a Human Resources Committee, a Nominations Committee, an Innovation Committee and the special committee established in 2019 for dealing with the glyphosate litigations.

The current membership of the committees is shown in the "Further Information" section under "Governance Bodies."

The meetings and decisions of the committees, and especially the meetings of the Audit Committee, were prepared on the basis of reports and other information provided by the Board of Management. Reports on the committee meetings were presented at the meetings of the full Supervisory Board.

Presidial Committee: This comprises the Chairman and Vice Chairman of the Supervisory Board along with a further stockholder representative and a further employee representative. The Presidial Committee serves primarily as the mediation committee pursuant to the German Codetermination Act. It has the task of submitting proposals to the Supervisory Board on the appointment of members of the Board of Management if the necessary two-thirds majority is not achieved in the first vote at a plenary meeting. Certain decision-making powers in connection with capital measures, including the power to amend the Articles of Incorporation accordingly, have also been delegated to this committee. On a case-by-case basis, furthermore, the Supervisory Board can delegate certain responsibilities to the Presidial Committee. Finally, the Presidial Committee may also undertake preparatory work for full meetings of the Supervisory Board.

The Presidial Committee convened once in 2019, meeting in February to prepare recommendations to the Supervisory Board regarding the results of the efficiency audit, which had been conducted with external support. These recommendations included the Supervisory Board intensifying its focus on potential candidates for the Board of Management, the onboarding process for new members of the Supervisory Board and opportunities for interaction between members of the Supervisory Board outside the meetings. Through a written vote in May, the Presidial Committee prepared the establishment of the special Supervisory Board committee to oversee the glyphosate litigations and the appointment of an independent legal advisor for the Supervisory Board. Through a written resolution in May 2019, furthermore, the Presidial Committee adjusted the wording of the Articles of Incorporation with regard to the authorizations for the use of Authorized Capital I and Authorized Capital II that were about to expire.

Audit Committee: The Audit Committee comprises three stockholder representatives and three employee representatives. The Chairman of the Audit Committee, Professor Norbert Winkeljohann, satisfies the statutory requirements concerning the expertise in the field of accounting or auditing that a member of the Supervisory Board and the Audit Committee is required to possess. The Audit Committee meets regularly four times a year.

Its tasks include in particular oversight of the accounting, the financial reporting process, the effectiveness and ongoing development of the internal control system, the risk management system, the internal audit system, the compliance system and the audit of the financial statements. The Audit Committee prepares the resolutions of the Supervisory Board concerning the financial statements and management report of Bayer AG and the proposal for the use of the distributable profit, the consolidated financial statements and management report of the Bayer Group and the agreements with the auditor (particularly the awarding of the audit contract, the determination of the main areas of focus for the audit and the audit fee agreement). The committee submits a reasoned proposal to the full Supervisory Board concerning the auditor's appointment, and takes appropriate measures to determine and monitor the auditor's independence. The audit focuses particularly on whether the financial statements have been prepared in compliance with the statutory requirements and whether the financial reporting provides a true and fair view of the financial position and results of operations of the company and the Group.

The Chairman of the Board of Management and the Chief Financial Officer regularly attended the meetings of the Audit Committee. Representatives of the auditor were also present at all the meetings and reported in detail on the audit work and the audit reviews of the Half-Year Report and the quarterly statements.

The Audit Committee discussed developments in the area of corporate compliance and the latest reports from Internal Audit at each of its meetings, where necessary.

The individual Audit Committee meetings also focused mainly on the following topics: At the February meeting, the Audit Committee discussed the financial statements of Bayer AG and the consolidated financial statements of the Bayer Group. It also carefully considered the risk report, which covers the risk early warning system, and the report on the internal control system (ICS). The Audit Committee also dealt with developments related to compliance cases and litigations, with a particular focus on the glyphosate litigations and their possible impact on Bayer. Based on a report by Internal Audit, the Audit Committee also discussed the procedures related to the capital expenditure for the construction of the Factor VIII facility in Wuppertal, which ultimately was not utilized. The Audit Committee came to the conclusion that there was no indication of possible breaches of duty by the Board of Management in this regard and decided to make a corresponding recommendation to the Supervisory Board. Finally, the Audit Committee made a recommendation to the full Supervisory Board concerning the resolution to be submitted to the Annual Stockholders' Meeting on the appointment of the auditor of the financial statements.

The April meeting mainly dealt with the yearly reports of the Group Compliance Officer and the Internal Audit department and with determining the main areas of focus for the audit of the 2019 financial statements. At its July meeting, the Audit Committee dealt with the quarterly reporting, as well as with the integration of the former Monsanto companies into the internal control system and the status of their integration into the Bayer accounting processes. As regards risk management, the Audit Committee also addressed in particular risks related to social acceptance and the upcoming audit by the German Financial Reporting Enforcement Panel (DPR).

At its November meeting, the Audit Committee discussed the yearly report of the Tax department and the Finance department, the status of the audit planning of Internal Audit, the audit conducted pursuant to Section 32 of the German Securities Trading Act (WpHG) (EMIR), the status of the DPR audit, and the audit budget for the external auditor for 2020 and the framework for the auditor's non-audit services.

Human Resources Committee: On this committee, too, there is parity of representation between stockholders and employees. It consists of the Chairman of the Supervisory Board and three other

Supervisory Board members. The Human Resources Committee prepares the personnel decisions of the full Supervisory Board, which resolves on appointments or dismissals of members of the Board of Management. The Human Resources Committee resolves on behalf of the Supervisory Board on the service contracts of the members of the Board of Management. However, it is the task of the full Supervisory Board to resolve on the total compensation of the individual members of the Board of Management and the respective compensation components, as well as to regularly review the compensation system on the basis of recommendations submitted by the Human Resources Committee. The Human Resources Committee also discusses the long-term succession planning for the Board of Management.

The Chairman of the Board of Management regularly attended the meetings of the Human Resources Committee where the issues discussed did not relate to him personally.

The Human Resources Committee convened on three occasions. In each case, the meetings involved deliberations and the adoption of resolutions relating to the compensation of the Board of Management and the service contracts of Board of Management members. The Human Resources Committee also dealt with the mutually agreed early termination of Kemal Malik's appointment to the Board of Management and the planned compensation system for the Board of Management from 2020, which was addressed in detail at two meetings.

Nominations Committee: This committee carries out preparatory work when an election of stockholder representatives to the Supervisory Board is to be held. It suggests suitable candidates for the Supervisory Board to propose to the Annual Stockholders' Meeting for election. The Nominations Committee comprises the Chairman of the Supervisory Board and the other stockholder representative on the Presidial Committee.

The Nominations Committee convened once in 2019 and resolved to recommend Ertharin Cousin to succeed Thomas Ebeling, who stepped down from the Supervisory Board with effect from September 30, 2019. During several discussions outside of meetings, the members of the Nominations Committee talked about possible candidates for Chairman of the Supervisory Board in the event of the current Chairman stepping down.

Innovation Committee: The Innovation Committee is primarily concerned with the innovation strategy and innovation management, the strategy for the protection of intellectual property, and major research and development programs at Bayer. Within its area of responsibility, the committee advises and oversees the management and prepares any Supervisory Board decisions. The Committee comprises the Chairman of the Supervisory Board and five other members of the Supervisory Board, with parity of representation between stockholder and employee representatives. The Chairman of the Board of Management and the member of the Board of Management responsible for Innovation regularly attend the meetings of the Innovation Committee.

The Innovation Committee convened twice in 2019. At its February meeting, it dealt with the new innovation model for pharmaceutical research and development. At its September meeting, this committee dealt with innovations in the area of weed management at Crop Science.

Glyphosate Litigation Committee: The committee for dealing with the glyphosate litigations was established as a non-standing committee. It intensively deals with the glyphosate litigations, and oversees and advises the Board of Management in matters related to this topic. The committee has eight members drawn in equal parts from among the stockholder and employee representatives. The independent U.S. lawyer John H. Beisner retained by the Supervisory Board is also invited to attend meetings of this committee. Beisner's task is to independently advise the Supervisory Board on matters related to the glyphosate litigations, including the trial strategy and the ongoing mediation process. Although not involved in Bayer's legal defense for these litigations, he has comprehensive access to all relevant information and documents in his role as advisor to the Supervisory Board.

This committee convened three times in 2019. At each meeting, it dealt with the most recently litigated trials and the immediately pending trials in connection with these litigations, the further trial calendar, the ongoing appeal proceedings and the status of mediation talks.

Corporate governance

The Supervisory Board dealt with the principles of corporate governance at Bayer. At its September meeting, it resolved in particular on the future distribution of responsibilities on the Board of Management. At its meeting in December, it resolved to issue an unqualified declaration of future compliance with the German Corporate Governance Code. At the meetings of the Supervisory Board, the Chairman of the Supervisory Board also gave a summary of the dialogue he had engaged in with investors at two roadshows held in February and November 2019 and during several individual conversations.

Financial statements and audits

The financial statements of Bayer AG were prepared according to the requirements of the German Commercial Code and Stock Corporation Act. The consolidated financial statements of the Bayer Group were prepared according to the German Commercial Code and the International Financial Reporting Standards (IFRS). The combined management report was prepared according to the German Commercial Code. The auditor, Deloitte GmbH Wirtschaftsprüfungsgesellschaft, Munich, has audited the financial statements of Bayer AG, the consolidated financial statements of the Bayer Group and the combined management report. The auditor responsible for the audit was Professor Frank Beine. The conduct of the audit is explained in the auditor's reports. The auditor finds that Bayer has complied, as appropriate, with the German Commercial Code, the German Stock Corporation Act and / or the International Financial Reporting Standards endorsed by the European Union, and issues an unqualified opinion on the financial statements of Bayer AG, the consolidated financial statements of the Bayer Group and the combined management report. The financial statements of Bayer AG, the consolidated financial statements of the Bayer Group, the combined management report and the audit reports were submitted to all members of the Supervisory Board. They were discussed in detail by the Audit Committee and at a meeting of the full Supervisory Board. The auditor submitted a report on both occasions and was present during the discussions.

We examined the financial statements of Bayer AG, the proposal for the use of the distributable profit, the consolidated financial statements of the Bayer Group and the combined management report. While examining the combined management report, we also examined in particular the nonfinancial statement that is fully integrated in the management report. This statement was also examined by the auditor. We have no objections, thus we concur with the result of the audit.

We have approved the financial statements of Bayer AG and the consolidated financial statements of the Bayer Group prepared by the Board of Management. The financial statements of Bayer AG are thus confirmed. We are in agreement with the combined management report and, in particular, with the assessment of the future development of the enterprise. We also concur with the dividend policy and the decisions concerning earnings retention by the company. We assent to the proposal for the use of the distributable profit, which provides for payment of a dividend of €2.80 per share.

The Supervisory Board would like to thank the Board of Management and all employees for their dedication and hard work in 2019.

Leverkusen, February 26, 2020

For the Supervisory Board

Werner Wenning
Chairman

Investor Information

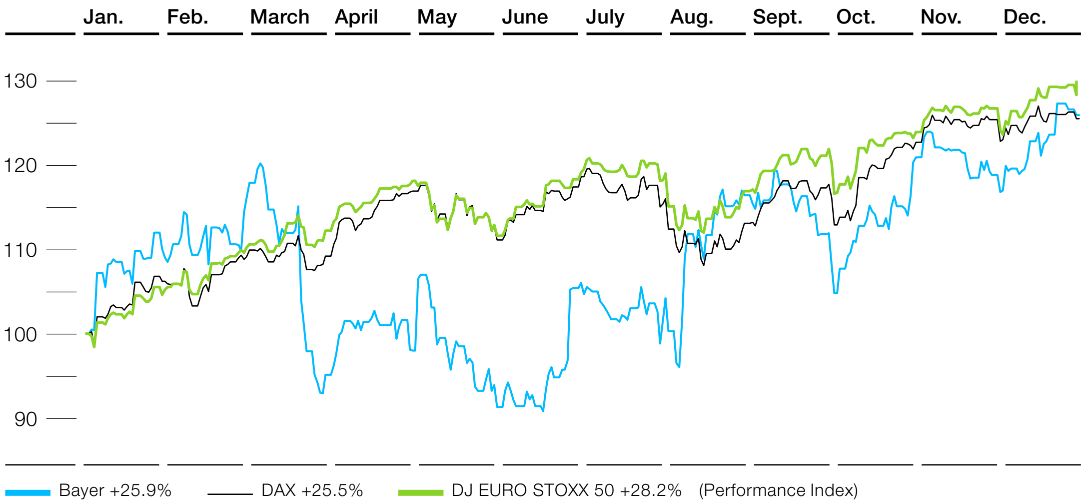
Positive performance of Bayer stock in 2019

The performance of Bayer stock was encouraging in 2019, with the share price rising 20.2% to €72.81. This was, however, still down on the previous year's prices, which were significantly higher at times. The Bayer stock price increased from just over €60 at the beginning of 2019 to more than €72 at the beginning of March, shortly after the 2018 Annual Report was presented and the outlook for 2019 was published. Bayer stock then trended weaker as the year went on – especially due to two rulings in first instance jury proceedings in favor of the plaintiffs in connection with the use of the crop protection agent glyphosate in the United States – and reached its lowest point of €52.53 on June 17. The stock price subsequently recovered amid fluctuations and ended the year at €72.81, close to the high of €73.60 reached on December 23. The announcement of mediation talks in connection with the glyphosate lawsuits and positive news reports on the sale of Animal Health, Currenta, Coppertone, and Dr. Scholl's contributed to this development. Assuming the reinvestment of the dividend payment of €2.80, Bayer stock achieved a yield of 25.9%. This means that the good performance of Bayer stock was similar to that of the DAX (+ 25.5%) and the Euro STOXX50 Performance Index (+ 28.2%).

1

Performance of Bayer Stock in 2019

Indexed; 100 = Xetra closing price on December 31, 2018, source: Bloomberg



2

Bayer Stock Data

		2018	2019
Earnings per share from continuing and discontinued operations	€	1.80	4.17
Core earnings per share from continuing operations[1]	€	5.60	6.40
Cash flow from operating activities in continuing operations per share	€	8.08	8.14
Equity per share	€	49.49	48.37
Dividend per share	€	2.80	2.80
Year-end price[2]	€	60.56	72.81
High for the year[2]	€	107.48	73.60
Low for the year[2]	€	59.16	52.53
Total dividend payment	€ million	2,611	2,751
Number of shares entitled to the dividend (Dec. 31)	million shares	932.55	982.42
Market capitalization (Dec. 31)	€ billion	56.5	71.5
Average daily share turnover on German stock exchanges	million shares	3.6	3.3
Price / EPS[2]		33.6	17.5
Price / core EPS[2]		10.8	11.4
Price / cash flow[2]		7.5	8.9
Dividend yield	%	4.6	3.8

2018 figures restated
[1] For details on the calculation of core earnings per share see Combined Management Report, A 2.3.
[2] Xetra closing prices (source: Bloomberg)

Bayer stock included in important indices

Bayer stock is included in a number of different indices. In December 2019, Bayer was ranked in sixth place in Germany's DAX in terms of market capitalization and in fifth place in terms of trading volume. This makes Bayer one of the heavyweights on German stock markets. At a European level, Bayer stock is also included in important indices, such as the Euro STOXX 50, the FTSE Euro 100 and the S&P Europe 350. It is also listed in the key sustainability indices: FTSE4Good, STOXX Global ESG Impact, STOXX Europe Sustainability and MSCI World Low Carbon Target Index.

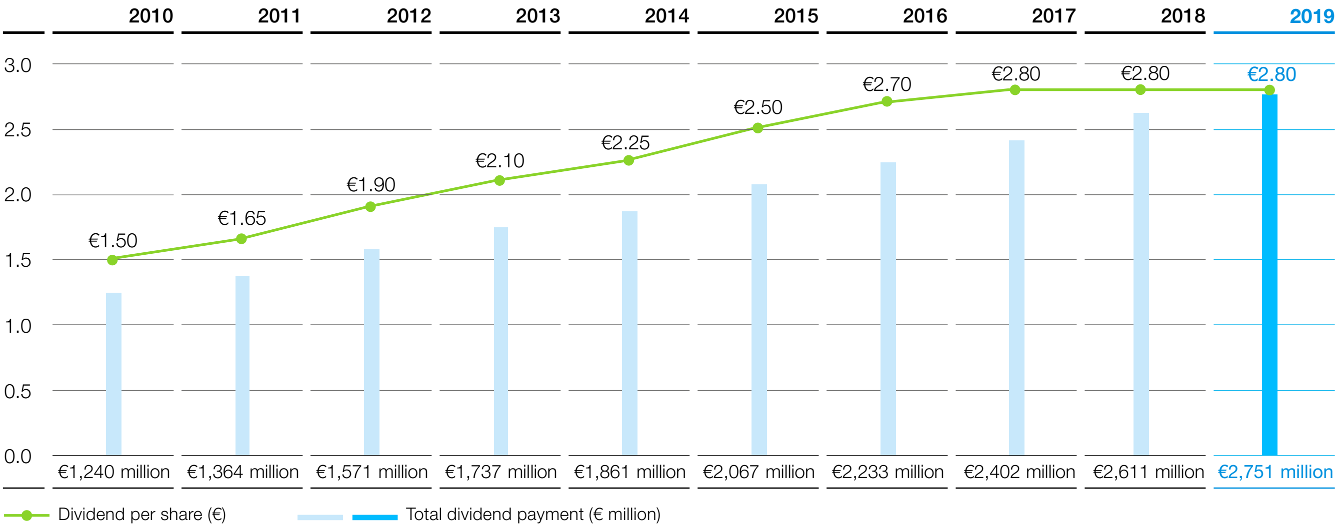
Attractive dividend of €2.80 proposed

In 2019, we once again met our financial targets and want our stockholders to share in the company's success accordingly. The Board of Management and the Supervisory Board will therefore propose an attractive dividend of €2.80 (previous year: €2.80) to the Annual Stockholders' Meeting. This corresponds to 43.8% of our core earnings per share (core EPS) from continuing operations of €6.40 for 2019. The payout ratio for 2019 is again above our target range of 30% to 40% of core EPS. This illustrates the importance we attach to paying a stable dividend. For the medium term, we aim to fall back into the target range and further increase our dividend.

Based on the Bayer stock price of €72.81 at the end of 2019, the dividend yield is 3.8%.

3

Dividends Per Share and Total Dividend Payment



Bayer stock tracked by large number of analysts

Around 30 analysts from domestic and foreign investment banks and brokerage firms publish studies on Bayer stock on a regular basis. Of the 25 analyst recommendations on Bayer stock published as of the end of 2019, 12 were positive, 12 were neutral and only one was negative.[1] The average target price was €79.80. The highest amount was €123.00 and the lowest estimate was €57.00.

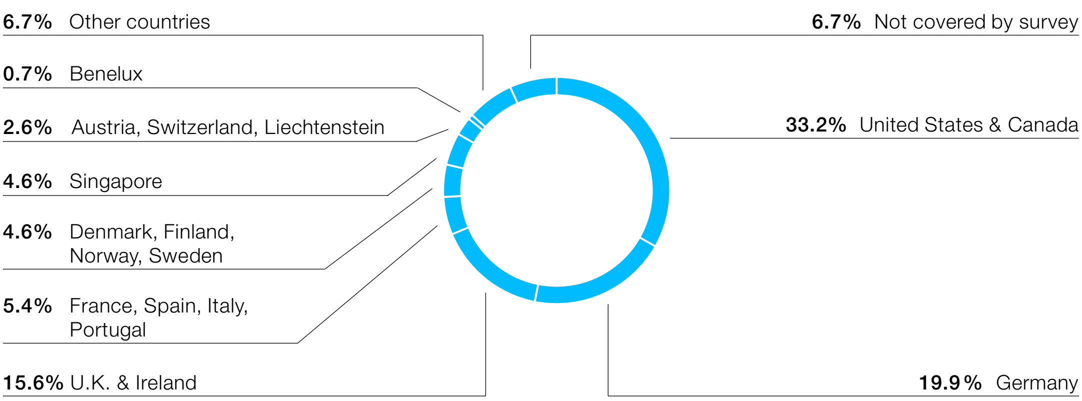
International ownership structure

At the end of 2019, a total of 403,340 stockholders were listed in the share register, over 20,000 more than at the end of 2018. Our ownership structure is very international, thus also reflecting our company's global presence. Almost one third (33.2%) of our stock is attributable to investors in North America. Just under one fifth (19.9%) is held by stockholders in Germany. Another significant group of investors is based in the United Kingdom and Ireland; they hold 15.6% of Bayer stock.

Bayer has a 100% free float as defined by Deutsche Börse, the operator of the Frankfurt Stock Exchange.

4

Shareholder Composition – Regional Allocation



Source: Cmi2i

[1] Source: VARA Research (Bayer does not assume any responsibility for these studies nor for any recommendations or assessments made as part of such studies)

Large number of investor relations activities conducted in 2019

An important investor relations event in 2019 was the “2019 Summer Technology Showcase” held on August 1 and 2. Almost 70 analysts and investors from all over the world came to St. Louis and the surrounding area. The main focus of the two-day event was on our Crop Science activities. The program featured presentations by members of the Board of Management and managerial employees as well as sessions in our research laboratories and in the trial fields in Jerseyville. The idea behind the event was to allow participants to get an in-depth look at the strategy, technologies and product pipeline of our largest division by sales.

In addition, we took part in a large number of conferences in Germany and abroad and took roadshows to many of our current and potential investors. The conferences and roadshows focused mostly on Europe and North America. Members of the Board of Management were frequently part of these events.

Keen interest in sustainability issues

The capital market’s growing interest in sustainability issues was also reflected in our discussions with investors and rating agencies in 2019. The integration of Monsanto, the impact of our products on the environment and subjects such as climate change and human rights were the key topics addressed.

The announcement of our ambitious sustainability targets for 2030 on December 10, 2019, marked another key event. The clear and measurable targets we have set ourselves will also be integrated into the compensation systems for the Board of Management and managerial employees.

In 2019 Bayer was again assessed by the CDP (Carbon Disclosure Project), whose scores are included in the criteria for investment decisions by many investors, and has been ranked as one of the leading international pharmaceutical companies in the areas of climate protection and sustainable water management.

€1.75 billion of hybrid bond successfully refinanced

For Bayer, 2019 got off to a successful start, with the company being named “Corporate Issuer of the Year” by the respected specialist magazine International Financial Review. As for bonds and notes, there were two significant events in 2019: The refinancing and repayment of the 3% coupon hybrid bond before the first call date in July 2020, and the maturing of the mandatory convertible notes issued in 2016.

The new hybrid bonds offered in November were in high demand among investors. Given the stable market environment, the target volume of €1.75 billion was refinanced in two tranches on better terms of 2.7% (volume-weighted average coupon). At the same time, Bayer offered investors the early repayment of the outstanding bond. Since over 80% of investors were prepared to tender the bond, Bayer was able to repurchase the remaining 20% of the hybrid bond at par in December. On maturity of the mandatory convertible notes at the end of November, the outstanding debt instruments in an amount of almost €4 billion were converted into equity through the issuance of around 50 million shares. This transaction did not have any effect on the number of shares used to calculate earnings per share, since we had adjusted this number at the time the mandatory notes were issued.

Further details of all outstanding bonds are given in Note [24] to the consolidated financial statements.

About this Report

This integrated Annual Report combines our financial reporting and our nonfinancial statement, which contains all material sustainability information required by commercial law. Our aim is to elucidate the interactions between financial, ecological and societal factors and underline their influence on our company's long-term success. In addition to the Annual Report, we publish a separate Sustainability Report with additional detailed nonfinancial information to meet the informational needs of all stakeholders to the greatest possible extent.

Legal principles and reporting standards

The consolidated financial statements of the Bayer Group as of December 31, 2019, comply with the International Financial Reporting Standards (IFRS), as adopted by the E.U., valid at the closing date and with the provisions of the German Commercial Code in conjunction with German financial reporting standards (DRS). With due regard to these provisions, the combined management report provides an accurate overview of the financial position and results of operations of the Bayer Group. The Corporate Governance Report also conforms with the German Stock Corporation Act and the recommendations of the German Corporate Governance Code.

The nonfinancial statement (Sections 289b et seq. and 315b et seq. of the German Commercial Code) is integrated into the combined management report and covers data for the Bayer Group and Bayer AG as the parent company. As a framework for this, we apply the GRI Standards (Section 289d of the German Commercial Code). We also use, for example, the international recommendations and guidelines of the OECD and ISO 26000 as a guide for defining and selecting nonfinancial indicators and in our reporting. In selecting and measuring our key data, we take into account the recommendations of the Greenhouse Gas Protocol with respect to greenhouse gas emissions and those of the European Federation of Financial Analysts Societies, the World Business Council for Sustainable Development and the European Chemical Industry Council (CEFIC) with respect to other nonfinancial indicators. The legality, accuracy and expediency of the nonfinancial statement have been verified by the Supervisory Board.

The Annual Report is available online as a PDF. Furthermore, contents subject to the statutory disclosure requirement are published in the Federal Gazette.

Data collection and reporting thresholds

In accordance with IFRS 5 (Non-current Assets Held for Sale and Discontinued Operations), financial indicators are given for continuing operations unless otherwise explicitly indicated. The same applies particularly to HR, procurement and HSE (health, safety and environment) indicators and our social data. Prior years' figures were restated as necessary.

Reporting of the Group's HSE data includes all fully consolidated companies in which we hold at least a 50 percent interest. Data on occupational injuries are collected at all sites worldwide. Environmental indicators are measured at all environmentally relevant production, research and administration sites.

External verification

The auditing company Deloitte GmbH Wirtschaftsprüfungsgesellschaft, Munich, Germany, has audited the consolidated financial statements of Bayer AG, Leverkusen, and the combined management report for the fiscal year from January 1, 2019, to December 31, 2019, and has issued an unqualified opinion. The audit, which is conducted to obtain reasonable assurance, also includes the disclosures pertaining to the nonfinancial statement. The pro-forma sales of Crop Science and the declaration of compliance with the German Corporate Governance Code have not been audited by the auditor.

Additional information

As the indicators in this report are stated in accordance with commercial rounding principles, totals and percentages may not always be exact.

A Combined Management Report

of the Bayer Group and Bayer AG as of December 31, 2019

1. Fundamental Information About the Group

1.1 Corporate Profile and Structure

Addressing some of society's major challenges with the help of innovation

Comprehensive reorganization of the Group launched to improve efficiency

1.1.1 Corporate Profile

"Health for all, hunger for none" – putting an end to hunger and helping everyone lead a healthy life, while at the same protecting ecosystems. That's what we aspire to achieve, guided by our corporate purpose "Science for a better life." The major issues of our time can only be addressed if we work together. Our campaigns #voranbringen in Germany and "This is why we science" in the United States underscore our approach. We are a life science company and a global leader in health care and nutrition. Our innovative products support efforts to overcome the major challenges presented by a growing and aging global population. We help prevent, alleviate and treat diseases. We also aim to ensure the world has a reliable supply of high-quality food, feed and plant-based raw materials. As part of this endeavor, the responsible use of natural resources is always a top priority.

We aim to enhance our company's earning power and create value for customers, patients, shareholders, employees and society. Growth and sustainability are integral parts of our strategy, guided by our corporate values of **L**eadership, **I**ntegrity, **F**lexibility and **E**fficiency, or LIFE for short. This culture ensures a common identity throughout the Bayer Group.

1.1.2 Corporate Structure

Corporate structure as of December 31, 2019

As the parent company of the Bayer Group, Bayer AG – represented by its Board of Management – performs the principal management functions for the entire enterprise. This mainly comprises the Group's strategic alignment, resource allocation, and the management of financial affairs and managerial staff, along with the management of the Group-wide operational business of the Crop Science, Pharmaceuticals and Consumer Health divisions. The supporting functions (enabling functions) support the operational business.

The portfolio and structural measures announced in late 2018 led to the following changes in the corporate structure:

- The sale of our **Animal Health** business unit was agreed in August 2019. As a result, it no longer constitutes a reportable segment and has been accounted for retroactively for 2018 and 2019 as a discontinued operation. We expect the sale to close in mid-2020.
- The service company **Currenta**, which operates the Chempark sites in Leverkusen, Dormagen and Krefeld-Uerdingen, is no longer part of the Bayer Group after the sale of our majority stake closed in November 2019. Currenta's business activities are reported retroactively for 2018 and 2019 under discontinued operations.
- The services previously performed by **Business Services** are gradually being transferred to the enabling functions and divisions as part of the Group restructuring.

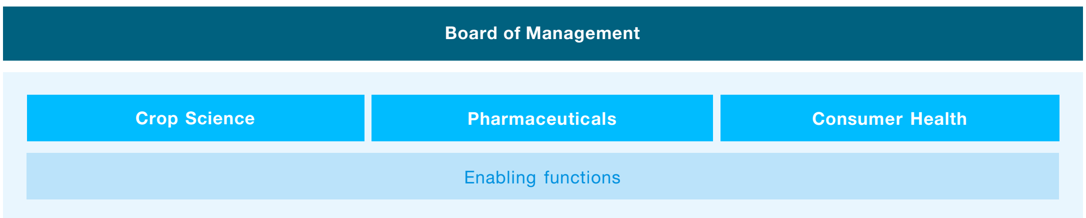
In addition, we are adjusting the structure of our enabling functions to create an organization and an infrastructure that provide optimum support for the business. The steps taken in 2019 to achieve this included combining the Accounting & Taxes and Finance functions to form the enabling function Group Finance. The activities of other functions, such as Corporate Technology & Manufacturing and Corporate Supply Chain Management, are either being dissolved or are transferring to the divisions or other enabling functions. We will continue the planned adjustments in 2020. For example, we will combine the Internal Audit and Risk Management functions to form the enabling function Internal Audit and Risk Management.

From the start of 2020 we have also simplified the value flows and aligned them to our structural changes and our steering logic. The costs of the enabling functions are now allocated to the income statements of the divisions either directly or using a reduced number of allocation keys that are standardized across the Group. Further details and effects of these adjustments on our key financial data are given in A 3.1.2 Corporate Outlook.

The Supervisory Board of Bayer AG resolved in September 2019 to reduce the size of the company's Board of Management from seven to five members effective January 1, 2020, as part of the efficiency program. Responsibilities within the Board of Management have been reassigned.

A 1.1.2/1

Bayer Group Structure in 2019



Crop Science is the world's leading agriculture enterprise, with businesses in crop protection and seeds. We offer a broad portfolio of high-value seeds, improved plant traits, innovative chemical and biological crop protection products, digital solutions and extensive customer service for sustainable agriculture. We market these products primarily via wholesalers and retailers or directly to farmers. In addition, we market pest and weed control products and services to professional users outside the agriculture industry. Most of our crop protection products are manufactured at the division's own production sites. Numerous decentralized formulation and filling sites enable the company to quickly react to the needs of local markets. The breeding, propagation, production and / or processing of seeds, including seed dressing, takes place at locations close to our customers, either at our own facilities or under contract.

Pharmaceuticals concentrates on prescription products, especially for cardiology and women's health care, and on specialty therapeutics focused on the areas of oncology, hematology and ophthalmology. The division also comprises the radiology business, which markets diagnostic imaging equipment together with the necessary contrast agents. Our portfolio includes a range of key products that are among the world's leading pharmaceuticals for their indications. The prescription products of our Pharmaceuticals Division are primarily distributed through wholesalers, pharmacies and hospitals.

Consumer Health is a leading supplier of nonprescription (OTC = over-the-counter) medicines, nutritional supplements, medicated skincare products and other self-care solutions in the categories of pain, cardiovascular risk prevention, dermatology, nutritional supplements, digestive health, allergy, and cough and cold. The products are generally sold by pharmacies and pharmacy chains, supermarket and drugstore chains, and online retailers. In 2019, we completely divested our sun care, foot care and prescription dermatology businesses.

See also A 2.1.3

The **enabling functions** serve as Group-wide competence centers and provide business support services.

More information on the divisions' products and activities is contained in the following table:

A 1.1.2/2

Products and Activities of the Divisions

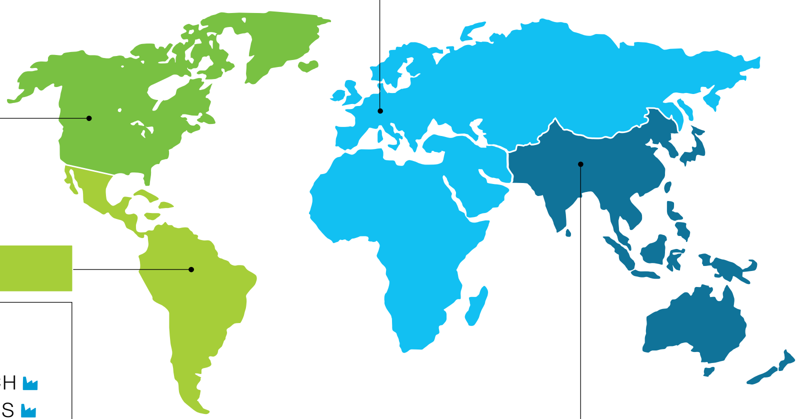
Indication / Application / Business	Core activities and markets	Main products and brands[1]
Crop Science		
Herbicides	Chemical crop protection products to control weeds	Roundup™, Adengo™, Alion™, Corvus™, Atlantis™
Corn Seed & Traits	Seeds and traits for corn	Dekalb™, SmartStax™ RIB Complete, VT Double™ PRO, VT Triple™ PRO
Soybean Seed & Traits	Seeds and traits for soybeans	Asgrow™, Intacta RR2PRO™, Roundup Ready 2 Xtend™, Roundup Ready 2 Yield™
Fungicides	Biological and chemical products to protect crop plants from fungal diseases	Fox™, Luna™, Nativo™, Serenade™, Xpro™
Insecticides	Biological and chemical products to protect crop plants from harmful insects and their larvae	BioAct™, Confidor™, Movento™, Sivanto™
Environmental Science	Products for professional pest control, vector control, forestry, golf courses and parks, railway tracks	Ficam™, Maxforce™, Esplanade™, K-Othrine™, Fludora™ Fusion
Vegetable Seeds	Vegetable seeds	Seminis™, DeRuiters™
Digital Agriculture	Digital applications for agriculture	Climate FieldView™
Other	Seeds and traits for cotton, oilseed rape / canola, rice and wheat as well as biological and chemical seed treatment products to protect against fungal diseases and pests	Gaucho™, Bollgard™ II, Bollgard™ II XtendFlex™, Deltapine™
Pharmaceuticals		
Cardiology	Hypertension, pulmonary hypertension, heart attack and stroke, thrombosis, coronary artery disease (CAD), peripheral artery disease (PAD)	Xarelto™, Adalat™, Aspirin™ Cardio, Adempas™
Oncology	Liver cancer, renal cell carcinoma, thyroid carcinoma, prostate cancer, colorectal cancer, gastrointestinal stromal tumors (GIST), follicular lymphoma, solid tumors with NTRK gene fusions	Nexavar™, Nubeqa™, Xofigo™, Stivarga™, Aliqopa™, Vitrakvi™
Ophthalmology	Visual impairment due to age-related macular degeneration (AMD), diabetic macular edema (DME) or retinal vein occlusion (RVO)	Eylea™
Hematology	Hemophilia A	Kogenate™ / Kovaltry™ / Jivi™
Women's health	Contraception, gynecological therapy	Mirena™ product family, Yaz™ product family, Visanne™
Infectious diseases	Bacterial infections	Avalox™ / Avelox™, Cipro™, Ciprobay™
Radiology	Contrast agents; diagnostic imaging equipment for use with contrast agents	Gadovist™, Ultravist™, Medrad Spectris Solaris™, Medrad Stellant™
Neurology	Multiple sclerosis	Betaferon™ / Betaseron™
Consumer Health		
Dermatology	Wound care, skin care, skin and intimate health	Bepanthen™, Canesten™
Nutritionals	Multivitamin products, dietary supplements	One A Day™, Elevit™, Berocca™, Supradyn™, Redoxon™
Pain and Cardio	General pain relief	Aspirin™, Aleve™
Digestive Health	Digestive health complaints	Alka-Seltzer™, MiraLAX™, Rennie™, Iberogast™
Allergy, Cough and Cold	Allergies, cough and cold	Claritin™, Aspirin™, Alka-Seltzer™, Afrin™

[1] The order of the products listed is no indication of their significance.

We operate sites around the world, and some are used by multiple divisions. As of December 31, 2019, the Bayer Group comprised 392 consolidated companies in 87 countries.

A 1.1.2/3

Bayer Worldwide 2019



North America

United States

Berkeley	PH ⚗ 🏭
Boston/Cambridge	PH ⚗
Kansas City	CS 🏭
Luling	CS 🏭
Morristown	CH ⚗
Muscatine	CS 🏭
Myerstown	CH 🏭
San Francisco	PH ⚗
Saxonburg	PH 🏭
Soda Springs	CS 🏭
St. Louis	CS ⚗ ▦
Whippany	▦ | PH ⚗ ▦ | CH ⚗
Woodland	CS ⚗

Europe / Middle East / Africa

Belgium

Antwerp	CS 🏭

Germany

Bergkamen	PH 🏭
Berlin	PH ⚗ 🏭 ▦
Bitterfeld-Wolfen	CH 🏭
Darmstadt	CH ⚗
Dormagen	CS 🏭
Frankfurt am Main	CS ⚗ 🏭
Grenzach	CH 🏭
Hürth-Knapsack	CS 🏭
Cologne	PH ⚗
Leverkusen	▦ | PH 🏭 ▦
Monheim am Rhein	CS ⚗ ▦
Weimar	PH 🏭
Wuppertal	PH ⚗ 🏭

Finland

Turku	PH ⚗ 🏭

France

Gaillard	CH ⚗
Lyon	CS ⚗
Sophia Antipolis	CS ⚗
Villefranche	CS 🏭

Italy

Garbagnate	PH 🏭

Netherlands

Bergschenhoek	CS ⚗

Norway

Oslo	PH ⚗

Switzerland

Basel	PH ⚗ ▦ | CH ▦
Muttenz	CS 🏭

Spain

Alcalá	CH 🏭

Latin America

Argentina

Pilar	CH 🏭
Zárate	CS 🏭

Brazil

Belford Roxo	CS 🏭
Camaçari	CS 🏭
Petrolina	CS ⚗
São José dos Campos	CS 🏭
São Paulo	▦ | CS ⚗ ▦

Mexico

Lerma	CH 🏭
Mexico City	▦

Asia / Pacific

China

Beijing	▦ | PH ⚗ 🏭 ▦
Qidong	CH ⚗

India

Thane	▦
Vapi	CS 🏭

Indonesia

Cimanggis	CH 🏭

Japan

Koka	PH 🏭
Osaka	PH ⚗ ▦
Tokyo	PH ⚗ ▦

CS: Crop Science
PH: Pharmaceuticals
CH: Consumer Health
⚗ Significant research and development location
🏭 Significant production location
▦ Significant administrative site

1.2 Strategy and Management

Long-term profitable growth in focus
Business activities support "health for all, hunger for none"
Ambitious sustainability targets set for entire Group
Integrated business approach across all divisions

1.2.1 Strategy and Targets

Group strategy

A growing and aging world population as well as the increasing strain on nature's ecosystems are among the major challenges facing humanity. As a global leader in health and nutrition, we are able to play a key role in devising solutions to tackle these challenges.

Guided by our purpose "Science for a better life," we deliver breakthrough innovations in health care and nutrition. We are helping to create a world in which diseases are not only treated but effectively prevented or cured, in which people can take care of their own health needs more effectively, and in which enough food is produced for all while respecting our planet's natural resources. That's because at Bayer, we believe that growth and sustainability should go hand in hand. In short, we are working to realize "health for all, hunger for none."

We focus on four strategic levers to deliver attractive returns for our shareholders while also making a positive contribution to society and for the environment:

1. As a **global leader in health and nutrition**, we continue to develop our business. We create value with strategy-based resource allocation focused on profitable growth. We are active in regulated and highly profitable sectors that are driven by innovation and in which we can achieve above-average growth rates.

2. We develop **innovations** and leverage cutting-edge research to solve major challenges in health and nutrition. As part of these endeavors, we are expanding our access to innovation by collaborating with third parties. At the same time, we are advancing the digital transformation of our value creation chain and working on the co-creation of disruptive technologies, aided, for example, by the latest Leaps by Bayer initiatives.

3. **Sustainability** is an integral part of our business strategy. As a corporate objective, it is afforded the same status as our financial indicators. In 2019, we advanced our approach to make a positive contribution to society and for the environment. Our targets for 2030 are aligned with the United Nations' Sustainable Development Goals and the Paris Agreement climate targets.

4. We are strengthening the **operational performance** of our business through measures such as the Bayer 2022 synergy and efficiency program.

These four strategic levers underpin the strategies of our divisions.

Strategies of the divisions

Crop Science

Continued population growth, increasing protein consumption, decreasing arable land per capita, climate change and growing pressure on limited natural resources all point to the need for more innovation and a stronger focus on sustainability in agriculture. At the same time, emerging markets in Asia, shifts in consumption patterns, advancements in life science technologies and the next wave of digitalization are set to shape the industry in the long-term.

As the largest integrated player in the agricultural industry with a leading portfolio in corn, soybeans, cereals and horticulture, we recognize our responsibility to address the challenges outlined above. Our strategy is based on three pillars: innovation, digitalization and sustainability. Guided by this approach, we aim to set new industry standards.

Our researchers deliver high-yielding seed varieties with effective traits, combined with cutting-edge chemical and biological crop protection products. By combining R&D platforms, we are able to unlock new potential and deliver integrated solutions to farmers.

As a leader in digital farming, we aim to drive the transformation of our business as we look to offer tailored solutions to our customers, automate processes and increase R&D productivity. At the same time, we are digitally connecting farms on a leading common platform to help create new value for our customers. New service- and data-based models will supplement or in some cases replace our conventional business.

See also A 1.3

More sustainable models for farming are crucial to counteracting the growing loss of biodiversity and tackling climate change. At the same time, the demand for food will continue to rise. In a bid to effectively address these challenges, sustainability parameters will become key considerations in R&D and business decisions. We are also looking to increase food security: by 2030, we aim to help **100 million smallholder farmers** in low- and middle-income countries produce enough food to feed themselves and others, and to improve their incomes. To achieve this goal, we will further expand our product and service portfolio. This will include providing access to tailored digital solutions. By collaborating and partnering with research institutes, nongovernmental organizations, companies and social start-ups, for instance, we aim to improve access to agronomic expertise, products and services specifically for smallholders. A good example of this is the Better Life Farming alliance, which is already supporting smallholder farmers with training courses, market access and technology, as well as financing options. Through these efforts, we can make an important contribution to strengthening local food production and reducing rural poverty. Attainment of this goal is to be assessed based on the number of smallholder farmers in low- and middle-income countries supported by products, services and partnerships. In addition, we have also set ourselves the objective of increasing environmental and climate protection. With the aid of new technologies and business models, we aim to help customers reduce greenhouse gas emissions on the field and lower the environmental footprint of the crop protection products they use.

Pharmaceuticals

Throughout the world, an increasingly aging population is leading to a growing number of chronic diseases and the increasing occurrence of multiple conditions. At the same time, digital technologies have the potential to transform the way health care is delivered. Examples include telemedicine, artificial intelligence-driven diagnostic and treatment support, as well as combining computer processing power with the availability of large data sets to enable personalized testing and treatment.

See also A 1.3

We are seeking to contribute to medical progress through our focus on researching, developing and marketing innovative medicines, primarily in the therapeutic areas of cardiology, oncology, women's health, hematology and ophthalmology. Our near- to medium-term growth will primarily be driven by key areas, such as China, as well as by key products, such as Xarelto™. It is expected to be further fueled by several promising late-stage R&D pipeline candidates, such as our recently approved product Nubeqa™. To safeguard long-term growth, we continue to invest in R&D in areas in which there is still a substantial need for innovation. Moreover, we are expanding our efforts to access more external innovation through research collaborations and in-licensing (e.g. Vitrakvi™), with Bayer capturing continued growth opportunities in biologics and novel technologies, for instance. Our recent acquisition of BlueRock Therapeutics in the area of stem cell therapies is one such example.

We continue to build capabilities in leveraging data, advanced analytics and artificial intelligence to deliver greater value to patients and customers, and to increase productivity across the pharmaceutical value chain from R&D to Medical Affairs, Commercial and Product Supply.

To improve access to our products in developing and emerging countries (Access to Medicine), we have entered into a series of long-term partnerships focusing on aspects such as the provision of contraceptives and logistics support for both multilateral and bilateral family planning programs. These measures will demonstrably improve women's health and strengthen their role in society by helping to promote gender equality and women's economic participation. Specifically, we aim to provide **100 million women** in low- and middle-income countries with access to modern contraception by 2030. To achieve this, we will expand our range of long-acting products that are in especially high demand in international development projects. As is currently the case for oral contraceptives and contraceptive injections, these products will be offered to our partners (such as the United Nations Population Fund, or UNFPA) at preferential prices. We also plan to enter into additional collaborations to support voluntary family planning programs. As part of these efforts, we pledge support for our partners irrespective of the products used. Attainment is to be assessed based on the number of women in low- and middle-income countries who have their need for modern contraception satisfied due to interventions supported by Bayer.

In addition, we remain committed to combating neglected tropical diseases. As part of this endeavor, we work closely with the World Health Organization. As well as making product donations and providing financial support, we are also involved in the further development of active ingredients. An example of this is the pediatric formulation of nifurtimox, our active ingredient for the treatment of children with Chagas disease, which we submitted for regulatory approval in the United States in December 2019.

Consumer Health

Cost pressure on public health care systems and the growing health awareness of consumers are increasingly putting the spotlight on the benefits of self-care and point to further long-term growth of the consumer health market. At the same time, digitalization is giving rise to new business opportunities.

We provide consumers with the products, services and information they need to take more responsibility for their daily health, improving their quality of life. Our strategy moving forward will accelerate our core categories, geographies and the transfer of prescription medicines and active ingredients to nonprescription status. We also aim to strengthen our innovation and R&D capabilities and drive marketing and sales execution. A new operating model, in place since the beginning of 2019, further enhances consumer- and customer-centricity and drives agility, efficiency and consistency in execution.

We are leveraging digital technologies and data to accelerate our strategy across all areas of the business. We are digitalizing our core business operations in supply chain, research and development, e-commerce and precision marketing. Digital will help us create efficiencies and serve our consumers and customers better. We also aim to discover new sources of growth from novel business models looking beyond the product toward broader digital health care platforms and ecosystems.

It is our ambition to expand access to everyday health for **100 million people** in underserved communities around the world by 2030.[1] At least half the world's population currently lacks access to basic health services, including self-care medication. More of these products, along with targeted education, can help prevent disease as well as offer health solutions to regions in which self-administered medication is often the only option. Beginning with a focus on women's health and improved access to micronutrients for pregnant women and children, we will create better access to our well-known brands and self-care initiatives.

Sustainability

Respecting the environmental boundaries of the Earth and enabling its population to enjoy a high quality of life within these limits are at the core of our **ambitious sustainability targets**. Our focus here is on generating inclusive growth while at the same time reducing our ecological footprint along our value chain. Alongside the targets of the divisions described, we therefore also want to drive forward a **reduction in greenhouse gas emissions** in our processes and value chain. We have set ourselves the target of making our own production sites **carbon-neutral** by 2030, and are therefore implementing energy efficiency measures at our sites and increasing the procurement of electricity from renewable sources. We will offset the remaining emissions we produce by purchasing certificates from certified climate protection projects that satisfy recognized quality standards. We also aim to reduce greenhouse gas emissions along the up- and downstream value chain through cooperation with suppliers and customers. To ensure that our targets are in line with the goal of the Paris Agreement to limit global warming to 1.5 degrees Celsius, or well below 2 degrees Celsius, we have joined the Science Based Targets initiative. We review target attainment by measuring greenhouse gas emissions at our own sites[2] and determining whether a science-based target (SBT) in terms of a percentage reduction has been achieved.

We define **sustainability as one of the four strategic levers of the company as a whole. Sustainability is an integral part** of our business strategy and afforded the same status as a corporate objective as our financial indicators. For this reason, we have closely linked our sustainability targets to our business and will incorporate it into the **compensation system** for the Board of Management. From 2020 this will form part of the qualitative component of the variable short-term cash compensation, and from 2021 it will become a quantitative element in the long-term stock-based cash compensation (Aspire program).

We also aim to intensify our cooperation with social organizations to enable us to understand different perspectives better and jointly amplify the effects of our efforts. One example is the establishment in 2020 of an external sustainability council to be composed of independent experts who can give us an outside perspective on our innovation, mindset and strategy. In addition, we have combined our guiding principles and the bases for our activities in the new Bayer Societal Engagement (BASE) Principles, which will guide our relationship with our social stakeholders in the future. These will also provide us with orientation in all internal and external processes and support us in being a company valued for its scientific endeavors, trustworthiness and transparency.

[1] Details on our objectives and how we measure attainment will be confirmed in 2020.
[2] Scope 1 and Scope 2 (market-based) emissions of the environmentally relevant sites, i.e. those with annual energy consumption of more than 1.5 terajoules, including emissions from the vehicle fleet

1.2.2 Sustainability Management

Our strategic focus on sustainability represents our targeted approach toward increasing the overall societal impact of our business activities. The Chairman of the Board of Management assumes responsibility for this strategy in his role as Chief Sustainability Officer. He is supported by the Public Affairs and Sustainability enabling function, which develops nonfinancial targets and key performance indicators as well as management systems and corporate policies. Operational implementation is effected throughout the value chain.

Our commitment to the U.N. Global Compact and the Responsible Care™ initiative of the chemical industry and our involvement in the World Business Council for Sustainable Development (WBCSD) underline our mission as a company that acts sustainably.

See A 1.2.1

Materiality analysis and stakeholder dialogue

We ascertain the expectations and requirements of our various stakeholders using a materiality analysis, which surveys external stakeholders and internal managerial employees from various areas of the company throughout the world. The results thereof reveal the latest developments along with sustainability-related opportunities and risks. Areas of activity with very high relevance from an internal and external perspective are accounted for in our strategic lever of sustainability and reflected in our nonfinancial Group targets. The current materiality analysis that was carried out at the end of 2018 confirmed the following key areas of activity:

www.bayer.com/materiality

- Innovation
- Access to health care
- Sustainable food supply
- Product stewardship
- Climate and environmental protection
- Business ethics

As part of our stakeholder engagement process, which is underpinned by a dedicated guideline, we approach key social and political players and canvass their support from the outset in strategic decision-making processes regarding new projects such as investment projects and launches of new products.

Respect for human rights

The observance of human rights is a fundamental basis of our actions. Bayer fully supports and promotes human rights and has documented its stance in a globally binding corporate policy entitled the “Bayer Human Rights Policy.” Directives, processes and management and monitoring systems control the implementation of human rights standards in business operations. We introduced and started the implementation of the Bayer policy in the acquired agriculture business in 2019. Comparable arrangements had applied there previously.

www.bayer.com/humanrights

We are a founding member of the U.N. Global Compact and respect the Universal Declaration of Human Rights, the U.N. Guiding Principles on Business and Human Rights and a range of globally recognized declarations applicable for multinational corporations, including the OECD Guidelines for Multinational Enterprises, the Tripartite Declaration of Principles concerning Multinational Enterprises and Social Policy, and the core labor standards of the International Labour Organization (ILO).

Within the context of our risk management process, we conduct a risk analysis of the potentially adverse consequences of our operating activities for human rights. In 2019, we did not establish any adverse potential consequences to be reported in accordance with the CSR Directive Implementation Act.

We offer corresponding training programs to enhance employees' awareness of the importance of human rights in their day-to-day activities. In 2019, around 76% of our employees received training in aspects of our Human Rights Policy. We also demand that our business partners, particularly our suppliers, fully observe human rights.

Foundation and charity activities

Bayer continues to be socially engaged worldwide in keeping with our corporate purpose "Science for a better life." In 2019, we made available some €61 million (2018: €66 million) for charitable projects and activities in the areas of research and education, social innovation in health and nutrition, and support for the communities near our sites. The global activities of the Bayer Science & Education Foundation and the Bayer Cares Foundation are a component of our societal engagement. The U.S.-based Bayer Fund also supports a wide range of initiatives in the areas of community assistance, nutrition, education and disaster aid. Group-wide allocation and management policies form the basis for our donation activities; the Board of Management is involved in major funding decisions. The yearly alignment of all programs is coordinated by a Board of Trustees staffed by senior figures from inside and outside the company. Panels of independent experts decide on the awarding of research prizes and scholarships by the foundations.

In 2019, the Bayer foundations established a new fund with a €20 million endowment to create a network for social innovation. Money from the fund is to be used to promote technological and entrepreneurial solutions in the fields of health care and agriculture that enable African smallholder farmers to lift themselves and their families out of poverty through their own agricultural smallholdings and an improved access to medical care. As a first step, the fund supported four groundbreaking social enterprises in 2019.

1.2.3 Management Systems

Planning and steering

One of the essential goals of the Bayer Group is to generate profitable, sustainable growth in order to steadily increase the enterprise value and ensure the long-term viability of our businesses. The company's economic planning and steering take place in line with the frameworks that are set for the Bayer Group and the divisions by the Board of Management in the course of the strategic planning process and are translated into specific targets during operational planning. The planning and steering process is complemented by the continuous monitoring of business developments, with key management and performance indicators being updated regularly. It is on this basis that strategic objectives are implemented and countermeasures are initiated in the event of deviations from the budget. In addition, the Board of Management uses predominantly nonfinancial targets and performance indicators to steer the company's sustainable alignment.

The following indicators are employed to plan, steer and monitor the development of our business:

Operational management indicators

The main parameters in performance management at the operational level are sales, earnings and cash flow data, which also form the basis of short-term variable compensation. Growth is measured in terms of the change in sales after adjusting for currency and portfolio effects (Fx & portfolio adj.) in order to reflect the operational business development of the Group and the divisions. A key measure of profitability is the EBITDA margin before special items, which is the ratio of EBITDA before special items to sales. The free cash flow – an absolute indicator – shows the generation of freely available financial resources and also reflects the company's financial strength and earning power. Another important profitability indicator for the Bayer Group is core earnings per share, which is the core net income divided by the weighted average number of shares.

See also A 2.3

Strategic value management indicator: return on capital employed (ROCE)

Return on capital employed (ROCE) is used as a strategic metric to measure the company's operating profit after taxes in relation to the average capital employed. Comparing ROCE against the weighted average cost of capital (WACC) on an annual basis illustrates the level of value creation.

See also A 2.2.3 and A 2.3

Total shareholder return

Bayer aims to create shareholder value and thus maximize the returns it delivers for its stockholders. Total shareholder return, which is determined based on the change in the share price over the measurement period plus any dividends paid in the interim, forms part of our long-term stock-based cash compensation (LTI).

Integrated management system

Bayer has in place an integrated management system (IMS), which is detailed in a corporate policy. The IMS provides a framework for existing and future management systems to ensure compliance with corporate policies and the law as well as efficient ways of working. This is achieved through applicable processes and internal requirements involving clear roles and responsibilities. Its tasks also include facilitating effective risk management and helping to safeguard the company's license to operate. Within the IMS, each function or organization is responsible for ensuring that its own management system is in line with business needs and with applicable legal and regulatory requirements.

1.3 Focus on Innovation

New LifeHub opened for drug discovery using artificial intelligence

Leaps by Bayer initiates cooperation with start-ups on cancer immunotherapy

Innovative herbicide Fox Xpro™ launched in Brazil

U.S. approval of new prostrate cancer drug Nubeqa™ (darolutamide) strengthens oncology portfolio; BlueRock Therapeutics acquisition helps Bayer build leading position in cell therapy

Innovation is a cornerstone of our Group strategy. We define innovations as new solutions that generate added value for our customers and society. Our activities focus on innovative products based on our research and development (R&D) competencies supplemented with targeted process, service and business model innovations. We also focus on social innovation to improve living conditions in developing countries.

See A 1.2.2 "Foundation and charity activities" for social innovations

Our innovations help us contribute to solving global challenges in medical care and agriculture. In addition to the strong innovative capabilities of our employees throughout the company, our efforts are driven by excellence in R&D, a broad open innovation network, and the use of new, groundbreaking technologies with a particular focus on data science insights.

With our global network of innovation coaches and ambassadors, we help our employees to develop and drive forward new ideas and projects on a cross-divisional and cross-functional basis. An online platform enables all employees to engage on innovation trends and current projects.

Excellence in research and development

Bayer's success is founded on excellence in R&D. The activities we pursue are aligned with the innovation strategies of our divisions to improve human and plant health and to safeguard stable harvests in agriculture. As part of these efforts, we are increasingly employing data science methods.

See the following subsections for further details

We maintain a global network of R&D locations, which employ roughly 16,000 researchers. In 2019, our R&D investments increased by a nominal 4.6% to €5,342 million.

Open innovation

Partnerships are integral to our innovation strategy, ensuring access complementary technologies and expertise. We enter into strategic alliances with various partners such as universities, governmental agencies, start-ups, suppliers and industry partners.

See the following subsections for information on selected collaborations

LifeHub network

Our LifeHub network serves as a springboard for the development of solutions at the interface between health and nutrition. Here customers, start-ups and students work together with Bayer employees on promising new solutions. LifeHubs provide an opportunity to incubate ideas within alliances aimed at developing new business models and researching leading-edge technologies. For example, some of our LifeHubs provide scientists and start-ups with laboratory facilities and other resources within the framework of CoLaborator™. The LifeHubs also enable us to come together with societal groups through networking, mentoring and events. To complement the existing sites at innovation hotspots around the world – Boston, Lyon, Berlin, Singapore, Osaka and three sites in California – we opened the LifeHub UK in Reading, United Kingdom, in 2019. The aim of this hub is to accelerate and optimize the diagnosis of diseases and data-driven drug discovery with the help of artificial intelligence (AI). Activities in this initial phase focus on the development of AI-supported solutions for radiology.

www.innovate.bayer.com/

Leaps by Bayer

Through Leaps by Bayer, we invest in breakthrough innovations in the areas of health and nutrition.

In 2019, Leaps by Bayer acquired a stake in the start-up company Khloris Biosciences, California, United States, with the goal of driving the development of novel vaccines based on human induced pluripotent stem cells (iPSCs), a technology that has the potential to prevent or cure cancer.

www.leaps.bayer.com

We also acquired a stake in Century Therapeutics, a company founded by Versant Ventures, San Francisco, United States, and Fujifilm Cellular Dynamics, Inc., Madison, United States, that develops allogeneic immune cell therapies for cancer. The company aims to advance multiple programs for hematologic and solid malignancies into clinical testing.

In 2019, we also announced the full acquisition of U.S.-based BlueRock Therapeutics, which had been founded in 2016 as a joint venture between Leaps by Bayer and Versant Ventures. The acquisition enables us to build a leading position in cell therapies. BlueRock Therapeutics focuses on the development of cell therapies in the fields of neurology, cardiology and immunology.

In addition, we participated in funding rounds for Pyxis Oncology, Boston, Massachusetts, United States, an immuno-oncological company specializing in the development of novel therapies for difficult-to-treat cancer types, and for eGenesis, Cambridge, Massachusetts, United States, a company that aims to help overcome the global shortage of donor organs.

We also acquired a stake in Informed Data Systems Inc., a digital health company based in the United States. Under the agreement, the U.S. company's digital therapeutics platform will be used to provide integrated solutions and services in multiple therapeutic areas with the goal of helping people with chronic diseases to improve their health.

Patents protect Bayer's intellectual property

Reliable global protection of intellectual property rights is particularly important for an innovation company like Bayer. In most cases, it would be impossible to cover the high costs incurred in the research and development of innovative products without this protection. We are therefore committed worldwide to protecting both the international patent system and our own intellectual property. Depending on the legal framework, we endeavor to obtain patent protection for our products and technologies in major markets. When we successfully market patent-protected products, we are able to reinvest the profits in sustainable research and development.

The term of a patent is normally 20 years from the date the application is filed. Since it takes an average of 11 to 13 years to develop a new medicine or crop protection active ingredient, only seven to nine years of patent protection remain following the product's approval. The same applies to the development of new transgenic traits. To nevertheless provide an adequate incentive to make the necessary major investments in research and development, the European Union (E.U.) member states, the United States, Japan and some other countries extend patent terms or issue supplementary protection certificates to compensate for the shortening of the effective protection period for pharmaceutical and crop protection patents, but not for transgenic traits.

Crop Science

We have amassed substantial experience in farm chemistry research and development and are a leader in biologicals and seeds and traits development. The business we acquired in 2018 brought leading seed brands and a strong foundation of plant biotechnology traits. We achieved significant progress in integrating its R&D activities in 2019. Working with digital applications and cutting-edge technologies, we develop and market a broad spectrum of tailored solutions for farmers that enable higher productivity in a sustainable manner, regardless of where farming is taking place, what size of land is being farmed or what agricultural practices are deployed.

Our R&D activities are driven by approximately 7,800 scientists (2018: 8,500)[3] operating in over 50 countries around the world. As announced in June 2019, we plan to invest some €5 billion in new weed control methods over the next 10 years. This includes research into resistance mechanisms, the discovery and development of new modes of action, and more precise application recommendations with the aid of digital technologies. We also enter into collaborations with external partners and leverage our established network to drive innovation and bring new solutions to farmers.

Research and development capacities

Our R&D is focused on developing technologies across multiple indications. Bringing together our expertise across multiple disciplines enables us to deliver more innovation faster. As part of these endeavors, we focus on the following technologies and areas:

Breeding

We aim to drive improvements in precision breeding, trait integration, greenhouse- and field-based product testing, and scalable data analytics and automation capabilities to help farmers maximize their productivity. Central to breeding is our focus on advancing our field testing through expanded environmental insights to provide farmers with tailored recommendations. This, combined with insights from our global germplasm sources, enables us to accelerate the development of new and improved product solutions.

[3] Including permanent and temporary employees

Biotechnology

Biotechnology helps us to develop solutions that strengthen plants' resistance to insects, weeds and other environmental stresses such as drought in a targeted manner. Using a variety of molecular approaches, including new gene editing tools like CRISPR, we transfer beneficial traits, such as the ability to resist a pest or to use water more efficiently, to a crop plant so that it can better survive in its environment. Biotechnology enables more productive farming and increases the sustainability of agriculture by, for example, facilitating minimum tillage practices which preserve topsoil and reduce CO_2 emissions.

Crop protection

We discover and develop innovative, safe and sustainable chemical crop protection compounds with herbicidal, insecticidal and fungicidal activity. Our current product portfolio and tailored solutions offerings help farmers achieve better harvests.

Biologicals

Our approach in biologicals encompasses a focus on microbial organisms and materials derived from them. These biologicals often enable us to reduce the use of synthetic chemicals, decreasing residue levels and helping to protect active ingredients against resistance issues. By introducing microbials into programs with traditional chemistry, we are building a more holistic system that is killing pests and eliminating pathogens while building healthier root systems.

Digital applications

The world of agriculture is being transformed by data sciences, and particularly by algorithms, analytics, deep learning and artificial intelligence, which can deliver crucial benefits for farmers. The yield potential of a crop relies on many complex interactions. For example, yield is dependent on genetics, environmental factors (weather and pest / disease burdens) and agronomic practices. The goal of digital solutions is to give farmers recommendations as to what products to use, in what amount, in what location, and at what time in order to optimize harvest yields and minimize environmental impact.

Research and development pipeline

Our product pipeline contains numerous new crop protection products, seed varieties, digital products and enhanced products (life cycle management) that promote sustainable agriculture and help improve productivity. In 2019, we launched confirmatory technical proof-of-concept field studies for seven new chemical or biological active ingredients and plant traits[4]. For 2020, we aim to launch confirmatory technical proof-of-concept field studies for four new chemical or biological active ingredients and plant traits.

[4] A new plant trait is a specific characteristic that has not yet been available or offered at Bayer for the crop plant in question.

The following table shows new products in late development phases[5], sorted according to key crops, that are planned to be launched by 2022.

A 1.3/1

Product Innovation Pipeline[1]

Crop / digital application	First launch	Product group	Indication	Product / trait / number of hybrids or varieties
Corn	2021	Biotechnology trait	Pest management	SmartStax PRO
	2022	Biological	Crop efficiency	BioRise third-generation seed treatment
	Annual	Breeding / native trait	Crop efficiency	> 150 new corn seed hybrids
Soybeans	2020	Biotechnology trait	Weed management	Xtendflex soybeans
	2021	Biotechnology trait	Pest management	Intacta2Xtend soybeans
	2022	Crop protection	Disease management	Fox Supra (Indiflin)[2]
	Annual	Breeding / native trait	Crop efficiency	> 150 new soybean seed hybrids
Cotton	2021	Biotechnology trait	Pest management	Lygus / thrips in cotton
	Annual	Breeding / native trait	Crop efficiency	> 20 new cotton seed varieties
Cereals	2020	Crop protection	Disease management	iblon (isoflucypram)
Oilseed rape / canola	2020	Biotechnology trait	Weed management	TruFlex Roundup Ready LibertyLink canola
Vegetables	Annual	Breeding / native trait	Crop efficiency, disease management	~ 150 new seed varieties launched with highlights in pepper, tomato and melon seed
Digital applications	2020	Digital / climate	Crop efficiency	Seed Advisor
	2021	Digital / climate	Crop efficiency	Advanced seed prescription service for corn in Argentina, Brazil and the E.U.
	2022	Digital / climate	Crop efficiency / disease management	Seed Advisor combined with new business model based on outcome-based pricing

As of December 2019
[1] Planned market launch of selected new products, subject to regulatory approval
[2] Co-development with Sumitomo

New products and registrations in 2019

In April, we launched the broad-spectrum insecticide Vayego™ in Korea. It provides long-lasting control of selected caterpillars, beetles and sucking pests. We expect 17 further market launches in 2020 and 2021.

In June, we signed a distribution agreement with AlphaBio Control, Cambridge, United Kingdom, to market Flipper™, an innovative biological pest control product developed by AlphaBio. Under the terms of the agreement, AlphaBio grants Bayer a worldwide exclusive right (except France) to commercialize Flipper™ for agricultural and nonagricultural uses.

In July, we launched the soybean fungicide Fox Xpro™ in Brazil. It provides full control of all relevant soybean diseases including Asian soybean rust. The optimized formulation received the AGROW Award 2019 “Best Formulation Innovation”.

Also in July, we launched Climate FieldView™ in Argentina. Already widely adopted, the digital farming platform helps farmers practice sustainable agriculture, enabling them to optimize yield potential while reducing the application of crop inputs such as fertilizers or crop protection products.

In September, we launched TruFlex canola with Roundup Ready™ and LibertyLink technologies in the DEKALB brand of canola seed. It forms part of an improved system designed for a range of growing conditions, providing hybrids that have tolerance to glyphosate and glufosinate

[5] Products in late development phases have proven proof of concepts validated by field studies and are ready for hand-off to the regulatory team for regulatory approvals.

herbicides. This enables a wider application window for grower flexibility as well as better weed control with improved crop safety.

Also in September, we presented best practice experiences with the implementation of our Root2Success™ concept on the African continent. This holistic approach supports sustainable production systems covering crop rotation, soil preparation, catch and cover crops, and the use of the innovative crop protection products Emesto™, Velum™ und Serenade™. The four-year experience with our smallholder project in Kenya underlined the success of the concept.

Patents

We regularly apply for patent protection for our innovations in both chemical crop protection and seed / biotechnology. However, the link between patents and products is relatively complex since products often combine multiple technologies that are patented differently in different areas of the world, with patents often granted only late in the product lifecycle.

Although the patents have already expired for some of our crop protection active ingredients, such as glyphosate, trifloxystrobin, prothioconazole[6] or imidacloprid, we have a portfolio of patents on formulations, mixtures and / or manufacturing processes for these active ingredients. In addition, some of our younger active ingredients such as fluopyram and bixafen are still patent-protected in the United States, Germany, France, the United Kingdom, Brazil, Canada and other countries until at least 2023. In fact, fluopyram is patent-protected until 2024 in the United States and 2025 in Brazil.[7] While our patent coverage on the first-generation Roundup Ready™ trait for soybeans has expired, some varieties – for example in the United States – are still protected by variety patents. The patent coverage on our second-generation Roundup Ready 2 Yield™ trait for soybeans runs until at least the mid-2020s. Our next-generation Intacta RR2 PRO™ soybean also has patent coverage until at least the mid-2020s. Patents on our next-generation herbicide trait which confers dicamba tolerance runs until at least the mid-2020s. In corn seed and traits, patent coverage on our first-generation YieldGard™ trait has expired. However, most farmers have already upgraded to next-generation branded corn traits with patent coverage running until at least the mid-2020s.

Collaborations

We are part of a global network of partners from diverse segments of the agricultural industry and work together with numerous public-private bodies, NGOs, universities and other institutions. In 2019, we entered into the new research partnerships detailed below.

In February, we announced a three-year research collaboration with Netafim Ltd., Tel Aviv, and BGN Technologies, the technology company of Ben-Gurion University of the Negev, Israel. The purpose of this project is to combine soil research, digital prediction tools and drip irrigation technologies – which are also the focus of an existing collaboration with Netafim – to develop best practices for the use of drip irrigation as a delivery system for the nematicide Velum™ Prime under typical conditions in arid regions.

Also in February, Bayer and KWS SAAT SE, Germany, granted a long-term license for the joint cultivation system Conviso™ Smart to MariboHilleshög ApS, Holeby, Denmark. With this agreement, another leading global sugar beet breeder can provide farmers worldwide with the innovative Conviso™ Smart technology, which is based on conventionally bred sugarbeet varieties that are tolerant to certain herbicides. In addition to the system’s broad spectrum weed control, the amount of herbicide used can be significantly reduced compared with current standards.

[6] The last supplementary protection certificates for prothioconazole will expire in some CIS countries in 2020.
[7] Patent protection does not take into account patent term extensions or supplementary protection certificates.

In June, we announced a broad collaboration with Arvinas, Inc., a U.S. biopharmaceutical company based in New Haven, Connecticut. The collaboration aims to utilize Arvinas' novel PROTAC™ technology, which harnesses the naturally occurring protein degradation system of the cell to selectively remove target proteins by proteolysis, the breakdown of proteins into amino acids. In October, Bayer and Arvinas announced the creation of Oerth Bio, the first company to explore the technology's potential for agriculture and crop protection. In our Pharmaceuticals Division, meanwhile, the PROTAC™ technology will be used to develop new drug products.

In July, the Bayer Trendlines Ag Innovation Fund, set up by Bayer CropScience LLC and The Trendlines Group Ltd., established EcoPhage Ltd. This new company is focused on discovering and developing environmentally friendly agricultural disease control products using bacteriophages, which are viruses that attack bacteria.

The following table provides an overview of important collaborations that are currently ongoing.

A 1.3/2

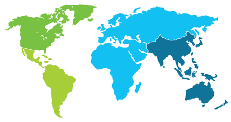
Crop Science: Important Collaborations

Partner	Collaboration objective
BASF Plant Science LP	Cofunded collaboration agreement to develop transgenic products with increased yield stability in corn and soybeans
Brazilian Agricultural Research Corporation – Embrapa	R&D cooperation to address specific agricultural challenges in Brazil, e.g. Asian soybean rust
2Blades Foundation	Collaboration research program to identify Asian soybean rust resistance genes in legumes and genes to control fungal diseases in corn
Citrus Research Development Foundation, Inc.	Search for solutions to citrus greening disease, which currently threatens the global citrus production and juice industry
Elemental Enzymes Ag and Turf, LLC	Use of soil microbes to improve plant health and thereby increase crop productivity
Energin .R Technologies 2009 Ltd. (NRGENE)	Collaboration to develop a sequence-based pangenome and haplotype database to facilitate molecular breeding approaches
Evogene Ltd.	Research program to identify genes for fungal disease resistance in corn
Forschungszentrum Jülich GmbH	Research collaboration focused on phenotyping of biologicals in plants
Grains Research and Development Corporation (GRDC)	Partnership for the discovery and development of innovative weed management solutions (herbicides)
Hitgen Ltd.	Research program based on a DNA-encoded library to discover new active substances for use in agriculture
Institute of Molecular Biology and Biotechnology, Foundation for Research and Technology Hellas (IMBB-FORTH)	Collaboration seeking to reveal key aspects of insect gut physiology and discover novel targets for the development of insect control solutions
Innovative Vector Control Consortium (IVCC)	Joint development of new substances to combat mosquitoes transmitting diseases such as malaria and dengue fever
KWS SAAT SE	Joint collaboration and commercial agreement for herbicide-tolerant sugar beet
Novozymes A/S (BioAg Alliance)	Joint development of new sustainable microbial solutions for crop agriculture
Pairwise Plants	Research alliance to develop genome editing tools and products in corn, soybeans, cotton, oilseed rape / canola, and wheat
Second Genome, Inc.	Alliance that leverages partner's microbiome / metagenomics platform to expand sourcing and diversity of novel proteins for the development of next-generation insect control traits
Targenomix GmbH	Development and application of systems biology approaches to achieve a better understanding of metabolic processes in plants

Pharmaceuticals

In our Pharmaceuticals Division, we focus on indications with high medical need in the areas of cardiovascular disease, oncology, gynecology, hematology and ophthalmology. Over 7,500 scientists conduct research and development at a number of locations around the world, mainly in Germany, the United States, Japan, China, Finland and Norway.

Bayer worldwide; see also A 1.1.2/3



Promising new molecular entities from our research pipeline are transferred to preclinical development. We define a new molecular entity (NME) as a chemical or biological substance that is not yet approved for use in humans. In preclinical development, these substances are examined further in various models with respect to their suitability for clinical trials and the associated “first-in-humans” studies.

Our R&D innovation model, which we realigned in 2018, is primarily based on the following core points: expanding our activities to include new modalities, technologies and external innovation; gaining a more in-depth understanding of disease mechanisms in fields with high medical need; and achieving greater flexibility with regard to our R&D model and our resources. Comprehensive implementation of our new R&D innovation model is ongoing. We achieved our first major milestones in 2019, particularly in terms of access to external innovation and new modalities and technologies. Examples here include research collaborations with Arvinas in the field of PROTAC™ and with Dewpoint Therapeutics in the field of biomolecular condensates, along with the acquisition of BlueRock Therapeutics, which is active in the field of cell therapies.

We conducted clinical trials with several drug candidates from our research and development pipeline in 2019. We strengthened products that were already on the market through additional development activities to further improve their application and / or expand their spectrum of indications.

Clinical trials are an essential tool for determining the efficacy and safety of new drugs before they can be used to diagnose or treat diseases. The benefits and risks of new medicinal products must always be scientifically proven and well documented. All clinical trials at Bayer satisfy strict international guidelines and quality standards, as well as the respective applicable national laws and standards.

Bayer also publishes information about clinical trials in line with the applicable national laws and according to the principles of the European (EFPIA) and U.S. (PhRMA) pharmaceutical industry associations, these principles being defined in position papers.

Information about our own clinical trials can be found in the publicly accessible register www.ClinicalTrials.gov and our own Trial Finder database. Further information on our globally uniform standards, the monitoring of studies and the role of the ethics committees can be found on the internet.

www.pharma.bayer.com/ethics-clinical-trials

Progress in Phase II clinical projects

The following table shows our most important drug candidates currently in Phase II clinical testing projects.

A 1.3/3

Research and Development Projects (Phase II)[1]

Projects	Indication
High-dose aflibercept (VEGF inhibitor)	Age-related macular degeneration (AMD)
Fulacimstat (BAY 1142524, chymase inhibitor)	Chronic kidney disease
Osocimab (BAY 1213790, anti-FXIa antibody)	Prevention of thrombosis
BAY 1817080 / BAY 1902607 (P2X3 antagonist)	Chronic cough
BAY 2306001 (IONIS-FXIRx)[2]	Prevention of thrombosis
BAY 2433334 (FXIa Inhibitor)	Prevention of stroke
Pecavaptan (BAY 1753011, vasopressin receptor antagonist)	Congestive heart failure
Levonorgestrel (progestin) + indomethacin (NSAID) combi IUS	Contraception
Regorafenib + Nivolumab Combination[3]	Metastatic colorectal cancer
Rogaratinib (pan-FGFR inhibitor)	Urothelial cancer
Vericiguat (sGC stimulator)	Chronic heart failure with preserved ejection fraction (HFpEF)
Vilaprisan (S-PRM)	Endometriosis

[1] As of January 31, 2020
[2] Sponsored by Ionis Pharmaceuticals, Inc.
[3] In collaboration with Bristol-Myers Squibb, United States, and Ono Pharmaceutical Co.,Ltd., Japan
The nature of drug discovery and development is such that not all compounds can be expected to meet the predefined project goals. It is possible that any or all of the projects listed above may have to be discontinued due to scientific and / or commercial reasons and will not result in commercialized products. It is also possible that the requisite U.S. Food and Drug Administration (FDA), European Medicines Agency (EMA) or other regulatory approvals will not be granted for these compounds. Moreover, we regularly review our research and development pipeline so that we can give priority to advancing the most promising pharmaceuticals projects.

Below are the most significant changes that occurred in 2019 compared with the previous year:

In July, we announced a clinical collaboration agreement with Bristol-Myers Squibb, New York City, United States, and Ono Pharmaceutical Co., Ltd., Osaka, Japan, to evaluate the combination of our multikinase inhibitor Stivarga™ (regorafenib) and Bristol-Myers Squibb's / Ono's immuno-oncology treatment Opdivo™ (nivolumab) in patients with micro-satellite stable metastatic colorectal cancer (MSS mCRC), the most common form of mCRC.

In September, we decided to discontinue the development program for our anti-TFPI antibody BAY 1093884 for the treatment of hemophilia for safety reasons after a Phase II trial investigating the safety and tolerability of BAY 1093884 in patients with hemophilia A or B with or without inhibitors was halted ahead of schedule.

In November, we decided to discontinue the development of our TASK channel blocker BAY 2253651 after it failed to demonstrate sufficient efficacy in the treatment of patients with obstructive sleep apnea in a Phase II trial.

In January 2020, we decided to halt the development of our alpha2c AR antagonist fadaltran as the efficacy endpoints in the Phase IIa trial were not met.

Progress in Phase III clinical projects

The following table shows our most important drug candidates currently in Phase III clinical testing projects:

A 1.3/4

Research and Development Projects (Phase III)[1]

Projects	Indication
Aflibercept (VEGF inhibitor)	Retinopathy of prematurity
Copanlisib (PI3K inhibitor)	Various types of non-Hodgkin lymphoma (NHL)
Regorafenib (multikinase inhibitor)	Newly diagnosed and recurrent glioblastoma
Darolutamide (ODM-201, AR antagonist)	Hormone-sensitive metastatic prostate cancer
Finerenone (MR antagonist)	Chronic kidney disease in patients with type 2 diabetes
Molidustat (HIF-PH inhibitor)	Renal anemia
Rivaroxaban (FXa inhibitor)	Peripheral artery disease (PAD)
Vericiguat (sGC stimulator)[2]	Chronic heart failure with reduced ejection fraction (HFrEF)
Vilaprisan (S-PRM)	Symptomatic uterine fibroids

[1] As of January 31, 2020
[2] Sponsored by Merck & Co., Inc., U.S.A.
The nature of drug discovery and development is such that not all compounds can be expected to meet the predefined project goals. It is possible that any or all of the projects listed above may have to be discontinued due to scientific and / or commercial reasons and will not result in commercialized products. It is also possible that the requisite U.S. Food and Drug Administration (FDA), European Medicines Agency (EMA) or other regulatory approvals will not be granted for these compounds. Moreover, we regularly review our research and development pipeline so that we can give priority to advancing the most promising pharmaceuticals projects.

Below are the most significant changes that occurred in 2019 compared with the previous year:

In May, the U.S. Food and Drug Administration (FDA) granted Bayer Breakthrough Therapy designation for copanlisib (Aliqopa™) for the treatment of adult patients with relapsed marginal zone lymphoma (MZL) who have received at least two prior therapies. MZL is a form of indolent non-Hodgkin lymphoma (iNHL).

Also in May, we presented further data from the Phase III ARAMIS trial at the ASCO Annual Meeting in Chicago showing that darolutamide, a nonsteroidal androgen receptor antagonist, in combination with androgen deprivation therapy (ADT) delays worsening of disease-related symptoms in men with nonmetastatic castration-resistant prostate cancer (nmCRPC) compared with placebo plus ADT.

At the ASCO Annual Meeting, we also presented new data confirming the high level of efficacy achieved by the precision oncology active substance larotrectinib (Vitrakvi™) in both adults and children with TRK fusion cancer and brain metastases or primary tumors of the central nervous system. In addition, the updated clinical data we presented at the ESMO Congress in Barcelona, Spain, in September again showed a high response rate even with an expanded dataset, while median overall survival was more than three years.

In June, we initiated a Phase III trial of the anti-VEGF treatment aflibercept (Eylea™) for intravitreal injection in retinopathy of prematurity, an eye condition in premature infants.

The enrollment of patients in the GBM AGILE trial, an international platform trial sponsored by the Global Coalition for Adaptive Research, also began in the United States in June. In a multi-arm cooperation trial in brain cancer patients, we are providing the active substance regorafenib, which will be evaluated first. The trial will investigate several therapies for patients with newly diagnosed or recurrent glioblastoma.

In early July, we presented the findings of the Phase III EINSTEIN-Jr. trial with rivaroxaban at the International Society on Thrombosis and Haemostasis (ISTH) Congress in Melbourne, Australia. The results showed the efficacy and safety profile of rivaroxaban in children with venous thromboembolism, and were similar to those seen in previous studies in adults. In November, we submitted an application to the European Medicines Agency (EMA) seeking approval of rivaroxaban for use in children with venous thromboembolism. The timely filing and review for the use of Xarelto™ in children in the European Union or the United States as agreed with the EMA and the U.S. FDA, respectively, enables us to apply for an extension of the compound patent protection by six months in each case.

In September, the European Society of Cardiology (ESC) published clinical practice guidelines recommending that Xarelto™ vascular dose plus aspirin low dose should be considered in the treatment of patients with chronic coronary syndromes at high risk of further events. Another ESC guideline addressing diabetes also includes such a recommendation for this regimen in patients with diabetes and lower extremity arterial disease. A new analysis of the COMPASS study in July demonstrated that patients with high risk factors benefited most from dual pathway inhibition.

In November, we announced that the Phase III study VICTORIA evaluating the use of vericiguat in patients with chronic heart failure with reduced ejection fraction (HFrEF) had met its primary endpoint. Vericiguat reduced the risk of cardiovascular death or heart failure hospitalization versus placebo when given in combination with available heart failure therapies. Vericiguat is the first-in-class soluble guanylate cyclase (sGC) stimulator being developed to treat patients with worsening chronic heart failure. Vericiguat is being jointly developed with MSD (known as Merck & Co., Inc. in the United States and Canada).

Filings and approvals

We regularly evaluate our research and development pipeline in order to prioritize the most promising pharmaceutical projects. Following the completion of the required studies with a number of these drug candidates, we submitted applications to one or more regulatory agencies for approvals or approval expansions. The most important drug candidates in the approval process are:

A 1.3/5

Main Products Submitted for Approval[1]

Projects	Indication
Darolutamide (ODM-201, AR antagonist)	Europe: castration-resistant nonmetastatic prostate cancer
Rivaroxaban (FXa inhibitor)	E.U.: VTE treatment in children

[1] As of January 31, 2020

In February, we completed the submission of a rolling New Drug Application for the active substance darolutamide to the U.S. FDA. The submission is based on data from the Phase III ARAMIS trial in men with nonmetastatic castration-resistant prostate cancer (nmCRPC). Darolutamide is a nonsteroidal androgen receptor inhibitor that Bayer developed together with Finnish pharmaceutical company Orion Corporation. In April, the U.S. FDA accepted the New Drug Application and granted priority review status. In late July, Nubeqa™ (darolutamide) was approved in the United States for the treatment of patients with nmCRPC.

In March, we submitted a marketing authorization application to the EMA for darolutamide for the treatment of patients with nmCRPC. Also in March, we submitted an application for marketing authorization to the Ministry of Health, Labor and Welfare (MHLW) in Japan for darolutamide for the treatment of patients with castration-resistant prostate cancer. In January 2020, the product was approved in Japan for the treatment of patients with nmCRPC. In the same month, the EMA's Committee for Medicinal Products for Human Use (CHMP) recommended darolutamide for marketing authorization in the European Union. The recommendation is for the treatment of patients with nmCRPC who are at high risk of developing metastatic disease. The final decision from the European Commission on the marketing authorization is expected in the coming months.

In July, we received approval from the U.S. FDA for Gadavist™ as the first and only contrast agent for use in cardiac magnetic resonance (MR) imaging to assess myocardial perfusion and late gadolinium enhancement in adult patients with known or suspected coronary artery disease (CAD).

In September, the European Commission granted Vitrakvi™ tumor-agnostic approval in the European Union. The approval is for the treatment of adult and pediatric patients with solid tumors that display a neurotrophic tyrosine receptor kinase (NTRK) gene fusion, who have a disease that is locally advanced, metastatic or where surgical resection is likely to result in severe morbidity, and who have no satisfactory treatment options.

In October, the U.S. FDA approved rivaroxaban (Xarelto™) for the prevention of venous thromboembolism (VTE), or blood clots, in acutely ill medical patients at risk for thromboembolic complications who are not at high risk of bleeding. The approval is based on data from the Phase III MAGELLAN trial, and supported by the data from the MARINER trial. These trials evaluated rivaroxaban for the prevention of VTE in acutely ill medical patients during hospitalization and immediately following discharge.

Patents

The following table shows the expiration dates for our most significant Pharmaceuticals patents:

A 1.3/6

Pharmaceuticals Patent Expiration Dates

Products											Market
	Germany	**France**	**Italy**	**Switzerland**	**Spain**	**U.K.**	**China**	**Japan**	**Brazil**	**Canada**	**U.S.A.**
Adempas™											
Active ingredient	2028	2028	2028	2028	2028	2028[e]	2023	2027-2028[d]	2028[c]	2023	2026
Eylea™											
Active ingredient	2025	2025	2025	2025	2025	2025[c]	2020	2021-2023[d]	2020[b]	2020	–
Jivi™											
Active ingredient	2025[a]	2025[a]	2025[a]	2025[a]	2025[a]	2025[a]	2025	2025[a]	2025[b]	2025[a]	2025[a]
Nexavar™											
Active ingredient	2021	2021	2021	2021	2021	2021	2020	2021-2025[d]	2025	2020	2020
Nubeqa™											
Active ingredient	2030	2030	2030	2030	2030	2030	2030	2030	2030[b]	2030	2030[a]
Stivarga™											
Active ingredient	2028	2028	2028	2028	2028	2028[c]	2024	2026[d]	2028	2024	2031
Xarelto™											
Active ingredient	2023	2023	2023	2023	2023	2023	2020	2022-2025[d]	2022	2020	2024
Xofigo™											
Use	2024	2024	2024	2024	2024	2024	2019	2022[e]	–	2019	2022
Vitrakvi™											
Active ingredient	2029	2029	2029	2029	2029	2029	2029	2029	2029[b]	2029[a]	2029[a]

[a] Current expiration date; patent term extension applied for
[b] Patent application pending
[c] Patent term revised
[d] Application-specific patent term extension(s)
[e] Patent term extension granted

Collaborations

We augment our own research capacities through collaborations and strategic alliances with industrial and academic research partners. In this way we gain access to complementary technologies and external innovation potential.

See also A 1.3 "Global open innovation network"

Following the acquisition of Loxo Oncology by Eli Lilly and Company in February, we exercised a change of control clause in our licensing agreements with Loxo Oncology. As a result, we now hold exclusive licensing rights for the global development and commercialization – including in the United States – of Vitrakvi™ (larotrectinib) and the investigational drug selitrectinib (BAY 2731954, formerly: LOXO-195).

In May, we signed a collaboration agreement with Foundation Medicine Inc., Cambridge, Massachusetts, United States, for the development and commercialization of therapy-accompanying diagnostic tests, also known as companion diagnostics (CDx), based on next-generation sequencing for new cancer drugs developed by Bayer. The agreement allows for collaboration across multiple treatment programs and covers Foundation Medicine's full portfolio of tests, including FoundationOne™ CDx. The first project will be to develop a CDx test in the United States for larotrectinib (Vitrakvi™).

As part of the aforementioned collaboration with Arvinas, Inc., we plan to develop next-generation medicines for patients with cardiovascular, oncological and gynecological diseases in our Pharmaceuticals Division. Under the four-year agreement announced in June, Arvinas will receive an upfront payment and pharmaceutical R&D support, as well as a direct equity investment.

In July, we announced the clinical collaboration agreement with Bristol-Myers Squibb, New York City, United States, and Ono Pharmaceutical Co., Ltd., Osaka, Japan, detailed earlier in this report.

In September, we announced the launch of a joint lab to research new drug candidates to treat chronic lung diseases together with Brigham and Women's Hospital and the Massachusetts Hospital in Boston, Massachusetts, United States. We will invest over US$30 million to fund joint research projects over a five-year period.

In November, we entered into an option, research and license agreement with Dewpoint Therapeutics, Inc., a biotechnology company based in Boston, Massachusetts, United States, and Dresden, Germany. The partnership will leverage Dewpoint's proprietary platform for biomolecular condensates and our small molecule compound library to develop new treatments for cardiovascular and gynecological diseases. The collaboration follows our participation in a Dewpoint financing round through our Leaps by Bayer unit.

In January 2020, we announced the expansion of our partnership with Evotec SE, Hamburg, Germany, in women's health indications with a new five-year, multi-target collaboration to develop multiple clinical candidates for the treatment of polycystic ovary syndrome (PCOS). PCOS is the most frequent endocrine disorder in women linked to metabolic dysfunction and the most frequent cause of female infertility. It occurs in an estimated 5–10% of women.

Also in January 2020, we announced that we had entered into a collaboration agreement with Exscientia Ltd., Oxford, United Kingdom, to work on early research projects to treat cardiovascular and oncological diseases. Exscientia specializes in AI-driven drug discovery and design. Under the agreement, which is initially set to run for three years, we aim to identify and optimize novel lead structures for potential drug candidates.

In the same month, we also entered into an exclusive license agreement with Daré Bioscience Inc., San Diego, United States, concerning U.S. commercial rights to Ovaprene™ once the contraceptive has been approved by the FDA. Ovaprene™ is a hormone-free, intravaginal ring that is currently in clinical development for pregnancy prevention. If approved, it could be the first monthly nonhormonal contraceptive product.

The following table shows examples of the main R&D collaborations.

A 1.3/7

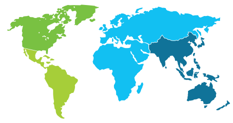
Main Collaborations

Partner	Collaboration objective
Arvinas, Inc.	Research collaboration in the field of life sciences using novel PROTAC™ (proteolysis-targeting chimeras) technology from Arvinas to develop new pharmaceuticals to treat cardiovascular, oncological and gynecological diseases
Brigham and Women's Hospital and Massachusetts Hospital	Joint laboratory for research into new drug candidates to treat chronic lung diseases
Bristol-Myers Squibb and Ono Pharmaceutical	Clinical collaboration to evaluate new combination possibilities for Stivarga™ (regorafenib) with immuno-oncologics
Broad Institute	Strategic partnership to research and develop new therapeutic options in the fields of cardiovascular medicine and oncology and establishment of a joint research laboratory
Compugen Ltd.	Research and development of new immunotherapy approaches in oncology
Daré Bioscience, Inc.	License agreement for U.S. commercial rights to hormone-free contraceptive Ovaprene™ in the future
Dewpoint Therapeutics, Inc.	Option, research and license agreement for the development of new treatments for cardiovascular and gynecological diseases, with the partnership leveraging Dewpoint's proprietary platform for biomolecular condensates and Bayer's compound library
Evotec AG	Collaboration to identify development candidates for the treatment of endometriosis and kidney diseases and to develop multiple clinical candidates for the treatment of polycystic ovary syndrome (PCOS)
Exscientia Ltd.	Collaboration in early research projects to treat cardiovascular and oncological diseases
Foundation Medicine Inc.	Collaboration for the development and commercialization of therapy-accompanying diagnositc tests, also known as companion diagnostics (CDx), based on next-generation sequencing for new cancer drugs developed by Bayer
German Cancer Research Center (DKFZ)	Strategic partnership to research and develop new therapeutic options in oncology, especially in immunotherapy, and establishment of a joint research laboratory
Haplogen GmbH	Research collaboration in the field of pulmonary diseases such as chronic obstructive pulmonary disease (COPD)
Ionis Pharmaceuticals, Inc.	Development of the antisense drug IONIS-FXIRx for thrombosis prevention and development of IONIS-FXI-LRx in the preclinical phase
Janssen Research & Development, LLC of Johnson & Johnson	Development and marketing of Xarelto™ (rivaroxaban) for the treatment of coagulation disorders
Kyoto University	Research alliance to identify new therapeutic approaches for pulmonary diseases
MD Anderson Cancer Center	Development collaboration in oncology
Merck & Co., Inc.	Development and marketing collaboration in the field of soluble guanylate cyclase (sGC) modulation
Orion Corporation	Development and marketing of darolutamide (previously ODM-201) for the treatment of patients with prostate cancer
Peking University	Research collaboration and establishment of a research center for joint projects
PeptiDream Inc.	Active ingredient research in various therapeutic areas and target classes with the help of PeptiDream's Peptide Discovery Platform System Technology
Tsinghua University	Research collaboration and establishment of a research center for joint projects
Ultragenyx Pharmaceuticals	Research and development of a novel gene therapy for the treatment of hemophilia A
University of Oxford	Strategic research partnership to develop novel gynecological therapies
Vanderbilt University Medical Center	Strategic research alliance to identify and develop new potential active ingredients for the treatment of kidney diseases
Wilmer Eye Institute of Johns Hopkins University	Research and development of innovative drug products to treat serious back-of-the-eye diseases
X-Chem, Inc.	Active ingredient research in various therapeutic areas and target classes

Consumer Health

At Consumer Health, we concentrate on developing new nonprescription (OTC) products and solutions that improve consumer health and well-being in the areas of pain, cardiovascular risk prevention, dermatology, nutritional supplements, digestive health, allergy and cough and cold. The focus lies on product developments that are aligned to the desires and needs of consumers. Our innovations range from new product formulations and packaging to technical applications and medical devices. In addition, we developed around 30 new consumer-validated concepts in 2019, thus exceeding our target. We are strengthening Consumer Health's innovation pipeline with more than 100 active projects which we are developing across all our categories. These include core and adjacent innovations as well as transformational innovations that could significantly advance self-care products for consumers worldwide.[8] Consumer Health maintains a global network of research and development facilities, with sites in the United States, France, Germany and China. A further important part of our innovation strategy is transitioning current prescription medicines that are suitable for self-care to OTC status (Rx-to-OTC switches).

Bayer worldwide;
see also A 1.1.2/3



1.4 Commitment to Employees

Defining our corporate culture through values, dialogue and diversity

Continued focus on integrating employees from the acquired agriculture business

Bayer's business success is based to a large extent on the knowledge and commitment of our employees. As an employer, we offer our employees attractive conditions and wide-ranging individual development opportunities. Alongside professional training, we focus on our corporate values (LIFE) and on establishing a dialogue- and feedback-oriented culture based on trust, intentional inclusion, and respect for diversity and equality of opportunity, which is also summarized in our corporate policy entitled "Fairness and Respect at Work." Our employees worldwide are trained to comply with these guidelines. We measure the engagement and satisfaction of our employees by means of institutionalized feedback discussions and regular employee surveys.

Responsibility for the human resources strategy of the Bayer Group falls within the remit of the Board of Management with the support of Bayer's Human Resources enabling function. The strategy is globally implemented within the scope of binding policies.

Employees at all Bayer sites around the world have the right to elect their own representatives. In 2019, the working conditions for around 55% (2018: 57%[9]) of our employees worldwide were governed by collective or company agreements.

Employee data

On December 31, 2019, we employed 103,824 people (2018: 107,894) worldwide. In Germany we had 24,953 (2018: 25,602) employees, which was 24.0% of the total Group workforce (2018: 23.7%). Global headcount fell by 3.8% in 2019 owing in particular to the restructuring measures launched at the beginning of the year and the divestments in our Consumer Health Division. The employees of the Animal Health business and of Currenta, the sales of which were agreed upon or completed in the course of 2019, are no longer included in the headcount of our continuing operations with retroactive effect.

Bayer AG key data:
see also A 1.7

[8] Core innovation means optimizing existing products for existing customers. Adjacent innovation refers to the extension of existing brands to new market segments. And transformational innovation refers to achieving breakthroughs and creating new markets that do not yet exist.
[9] 2018 figure as last reported

The decline in employee numbers as a result of the restructuring and portfolio measures is also reflected in the development in all the regions. Relatively speaking, headcount dropped the most in Latin and North America. As part of the integration of the acquired agriculture business, we transferred around 970 employees from the Crop Science Division to the service companies and other units.

In 2019, the Bayer Group hired 12,547 new employees (accounting for 11.8% of our workforce). On the reporting date, our employees had worked for the Bayer Group for an average of 10.2 years (2018: 9.8). Our workforce includes only a small number of employees on temporary contracts (4.9%).

Restructuring measures

We act with social responsibility when changes and restructuring measures are necessary. For example, we will complete the worldwide reduction of around 12,000 jobs initiated in late 2018 by the end of 2021 on the basis of local laws and regulations, meaning that there might be different solutions in different countries. In all countries we aim to minimize the impact on employees and find mutually agreeable solutions in cases where job cuts are necessary. In Germany, the company’s largest operational base, business-related dismissals are fundamentally excluded in the major companies through the end of 2025 under agreements with the employee representatives.

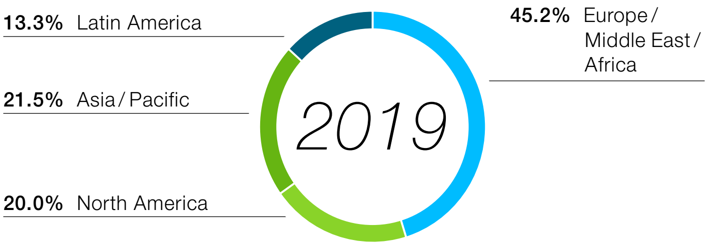
We made good progress with the planned Group-wide measures in 2019. Voluntary severance agreements are the most important tool for the job cuts announced in Germany. Flexible models with attractive conditions have been offered to employees of various age groups since February 2019.

A 1.4 /1

Employee Data

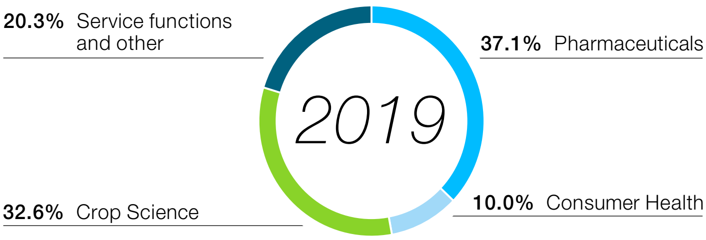
	2018	2019	Change %
Total	**107,894**	**103,824**	**–3.8**

by Region



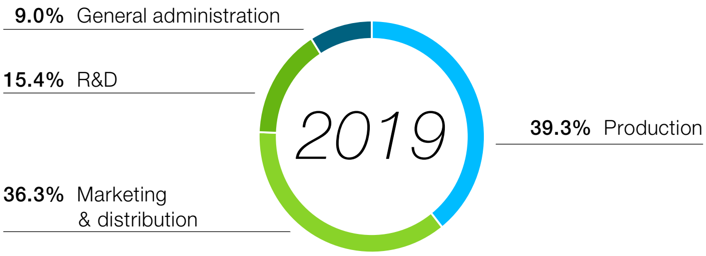
	2018	2019	Change %
Europe / Middle East / Africa	48,390	46,933	–3.0
North America	21,951	20,735	–5.5
Asia / Pacific	22,863	22,341	–2.3
Latin America	14,690	13,815	–6.0

by Division



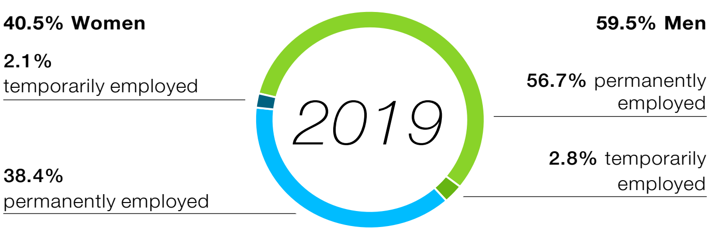
	2018	2019	Change %
Crop Science	38,109	33,866	–11.1
Pharmaceuticals	38,478	38,553	+0.2
Consumer Health	11,050	10,400	–5.9
Service functions and other	20,257	21,005	+3.7

by Function



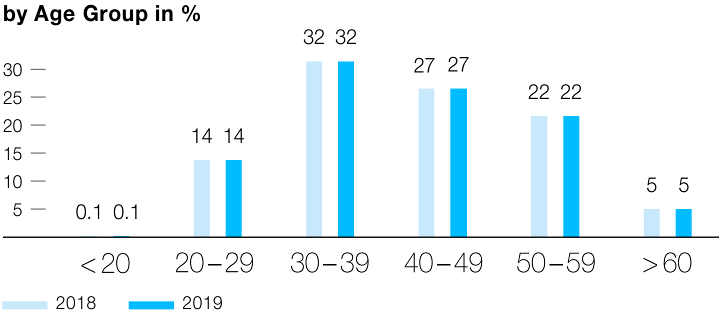
	2018	2019	Change %
Production	40,979	40,814	–0.4
Marketing & distribution	40,435	37,665	–6.9
R&D	16,835	16,006	–4.9
General administration	9,645	9,339	–3.2

by Gender



	Women		Men	
	2018	2019	2018	2019
Europe / Middle East / Africa	21,132	20,609	27,258	26,324
North America	8,465	7,799	13,486	12,936
Asia / Pacific	8,700	8,542	14,163	13,799
Latin America	5,310	5,089	9,380	8,726
Total	43,607	42,039	64,287	61,785

by Age Group in %



Fluctuation in %

%	Voluntary 2018	Voluntary 2019	Total 2018	Total 2019
Women	6.1	7.2	14.2	15.3
Men	5.1	6.2	15.2	14.7
Total	5.5	6.6	14.8	15.0

2018 figures restated
Number of employees in full-time equivalents (FTE)

Employee compensation and variable pay

Our compensation system combines a basic salary reflecting performance and responsibility with elements based on the company's success, such as variable one-time payments, plus additional benefits that include stock participation programs. Senior managers throughout the Bayer Group are invited to participate in Aspire, a uniform long-term compensation program based on the development of the share price. Adjustments based on continuous benchmarking make our compensation internationally competitive.

Alongside providing attractive compensation for their work, Bayer contributes to the financial security of its present and former employees after their retirement. Retirement benefit plans are available to 78% (2018: 80%[10]) of Bayer employees worldwide to complement national pension systems.

A 1.4/2

Personnel Expenses and Pension Obligations

€ million	2018	2019
Personnel expenses	10,778	11,788
of which pension expenses	878	968
Pension obligations[1]	25,869	25,879
Pension benefits paid[2]	1,123	1,198

2018 figures restated
[1] Present value of defined benefit obligations for pensions and other post-employment benefits as of December 31
[2] Including Animal Health and Currents (until their deconsolidation)

The increase in personnel expenses is essentially due to the first full-year inclusion of the employees of the acquired agriculture business and additions to provisions in connection with the restructuring measures. In addition, provisions of around €890 million (2018: €1,070 million for employees in continuing operations) were established in 2019 for variable one-time payments to employees under the Group-wide short-term incentive (STI) program and similar programs. Furthermore, a budget of approximately €70 million was made available in 2019 for individual Top Performance Awards.

Our compensation principles comprise maintaining equal pay for men and women, providing fair compensation and informing our employees transparently about the overall structure of their compensation. As standard practice, Bayer pays at least a "living wage," which is annually reviewed and defined worldwide by the nonprofit organization Business for Social Responsibility, and compensates employees on both permanent and temporary employment contracts in excess of the statutory minimum wage in many of the countries in which we operate. That makes Bayer one of the first companies in the world to commit to this concept.

Vocational and ongoing training

To meet the need for skilled employees, Bayer provides vocational training in Germany in more than 25 different occupations and offers more vocational training places than required to meet its own needs. In total, we have around 1,400 apprentices. Bayer also offers trainee programs in various areas for those embarking on a career and internships for students around the world.

www.bayer.com/
training

A wide range of ongoing training opportunities is available to our employees in the form of both e-learning and face-to-face training. Each employee engaged in an average of around 23 hours of ongoing training in 2019.

Digitalization

Through special training courses, we are systematically preparing our employees for the digital evolution. Furthermore, there are some areas in which we already leverage the opportunities offered by artificial intelligence – such as the execution of internal standard processes with the help of robotic process automation. In the area of recruiting, we are testing new, intelligent

[10] 2018 figure as last reported

algorithms to discover how innovative technologies can support our HR employees in selecting talented personnel for vacant positions.

Work-life balance

We offer our employees flexible working hours, allow them to take parental leave within the scope of the relevant legal regulations and support them in child care or caring for close relatives. In 2019, part-time employees accounted for around 8.4% of the Bayer Group workforce (of which 59.4% were women and 40.6% men), primarily in Europe.

www.bayer.com/
career

Inclusion and diversity

Mutual understanding and a corporate culture that leverages talented employees of different educational and professional backgrounds and perspectives are important success factors for the Bayer Group. We create an inclusive workplace where all employees feel welcome and are able to contribute to bringing best-in-class solutions for the benefit of all. Inclusion and diversity also plays an important role in meeting and anticipating the needs of our customers.

The percentage of women in the total headcount remained virtually constant at 40.5% (2018: 40.4%). We focus on achieving a better gender balance in management. In 2019, women accounted for a 40.5% (2018: 41.4%) share of the total of 37,309 managerial employees and a 40.4% (2018: 40.0%) share of specialized personnel. The proportion of women in the Group Leadership Circle, the highest management level below the Board of Management, increased again compared to previous years. By the end of 2019, it was made up of 22.5% women (2010: 6.5%[11]).

The Group Leadership Circle currently comprises 29 nationalities (2018: 30), with around 65.8% (2018: 67.9%) of its members working in their native country. Information on diversity in our Board of Management and our Supervisory Board can be found in our Corporate Governance Report.

The average age of our employees is 42 (2018: 42). There were no significant changes to the age structure in 2019 compared to 2018.

In 2019, we further developed our inclusion and diversity strategy. The comprehensive approach is supported across the organization through a global, regional and local structure. People with disabilities are an integral part of our workforce. Based on voluntary statements by employees, we employ some 2,250 people with disabilities, 46% of whom are women and 54% men. That represents around 2.1% of our total workforce.

Health promotion

Almost 98% (2018: 98%[12]) of our employees worldwide either have statutory health insurance or can obtain health insurance through the company.

We aim to provide employees in all countries with access to regular medical check-ups, sports programs, rehabilitation and on-site medical care.

[11] Figure as last reported
[12] 2018 figure as last reported

1.5 Procurement and Supplier Management

Requirements raised in the Supplier Code of Conduct

Sustainability and supplier management processes in procurement harmonized

We exert influence on society and the environment through our procurement activities and supplier relationships. Not only economic, but also ethical, social and ecological principles are therefore anchored in our Procurement Policy, which is binding for all employees worldwide. From 2020, the procurement function of the acquired agriculture business will fully operate according to the globally valid Bayer Procurement Policy.

As a cross-divisional enabling function, Procurement leverages synergies by bundling know-how and procurement spend. In 2019, we had a total of 86,400 (2018: 85,599) suppliers. Our procurement spend was €17.6 billion (2018: €15.6 billion).[13]

Our main direct procurement materials include active ingredients, raw materials, intermediates, finished products and seed. Technical goods and services, marketing services and research and development are important components of our indirect procurement portfolio.

Procurement operates according to established procurement and supplier management processes. Long-term contracts and active supplier management for strategically important goods and services are important elements here. They serve to minimize procurement-specific risks such as supply disruptions or significant price fluctuations, as well as to safeguard the company's competitiveness and ensure smooth production processes.

Sustainability in the supply chain

Clear, sustainability-oriented criteria and standards apply to our supply chain at both a global and regional level. A four-step management process is thus established throughout the company to improve sustainability practices in the supply chain, comprising awareness-raising and supplier nomination, performance evaluation and development. The suppliers of the acquired agriculture business were included in the four-step management process in 2019 (with the exception of seed growers, who are subject to a separate human rights assessment process due to particular risks in the agricultural industry).

Our sustainability requirements are established in the Supplier Code of Conduct updated in 2019, which is based on our Bayer Human Rights Policy and the principles of the U.N. Global Compact. The code serves as the basis for selecting and evaluating our suppliers and is integrated into electronic ordering systems and contracts throughout the Bayer Group. Furthermore, Bayer's standard supply contracts contain a clause that authorizes Bayer to verify suppliers' compliance with our sustainability requirements. From the beginning of 2020, all standard supply contracts (including those of the acquired agriculture business) will contain this clause.

Bayer verifies the observance of the code requirements by its suppliers through online assessments[14] or on-site audits[15]. We evaluate our strategically important suppliers, comprising altogether more than 25% of our total procurement spend, and suppliers with a high sustainability risk, which combines both country and category risks. Our assessment process also includes supplier evaluations produced within the scope of industry initiatives. In total, our service provider EcoVadis assessed 650 (2018: 715) suppliers on our behalf in 2019. In 2019, we arranged for 62

[13] In addition, internal services to the value of €0.3 billion (2018: €0.3 billion) were procured from the Currenta group at the time of Currenta's deconsolidation.
[14] The online assessments of suppliers that belong to a company group generally take place at parent company level.
[15] The number of evaluations comprises suppliers of continuing and discontinued operations in both 2018 and 2019.

(2018: 79) of our suppliers to be audited on site by external, independent auditors.[16] In 2019, 103 suppliers (2018: 130) were evaluated through an HSE audit, with the focus on health, safety and environmental protection.

If critical results are recorded in the event of a serious violation or several major findings being identified in a supplier's sustainability performance, specific improvement measures are then jointly defined. In 2019, critical results were determined for 11 suppliers (2% of all assessed and audited suppliers; 2018: 2% (17 suppliers)). In these cases, we request the suppliers to remedy the identified weaknesses. We monitor the implementation of these activities by way of re-assessments or follow-up audits. We reserve the right to terminate a supplier relationship if no improvement is observed during a re-evaluation. In 2019, Bayer did not have to end any supplier relationship due solely to sustainability performance. In 2019, 332 (2018: 343) of the 712 (2018: 794) suppliers assessed and audited improved their sustainability performance.

1.6 Product Stewardship

For us, product stewardship means that our products satisfy the highest quality standards and are safe for people, animals and the environment when properly used. We respect legal requirements, and our voluntary commitment and internal standards go beyond these in various areas. We have put in place suitable directives and management systems for the implementation of regulatory and voluntary product stewardship requirements that are steered by our Corporate Health, Safety & Environment enabling function and the quality functions of the divisions.

Assessment and testing of active ingredients and products

Along the entire value chain, our substances and finished products undergo extensive assessment and testing that we use to derive appropriate measures to mitigate health and environmental risks. Our divisions have quality management systems based on sector-specific international standards. Through binding company-wide quality assurance, we guarantee high-quality, safe and effective products and services that satisfy all internal and external requirements and meet customer expectations. In this way we work to prevent customer complaints, product recalls, cross-contamination and other problems. For all chemical substances, we compile safety data sheets targeting professional users. End consumer products contain appropriate information in their packaging, an example being package inserts for pharmaceuticals. We also conduct environmental risk assessments and implement risk management measures subsequent to product registration.

At Crop Science, we already examine our crop protection products during the early development phase, with regard to their mode of action, their (eco)toxicological properties and the extent of potential residues in plants and the environment, in tests required by law. Each new crop protection active ingredient undergoes a thorough safety assessment and suitable scientific studies and testing.

Furthermore, we have made a voluntary commitment to market only those crop protection products whose active ingredients are registered in at least one OECD country or, in the case of new active ingredients, for which an OECD data package has been compiled.

Bayer aims to strengthen our customers' and stakeholders' confidence in our products through transparency and Crop Science is the first business in its industry to make safety-relevant data on crop protection products publicly available. More than 230 summaries of scientific studies submitted to the European Food Safety Authority in connection with the registration procedures for 28 of our active ingredients in the European Union are already available on an online platform.

https://cropscience-transparency.bayer.com/en

[16] The suppliers gained through the acquired agriculture business were not yet included in the on-site audits and will be completely integrated into Bayer's evaluation processes from 2020.

These reports include information on toxicological and ecotoxicological studies and investigations into degradability. Detailed study reports are available on request.

In the sale and application of crop protection products and technologies, we observe the International Code of Conduct on Pesticide Management of the United Nations Food and Agriculture Organization (FAO). The principles of our product stewardship are established in our Product Stewardship Policy and implemented in the Product Stewardship Program. We provide farmers, seed treatment professionals, dealers and other stakeholders with dedicated training on how to use our products safely and aim to increase the intensity of our training activities worldwide.

The Pharmaceuticals and Consumer Health divisions assess the medical benefit-risk profile of their pharmaceuticals, medicinal products, dietary supplements and medicated skincare products throughout their entire product life cycle. The efficacy, safety and tolerability of pharmaceuticals are investigated in preclinical and Phase I to III clinical development studies. These results and the benefit-risk assessment are submitted to the relevant authorities during the pharmaceutical registration process. We continue to compile safety-relevant information in a dedicated database following market launch of the product. Post-Authorization Safety Studies (PASS) are also conducted after approval. The results are entered into the PASS registry in compliance with E.U. pharmacovigilance legislation.

Animal welfare in active ingredient testing

Animal studies are legally required and essential from a scientific viewpoint for assessing the safety and efficacy of our products. Such studies must comply not just with legal requirements, but also with Bayer’s principles on animal welfare and animal studies. The latter also apply to both the research institutes we commission and our suppliers, whose compliance with our animal welfare requirements we regularly monitor. We aim to minimize the use of study animals and to employ alternative methods whenever possible.

Environmental impact

In the course of our business activities, we aim to monitor the impact of our products on the environment.

Biodiversity

We aim to use natural resources responsibly and respect biodiversity. Our principles on biodiversity are set forth in both the Bayer Human Rights Policy and our own position on this issue that was updated in 2019. In this, we express our commitment to the United Nations Convention on Biological Diversity and the associated Nagoya Protocol, which regulates the balanced and fair sharing of the benefits arising from the use of genetic resources. We published a supplementary corporate policy dedicated to the Nagoya Protocol in 2019.

https://www.bayer.com/en/position-biodiversity.aspx

Agriculture in particular benefits significantly from biodiversity but it can also contribute to its loss. Crop Science is therefore investigating and developing cultivation systems that help to achieve a better balance between productivity and the conservation of biodiversity and habitats.

Operational implementation is ensured through specific measures with our customers and distribution partners.

Bee safety and crop protection products

We contribute our experience in crop protection to numerous projects, such as our Bee Care activities, and partnerships with the goal of protecting and improving pollinator health.

To minimize risks posed to bees by our crop protection products, we perform extensive safety testing and risk assessments. We also implement product stewardship measures, including certification for seed treatment facilities, knowledge-sharing and educational training courses for growers to help them understand the benefits that pollinators can bring for crop quality and yield and the need to protect them, and training programs for farmers who use our products. In addition, we develop bee-friendly crop protection products and processes. The first tests to measure bee toxicity are conducted as early as the development stage.

We are also convinced that our insecticides, including the neonicotinoids, have a favorable environmental safety profile and are not dangerous to bee colonies when used according to label instructions.

Glyphosate

Glyphosate is a nonselective herbicide used in many countries for effective, simple and cost-effective weed control. It works in plants by specifically inhibiting an enzyme that is essential to plant growth. This enzyme is not found in cells of humans or animals. Glyphosate has a proven track record of more than 40 years of safe use when used according to label directions. This is confirmed by science-based evaluations conducted by regulatory bodies and other institutions such as the European Food Safety Authority (EFSA), the U.S. Environmental Protection Agency and the Canadian Pest Management Regulatory Agency (PMRA).

Combining glyphosate with crops that could withstand applications of this herbicide transformed agriculture. Farmers who cultivate glyphosate-tolerant crops tend to adopt conservation tillage, which brings its own benefits in terms of reduced soil erosion, improved water quality and lower carbon dioxide (CO_2) emissions. In agricultural systems where glyphosate-tolerant crops are not available, glyphosate still provides benefits for farmers and the environment by simplifying weed management and reducing the need for mechanical tillage and enabling the adoption of cover crops. Outside of agriculture glyphosate delivers benefits for noxious or invasive weed control.

With these benefits in mind, it is also important to note that reliance on a single herbicidal site of action to control weeds can lead to resistant weed biotypes. As has been the case in the past, natural selection of resistant weeds has meant that farmers and others needing to manage weeds have had to adapt and implement evolving weed management strategies.

Glyphosate’s favorable environmental safety profile underlies its ability to be used in many diverse settings. Glyphosate degrades in the environment and does not accumulate in the food chain. It is not volatile and will bind to soil after application rather than run off into waterways. Detailed reviews by the EFSA, EPA, PMRA and other regulatory authorities have concluded that approved uses of glyphosate-based herbicides are unlikely to cause adverse effects on the environment.

Bayer scientists regularly review the scientific literature relevant to glyphosate and glyphosate-based herbicides and are aware of the range of claims made in connection with these products. Regulatory agencies responsible for overseeing these products to protect human health and the environment are also aware of these studies and consider them when preparing their reviews.

With regard to risks associated with glyphosate we refer to A 3.2 Opportunity and Risk Report. See also Note [30] to B Consolidated Financial Statements (Legal Risks) for information on current court cases.

Biotechnology

Bayer applies biotechnological processes both in the area of seeds and in pharmaceutical product development and production, such as for Kogenate™, Kovaltry™ and Jivi™. Further biotechnologically manufactured active ingredients are undergoing clinical development. In plant cultivation, we use conventional breeding methods and genetic engineering.

For us, safety for people and the environment is always a top priority in the use of biotechnology. In addition to meeting legal and regulatory requirements, we have specified the responsible use of genetic engineering and strict, globally applicable safety measures in handling biological substances in corresponding corporate policies.

The development and commercialization of genetically improved seeds is also subject to stringent laws and regulations. We have additionally established internal processes to ensure the responsible use of biotechnologically manufactured products throughout their life cycle. Furthermore, in 2019, Crop Science maintained its membership in the Excellence Through Stewardship (ETS) organization.

Active ingredient residues in the environment

Small volumes of pharmaceutical and crop protection active ingredients can enter the environment during production and use and through improper disposal. Surface waters are particularly relevant here. All divisions carry out their own ecotoxicological investigations on their active ingredients to assess the potential environmental impact of these products. Building on this, extensive environmental risk assessments are performed on all crop protection active ingredients in connection with the official approval process and, if necessary, risk mitigation measures are specified. All new active ingredients for human pharmaceuticals in Europe and the United States are subject to an environmental risk assessment.

Compliance with the relevant wastewater thresholds at our production sites worldwide is reviewed by supervisory authorities and external assessors and also at regular intervals through on-site audits by internal experts. To further reduce the release of active ingredients into the environment, we take additional action in our production facilities. We are also participating in various research projects to develop reduction measures.

www.i-pie.org

www.dialog-spurenstoffstrategie.de

1.7 Environmental Protection and Safety

We are working on ways to further reduce the environmental impact of our business activities and develop solutions that reduce the burden on the environment. Responsibility for this lies with the Corporate Health, Safety & Environment (HSE) enabling function, which stipulates framework conditions in the form of corporate policies and other measures. We use HSE management systems to control operational implementation in the divisions.

Energy consumption

Compared with 2018, Bayer's total energy consumption rose by 34.0% to 38.7 petajoules in 2019 (2018: 28.9 petajoules). This includes both primary energy consumption, which mainly relates to fossil fuels, and secondary energy consumption. In connection with the agriculture business acquisition, Bayer has taken over sites for seed production and also, among others, for the extraction of raw materials for the manufacture of intermediates for crop protection products, which involves energy-intensive treatment and downstream processing. The full-year integration of these process steps into the value chain increases the values for the performance indicators for energy consumption.

Energy efficiency reported as the ratio of energy consumed to external sales deteriorated from 218.51 kWh/€ thousand to 247.15 kWh/€ thousand in 2019.

Greenhouse gas emissions

We consider climate protection and the related reduction of greenhouse gas emissions to be a top priority. We have therefore set ourselves ambitious targets in this area that are explained in more detail in Chapter 1.2.1 Strategy and Targets.

www.bayer.com/CDP-Climate

We also aim to reduce emissions from our up- and downstream value chain between 2020 and 2030 in absolute terms and are currently examining available levers.

The following table provides an overview of the development in 2019:

A 1.7/1

Greenhouse Gas Emissions

Million metric tons of CO_2 equivalents	2018	2019
Direct emissions[1]	1.50	2.03
Indirect emissions[2] according to the market-based method	1.38	1.68
Total greenhouse gas emissions according to the market-based method	**2.88**	**3.71**

2018 figures restated

[1] Direct emissions result from our own power plants, vehicles, waste incineration plants and production facilities (Scope 1). In line with the GHG Protocol, we also report the direct emissions that arise through the generation of energy for other companies and are sold as a site service. Consequently, the figures for direct emissions of the Bayer Group are higher than the actual emissions resulting from Bayer's business activities alone. In 2019, 97.2% of direct greenhouse gas emissions were CO_2 emissions. Other greenhouse gases such as nitrous oxide, partially fluorinated hydrocarbons and methane made a negligible contribution to direct greenhouse gas emissions.

[2] Indirect emissions result from the procurement of electricity, steam and cooling energy (Scope 2). We report these in CO_2 equivalents.

The increase in greenhouse gas emissions is due to the first full-year inclusion of the sites of the acquired agriculture business. In 2018, these were only included on a pro rata basis for the period following the acquisition in June 2018.

Water

We use water resources as sparingly as possible and are endeavoring to further reduce emissions into water. We check whether our sites in water-scarce areas or areas identified as being threatened by water scarcity have introduced a water management system and take the appropriate action if necessary.

In 2019, total water use was 59 million cubic meters (2018: 42 million cubic meters). This year-on-year increase in use is due to the first full-year inclusion of the sites of the acquired agriculture business. Some 36.3% of all water used by Bayer is cooling water that is only heated in this process and does not come into contact with products. It can be returned to the water cycle, in line with the relevant official permits.

www.bayer.com/CDP-Water

At our production facilities, we endeavor to use water several times and to recycle it. The total quantity of industrial and mixed wastewater was 26 million cubic meters in 2019 (2018: 18 million cubic meters), which is 42.1% more than in 2018. This increase in use is due especially to the full-year inclusion of the sites of the acquired agriculture business. All wastewater is subject to exact controls before it is discharged into the various disposal channels. In 2019, 81.9% of Bayer's industrial and mixed wastewater worldwide was purified in wastewater treatment plants (Bayer or third-party facilities). The remaining volume was categorized as environmentally safe according to official provisions and returned to the natural water cycle.

Waste and recycling

We want to minimize material consumption and disposal volumes through systematic waste management. In accordance with Bayer's corporate policies, all production sites are obliged to prevent, recycle and reduce waste and to dispose of it safely and in line with good environmental practices. The total quantity of waste generated rose by 54.7% – from 568,000 to 879,000 metric tons – in 2019. This increase is due to the full-year inclusion of the sites of the acquired agriculture business and the demolition of a building and further construction work at the Bergkamen site in Germany. The volume of hazardous waste rose by 4.4% to 316,000 metric tons (2018: 303,000 metric tons). The volume of hazardous waste from production rose slightly by 0.4% from 282,000 to 283,000 metric tons because of increased production at the Muttenz site in Switzerland.

Process and plant safety

We aim to design and operate our processes and production facilities in such a way that they do not pose any inappropriate risks to employees, the environment or neighboring communities. We are working to further develop our safety culture, the expertise of employees and our globally applicable corporate policies on process and plant safety. Compliance with internal and external safety regulations is verified in internal audits.

To prevent substance and energy releases, the causes of PSIs (Process Safety Incidents) are analyzed and relevant findings communicated throughout the Bayer Group. A globally standardized key performance indicator (KPI) – Process Safety Incident Rate (PSI-R)[17] – is used at Bayer as an early indicator and is integrated into Group-wide safety reporting. The Process Safety Incident Rate indicates the number of PSI incidents per 200,000 hours worked. In 2019, the PSI-R was 0.10.

www.bayer.com/en/safety.aspx

Intensive analyses, site visits and expert-level discussions have shown that the plant safety approaches pursued at Bayer and in the acquired agriculture business are comparable. Based on this analysis, an integration project was initiated to ensure in-depth harmonization of the systems in the years ahead.

Transportation safety

Transportation and warehouse safety is part of the HSE management and led by a network of experts and experienced users who cooperate across the Group. In addition to legal regulations, we have implemented supplementary standards and requirements that are defined in internal procedures. We thereby ensure that our materials are handled and transported in accordance with applicable regulations and their respective potential hazards. The acquired agriculture business continues to have its own regulations on and processes for transportation safety that will still apply until Bayer's transportation and storage safety requirements have been introduced in the course of 2020. The number of transport incidents pertains to both Bayer and the acquired business.

There were 28 transport incidents[18] in 2019 (2018: 10), primarily involving road transport accidents. Three of the transport incidents were also classed as environmental incidents[19].

Safe working conditions

Nothing is important enough to justify an accident. We consider safeguarding the occupational health of our employees, and of the employees of contractors on our company premises and under the supervision of Bayer, to be a top priority. In 2019, the RIR[20] rose from 0.40 to 0.46 cases per 200,000 hours worked, corresponding to 599 occupational injuries worldwide (2018: 487). Regrettably, one Bayer employee (2018: 2) lost his life in a work-related accident in 2019. We will not let up in our efforts to further reduce risks and risky behavior.

Our Behavioral Safety initiative promotes safety-conscious conduct through corresponding training programs. Around 13,000 employees have been trained at 143 sites worldwide since 2015. Behavioral improvements were achieved in areas in which the program has already been implemented, and the Recordable Incident Rate is therefore expected to decline across the Bayer Group in the medium term.

[17] In 2019, we changed over to the reporting criteria of the International Council of Chemical Associations (ICCA) and now report the discharge of chemical substances or utilities as Process Safety Incidents (PSI). Previously we reported according to the criteria of the European Chemical Association (CEFIC).

[18] Transport incidents include accidents that cause personal injury or significant damage to property, environmental impact resulting from the release of substances, or leakage of hazardous goods.

[19] Factors that determine whether there is a reporting obligation include, in particular, the nature and quantity of the substance that was leaked or released into the environment, the amount of damage caused and any consequences for nearby residents. In accordance with our internal voluntary commitment, we report any leakage of substances with a high hazard potential from a quantity of 100 kilograms upward.

[20] The RIR covers all injuries to employees leading to medical treatment that goes beyond simple first aid.

2. Report on Economic Position

2.1 Overview of Business Performance

2.1.1 Economic Position and Target Attainment

Our business expanded in 2019. Sales increased by 3.5% on a currency- and portfolio-adjusted basis (Fx & portfolio adj.). EBITDA before special items rose by 28.3%, despite negative currency effects. Crop Science posted an increase in sales (Fx & portfolio adj.), while EBITDA before special items rose significantly, mainly due to the contribution from the acquired business. Pharmaceuticals posted strong growth in sales and earnings, with gains in China and the ongoing positive development of our products Xarelto™ and Eylea™ playing an especially important part. Consumer Health also expanded business on a currency- and portfolio-adjusted basis, while EBITDA before special items of this division came in at the prior-year level. Earnings per share (total) more than doubled, reflecting not just the rise in earnings from operations, but also the proceeds from the divestment of our stake in Currenta (€1.6 billion) and other factors. Core earnings per share from continuing operations rose by 14.3%, due particularly to the earnings contribution from the acquired agriculture business and the positive business performance at Pharmaceuticals.

In the Group outlook published in February 2019 in our Annual Report 2018, we anticipated currency- and portfolio-adjusted sales of €46 billion, EBITDA before special items of approximately €12.2 billion and core earnings per share of around €6.80. This original forecast was issued on the basis of all businesses being continuing operations since the timing of the envisioned portfolio measures (in particular the sale of Animal Health and Currenta) was not yet sufficiently certain. As the conditions for presenting Animal Health and Currenta as discontinued operations had been fulfilled during the year, we adjusted our forecast in October for the entire fiscal year to include continuing operations only. We also adjusted the forecast to reflect prevailing exchange rates. We largely met this full-year forecast in terms of the Group's operational management indicators:

A 2.1.1/1

Target Attainment 2019

	Forecast 2019[1]	Target Attainment	Forecast 2019[1]	Target Attainment
	Nominal	Nominal	Currency-adjusted	Currency-adjusted
Group sales	~ €43.5 billion	€43.5 billion	~ €43 billion	€43.0 billion
			~4% increase (Fx & p adj.)	3.5% increase (Fx & p adj.)
EBITDA before special items	~ €11.5 billion	€11.5 billion	~ €11.6 billion	€11.5 billion
Core earnings per share	~ €6.35	€6.40	~ €6.45	€6.47

Fx & p adj. = currency- and portfolio-adjusted
[1] Issued in October 2019; based on original forecast for 2019 excluding discontinued operations (Animal Health & Currenta); nominal forecast based on closing rates on Sept. 30, 2019

2.1.2 Key Events

We made further progress in implementing our strategic objectives in 2019, comprising the following portfolio measures:

// In July, the sale of Consumer Health's global prescription dermatology business outside the United States to LEO Pharma A/S, Ballerup, Denmark, was completed following the transfer of the U.S. business in September 2018. The purchase price for the remaining business was approximately €0.6 billion and the divestment gain €0.3 billion.
// In August, we completed the sale of the Coppertone™ brand to Beiersdorf AG for a preliminary purchase price of approximately US$0.6 billion. The transaction includes the global product rights to Coppertone™, the transfer of the approximately 450 employees in the United States, Canada and China, and the production facility in Cleveland, Ohio, United States. An agreement concerning this divestment had been concluded in May 2019.
// Also in August, Bayer entered into an agreement to sell its Animal Health business unit to Elanco Animal Health Incorporated, Greenfield, Indiana, United States, for a purchase price of US$7.6 billion that is subject to customary purchase price adjustments. The transaction volume comprises US$5.3 billion in cash and US$2.3 billion in Elanco stock based on the unaffected 30-day volume-weighted average price as of August 6, 2019. The number of shares constituting the equity consideration is fixed within a 7.5% collar.[21] The divestment is expected to be concluded in mid-2020 subject to the satisfaction of customary closing conditions, including antitrust clearance.
// In September, we completed the acquisition of BlueRock Therapeutics L.P., Cambridge, Massachusetts, United States, which had previously been a joint venture. BlueRock Therapeutics focuses on the development of cell therapies in the fields of neurology, cardiology and immunology using a proprietary induced pluripotent stem cell platform. Under the agreement, we made an upfront payment of approximately US$0.2 billion, while further payments of up to US$0.4 billion will be due upon achievement of pre-defined milestones.
// In November, we completed the sale of the Dr. Scholl's™ business to Yellow Wood Partners, Boston, United States, for a purchase price of approximately US$0.6 billion. Bayer had entered into an agreement in July 2019 regarding the sale of the rights to the Dr. Scholl's™ brand in North and South America and the transfer of around 30 employees in the United States.
// Also in November, we completed the sale of our 60% stake in the Chempark operator Currenta to InfraChem Holdings S.à r.l., Luxembourg, a subsidiary of Macquarie Infrastructure and Real Assets (Europe) Limited, for a preliminary purchase price of €1.1 billion. We had concluded an agreement in August 2019 concerning the sale of our stake together with the other former shareholder, Lanxess. Bayer is also selling an extensive portfolio of real estate and infrastructure to the Currenta Group for approximately €0.2 billion. The transaction included, among other things, the transfer of pension provisions amounting to €1.6 billion. The provisional divestment gain amounts to roughly €1.6 billion.

Further key developments:

In June, we announced we would set ourselves higher standards for transparency, sustainability and communication with all stakeholder groups in line with our increased responsibility as a leading agriculture company. In December, furthermore, we presented our ambitious sustainability goals for the Bayer Group for 2020 and beyond. To ensure that we meet the expectations society has of our company and to create value for all of our stakeholders, we have drafted the Bayer Societal Engagement (BASE) principles, which form the basis for all of Bayer's activities.

See also A 1.2 and A 1.3

[21] This means that the number of Elanco shares that Bayer receives increases (decreases) in the event of share price decreases (increases) within this 7.5% corridor. Based on the closing price of Elanco shares on December 31, 2019, Bayer would receive approximately 73 million Elanco shares.

In the first half of 2019, two cases related to the glyphosate litigations that went to trial before a federal court and a state court in California resulted in jury verdicts in favor of the plaintiffs. Our post-trial motions subsequently filed with the trial courts only resulted in a reduction of the damages and punitive damages awards, respectively. We filed appeals in both cases. A number of trials that were originally scheduled to begin in 2019 and early 2020 have been continued. This continuance is intended to provide room for the parties to continue the court-ordered mediation process in good faith and explore whether a settlement can be reached on reasonable terms that includes a process to bring reasonable resolution to the overall litigation.

See also Note [30] Legal Risks

In June, the Supervisory Board of Bayer AG decided on a package of measures in connection with the glyphosate litigations. Among them are the establishment of a new Supervisory Board committee to monitor the current litigations including trial and mediation activities. In addition, U.S. lawyer and product liability litigation expert John H. Beisner has been retained to advise the Supervisory Board on matters related to the glyphosate litigations on an ongoing basis.

In September, the Supervisory Board of Bayer AG reached a decision to reduce the size of the company's Board of Management from seven to five members effective January 1, 2020. In this connection, Dr. Hartmut Klusik and Kemal Malik left the company as of December 31, 2019. The respective responsibilities have been reallocated among the members of the Board of Management.

2.1.3 Economic Environment

Global economic growth slower than in the previous year

See also A 2.2.2

The pace of global economic growth in 2019 was slower than in the previous year, with all of our defined regions affected by this trend. Economic growth was impacted particularly by trade conflicts and higher tariffs, especially in the United States and China. In the European Union, growth was held back especially by the uncertainty related to Brexit. Germany in particular showed a considerably reduced pace of growth. Among the factors diminishing growth in addition to the aforementioned trade conflicts were the political uncertainties in the emerging markets, particularly a number of Latin American countries. By contrast, a positive overall effect came from ongoing robust consumption, which was buoyed by low inflation and interest rates.

A 2.1.3/1

Economic Environment

	Growth[1] 2018	Growth[1] 2019
World	+3.2%	+2.6%
European Union	+2.0%	+1.4%
of which Germany	+1.5%	+0.5%
United States	+2.9%	+2.3%
Emerging Markets[2]	+4.8%	+4.1%

[1] Real GDP growth, source: IHS Markit
[2] Including about 50 countries defined by Global Insight as Emerging Markets in line with the World Bank
As of January 2020

Currency development

Positive currency effects increased sales at the Bayer Group by €548 million (1.5%) in 2019, while negative currency effects diminished EBITDA before special items by €43 million. The currency effects from the acquired agriculture business are included from June 7 until December 31. The effects pertained to the currencies shown in the following table.

A 2.1.3/2

Currency Development Bayer Group

	Average end-of-day exchange rate against the euro for the year		€ million		
	2018	2019	Delta FX effect on sales	Delta FX effect on clean EBITDA	Of which delta FX effect from hedging
AUD	1.58	1.61	(12)	(13)	(1)
BRL	4.29	4.41	(37)	(28)	(16)
CAD	1.53	1.49	34	(25)	(23)
CNY	7.80	7.74	26	(2)	(31)
JPY	130.38	122.01	145	28	(28)
MXN	22.69	21.55	37	–	(16)
RUB	73.87	72.44	14	(19)	(18)
TRY	5.56	6.35	(51)	(41)	–
USD	1.18	1.12	440	44	(42)
Other currency areas			(48)	13	(16)
All currencies			**548**	**(43)**	**(191)**

Source: Bloomberg, annual average closing rates

2.2 Earnings; Asset and Financial Position of the Bayer Group

2.2.1 Earnings Performance of the Bayer Group

Business Development of the Bayer Group

A 2.2.1/1

Bayer Group Key Data

€ million	Q4 2018	Q4 2019	Change %[1] Reported	Change %[1] Fx & p adj.	2018	2019	Change %[1] Reported	Change %[1] Fx & p adj.
Sales	**10,355**	**10,750**	**+ 3.8**	**+ 3.4**	**36,742**	**43,545**	**+ 18.5**	**+ 3.5**
Change in sales[1]								
Volume	+ 5.4%	+ 2.3%			+ 4.5%	+ 2.6%		
Price	– 0.1%	+ 1.1%			– 1.0%	+ 0.9%		
Currency	– 0.3%	+ 1.3%			– 4.3%	+ 1.5%		
Portfolio	+ 25.0%	– 0.9%			+ 13.7%	+ 13.5%		
Sales by region								
Europe / Middle East / Africa	2,830	2,971	+ 5.0	+ 5.1	12,392	13,185	+ 6.4	+ 2.4
North America	3,260	3,392	+ 4.0	+ 2.4	10,942	15,087	+ 37.9	– 0.8
Asia / Pacific	2,005	2,151	+ 7.3	+ 4.5	7,796	8,610	+ 10.4	+ 7.4
Latin America	2,260	2,236	– 1.1	+ 1.8	5,612	6,663	+ 18.7	+ 9.0
EBITDA[1]	**(53)**	**2,002**	**.**		**9,695**	**9,554**	**– 1.5**	
Special items[1]	(2,017)	(481)			726	(1,949)		
EBITDA before special items[1]	**1,964**	**2,483**	**+ 26.4**		**8,969**	**11,503**	**+ 28.3**	
EBITDA margin before special items[1]	19.0%	23.1%			24.4%	26.4%		
EBIT[1]	**(4,206)**	**396**	**.**		**3,454**	**4,189**	**+ 21.3**	
Special items[1]	(5,249)	(923)			(2,559)	(2,818)		
EBIT before special items[1]	**1,043**	**1,319**	**+ 26.5**		**6,013**	**7,007**	**+ 16.5**	
Earnings per share (total) (€)	**(4.00)**	**1.44**	**.**		**1.80**	**4.17**	**+ 131.7**	
Core earnings per share from continuing operations (€)[1]	**1.05**	**1.29**	**+ 22.9**		**5.60**	**6.40**	**+ 14.3**	
Core earnings per share from continuing and discontinued operations (€)	1.10	1.37	+ 24.5		5.93	6.77	+ 14.2	
Free cash flow	**1,363**	**1,692**	**+ 24.1**		**4,652**	**4,214**	**– 9.4**	

2018 figures restated
Fx & p adj. = currency- and portfolio-adjusted
[1] For definition see A 2.3 "Alternative Performance Measures Used by the Bayer Group."

Group sales increased by 3.5% (Fx & portfolio adj.)

Sales at the Bayer Group rose by 3.5% (Fx & portfolio adj.) to €43,545 million (reported: +18.5%) in 2019, including €2,364 million in Germany.

Sales at Crop Science advanced by 1.4% (Fx & portfolio adj.) to €19,832 million. On a reported basis, sales climbed by 39.0%, mainly as a result of a portfolio effect of 36.3% (€5,177 million). Sales at Pharmaceuticals advanced by 5.6% (Fx & portfolio adj.) to €17,962 million. This development was mainly the result of continuing growth in China and the ongoing very positive performance of our products Xarelto™ and Eylea™. Consumer Health posted a 2.6% (Fx & portfolio adj.) increase in sales to €5,462 million; business expanded in the Latin America, Asia / Pacific and Europe / Middle East / Africa regions. In the Reconciliation, we increased sales by 2.7% to €289 million.

Earnings

EBITDA before special items at the Bayer Group advanced by 28.3% to €11,503 million (2018: €8,969 million). Negative currency effects diminished earnings by €43 million. At Crop Science, EBITDA before special items advanced by 80.9% to €4,796 million (2018: €2,651 million). The increase was mainly attributable to the earnings contribution from the acquired agriculture business and to the realization of cost synergies as we progress with its integration. EBITDA before special items at Pharmaceuticals advanced by 6.7% to €5,975 million (2018: €5,598 million), the main factors here being the positive sales development and a lower cost of goods sold against an elevated prior-year figure. EBITDA before special items at Consumer Health was level year on year (–0.5%) at €1,090 million (2018: €1,096 million). Positive effects from the efficiency program initiated at the end of 2018 and the currency- and portfolio-adjusted expansion of business among other factors were offset by the absence of the contribution from the divested prescription dermatology business. In the Reconciliation, EBITDA before special items improved by 4.8% to minus €358 million.

See also A 2.3

EBITDA in 2019 came in at €9,554 million (2018: €9,695 million). **Depreciation, amortization and impairment losses** amounted to €5,365 million (2018: €6,241 million), with intangible assets accounting for €2,887 million (2018: €4,441 million) and property, plant and equipment for €2,478 million (2018: €1,800 million). Impairment losses, net of impairment loss reversals, were €928 million (2018: €3,349 million). These included €247 million (2018: €2,673 million) in impairments on intangible assets, primarily at Consumer Health, where we recorded impairment losses of €429 million in connection with the divestment of the Dr. Scholl's™ brand and an impairment loss reversal of €211 million for the Claritin™ brand. Impairment losses on property, plant and equipment amounted to €680 million (2018: €676 million). At Crop Science, we recorded an impairment loss of €522 million for the dicamba production facility (Herbicides business) in Luling, Louisiana, United States. Impairment losses of €866 million (2018: €3,282 million), net of impairment loss reversals, and accelerated depreciation of €1 million (2018: €3 million) were included in special items.

See also A 2.3

EBIT climbed by 21.3% to €4,189 million in 2019 (2018: €3,454 million) after net special charges of €2,818 million (2018: €2,559 million) The special charges were primarily related to the ongoing restructuring program, the acquisition and integration of Monsanto, the aforementioned impairments in connection with the dicamba production facility at Crop Science and the divestment of Dr. Scholl's™ at Consumer Health, and legal fees. Special gains were recorded particularly at Consumer Health, especially from the aforementioned divestment of the prescription dermatology business outside the United States and the impairment loss reversal for Claritin™. In addition, a compensation payment from a product liability insurance policy led to a special gain at Pharmaceuticals. **EBIT before special items** rose by 16.5% to €7,007 million (2018: €6,013 million).

In 2019, the following special effects were taken into account in calculating EBIT and EBITDA before special items.

A 2.2.1/2

Special Items by Category[1]

€ million	EBIT Q4 2018	EBIT Q4 2019	EBIT 2018	EBIT 2019	EBITDA Q4 2018	EBITDA Q4 2019	EBITDA 2018	EBITDA 2019
Total special items	**(5,249)**	**(923)**	**(2,559)**	**(2,818)**	**(2,017)**	**(481)**	**726**	**(1,949)**
Restructuring	(1,195)	(497)	(1,282)	(1,353)	(676)	(384)	(761)	(1,237)
of which in the Reconciliation	(138)	(319)	(171)	(1,088)	(137)	(318)	(170)	(1,085)
Acquisition / integration	(858)	(67)	(1,983)	(707)	(858)	(66)	(1,975)	(707)
of which in the Reconciliation	(19)	(4)	(51)	(19)	(19)	(3)	(51)	(19)
Divestments	158	39	4,127	299	158	38	4,127	299
Litigations / legal risks	(604)	(13)	(613)	(245)	(604)	(13)	(613)	(245)
of which in the Reconciliation	(38)	(37)	(41)	(77)	(38)	(37)	(41)	(77)
Impairment losses / loss reversals[2]	(2,745)	(329)	(2,788)	(756)	(32)	–	(32)	(3)
Other	(5)	(56)	(20)	(56)	(5)	(56)	(20)	(56)
of which in the Reconciliation	–	(56)	1	(56)	–	(56)	1	(56)

2018 figures restated
[1] For definition see A 2.3 "Alternative Performance Measures Used by the Bayer Group."
[2] Other than those already included in the other special items categories

Core earnings per share

Earnings per share (total) more than doubled to €4.17 in 2019 (2018: €1.80). The proceeds of approximately €1.6 billion from the divestment of our interest in the Currenta Group had a positive effect. Furthermore, earnings in the previous year were diminished by impairment losses recognized on goodwill and on intangible assets at Consumer Health and on property, plant and equipment at Pharmaceuticals. Core earnings per share from continuing operations advanced by 14.3% to €6.40 (2018: €5.60). This development was driven by the earnings contribution from the acquired agriculture business, which was included for the full year for the first time, and by the positive business performance at Pharmaceuticals. By contrast, earnings were diminished by factors such as an acquisition-related increase in financing costs and a dilutive effect from equity measures undertaken in 2018.

See also A 2.2.4

A 2.2.1/3

Core Earnings per Share[1]

€ million	Q4 2018	Q4 2019	2018	2019
EBIT (as per income statements)	**(4,206)**	**396**	**3,454**	**4,189**
Amortization and impairment losses / loss reversals on goodwill and other intangible assets	3,191	486	4,442	2,889
Impairment losses / loss reversals on property, plant and equipment, and accelerated depreciation included in special items	660	674	678	682
Special items (other than accelerated depreciation, amortization and impairment losses / loss reversals)	2,017	481	(726)	1,949
Core EBIT	**1,662**	**2,037**	**7,848**	**9,709**
Financial result (as per income statements)	(720)	(378)	(1,568)	(1,309)
Special items in the financial result	296	10	355	(268)
Income taxes (as per income statements)	964	(45)	(496)	(450)
Special items in income taxes	91	67	175	67
Tax effects related to amortization, impairment losses / loss reversals and special items	(1,259)	(410)	(1,028)	(1,441)
Income after income taxes attributable to noncontrolling interest (as per income statements)	(2)	(11)	(16)	(19)
Above-mentioned adjustments attributable to noncontrolling interest	(1)	(1)	(1)	(4)
Core net income from continuing operations	**1,031**	**1,269**	**5,269**	**6,285**
Shares (million)				
Weighted average number of shares[2]	980.15	982.43	940.76	981.69
€				
Core earnings per share from continuing operations	**1.05**	**1.29**	**5.60**	**6.40**

2018 figures restated
[1] For definition see A 2.3 "Alternative Performance Measures Used by the Bayer Group."
[2] The weighted average number of shares (basic and diluted) was restated pursuant to IAS 33 for all periods prior to June 2018 to reflect the effect of the bonus component of the subscription rights issued as part of the June 2018 capital increase, because the subscription price of the new shares was below the market price of the existing shares.

Core earnings per share from continuing and discontinued operations were €6.77. The depreciation, amortization and impairments halted in connection with discontinued operations according to IFRS 5 are recognized as special charges (see table below).

A 2.2.1/4

Core Earnings per Share From Continuing and Discontinued Operations[1]

€ million	2019
EBIT[2]	**6,224**
Amortization and impairment losses/loss reversals on goodwill and other intangible assets	2,897
Impairment losses/loss reversals on property, plant and equipment, and accelerated depreciation included in special items	683
Special items (other than accelerated depreciation, amortization and impairment losses/loss reversals)	407
Core EBIT	**10,211**
Financial result[2]	(1,357)
Special items in the financial result	(276)
Income taxes[2]	(756)
Special items in income taxes	87
Tax effects related to amortization, impairment losses/loss reversals and special items	(1,242)
Income after income taxes attributable to noncontrolling interest[2]	(19)
Above-mentioned adjustments attributable to noncontrolling interest	(4)
Core net income from continuing operations	**6,644**
Shares (million)	
Weighted average number of shares	981.69
€	
Core earnings per share from continuing and discontinued operations	**6.77**

[1] Contrary to the definition in A 2.3 "Alternative Performance Measures Used by the Bayer Group"
[2] Figures include continuing and discontinued operations

Bayer Group – Other Earnings Parameters

A 2.2.1/5

Bayer Group Summary Income Statements

€ million	Q4 2018	Q4 2019	Change %	2018	2019	Change %
Net sales	10,355	10,750	+3.8	36,742	43,545	+18.5
Cost of goods sold	(5,644)	(4,875)	−13.6	(15,381)	(17,467)	+13.6
Selling expenses	(4,185)	(3,004)	−28.2	(12,210)	(12,274)	+0.5
Research and development expenses	(1,698)	(1,408)	−17.1	(5,105)	(5,342)	+4.6
General administration expenses	(845)	(1,050)	+24.3	(2,657)	(3,890)	+46.4
Other operating income (+) and expenses (–)	(2,189)	(17)	−99.2	2,065	(383)	.
EBIT[1]	**(4,206)**	**396**	**.**	**3,454**	**4,189**	**+21.3**
Financial result	**(720)**	**(378)**	**+47.5**	**(1,568)**	**(1,309)**	**+16.5**
Income before income taxes	**(4,926)**	**18**	**.**	**1,886**	**2,880**	**+52.7**
Income taxes	964	(45)	.	(496)	(450)	−9.3
Income from continuing operations after taxes	(3,962)	(27)	+99.3	1,390	2,430	+74.8
Income from discontinued operations after taxes	40	1,452	.	321	1,680	.
Income after income taxes (total)	**(3,922)**	**1,425**	**.**	**1,711**	**4,110**	**+140.2**
of which attributable to noncontrolling interest	2	11	.	16	19	+18.8
of which attributable to Bayer AG stockholders (net income)	**(3,924)**	**1,414**	**.**	**1,695**	**4,091**	**+141.4**

2018 figures restated
[1] For definition see A 2.3 "Alternative Performance Measures Used by the Bayer Group."

Functional costs

The cost of goods sold increased by 13.6% to €17,467 million in 2019, due in particular to the full-year inclusion of the acquired agriculture business. The ratio of the cost of goods sold to total sales declined slightly to 40.1% (2018: 41.9%). Selling expenses amounted to €12,274 million (+0.5%), with an increase resulting from the acquisition of the agriculture business. In 2018, a rise in special charges in connection with impairment losses recognized on Consumer Health brands had a negative impact. Selling expenses accounted for 28.2% (2018: 33.2%) of sales. Research and development (R&D) expenses rose by 4.6% to €5,342 million. The ratio of R&D expenses to sales was 12.3% (2018: 13.9%). General administration expenses climbed by 46.4% to €3,890 million, due chiefly to the acquired agriculture business and one-time expenses related to the restructuring measures. The ratio of general administration expenses to total sales therefore increased to 8.9% (2018: 7.2%). The balance of other operating expenses and other operating income amounted to €383 million (2018: minus €2,065 million). Key factors here were the aforementioned special gains from the divestment of the prescription dermatology business outside the United States at Consumer Health and from the compensation payment in connection with a product liability insurance policy at Pharmaceuticals. On the other hand, earnings were diminished by impairment losses in the amount of €208 million attributable to the proportionate goodwill to be transferred in connection with the divestment of the Dr. Scholl's™ brand.

The special effects accounted for in EBIT and EBITDA before special items were attributable to the functional costs as shown in the following table.

A 2.2.1/6

Special Items by Functional Cost[1]

€ million	EBIT Q4 2018	EBIT Q4 2019	EBIT 2018	EBIT 2019	EBITDA Q4 2018	EBITDA Q4 2019	EBITDA 2018	EBITDA 2019
Total special items	(5,249)	(923)	(2,559)	(2,818)	(2,017)	(481)	726	(1,949)
Cost of goods sold	(1,610)	(683)	(2,312)	(1,190)	(959)	(23)	(1,651)	(531)
Selling expenses	(1,088)	174	(1,158)	(153)	(54)	(37)	(124)	(146)
Research and development expenses	(332)	(22)	(404)	(19)	(331)	(22)	(360)	(19)
General administration expenses	(222)	(412)	(630)	(1,299)	(222)	(412)	(630)	(1,296)
Other operating income/expenses	(1,997)	20	1,945	(157)	(451)	13	3,491	43

2018 figures restated

[1] For definition see A 2.3 "Alternative Performance Measures Used by the Bayer Group."

Financial result and income before income taxes

After a financial result of minus €1,309 million (2018: minus €1,568 million), income before income taxes was €2,880 million (2018: €1,886 million). Among other items, the financial result comprised income from investments in affiliated companies of €190 million (2018: loss of €87 million), net interest expense of €1,281 million (2018: €1,064 million), a net exchange gain of €58 million (2018: net exchange loss of €269 million), interest cost of €273 million (2018: €177 million) for pension and other provisions, and net other financial expenses of €3 million (2018: income of €29 million). The financial result included net special gains of €268 million (2018: net special charges of €355 million) that mainly resulted from the remeasurement of the shares of BlueRock Therapeutics L.P., Cambridge, Massachusetts, United States, which were previously accounted for using the equity method and are now fully consolidated.

Income tax expense
Income tax expense amounted to €450 million (2018: €496 million) after special charges of €67 million (2018: special charges of €175 million) from a change in tax rate.

Income after income taxes from discontinued operations
Income after income taxes from discontinued operations was €1,680 million (2018: €321 million) and included income of approximately €1,637 million from the divestment of our interest in the Currenta Group. The businesses of Currenta and Animal Health, which are recognized under discontinued operations, developed as follows in 2019.

Currenta posted sales of €1,171 million until its deconsolidation at the end of November. Full-year sales of that company in 2018 were €1,343 million. EBITDA before special items was €226 million (2018: €220 million).

Sales at Animal Health rose by 2.0% (Fx & portfolio adj.) to €1,571 million (2018: €1,501 million). This development was attributable to factors such as the positive development of business for Seresto™ (€293 million, Fx & portfolio adj. +6.1%), mainly in Europe. Sales of the Advantage™ product family declined by 3.4% (Fx & portfolio adj.) to €418 million, with price increases unable to offset a decrease in volumes, particularly in the United States. Overall, sales rose by 3.1% (Fx & portfolio adj.) to €420 million in Europe / Middle East / Africa, by 3.5% (Fx & portfolio adj.) to €337 million in Asia / Pacific and by 8.8% (Fx & portfolio adj.) to €158 million in Latin America. By contrast, sales were down by 1.1% (Fx & portfolio adj.) in North America to €656 million.

EBITDA before special items of Animal Health improved by 5.6% to €378 million (2018: €358 million), largely due to the sales growth resulting from price increases.

Net income
After income tax expense, income from discontinued operations after taxes and noncontrolling interest, net income in 2019 came to €4,091 million (2018: €1,695 million).

2.2.2 Business Development by Division
Crop Science
Seed and crop protection market at prior-year level
The global seed and crop protection market remained stable in 2019 (0%; 2018: +2%). Growth momentum was strongest in the Latin America region, with an above-average increase in market volume in Brazil following the normalization of inventory levels for crop protection products and an expansion of soybean, corn, and cotton acreages. On the other hand, adverse weather conditions across key regions counteracted this development. Especially the market in North America was negatively impacted by flooding and heavy rains in the Midwestern United States as well as continued uncertainties driven by the ongoing trade disputes leading to a significant decline in soybean acreages.

A 2.2.2/1

Key Data – Crop Science

€ million	Q4 2018	Q4 2019	Change %[1] Reported	Change %[1] Fx & p adj.	2018	2019	Change %[1] Reported	Change %[1] Fx & p adj.
Sales	**4,661**	**4,652**	**−0.2**	**−0.9**	**14,266**	**19,832**	**+39.0**	**+1.4**
Change in sales[1]								
Volume	+14.2%	−1.7%			+5.9%	−0.3%		
Price	+1.2%	+0.8%			+0.2%	+1.7%		
Currency	+1.3%	+0.7%			−4.3%	+1.3%		
Portfolio	+89.3%	0.0%			+47.2%	+36.3%		
Sales by region								
Europe / Middle East / Africa	592	581	−1.9	−2.9	3,689	4,170	+13.0	−1.9
North America	1,703	1,761	+3.4	+0.5	4,696	8,743	+86.2	+0.1
Asia / Pacific	530	490	−7.5	−10.3	1,858	1,829	−1.6	−5.7
Latin America	1,836	1,820	−0.9	+1.2	4,023	5,090	+26.5	+9.4
EBITDA[1]	**(441)**	**797**	**.**		**4,500**	**3,895**	**−13.4**	
Special items[1]	(984)	(75)			1,849	(901)		
EBITDA before special items[1]	**543**	**872**	**+60.6**		**2,651**	**4,796**	**+80.9**	
EBITDA margin before special items[1]	11.6%	18.7%			18.6%	24.2%		
EBIT[1]	**(933)**	**(453)**	**+51.4**		**3,138**	**582**	**−81.5**	
Special items[1]	(984)	(596)			1,841	(1,423)		
EBIT before special items[1]	**51**	**143**	**+180.4**		**1,297**	**2,005**	**+54.6**	
Net cash provided by operating activities	**1,549**	**2,669**	**+72.3**		**3,743**	**4,209**	**+12.4**	
Capital expenditures	403	484	+20.1		1,000	1,203	+20.3	
Research and development expenses	669	605	−9.6		1,950	2,344	+20.2	

Fx & p adj. = currency- and portfolio-adjusted
[1] For definition see A 2.3 "Alternative Performance Measures Used by the Bayer Group."

Sales up against prior year

Crop Science posted sales of €19,832 million in 2019. Sales grew by 39.0% on a reported basis, thanks mainly to a positive portfolio effect of 36.3% from the acquisition of Monsanto (€6,649 million) less the prorated contribution from the divested businesses in the prior year (€1,471 million). Sales were also impacted by positive currency effects of 1.3%. Adjusted for currency and portfolio effects, sales increased by 1.4%. This growth figure only takes account of the acquired business from June 7 until December 31, the impact of which is primarily visible in North and Latin America. By contrast, the pro-forma sales commentary later in this section includes the development of the combined business on a full-year basis.

A 2.2.2/2

Sales by Strategic Business Entity

€ million	Q4 2018	Q4 2019	Change %[1] Reported	Change %[1] Fx & p adj.	2018	2019	Change %[1] Reported	Change %[1] Fx & p adj.
Crop Science	**4,661**	**4,652**	**−0.2**	**−0.9**	**14,266**	**19,832**	**+39.0**	**+1.4**
Herbicides	1,172	1,203	+2.6	+1.0	4,171	5,097	+22.2	+1.8
Corn Seed & Traits	1,036	1,100	+6.2	+4.0	1,808	5,164	+185.6	+7.3
Soybean Seed & Traits	602	587	−2.5	−1.7	1,200	2,119	+76.6	−1.4
Fungicides	757	788	+4.1	+5.8	2,647	2,718	+2.7	+2.5
Insecticides	364	380	+4.4	+4.5	1,345	1,448	+7.7	+6.6
Environmental Science	229	235	+2.6	+0.6	732	994	+35.8	+2.8
Vegetable Seeds	91	157	+72.5	+70.3	629	689	+9.5	+6.6
Other	410	202	−50.7	−51.5	1,734	1,603	−7.6	−11.9

Fx & p adj. = currency- and portfolio-adjusted
[1] For definition see A 2.3 "Alternative Performance Measures Used by the Bayer Group."

Sales by region

- // Sales in the **Europe/Middle East/Africa** region improved by 13.4% (Fx adj.) to €4,170 million. The portfolio effect amounted to €568 million. Adjusted for currency and portfolio effects, business declined by 1.9%. This was largely due to the loss of registrations in the SeedGrowth business (Other) in northern and central Europe. We also saw a decline in sales at Fungicides due to drought but achieved sales gains at Insecticides and Vegetable Seeds.
- // In the **North America** region, we posted an 83.0% (Fx adj.) increase in sales to €8,743 million. The portfolio effect amounted to €3,896 million. After adjusting for currency and portfolio effects, sales were level year on year (+0.1%). There was an increase in sales at Corn Seed & Traits, where we registered higher volumes despite the aforementioned extreme weather conditions in the Midwestern United States in the first half of the year. Business at Soybean Seed & Traits was also impacted by extreme weather conditions, which, together with uncertainties driven by trade conflicts, resulted in a decline in sales.
- // Sales in the **Asia/Pacific** region decreased by 3.7% (Fx adj.) to €1,829 million, with the portfolio effect amounting to €36 million. On a currency- and portfolio-adjusted basis, sales fell by 5.7%. There was a significant decline in our cotton seed business (Other) and at Herbicides in Australia due to extreme drought.
- // Sales in **Latin America** advanced by 26.2% (Fx adj.) to €5,090 million. The portfolio effect was €677 million. After adjusting for currency and portfolio effects, business expanded by 9.4%. The very positive overall sales development was mainly attributable to price and volume increases in Brazil at Fungicides, where business benefited particularly from the launch of Fox Xpro™. We also posted an increase in sales at Herbicides.

Earnings

EBITDA before special items at Crop Science advanced by 80.9% to €4,796 million in 2019. The increase was primarily attributable to the earnings contribution from the newly acquired business and to the realization of cost synergies as we progress with its integration. By contrast, earnings were diminished by the absence of the contribution from the businesses divested to BASF, an increase in the cost of goods sold, the extreme weather conditions in North America and Australia, and a negative currency effect of €24 million.

EBIT decreased by 81.5% to €582 million after net special charges of €1,423 million (2018: net special gains of €1,841 million) that mainly included a total of €688 million in connection with the acquisition and integration of Monsanto and the divestments to BASF, of which €483 million comprised prorated reversals of inventory step-ups. Further special charges comprised €522 million in impairment losses on the dicamba production facility in the Herbicides business and legal fees in connection with the glyphosate litigations. The special gains in the prior year mainly comprised a divestment gain from the sale of businesses to BASF.

A 2.2.2/3

Special Items[1] Crop Science

€ million	EBIT Q4 2018	EBIT Q4 2019	EBIT 2018	EBIT 2019	EBITDA Q4 2018	EBITDA Q4 2019	EBITDA 2018	EBITDA 2019
Restructuring	(27)	–	(35)	(1)	(27)	(1)	(35)	(1)
Acquisition/integration	(839)	(63)	(1,932)	(688)	(839)	(63)	(1,924)	(688)
Divestments	125	37	4,061	(21)	125	37	4,061	(21)
Litigations/legal risks	(243)	(48)	(249)	(191)	(243)	(48)	(249)	(191)
Impairment losses/loss reversals	–	(522)	–	(522)	–	–	–	–
Other	–	–	(4)	–	–	–	(4)	–
Total special items	**(984)**	**(596)**	**1,841**	**(1,423)**	**(984)**	**(75)**	**1,849**	**(901)**

[1] For definition see A 2.3 "Alternative Performance Measures Used by the Bayer Group."

Pro-forma sales by strategic business entity (unaudited)

Due to the scope of the acquired activities and the seasonality of the business, we are presenting sales by strategic business entity on a pro-forma basis in order to more transparently reflect the underlying operational business development for the combined business of Crop Science and Monsanto, among other reasons. In this context, sales are presented as if both the acquisition of

Monsanto and the associated divestments had already taken place as of January 1, 2018. Sales under the service agreements with BASF after the divestments closed are not included.

A 2.2.2/4

Pro-Forma Sales by Strategic Business Entity[1]

			Change %[2]				Change %[2]	
€ million	Q4 2018	Q4 2019	Reported	Fx adj.	2018	2019	Reported	Fx adj.
Crop Science	**4,511**	**4,568**	**+1.3**	**+1.0**	**19,332**	**19,585**	**+1.3**	**−1.4**
Herbicides	1,125	1,195	+6.2	+5.3	5,014	5,034	+0.4	−1.4
Corn Seed & Traits	1,036	1,100	+6.2	+4.0	4,871	5,164	+6.0	+1.5
Soybean Seed & Traits	651	587	−9.8	−8.6	2,378	2,119	−10.9	−14.5
Fungicides	753	788	+4.6	+6.0	2,643	2,718	+2.8	+2.5
Insecticides	366	380	+3.8	+4.3	1,346	1,448	+7.6	+6.6
Environmental Science	228	235	+3.1	+1.0	955	991	+3.8	−0.1
Vegetable Seeds	91	157	+72.5	+70.7	670	689	+2.8	+1.1
Other	261	126	−51.7	−49.3	1,455	1,422	−2.3	−6.0

Fx. adj. = currency-adjusted

[1] The unaudited pro-forma data is presented as if both the acquisition of Monsanto and the associated divestments had already taken place as of January 1, 2018. Sales of Monsanto are presented in periods as per the Bayer fiscal year. One-time effects of business operations, the accounting for discontinued operations and the recognition and measurement of sales from certain business transactions have been adjusted in line with our accounting. Due to this simplified procedure, they explicitly do not reflect sales according to IFRS or IDW RH HFA 1.004.

[2] For definition see A 2.3 “Alternative Performance Measures Used by the Bayer Group.”

Sales decreased by 1.4% (Fx adj.) in 2019 on a pro-forma basis.

- The decline at Herbicides was largely the result of lower volumes for Roundup™ in the North America region, where demand was mainly impacted by the aforementioned extreme weather conditions in the Midwestern United States in the first half of the year and drought in Canada. On the other hand, shifts in demand for selective herbicides from 2020 into 2019 had a positive impact on sales. Business also declined in Asia / Pacific, partly as a result of drought in Australia. Sales were level year on year in the Europe / Middle East / Africa region but rose substantially in Latin America due particularly to price and volume increases in Brazil.
- The improvement in sales at Corn Seed & Traits was partly attributable to growth in North America, where acreages increased slightly despite the aforementioned weather conditions in the United States. Volumes also expanded as a result of increased market share and shifts in demand from 2020 into 2019, which stood against negative product mix effects. In addition, we achieved double-digit-percentage growth rates in the Europe / Middle East / Africa region. By contrast, sales decreased in Latin America, where we had benefited from a special effect and the associated license revenues in Brazil in the previous year and the difficult economic situation in Venezuela led to lower volumes in 2019.
- The decline in sales at Soybean Seed & Traits was mainly attributable to North America, where business was impacted by lower acreages, strong competitive pressure, weather conditions and uncertainties driven by trade conflicts.
- The increase in sales at Fungicides was driven by the very positive development of business in Latin America, where we benefited in particular from the launch of Fox Xpro™ in Brazil. By contrast, we saw weather-related declines in the North America and Europe / Middle East / Africa regions.
- At Insecticides, sales increased as a result of higher prices and volumes, especially in Europe / Middle East / Africa, where increased pest pressure had a positive effect, and in Latin America.
- Sales at Environmental Science matched the prior-year level, with growth in our business with professional users standing against a decline in our consumer business.

// Sales at Vegetable Seeds were up slightly overall. As expected, shifts in demand from prior quarters led to a very strong fourth quarter, especially in Europe / Middle East / Africa.

// Sales of the strategic business entities subsumed under Other were down overall, mainly due to the decline at SeedGrowth as a result of the loss of registrations in northern and central Europe. As for our oilseed rape / canola seed business, development was held back by lower demand in Europe due to drought along with lower acreages in Canada, among other factors. Our cotton seed and traits business posted strong growth in North America, where a significant increase in market share more than offset a slight decline in acreages. Sales were down in Asia / Pacific, however, where extreme drought in Australia led to considerably lower acreages.

Pharmaceuticals

Pharmaceuticals market continues to grow

The pharmaceuticals market expanded by 6% in 2019 (2018: 5%), with strong momentum seen in the Americas and large parts of Asia. An aging population and improved access to medical care remained the main drivers, while innovative, often high-end products also contributed to market growth. By contrast, growth was again impacted by heightened price pressure from generics and reforms to national health care systems.

A 2.2.2/5

Key Data – Pharmaceuticals

			Change %[1]				Change %[1]	
€ million	Q4 2018	Q4 2019	Reported	Fx & p adj.	2018	2019	Reported	Fx & p adj.
Sales	**4,291**	**4,682**	**+ 9.1**	**+ 7.2**	**16,746**	**17,962**	**+ 7.3**	**+ 5.6**
Change in sales[1]								
Volume	+ 3.9%	+ 6.3%			+ 5.7%	+ 5.7%		
Price	– 1.3%	+ 0.9%			– 2.3%	– 0.1%		
Currency	– 0.7%	+ 1.9%			– 3.7%	+ 1.8%		
Portfolio	– 0.1%	0.0%			– 0.3%	– 0.1%		
Sales by region								
Europe / Middle East / Africa	1,699	1,847	+ 8.7	+ 7.6	6,590	6,918	+ 5.0	+ 4.8
North America	1,019	1,071	+ 5.1	+ 2.4	3,965	4,040	+ 1.9	– 2.3
Asia / Pacific	1,312	1,501	+ 14.4	+ 10.8	5,206	6,031	+ 15.8	+ 12.7
Latin America	261	263	+ 0.8	+ 4.3	985	973	– 1.2	+ 5.4
EBITDA[1]	**495**	**1,478**	**+ 198.6**		**4,797**	**5,951**	**+ 24.1**	
Special items[1]	(771)	42			(801)	(24)		
EBITDA before special items[1]	**1,266**	**1,436**	**+ 13.4**		**5,598**	**5,975**	**+ 6.7**	
EBITDA margin before special items[1]	29.5%	30.7%			33.4%	33.3%		
EBIT[1]	**(302)**	**1,085**	**.**		**3,213**	**4,762**	**+ 48.2**	
Special items[1]	(1,289)	(72)			(1,362)	(137)		
EBIT before special items[1]	**987**	**1,157**	**+ 17.2**		**4,575**	**4,899**	**+ 7.1**	
Net cash provided by operating activities	**1,587**	**1,040**	**– 34.5**		**4,376**	**4,523**	**+ 3.4**	
Capital expenditures	475	385	– 18.9		964	811	– 15.9	
Research and development expenses	956	736	– 23.0		2,893	2,752	– 4.9	

Fx & p adj. = currency- and portfolio-adjusted

[1] For definition see A 2.3 “Alternative Performance Measures Used by the Bayer Group.”

Encouraging increase in sales

Sales at Pharmaceuticals rose by 5.6% (Fx & portfolio adj.) to €17,962 million in 2019, driven by continued strong growth in China and the performance of Xarelto™ and Eylea™, which again delivered robust sales gains. In addition, the encouraging development of the radiology business had a positive impact.

A 2.2.2/6

Best-Selling Pharmaceuticals Products

€ million	Q4 2018	Q4 2019	Change %[1] Reported	Change %[1] Fx & p adj.	2018	2019	Change %[1] Reported	Change %[1] Fx & p adj.
Xarelto™	993	1,148	+15.6	+14.0	3,631	4,126	+13.6	+12.6
Eylea™	600	667	+11.2	+9.2	2,185	2,494	+14.1	+12.6
Mirena™ / Kyleena™ / Jaydess™	270	302	+11.9	+9.6	1,143	1,223	+7.0	+3.3
Kogenate™ / Kovaltry™ / Jivi™	216	222	+2.8	+0.5	855	882	+3.2	+0.4
Nexavar™	177	164	−7.3	−8.9	712	706	−0.8	−2.5
YAZ™ / Yasmin™ / Yasminelle™	161	172	+6.8	+3.8	639	681	+6.6	+5.3
Glucobay™	150	167	+11.3	+9.3	623	667	+7.1	+6.1
Adalat™	127	156	+22.8	+20.4	611	664	+8.7	+7.3
Aspirin™ Cardio	137	147	+7.3	+6.1	557	579	+3.9	+3.8
Betaferon™ / Betaseron™	139	125	−10.1	−11.8	544	457	−16.0	−18.0
Adempas™	96	111	+15.6	+14.2	356	418	+17.4	+14.4
Stivarga™	86	106	+23.3	+21.8	315	411	+30.5	+27.3
Gadavist™ / Gadovist™	87	104	+19.5	+17.0	366	400	+9.3	+7.6
Stellant™	92	94	+2.2	−0.5	342	371	+8.5	+4.4
Ultravist™	80	87	+8.7	+8.4	320	340	+6.3	+6.6
Total best-selling products	**3,411**	**3,772**	**+10.6**	**+8.7**	**13,199**	**14,419**	**+9.2**	**+7.5**
Proportion of Pharmaceuticals sales	79%	81%			79%	80%		

Fx & p adj. = currency- and portfolio-adjusted
[1] For definition see A 2.3 "Alternative Performance Measures Used by the Bayer Group."

Sales by product

// We again registered a strong increase in sales of our oral anticoagulant **Xarelto™**, largely as a result of expanded volumes in China, Russia and Europe. In the United States, where Xarelto™ is marketed by a subsidiary of Johnson & Johnson, license revenues – recognized as sales – edged higher year on year.

// We registered a marked increase in sales of our eye medicine **Eylea™**, which benefited from the market growth seen primarily in Europe / Middle East / Africa, especially the United Kingdom and Germany, and in Japan.

// Business with our cancer drug **Nexavar™** saw a slight decline due to lower volumes in the United States and Japan following ongoing competitive pressure. This was nearly offset by significantly higher volumes in China.

// Sales of our multiple sclerosis treatment **Betaferon™ / Betaseron™** continued to decline substantially, primarily as a result of strong competition in the United States.

// Business with our pulmonary hypertension treatment **Adempas™** increased significantly, largely due to the positive development in the United States. As in the past, sales reflected the proportionate recognition of the upfront and milestone payments resulting from the sGC collaboration with Merck & Co., United States.

// We posted significant sales gains for our cancer drug **Stivarga™** that were mainly attributable to expanded volumes in China. In addition, business developed positively in the United States and Russia.

Earnings

EBITDA before special items advanced by 6.7% to €5,975 million in 2019. The growth in earnings was driven by higher volumes and a decrease in the cost of goods sold against the elevated figure of the prior year. By contrast, earnings were diminished by an increase in selling expenses for product launches and new indications as well as a negative currency effect of approximately €32 million. In addition, earnings in the prior year included a positive one-time effect of approximately €190 million in connection with income from a development collaboration.

EBIT at Pharmaceuticals rose by a substantial 48.2% to €4,762 million. The year-on-year decline in special charges, from €1,362 million in 2018 to €137 million in 2019, had a positive impact. The special charges recorded in 2019 primarily comprised €157 million in expenses for restructuring that mainly comprised an impairment recognized on a facility under construction that has since been sold. However, earnings were augmented by a compensation payment under a product liability insurance policy.

A 2.2.2/7

Special Items[1] Pharmaceuticals

€ million	EBIT Q4 2018	EBIT Q4 2019	EBIT 2018	EBIT 2019	EBITDA Q4 2018	EBITDA Q4 2019	EBITDA 2018	EBITDA 2019
Restructuring	(971)	(144)	(991)	(157)	(453)	(30)	(473)	(44)
Litigations / legal risks	(323)	72	(323)	23	(323)	72	(323)	23
Impairment losses / loss reversals	(32)	–	(75)	(3)	(32)	–	(32)	(3)
Divestments	41	–	41	–	41	–	41	–
Other	(4)	–	(14)	–	(4)	–	(14)	–
Total special items	**(1,289)**	**(72)**	**(1,362)**	**(137)**	**(771)**	**42**	**(801)**	**(24)**

[1] For definition see A 2.3 “Alternative Performance Measures Used by the Bayer Group.”

Consumer Health

Stable market growth

Growth of the global consumer health market in 2019 was 4% (2018: 4%). Solid fundamentals of the growing, aging population and the self-care trend were supported by strong allergy, cough and cold seasons.

A 2.2.2/8

Key Data – Consumer Health

			Change %[1]				Change %[1]	
€ million	Q4 2018	Q4 2019	Reported	Fx & p adj.	2018	2019	Reported	Fx & p adj.
Sales	**1,331**	**1,337**	**+0.5**	**+6.2**	**5,450**	**5,462**	**+0.2**	**+2.6**
Changes in sales[1]								
Volume	−3.1%	+3.0%			−1.5%	+0.9%		
Price	+1.4%	+3.2%			+0.8%	+1.7%		
Currency	−1.5%	+1.4%			−5.7%	+1.2%		
Portfolio	−1.7%	−7.1%			−0.6%	−3.6%		
Sales by region								
Europe / Middle East / Africa	474	479	+1.1	+7.3	1,857	1,838	−1.0	+2.7
North America	534	547	+2.4	+6.6	2,263	2,280	+0.8	−0.3
Asia / Pacific	163	160	−1.8	+2.1	730	749	+2.6	+3.6
Latin America	160	151	−5.6	+5.4	600	595	−0.8	+11.9
EBITDA[1]	**211**	**251**	**+19.0**		**1,035**	**1,303**	**+25.9**	
Special items[1]	(68)	(34)			(61)	213		
EBITDA before special items[1]	**279**	**285**	**+2.2**		**1,096**	**1,090**	**−0.5**	
EBITDA margin before special items[1]	21.0%	21.3%			20.1%	20.0%		
EBIT[1]	**(2,607)**	**360**	**.**		**(2,077)**	**713**	**.**	
Special items[1]	(2,781)	161			(2,776)	(18)		
EBIT before special items[1]	**174**	**199**	**+14.4**		**699**	**731**	**+4.6**	
Net cash provided by operating activities	**196**	**236**	**+20.4**		**727**	**841**	**+15.7**	
Capital expenditures	78	59	−24.4		204	169	−17.2	
Research and development expenses	58	61	+5.2		226	230	+1.8	

Fx & p adj. = currency- and portfolio-adjusted
[1] For definition see A 2.3 “Alternative Performance Measures Used by the Bayer Group.”

Sales increase year on year

Sales at Consumer Health rose by 2.6% (Fx & portfolio adj.) to €5,462 million in 2019. In North America we gradually strengthened our performance during the year. We grew the business in all other regions, helped by an improved supply situation.

A 2.2.2/9

Sales by Category[1]

€ million	Q4 2018	Q4 2019	Change %[2] Reported	Change %[2] Fx & p adj.	2018	2019	Change %[2] Reported	Change %[2] Fx & p adj.
Consumer Health	**1,331**	**1,337**	**+0.5**	**+6.2**	5,450	5,462	+0.2	+2.6
Nutritionals	293	299	+2.0	+1.0	1,112	1,134	+2.0	+2.0
Allergy & Cold	264	298	+12.9	+9.8	1,061	1,155	+8.9	+5.0
Dermatology	250	279	+11.6	+9.9	1,053	1,104	+4.8	+3.8
Pain & Cardio	216	222	+2.8	+3.2	819	818	−0.1	+1.7
Digestive Health	181	196	+8.3	+6.6	703	721	+2.6	+0.3
Other[3]	127	43	−66.2	+7.6	702	530	−24.5	+1.3

Fx & p adj. = currency- and portfolio-adjusted

[1] In line with the internal financial management system implemented on January 1, 2019, the sales commentary for Consumer Health is now based primarily on regions and categories rather than products. These categories comprise Nutritionals (e.g. Elevit™, One A Day™), Allergy & Cold (e.g. Claritin™, Alka-Seltzer™ Plus, Aspirin™ Cold), Dermatology (e.g. Bepanthen™, Canesten™), Pain & Cardio (e.g. Aleve™, Aspirin™) and Digestive Health (e.g. MiraLAX™, Alka-Seltzer™).

[2] For definition see A 2.3 “Alternative Performance Measures Used by the Bayer Group.”

[3] The divested sun care, global prescription dermatology, U.S. prescription dermatology and foot care businesses are included until their respective transfer dates (August 30, 2019, July 1, 2019, September 4, 2018, and November 1, 2019).

Sales by region and category

// We are back on course for growth in **Europe / Middle East / Africa**, with sales in 2019 up 2.7% (Fx & portfolio adj.) to €1,838 million. This was largely due to growth in the Dermatology and Nutritionals categories, with the latter buoyed by a product line extension of our vitamin product Supradyn™.

// Sales in **North America** remained level year on year at €2,280 million (Fx & portfolio adj. −0.3%). We saw encouraging business expansion particularly in the Allergy & Cold category thanks to higher volumes for our antihistamine Claritin, which, in turn, benefited from a product line extension. By contrast, business was down primarily in the Pain & Cardio category, partly due to lower demand for Aspirin™.

// Sales in the **Asia / Pacific** region advanced by 3.6% (Fx & portfolio adj.) to €749 million. We registered solid growth across all categories, with very encouraging business development in Southeast Asia.

// Sales in **Latin America** rose by 11.9% (Fx & portfolio adj.) to €595 million. We recorded strong growth in the Pain & Cardio, Digestive Health and Nutritionals categories, partly as a result of inflation-related price increases in Argentina.

Earnings

EBITDA before special items came in at €1,090 million in 2019, matching the level of the prior year (–0.5%). Positive contributions to earnings came primarily from the efficiency program initiated at the end of 2018, which led to a significant decrease in selling expenses, and from the expansion of business on a currency- and portfolio-adjusted basis. There was also a positive currency effect of €16 million. By contrast, earnings were primarily held back by the absence of the contribution from the divested prescription dermatology business. A negative change in the balance of other operating income and expenses, in part due to lower one-time gains from the sale of noncore brands, also had a negative impact on earnings.

EBIT at Consumer Health amounted to €713 million (2018: minus €2,077 million) after net special charges of €18 million (2018: €2,776 million). Special charges mainly resulted from impairment losses of €429 million in connection with the divestment of the Dr. Scholl’s™ brand, of which €208 million pertained to goodwill, and from the aforementioned efficiency program. On the other hand, special gains arose from the divestment of the prescription dermatology business outside the United States and from a €211 million reversal of an impairment loss on our Claritin™ brand. The special charges in the previous year primarily comprised impairment losses recognized on goodwill and other intangible assets.

A 2.2.2/10

Special Items[1] Consumer Health

€ million	EBIT Q4 2018	EBIT Q4 2019	EBIT 2018	EBIT 2019	EBITDA Q4 2018	EBITDA Q4 2019	EBITDA 2018	EBITDA 2019
Restructuring	(59)	(34)	(85)	(107)	(59)	(35)	(83)	(107)
Divestments	(8)	2	25	320	(8)	1	25	320
Impairment losses/loss reversals	(2,713)	193	(2,713)	(231)	–	–	–	–
Other	(1)	–	(3)	–	(1)	–	(3)	–
Total special items	**(2,781)**	**161**	**(2,776)**	**(18)**	**(68)**	**(34)**	**(61)**	**213**

[1] For definition see A 2.3 "Alternative Performance Measures Used by the Bayer Group."

2.2.3 Value-Based Performance

A 2.2.3/1

Value-Based Performance

	Crop Science		Pharmaceuticals		Consumer Health		Group[2]	
€ million	**2018**	**2019**	**2018**	**2019**	**2018**	**2019**	**2018**	**2019**
EBIT[1]	3,138	582	3,213	4,762	(2,077)	713	3,454	4,189
Taxes[1,3]	(753)	(139)	(771)	(1,143)	498	(171)	(829)	(1,005)
NOPAT[1]	2,385	443	2,442	3,619	(1,579)	542	2,625	3,184
Average capital employed[1]	37,666	58,430	14,721	15,043	12,278	10,573	66,354	84,830
ROCE[1]	6.3%	0.8%	16.6%	24.1%	(12.9)%	5.1%	4.0%	3.8%
WACC[1,4]	6.7%	6.8%	6.7%	6.8%	6.7%	6.8%	6.7%	6.8%

[1] For definition see A 2.3 "Alternative Performance Measures Used by the Bayer Group."
[2] Including Reconciliation; 2018 figures restated to reflect the recognition of Animal Health and Currenta as discontinued operations
[3] 24% on EBIT; based on historical average of tax rates
[4] At the divisional level, ROCE is compared with the WACC of the Bayer Group as we do not report WACC for the individual divisions.

Bayer's ROCE in 2019 amounted to 3.8%, which was 3 percentage points below the Bayer Group's cost of capital of 6.8%. The year-on-year changes were mainly attributable to the significant special items recognized in 2018 in all divisions pertaining to acquisitions, divestments and impairment testing. The ROCE at Crop Science continued to be weighed down by special items related to the acquisition and integration of the acquired agriculture business. Pharmaceuticals showed a clear improvement due to the positive development in the operational business and a stable capital base. The operating income at Consumer Health benefited from impairment loss reversals, while the capital base shrank due to divestments.

The following overview shows the components of the average capital employed used in calculating ROCE, taking into account the recognition of Animal Health and Currenta as discontinued operations.

A 2.2.3/2

Components of Capital Employed[1]

€ million	Dec. 31, 2018	Dec. 31, 2019
Goodwill	38,345	39,126
Other intangible assets	36,521	34,709
Property, plant and equipment	12,053	12,479
Other financial assets[2]	43	39
Inventories	10,833	10,770
Trade accounts receivable	11,165	11,459
Other receivables[2]	1,824	1,868
Deferred tax assets[2,3]	1,733	7,862
Claims for income tax refunds	808	1,652
Assets held for sale	234	124
Gross capital employed	**113,559**	**120,088**
Other provisions[2]	(6,182)	(6,662)
Trade accounts payable	(5,729)	(6,321)
Other liabilities[2]	(1,628)	(2,338)
Refund liabilities	(3,729)	(4,239)
Contract liabilities	(4,218)	(4,052)
Financial liabilities[2]	(1)	(3)
Deferred tax liabilities[2,3]	(4,578)	(9,350)
Income tax liabilities	(2,483)	(2,243)
Liabilities directly related to assets held for sale	(12)	(219)
Capital employed	**84,999**	**84,661**
Average capital employed	**66,354**	**84,830**

[1] For definition see A 2.3 “Alternative Performance Measures Used by the Bayer Group.”
[2] Selected items of the component; items that were predominantly non-interest-bearing or nonoperating in nature were eliminated from capital employed
[3] Here we have elected to present deferred tax assets and liabilities as gross amounts. In table B3, Statements of Financial Position of the Bayer Group, by contrast, they are presented in net terms.

2.2.4 Asset and Financial Position of the Bayer Group

Financial management of the Bayer Group

The financial management of the Bayer Group is conducted centrally. Capital is a global resource, generally procured centrally and distributed within the Bayer Group. The foremost objectives of our financial management are to help bring about a sustained increase in corporate value and to ensure the Group’s liquidity and creditworthiness. This involves optimizing the capital structure and effectively managing risks. The management of currency, interest-rate, commodity-price and default risks helps to reduce the volatility of our earnings.

See also A 1.2.2

Following our acquisition of Monsanto, the contracted rating agencies adjusted their ratings and now assess Bayer as follows:

A 2.2.4/1

Rating

	Long-term rating	Short-term rating	Outlook
S&P Global Ratings	BBB	A2	stable
Moody’s	Baa1	P2	negative
Fitch Ratings	BBB+	F2	negative

These investment grade ratings from all three agencies reflect the company’s high solvency and ensure access to a broad investor base for financing purposes. Our stated aim is to regain A-category long-term ratings in the future.

As a matter of principle, we pursue a prudent debt management strategy to ensure flexibility, drawing on a balanced financing portfolio. This is fundamentally based on bonds in various currencies, syndicated credit facilities, bilateral loan agreements and a global commercial paper program.

We use financial derivatives to hedge against risks arising from business operations or financial transactions, but do not employ contracts in the absence of an underlying transaction. It is our policy to diminish default risks by selecting trading partners with a high credit standing. We closely monitor the execution of all transactions, which are conducted in accordance with Bayer Group policies.

See also A 3.2.2

Liquidity and Capital Expenditures of the Bayer Group

A 2.2.4/2

Bayer Group Summary Statements of Cash Flows

€ million	Q4 2018	Q4 2019	2018	2019
Net cash provided by (used in) operating activities from continuing operations	**2,869**	**3,312**	**7,533**	**8,001**
Net cash provided by (used in) operating activities from discontinued operations	99	(66)	384	206
Net cash provided by (used in) operating activities (total)	**2,968**	**3,246**	**7,917**	**8,207**
Net cash provided by (used in) investing activities (total)	**(571)**	**35**	**(34,152)**	**(671)**
Net cash provided by (used in) financing activities (total)	**(3,172)**	**(4,471)**	**23,432**	**(8,389)**
Change in cash and cash equivalents due to business activities	**(775)**	**(1,190)**	**(2,803)**	**(853)**
Cash and cash equivalents at beginning of period	**4,850**	**4,410**	**7,435**	**4,052**
Change due to exchange rate movements and to changes in scope of consolidation	(23)	(35)	(580)	(14)
Cash and cash equivalents at end of period	**4,052**	**3,185**	**4,052**	**3,185**

2018 figures restated

Net cash provided by operating activities

In 2019, the net cash provided by operating activities from continuing operations increased by 6.2% to €8,001 million thanks in particular to a rise in operating income. A smaller decline in cash tied up in working capital had a negative impact. The first-time application of IFRS 16 had a positive effect on operating cash flow because lease expenses were no longer recognized in operating income. Operating cash flow (total) rose by 3.7% year on year to €8,207 million.

Net cash used in investing activities

The net cash used in investing activities stood at €671 million in 2019. Capital expenditures for property, plant and equipment and intangible assets included therein were 2.2% higher than the previous year, at €2,650 million (2018: €2,593 million). Cash outflows for acquisitions less acquired cash amounted to €410 million (2018: €45,316 million) and pertained partly to the acquisition of the remaining shares in BlueRock Therapeutics L.P., Cambridge, Massachusetts, United States. In the previous year, this primarily included cash outflows for the acquisition of the agriculture business. In 2019, divestments resulted in an inflow of €2,546 million (2018: €7,563 million), which is mainly attributable to the sale of our interest in Currenta and the aforementioned divestments at Consumer Health. Net cash outflows for current and noncurrent financial assets totaled €575 million (2018: inflow of €5,717 million), with the significant decline due in particular to the prior-year proceeds from the sale of Covestro shares.

Net cash used in financing activities

In 2019, the net cash outflow for financing activities amounted to €8,389 million and primarily comprised net loan repayments of €4,296 million (2018: net borrowings of €17,819 million). Net interest payments rose to €1,478 million (2018: €919 million). The Bayer Group paid dividends of €2,615 million (2018: €2,407 million). The cash outflow increased as a result of the first-time application of IFRS 16 because the repayment component of lease payments and the interest expense were recognized in the financing cash flow.

Free cash flow

Free cash flow (total), which is the total operating cash flow less capital expenditures plus interest and dividends received less interest paid, was €4,214 million in 2019 (2018: 4,652 million).

Capital expenditures

A 2.2.3/3

Capital Expenditure for Property, Plant and Equipment and for Intangible Assets[1]

€ million	2018	2019
Crop Science	1,000	1,203
Pharmaceuticals	964	811
Consumer Health	204	169
Reconciliation	226	269
Group[2]	**2,593**	**2,650**

[1] Capital expenditures as per statement of cash flows
[2] Group total including continuing and discontinued operations

Crop Science continuously invests in its global production network for crop protection products and seeds as well as in research, development and digital transformation. Some of the largest projects in 2019 comprised investments in herbicide production (€250 million) and breeding stations for corn in the United States (€50 million), and in fungicide production in Germany (€20 million). Alongside these projects, the development of digital solutions for our customers was a key investment in 2019 and will remain so in the coming years.

At **Pharmaceuticals,** the highest expenditures for property, plant, and equipment in 2019 were the development of a modular production center for biologicals in Berkeley, United States (€47 million); modernization programs for the production network of our product supply organization (€42 million); the building of a new research facility in Wuppertal, Germany (€36 million); and the construction of a sterile filling plant in Berlin, Germany (€19 million).

At approximately €26 million, **Consumer Health**'s largest investment was the GMP upgrade program across its global production sites, including €12 million for the production site in Lerma, Mexico.

A 2.2.4/4

Material Investments in Property, Plant and Equipment

		2018	2019
Crop Science	Capacity expansions for herbicide production in Muskegon, Michigan, and Mobile, Alabama, U.S.A., and Frankfurt and Knapsack, Germany	divested[2]	
	Construction of a production facility for insecticides in Dormagen, Germany	completed	
	Expansion of production capacities for fungicides in Dormagen, Germany	completed	initiated[3]
	Expansion of research and development facilities in Monheim, Germany	ongoing	ongoing
	Construction of breeding stations for various plant species worldwide	divested[2]	
	Expansion of R&D facilities in Raleigh, North Carolina, U.S.A.	divested[2]	
	Expansion of production and research greenhouses in Nunhem, Netherlands	divested[2]	
	Establishment of a production site for fungicides in Kansas City, Missouri, U.S.A.	ongoing	completed
	Expansion of production capacities for insecticides in Vapi, India	ongoing	ongoing
	Construction of a production facility for herbicides in Luling, Louisiana, U.S.A.[1]	ongoing	ongoing
	Construction of a corn seed production site in Pochuyki, Ukraine[1]	ongoing	completed
	Construction of a corn breeding station in Marana, Arizona, U.S.A.[1]	ongoing	completed
	Expansion of R&D facilities in Petrolina, Brazil		initiated
	Expansion of R&D facilities in Chesterfield, Missouri, U.S.A.[1]	initiated	completed
	Construction of a cotton seed production site in Lubbock, Texas, U.S.A.[1]	ongoing	completed
	IT solutions to support digital transformation[1]	ongoing	ongoing

A 2.2.4/4 (continued)

Material Investments in Property, Plant and Equipment

		2018	2019
Pharmaceuticals	Expansion of Eylea™ production capacities in Berlin, Germany, and Shiga, Japan	ongoing	ongoing
	Pilot facility for continuous solids production in Leverkusen, Germany	ongoing	ongoing
	Modernization of production facilities at sites across the production network (Leverkusen, Germany; Garbagnate, Italy; etc.)	ongoing	ongoing
	Construction of a new research building in Wuppertal (Aprath), Germany	ongoing	ongoing
	Modernization of research facilities in Berlin, Germany	ongoing	ongoing
	Expansion of active ingredient production for Xarelto™ in Bergkamen, Germany	ongoing	ongoing
	Construction of modular production center for biologicals in Berkeley, United States	initiated	ongoing
	Construction of a sterile filling plant in Berlin, Germany	ongoing	ongoing
	Modernization of active ingredient production for intrauterine systems in Turku, Finland	initiated	ongoing
	Expansion of Xarelto production in Bitterfeld, Germany	ongoing	ongoing
	Expansion of active ingredient production for acarbose in Wuppertal, Germany	initiated	ongoing
Consumer Health	Upgrade of global production site facilities to new GMP standards	ongoing	ongoing

[1] Monsanto was responsible for these projects until the closing of the acquisition.
[2] In conjunction with the divestments to BASF
[3] New investment project initiated at the same site

Liquid assets and net financial debt

A 2.2.4/5

Net Financial Debt[1]

€ million	Dec. 31, 2018	Dec. 31, 2019	Change %
Bonds and notes/promissory notes	35,402	33,569	– 5.2
of which hybrid bonds[2]	4,537	4,528	– 0.2
Liabilities to banks[3]	4,865	4,062	– 16.5
Lease liabilities	399	1,251	.
Liabilities from derivatives[4]	172	123	– 28.5
Other financial liabilities	556	89	– 84.0
Receivables from derivatives[4]	(137)	(76)	– 44.5
Financial debt	**41,257**	**39,018**	**– 5.4**
Cash and cash equivalents	(4,052)	(3,185)	– 21.4
Current financial assets[5]	(930)	(1,282)	+ 37.8
Shares in Covestro[6]	(596)	(483)	– 19.0
Net financial debt	**35,679**	**34,068**	**– 4.5**

[1] For definition see A 2.3 “Alternative Performance Measures Used by the Bayer Group.”
[2] Classified as debt according to IFRS
[3] Including both financial and nonfinancial liabilities
[4] Including the market values of interest-rate and currency hedges of recorded transactions
[5] Including short-term receivables with maturities between 3 and 12 months outstanding from banks and other companies as well as financial investments in debt and equity instruments that were recorded as current on first-time recognition
[6] Covestro shares are held for risk management purposes relating to the exchangeable bond issued in 2017 that matures in 2020.

In 2019, the Bayer Group’s net financial debt decreased by €1.6 billion. Cash inflows from operating activities more than offset the cash outflows for dividends, negative currency effects and the impact of the first-time application of IFRS 16.

Financial debt included four subordinated hybrid bonds with a total volume of €4.5 billion, 50% of which is treated as equity by the rating agencies. As such, the hybrid bonds have a positive impact on the Group’s rating-specific debt indicators.

In 2019, Bayer AG repurchased the €1.75 billion hybrid bond maturing in 2075 (callable on July 1, 2020) before the first call date. The repurchase was financed through the issuance of two hybrid bonds with nominal volumes of €1.0 billion and €750 million. In addition, three bonds with a total nominal volume of US$2.5 billion and a bond with a nominal volume of JPY 10 billion were redeemed at maturity.

The decline in liabilities to banks was largely due to further repayments of the acquisition financing. This amounted to US$3.8 billion as of December 31, 2019.

The increase in lease liabilities was mainly due to the change in lease accounting resulting from the first-time application of IFRS 16.

The decline in other financial liabilities was primarily due to the maturing of the mandatory convertible notes issued in November 2016, which were converted into Bayer AG shares on November 22, 2019.

Asset and Capital Structure of the Bayer Group

A 2.2.4/6

Bayer Group Summary Statements of Financial Position

€ million	Dec. 31, 2018	Dec. 31, 2019	Change (%)
Noncurrent assets	**95,667**	**93,699**	**– 2.1**
Assets held for sale	234	1,137	.
Other current assets	30,831	31,422	+ 1.9
Current assets	**31,065**	**32,559**	**+ 4.8**
Total assets	**126,732**	**126,258**	**– 0.4**
Equity	**46,148**	**47,517**	**+ 3.0**
Noncurrent liabilities	**57,459**	**55,526**	**– 3.4**
Current liabilities	23,113	22,553	– 2.4
Provisions directly related to assets held for sale	12	662	.
Total current liabilities	**23,125**	**23,215**	**+ 0.4**
Liabilities	**80,584**	**78,741**	**– 2.3**
Total equity and liabilities	**126,732**	**126,258**	**– 0.4**

2018 figures restated

Between December 31, 2019, and December 31, 2018, total assets decreased by €0.5 billion.

Noncurrent assets fell by €2.0 billion to €93.7 billion, primarily due to a €2.0 billion decline in intangible assets that was largely attributable to amortization and disposals resulting from the divestments at Consumer Health. The €0.5 billion drop in property, plant and equipment is partly related to the reclassification of the Animal Health business to assets held for sale and to the sale of our stake in Currenta. By contrast, goodwill rose by around €0.7 billion, primarily due to the acquisition of BlueRock and a currency-related increase, while the divestments of Coppertone™ and Dr. Scholl's™, for which proportionate goodwill was transferred, were among the factors that had an opposing effect.

Total current assets increased by €1.5 billion to €32.6 billion, with assets held for sale in particular increasing by €0.9 billion due to the agreed divestment of our Animal Health business. Other financial assets rose by €1.2 billion to €2.3 billion. In addition, claims for income tax refunds increased by €0.8 billion to €1.7 billion, largely as a result of the capital gains tax paid on intra-Group dividends in Germany. Cash and cash equivalents decreased by €0.9 billion to €3.2 billion in 2019.

Equity rose by €1.4 billion compared with December 31, 2018, to €47.5 billion, mainly due to the increase in comprehensive income. The equity ratio advanced to 37.6% as of December 31, 2019 (December 31, 2018: 36.4%).

Liabilities as of December 31, 2019, declined by €1.8 billion to €78.7 billion. Noncurrent liabilities decreased by €1.9 billion to €55.5 billion, while current liabilities remained virtually unchanged.

2.3 Alternative Performance Measures Used by the Bayer Group

The Combined Management Report and the consolidated financial statements of the Bayer Group are prepared according to the applicable financial reporting standards. In addition to the disclosures and metrics these require, Bayer publishes alternative performance measures (APMs) that are not defined or specified in these standards and for which there are no generally accepted reporting formats. Bayer calculates APMs to enable a comparison of performance indicators over time and against those of other companies in its industry sectors. These APMs are calculated by making certain adjustments to items in the statement of financial position or the income statement prepared according to the applicable financial reporting standards. Such adjustments may result from differences in calculation or measurement methods, nonuniform business activities or special factors affecting the information value of these items. The APMs determined in this way apply to all periods and are used both internally for business management purposes and externally by analysts, investors and rating agencies to assess the company's performance. Bayer determines the following APMs:

See also "About this Report"

// Change in sales (reported, currency-adjusted, currency- and portfolio-adjusted)
// Pro-forma sales
// EBITDA
// EBITDA before special items
// EBITDA margin before special items
// EBIT
// EBIT before special items
// Core earnings per share
// Net financial debt
// Return on capital employed (ROCE)
// Net operating profit after tax (NOPAT)
// Capital employed
// Weighted average cost of capital (WACC)
// Free cash flow
// Forecast key financial data

The **(reported) change in sales** is a relative indicator. It shows the percentage by which sales varied from the previous year.

The **currency-adjusted or currency- and portfolio-adjusted change in sales** shows the percentage change in sales excluding the impact of exchange rate effects and, in the latter case, disregarding material acquisitions and divestments as well. Exchange rate effects are generally calculated on the basis of the functional currency valid in the respective country. An exception existed in Argentina, primarily in our crop protection business, where the currency effect was calculated on the basis of the U.S. dollar instead of the functional (national) currency.

Due to the scope of the activities acquired through the Monsanto acquisition and the seasonality of the business, we are also presenting sales by strategic business entity on an unaudited, pro-forma basis to better show the operational business development for the combined business of Crop Science and Monsanto, among other reasons. The **pro-forma sales** are presented as if both the acquisition of Monsanto and the associated divestments had taken place as of January 1, 2018, and are being reported for the last time for fiscal 2019.

See A 2.2.2/10 for further details of the calculation of pro-forma sales

EBITDA stands for earnings before interest, taxes, depreciation and impairment losses / loss reversals on property, plant and equipment, impairment losses on goodwill, and amortization and impairment losses / loss reversals on other intangible assets. This performance indicator neutralizes the effects of the financial result along with distortions of operational performance that result from divergent depreciation and amortization methods and the exercise of measurement discretion. EBITDA is EBIT plus the amortization of intangible assets and the depreciation of property, plant and equipment, plus impairment losses and minus impairment loss reversals, recognized in profit or loss during the reporting period.

EBIT (earnings before interest and taxes) serves to present a company's performance while eliminating the effects of differences among local taxation systems and different financing activities.

See B 1 of the Notes to the Consolidated Financial Statements for the reconciliation to EBIT

EBITDA before special items and **EBIT before special items** show the development of the operational business irrespective of the effects of special items, i.e. special effects for the Bayer Group with regard to their nature and magnitude. These may include acquisition costs, divestments, litigations, restructuring, integration costs, impairment losses and impairment loss reversals. In the calculation of EBIT before special items and EBITDA before special items, special charges are added and special gains subtracted.

The **EBITDA margin before special items** is a relative indicator used by Bayer for internal and external comparisons of operational earnings performance. It is the ratio of EBITDA before special items to net sales.

The APM **core earnings per share (core EPS)** from continuing operations is based on the concept of earnings per share (EPS) as defined in IAS 33. Core EPS forms the basis of the Bayer Group's dividend policy.

See A 2.2.1/5 for the calculation of core EPS, and A 2.2.1 for further details

Core EPS is calculated using the following method: Based on EBIT (as per the income statements), the special items, impairment losses on goodwill, amortization / impairment losses / loss reversals on other intangible assets, impairment losses / loss reversals on property, plant and equipment and the accelerated depreciation included in special items are neutralized to determine **core EBIT**. This enables a comparison of performance over time. Core EBIT is reconciled to **core net income from continuing operations**, and **core EPS** is then calculated by dividing core net income by the weighted average number of shares.

As core EPS is calculated for each interim reporting period, core EPS for the fiscal year or for each interim reporting period up to the respective closing date may deviate from the cumulated core EPS for the individual interim reporting periods.

Net financial debt is an important financial management indicator for the Bayer Group and is used both internally and externally in assessing its liquidity, capital structure and financial flexibility.

See A 2.2.4/4 for the calculation of net financial debt, and A 2.2.4 for further details

The **return on capital employed (ROCE)** measures the capital return over a specified period and is employed as a strategic indicator to evaluate value creation. It is the ratio of **net operating profit after taxes (NOPAT)** to the average capital employed in a fiscal year. NOPAT is calculated by subtracting income taxes from EBIT. Income taxes are calculated by multiplying EBIT by a uniform tax rate that is based on a historical average of tax rates.

See A 2.2.3/1 for the calculation of ROCE, and A 2.2.3 for further details

The **capital employed** by Bayer is the total carrying amount of operational noncurrent and current assets, minus liabilities that are largely non-interest-bearing in character and/or would distort the capital base. An average value, calculated from the values at the end of the prior year and of the reporting year, is used to depict the change in capital employed during the reporting year. In addition to changes from operating activities, the capital employed in 2019 rose by €1,327 million due to a one-time effect resulting from application of the International Financial Reporting Standard IFRS 16 (“Leases”) as of January 1, 2019.

See A 2.2.3/2 for the calculation of capital employed

The ROCE is compared to the **weighted average cost of capital (WACC),** which is the return expected by the providers of equity and debt. If the ROCE exceeds the WACC, return expectations have been exceeded, indicating that enterprise value has been created.

The WACC is based on an after-tax approach and calculated at the start of the year as the weighted average of the equity and debt cost factors. The cost of equity is determined using the capital asset pricing model (CAPM), while the debt-capital cost factor is calculated based on the average returns of ten-year Eurobonds issued by industrial companies. Further information on the segment-specific capital cost factors used in impairment testing is provided in Note [4] to B Consolidated Financial Statements.

Free cash flow (FCF) is an alternative performance measure that is based on the cash flow from operating activities under IAS 7. FCF illustrates the cash flows available for paying dividends and reducing debt as well as for investing in innovation and acquisitions. It is calculated by subtracting cash outflows for additions to property, plant and equipment and intangible assets from the cash flow from operating activities from continuing and discontinued operations, adding interest and dividends received along with interest received from interest-rate swaps, and deducting interest paid including interest-rate swaps.

The forward-looking key performance indicators published in the **forecast for key financial data** are based on data that is determined in the course of our planning process. The key financial data in the forecast is determined in accordance with the applied accounting policies and with the calculation models for alternative performance measures described in this chapter.

3. Report on Future Perspectives and on Opportunities and Risks

3.1 Future Perspectives

3.1.1 Economic Outlook

A 3.1.1/1

Economic Outlook

	Growth[1] 2019	Growth forecast[1] 2020
World	+2.6%	+2.5%
European Union	+1.4%	+1.0%
of which Germany	+0.5%	+0.4%
United States	+2.3%	+2.1%
Emerging Markets[2]	+4.1%	+4.2%

[1] Real growth of gross domestic product, source: IHS Markit
[2] Including about 50 countries defined by IHS Markit as emerging markets in line with the World Bank
As of January 2020

Global economic growth at the previous year's level

In 2020, we expect the global economy to grow at about the same rate as in 2019. Positive stimuli are likely to result from a temporary easing of the trade dispute between China and the United States and a lessening of the uncertainty over Brexit, which has since taken place. On the other hand, risks emanating from geopolitical tensions have increased. In the European Union, we foresee a continued slowing of growth overall, with Germany in particular unlikely to provide positive impetus for the economy. In the United States, however, robust consumption should ensure there is only a slight dip in growth. We expect the Emerging Markets to grow at the same rate as in 2019. While growth in China will likely continue to slow, we believe the pace of economic expansion in Latin America as a whole will be somewhat higher than in the prior year.

A 3.1.1/2

Economic Outlook for the Divisions

	Growth 2019	Growth forecast 2020
Seeds and crop protection market[1]	0%	+2%
Pharmaceuticals market[2]	+6%	+5%
Consumer health market[3]	+4%	+4%

2019 data provisional
[1] Bayer's estimate (as of January 2020)
[2] Source: IQVIA Market Prognosis (October 2019); all rights reserved; currency adjusted
[3] Source for forecast: Nicholas Hall (November 2019); all rights reserved; 2019 figure: Bayer's estimate; figures are currency-adjusted in both cases

We foresee solid growth for the global **seed and crop protection market** after 2019 was impacted by adverse weather conditions. A positive development is expected in North America, driven by an anticipated increase / rebound in corn and soybean acreage, while the Asia / Pacific region is set to benefit from demand for high-quality produce. By contrast, a number of macroeconomic factors such as the aforementioned trade dispute and environmental challenges such as African swine fever are likely to have a negative impact. In view of the political uncertainties and environmental developments, the outlook for Latin America is unclear. In the Europe / Middle East / Africa region, the regulatory environment and growing generic pressure in Europe will limit growth expectations.

We expect the **pharmaceuticals market** to expand by 5% in 2020 (2019: 6%), with slightly lower growth rates in nearly all regions compared with 2019. The Japanese market in particular is likely to experience a decline. We anticipate continued growth momentum to come from new, high-end products and volume increases.

We anticipate that growth of the **consumer health** market in 2020 will be on a par with the 2019 level. The market is likely to experience rising price pressure from e-commerce and continued consolidation of the retail sector.

3.1.2 Corporate Outlook

The following forecast is based on the current business development and our internal planning. It also proceeds from the assumption that our Animal Health business will transfer to the acquirer effective July 1, 2020, and that we will receive the purchase price on that date in cash and Elanco shares as agreed.

To enhance the comparability of operating performance, the forecasts are adjusted for currency effects[22]. A 1% appreciation (depreciation) of the euro against all other currencies would decrease (increase) sales on an annual basis by some €350 million and EBITDA before special items by about €100 million.

We adjusted our value flows as of January 1, 2020 (for further details see A 1.1.2 “Corporate Structure”), which has an impact on the divisions’ EBITDA before special items. If these value flows had already applied in 2019, this key indicator would have been as follows:

A 3.1.2/1

Pro-forma EBITDA Before Special Items After Value Flow Changes

€ million	Crop Science	Pharma-ceuticals	Consumer Health
EBITDA before special items[1]	**4,796**	**5,975**	**1,090**
Value flow changes	(82)	(114)	51
Pro-forma EBITDA before special items after value flow changes	**4,714**	**5,861**	**1,141**

[1] For definition see A 2.3 “Alternative Performance Measures Used by the Bayer Group.”

For 2020, we expect currency-adjusted sales from continuing operations to amount to around €44 billion to €45 billion. This corresponds to an increase of about 3% to 4% on a currency- and portfolio-adjusted basis. We aim to increase the EBITDA margin before special items to around 28% on a currency-adjusted basis. Based on the aforementioned sales figure, this would correspond to EBITDA before special items of €12.3 billion to €12.6 billion on a currency-adjusted basis. We plan to raise core earnings per share to between €7.00 and €7.20 on a currency-adjusted basis.

[22] Using the average monthly exchange rates from 2019 (see table B 4/1)

A 3.1.2/2

Forecast for 2020

	2019 figures		2020 forecast	
	€ billion	Fx & p adj. change (%)	€ billion	Fx & p adj. change (%)
Sales[1]	**43.5**	**+ 3.5**	**44 to 45**	**+ 3 to 4**
Crop Science	19.8	+ 1.4		~+ 4
Pharmaceuticals	18.0	+ 5.6		+ 3 to 4
Consumer Health	5.5	+ 2.6		+ 2 to 3
		Margin (%) (pro forma)		**Margin (%)**
EBITDA before special items[1] (pro forma)	**11.5**	**26.4**		**~28**
Crop Science	4.8 (4.7)	24.2 (23.8)		~26
Pharmaceuticals	6.0 (5.9)	33.3 (32.6)		~33
Consumer Health	1.1 (1.1)	20.0 (20.9)		22 to 23
Financial result (core)[2]	**(1.6)**		**~(1.5)**	
Tax rate (core)[3]	**22.5%**		**~23%**	
Free cash flow[1]	**4.2**		**~5**	
Net financial debt[1]	**34.1**		**~27**	
Special items in EBITDA	(1.9)		~(0.9)	
	€		€	
Core EPS[1]	**6.40**		**7.00 to 7.20**	

Fx & p adj. = currency- and portfolio-adjusted
[1] For definition see A 2.3 "Alternative Performance Measures Used by the Bayer Group."
[2] Financial result before special items
[3] (Income taxes + special items in income taxes + tax effects on adjustments) / (core EBIT + financial result + special items in financial result)

We plan to take total special charges of about €0.9 billion (currency-adjusted) in 2020, of which we expect approximately €0.7 billion to be spent on restructuring.

Potential estimation risks regarding special charges in connection with litigations are referenced in A 3.2 Opportunity and Risk Report.

3.2 Opportunity and Risk Report

3.2.1 Group-wide Opportunity and Risk Management System

As a global life science enterprise, we are exposed to a wide range of internal or external developments and events that could significantly impact the achievement of our financial and nonfinancial objectives. Opportunity and risk management is therefore an integral part of corporate management at Bayer.

Opportunity management system

We identify opportunities as part of the annual strategic planning cycle, during which we analyze internal and external factors that may affect our business. These may be factors of a social, economic or environmental nature. The core phase of our strategic planning process takes place in the first half of the year and starts with a comprehensive analysis of the markets. We build on this by analyzing the respective market environments to identify opportunities. These analyses are based on different time periods since trends or developments may impact our business over the short, medium or long term. In addition, opportunities are identified by the management and employees through daily observation of internal processes and markets. Depending on developments, factors affecting our business, such as market risks, may result in either risks or opportunities. Opportunities that we regard as highly likely to materialize have already been taken into account in our planning.

Risk management system

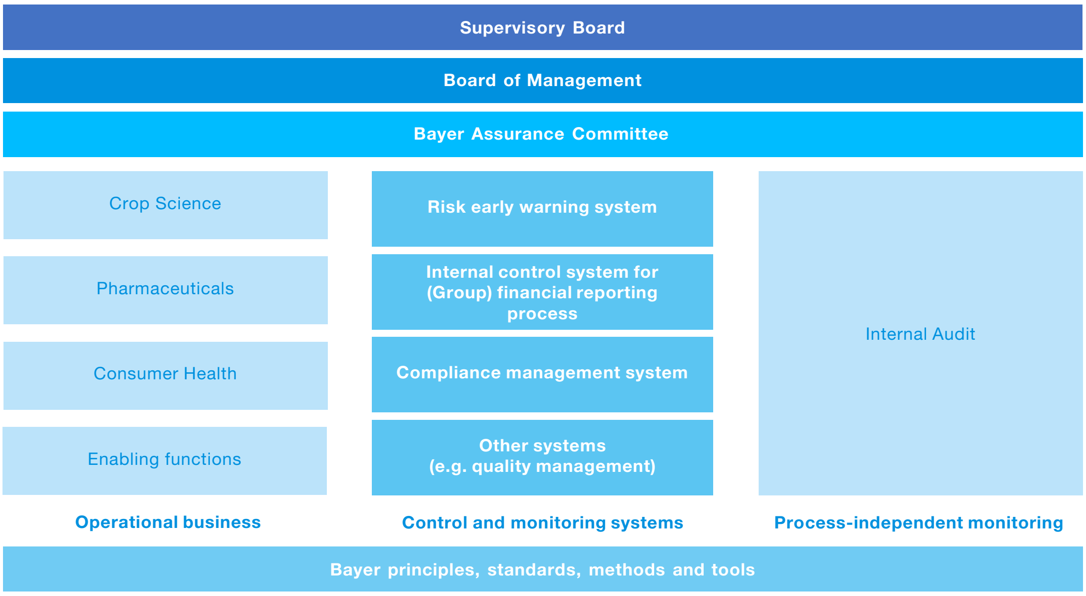
We have implemented a holistic and integrated risk management system designed to ensure the continued existence and future target attainment of the Group through the early identification, assessment and treatment of risks.

Our risk management system is aligned to internationally recognized standards and principles such as the ISO 31000 risk management standard of the International Organization for Standardization.

Structure of Bayer's Risk Management System

A 3.2.1/1

Structure of the Risk Management System



The **Board of Management** of Bayer AG holds overall responsibility for an effective risk management system. The Audit Committee of the Supervisory Board examines the appropriateness and effectiveness of the risk management system at least once a year and reports to the full Supervisory Board.

The **Bayer Assurance Committee**, which is chaired by the Chief Financial Officer, is a committee of the Board of Management. As well as ensuring that appropriate action is taken to control any substantial risks, the Bayer Assurance Committee regularly discusses and reviews the risk portfolio and the status of the risk control measures.

Responsibility for the identification, assessment, treatment and reporting of risks lies with the **operational business units** in the divisions and enabling functions.

Control and monitoring systems

To enable the Board of Management and the Supervisory Board to monitor material business risks as required by law, we have implemented a risk early warning system pursuant to Section 91, Paragraph 2 of the German Stock Corporation Act (AktG), an internal control system for (Group) accounting and financial reporting processes, and a compliance management system. Various enabling functions are responsible for these systems. The Risk Management enabling function steers and coordinates the risk management system. It provides overarching standards, methods and tools, is responsible for the risk early warning system, steers the annual Enterprise Risk Management (ERM) process, and ensures reporting to the Bayer Assurance Committee and the Board of Management.

Risk early warning system

Our ERM system meets the requirement set out in Section 91, Paragraph 2 of the German Stock Corporation Act that a risk early warning system be implemented and used to identify at an early stage developments that are material and / or could endanger the company's continued existence. It establishes a consistent framework and uniform standards for the risk early warning system throughout the Bayer Group.

Internal control system for (Group) accounting and financial reporting

(Report pursuant to Sections 289, Paragraph 4 and 315, Paragraph 4 of the German Commercial Code)

As part of the comprehensive risk management system, Bayer has an internal control system (ICS) in place for the (Group) accounting and financial reporting process. This system comprises suitable structures and workflows that are defined and implemented throughout the organization. The purpose of our ICS is to ensure proper and effective accounting and financial reporting in accordance with Section 289, Paragraph 4 and Section 315, Paragraph 4 of the German Commercial Code. The ICS is designed to guarantee timely, uniform and accurate accounting for all business transactions based on applicable statutory regulations, accounting and financial reporting standards and the internal Group policies that are binding upon all consolidated companies. Risks are identified and assessed, and appropriate countermeasures are taken to mitigate them. Mandatory, Group-wide standards such as system-based and manual reconciliation processes and functional separation have been derived from these frameworks and promulgated throughout the Bayer Group by the Risk Management enabling function on behalf of the Chief Financial Officer of Bayer AG. These standards are implemented by the Bayer Group companies. Compliance with these standards is the responsibility of the respective management teams. The Board of Management has confirmed the effective functioning of the ICS and the relevant criteria for the 2019 fiscal year. However, it should be noted that an internal control system, irrespective of its design, cannot provide absolute assurance that material misstatements in the financial reporting will be avoided or identified.

Compliance management system

Our compliance management system is aimed at ensuring lawful and responsible conduct by our employees. It is designed to identify potential violations in advance and systematically prevent their occurrence. The compliance management system thus contributes significantly to the integration of compliance into our operating units and their processes. Details of compliance management can be found in Chapter A 4.2 Compliance, which describes in particular the process for identifying risks and taking steps to mitigate them.

See also A 4.2

Process-independent monitoring

The Internal Audit enabling function supports Bayer's attainment of the Group targets by employing a systematic and targeted approach in order to assess and help improve the effectiveness of corporate governance, risk management and monitoring processes. In addition, the external auditor, as an independent external body, assesses the fundamental suitability of the early warning system as part of its audit of the annual financial statements.

Basic elements of the Bayer risk management system

Risk culture and objectives of the risk management system

All levels of the company are included in risk management in order to heighten the awareness and understanding of risks. This lays the foundation for a risk culture with independent, proactive and systematic risk management involving clearly defined roles and responsibilities, principles, standards, methods, tools and training measures. The aims of the risk management system are to achieve risk transparency, which also encompasses the early detection of risks, to support risk-based (treatment) decisions and to ensure compliance with legal requirements. This establishes a basis for the proper and responsible management of risks.

Risk management process

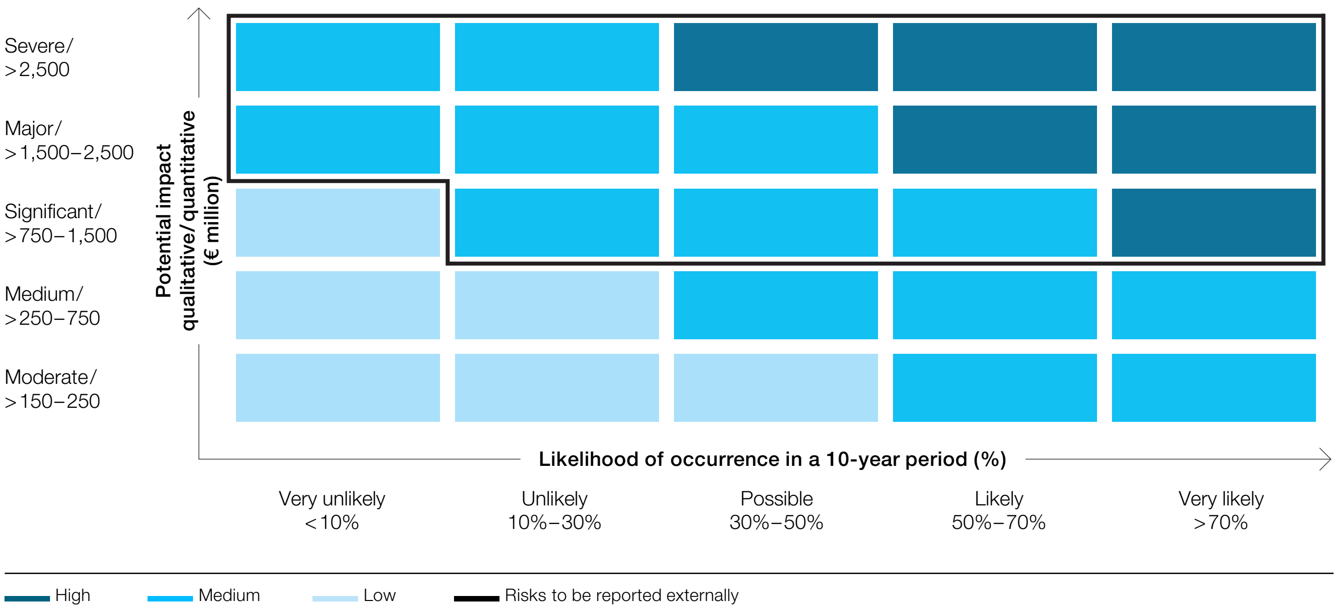
Identification: Risks are identified by risk owners in the divisions and enabling functions. To support the fullest possible identification of risks, the Bayer Group maintains a Risk Universe that reflects the company's potential risk categories. The Bayer Risk Universe, which is regularly updated, expressly accounts for risks of a nonfinancial nature that are linked to our business activity or to our business relationships, products and services. Risks pursuant to the CSR Directive Implementation Act that relate to environmental, employee and social issues, human rights, corruption and bribery (compliance) are included as well.

See "About this Report" for more information on the nonfinancial statement pursuant to the CSR Directive Implementation Act

Assessment: Where possible, the identified risks are evaluated with regard to their potential impact and likelihood of occurrence using the following matrix and taking into account established risk control measures.

A 3.2.1/2

Risk Assessment Matrix



Risks are classified as high, medium or low when assessing their materiality within the overall risk portfolio. The extent of the impact is rated in quantitative and/or qualitative terms. The quantitative assessment reflects a potentially negative effect on cash flows. A qualitative assessment of the impact is based on criteria such as the effect on our strategy or reputation, the potential loss of stakeholder confidence, and potential incomplete compliance with sustainability principles (e.g. in the area of safety, environmental protection or human rights). The higher rating – qualitatively or quantitatively – determines the overall assessment. The likelihood of occurrence is calculated based on a maximum period of 10 years. A further aspect we consider is the speed at which the impact will occur if a risk materializes. Risk categories may potentially influence the materialization of risks in other categories, a factor that we take into account when assessing the likelihood of occurrence. For example, developments in the "Social and macroeconomic trends" risk category may have an influence on the "Regulatory changes," "Legal/compliance" and "Product safety and stewardship" categories.

Risks with a potential impact of over €5,000 million are examined separately by the Bayer Assurance Committee to determine whether they could endanger the company's continued existence.

Treatment: The risk owners decide on a targeted risk level based on a cost-benefit analysis and define a risk management strategy as well as risk management measures. These include risk avoidance, risk reduction, risk transfer and risk acceptance.

Reporting: The results are reported to the Bayer Assurance Committee by the Risk Management enabling function. In addition, new risks above a defined threshold are reported to the Risk Management enabling function on an ad-hoc basis and, if relevant, to the Bayer Assurance Committee and the Chief Financial Officer. A report on the risk portfolio is submitted to the Board of Management and the Audit Committee of the Supervisory Board at least once a year.

Monitoring and improvement

The Risk Management enabling function continuously evaluates whether the principles, standards, methods and tools are appropriate and up to date.

3.2.2 Opportunity and Risk Status

In this section, we report on material, reportable risks pursuant to German Accounting Standard No. 20. These include all financial and nonfinancial risks that have been classified as high or medium and are at least significant in terms of potential impact after taking the existing risk control measures into account (net risk). They encompass risks falling within the black outline in the rating matrix A 3.2.1/2. In addition, we report relevant risks that from a financial point of view may not be sufficiently or meaningfully quantifiable, if at all. We also report on the principal opportunities identified in the course of our opportunity management. Furthermore, we assess the probability that the effects of individual risks could change significantly during the forecast period. Our most recent evaluation did not find this to be case, with the following exception: Legal proceedings generally involve estimation risks, which may be substantial in some cases. Against the background of the proceedings in the glyphosate matter, in particular, outcomes of the mediation process and/or the ongoing litigations may lead to adjustments of the provisions established in connection with this series of litigations. Such adjustments may materially impact the forecast issued with respect to the financial position and cash flows.

Comparable risks existing in different divisions of the company are bundled where applicable.

According to our understanding, risks relating to the aspects outlined in the CSR Directive Implementation Act that would have to be reported separately would have to have at least a “severe” potential impact under the qualitative criterion “potential incomplete compliance with sustainability principles” and additionally their likelihood of occurrence would have to be classified as “very likely.” We did not identify any such risks in 2019.

See also A 3.2.1 and “About this Report”

The section below details the individual risk categories, how they have been classified and the divisions concerned. The order in which the risks are listed does not imply any order of importance. We also describe opportunities and risks of a division-specific nature where relevant. The divisions mentioned are those that have identified material risks. Other divisions may also be affected to a lesser extent. Material risks reported by enabling functions are categorized under “Group,” although they may also affect the divisions.

Social and macroeconomic trends (High: Group; Medium: Crop Science)[23]

The growing world population and the resulting higher demand for food offer opportunities for our Crop Science Division. Changes in consumer behavior are in some cases driving an increase in demand for food products of animal origin. Agricultural productivity therefore needs to increase in view of declining per-capita acreages, the challenges presented by climate change, and increasing product resistance. We therefore expect demand for high-quality seeds and crop protection products to rise. Furthermore, the increase in quality of life and life expectancy is leading to a heightened focus on the medical care needs of elderly patients. To take advantage of the opportunities arising from the growing demand for innovative health care products to treat age-related diseases, our Pharmaceuticals Division is concentrating its research and development activities on relevant therapeutic areas, among other measures.

[23] The classification pertains to the risks.

Furthermore, a deterioration in public perception toward Bayer represents a risk. For example, modern agricultural methods, such as the application of certain classes of crop protection products and the use of genetic engineering, are often the subject of intense public debate and can adversely affect our reputation. The risk of an increasingly negative public debate that is not primarily based on science may, for example, lead to legislative and regulatory decisions that are unfavorable to us, significantly limiting the use of our products or even resulting in voluntary or mandated product withdrawals. We are engaged in constant dialogue with interest groups and regulators to promote a scientifically founded, rational and responsible discussion and decision-making process.

Moreover, negative developments of a macroeconomic nature, such as crises in important sales markets for Bayer, could adversely impact our Crop Science business and reduce our earnings. Our markets are cyclical and are shaped by economic developments and factors including fluctuating weather conditions and pest pressure that may adversely impact our business. We address these influences through our globally diversified business, flexible supply chain, comprehensive monitoring and assessment of market developments, and our ability to adjust production volumes to the level of demand forecast in sales and distribution planning on the basis of an optimized supply chain strategy.

See also A 1.2 Strategy

Market developments (Medium: Crop Science, Consumer Health)

In the Crop Science Division, we could face increased competition in the seed and crop protection industry. New competitors entering the market as well as aggressive marketing and pricing strategies – not only for generic products – could negatively impact our profitability. In addition, increasing digitalization in the agriculture sector could lead to the rise of new players and alter the market, potentially impacting value creation at our crop protection business. To take account of these developments, we are realigning our business models, engaging in scientific and commercial partnerships and utilizing our own R&D capabilities. The unexpected development of resistances, which could impact market growth or the profitability of our products, represents a further risk. By regularly monitoring such developments, we are able to initiate industry-wide measures to halt the spread of resistance if necessary. In addition, we actively update our product portfolio based on anti-resistance strategies.

See also A 1.2.3 Sustainability Management

However, the development of resistance to crop protection products and special traits also represents an opportunity as a continuous natural driver of innovation.

See also A 1.2 Strategy and A 1.3 Innovation

The risk of existing business models undergoing rapid change as a result of digitalization and new digital products is also present in the Consumer Health Division. Digitalization is a key factor in gaining a competitive advantage. If we fail to adequately integrate this development into our existing business models, we could lose customers and market share. We monitor the market very closely, while devising strategies and establishing measures to address developments in our business models.

Regulatory changes (Medium: Crop Science, Pharmaceuticals, Group)

Our business activity is subject to extensive regulations that may change. For example, further restrictions could be imposed on the sale and use of various crop protection products, or the pricing of pharmaceutical products could be more strictly regulated. Residues of agrochemical products, pharmaceutical compounds or microplastics in the environment could also become subject to more stringent regulation. In addition, regulatory changes could affect agricultural imports from other parts of the world and therefore our business in those regions. Regulatory changes could also cause uncertainty over our products’ patent protection, potentially resulting in financial losses that may even include the repayment of license fees. Regulatory changes may also lead to higher product development costs and longer development times or even necessitate adjustments to our product portfolio, which in turn may negatively impact our reputation.

We counter such risks by monitoring changes in regulatory requirements in order to adequately address them within the company. To adapt to these factors, we deploy in-house research and development capacities, make acquisitions, enter into collaborations and engage in dialogue with the authorities with the goal of promoting science-based decision-making. We also continue to develop our product portfolio in light of anticipated changes.

See also A 1.6

Business strategy (Medium: Crop Science, Pharmaceuticals, Group)

In the Pharmaceuticals Division in particular, we look to supplement our organic growth through acquisitions and / or inlicensing. The strategic measures aimed at achieving inorganic growth involve heightened challenges, in part due to the increasing difficulty in identifying suitable acquisition or inlicensing candidates on economically acceptable terms.

One of the challenges for our Crop Science Division lies in enhancing agricultural productivity through the use of digital tools, such as data analysis. In addition, new digital business models will emerge. These developments entail risks and uncertainties.

We counter these risks by aligning our organization and our processes to the existing challenges in areas including the identification and implementation of inlicensing opportunities and project oversight. In the Crop Science Division, our digital farming activities are bundled in our subsidiary, The Climate Corporation. Where necessary, they are supplemented by strategic partnerships with leading IT companies.

Research and development (High: Pharmaceuticals)

Across our businesses, we see opportunities both in the continued development of our brands and in the expansion of our research pipeline as a result of our innovation strength. In the Pharmaceuticals Division, opportunities result from digitalization and associated new research and development methods that save time and increase development effectiveness. We also rely on networking, both within the company and with external partners, to boost our innovation strength. This stimulates the development of new products. Technological advances in pharmaceutical product development may at the same time represent a risk for us should we not be in a position to play a role in shaping such advances. The need to identify a sufficient number of research candidates represents a challenge. Furthermore, we cannot ensure that all of the products we are currently developing or will develop in the future will obtain their planned approval / registration or achieve commercial success. These goals may not be reached if, for example, we are unable to satisfy technical or capacity requirements or meet time constraints in product development, fail to achieve study objectives or do not allocate financial resources optimally. Delays or cost overruns may occur during product registration or launch. We counter this risk through holistic portfolio management, by estimating the probability of success and prioritizing development projects.

In the Crop Science Division, we anticipate that the combination of innovation capacities and budgets achieved as part of the acquisition and integration of the agriculture business acquired in 2018 will enable us to more effectively tackle the challenges faced in developing and introducing product solutions in agriculture, including longer and more costly development cycles or stricter regulatory requirements. In the medium to long term, we plan to leverage the strengths of the combined R&D platform to deliver pioneering technologies faster.

Supply of products (procurement, production, logistics) (Medium: Crop Science, Pharmaceuticals)

Despite all precautions, operations at our sites may be disrupted by fires, power outages, process changeovers – including those required by regulatory authorities – or plant breakdowns for example. In addition, some of our production facilities are located in areas that may be affected by natural disasters such as flooding or earthquakes. These risks can lead to production disruptions or stoppages, result in personal injury and damage to our reputation, lead to declines in sales and / or margins, and necessitate the reconstruction of damaged infrastructure. If we are unable to meet product demand, sales may undergo a structural decline because patients then receive alternative treatments and may not switch back to our products. We address this risk for certain products by building up safety stocks and by distributing production among multiple sites, for example. Furthermore, an emergency response system based on the respective corporate policy has been implemented at all our production sites.

Disruptions at our suppliers may also negatively impact our ability to supply products. Certain materials, particularly in our Pharmaceuticals Division, are offered by only a small number of suppliers. We counter these risks by establishing relationships with alternative suppliers, concluding long-term agreements, expanding inventories or producing raw materials ourselves. Strategic Material Review Committees regularly examine and assess the supplier risks.

Marketing, sales and distribution (Medium: Pharmaceuticals)

New product launches present particular challenges for our marketing and distribution organization since assumptions about aspects such as the market and market circumstances may not materialize as anticipated. As a result, product launch concepts – including those related to clinical trials – and the planning or implementation of the distribution strategy could turn out to be inefficient or inadequate in terms of scheduling. In addition, if competitors' marketing activities surpass our own efforts in this regard, this may represent a risk for sales of our products. We address these risks with a forward-looking analysis of possible scenarios and the development of suitable strategies for projects such as planned product launches.

Human resources (Medium: Group, Pharmaceuticals)

Skilled and dedicated employees are essential for the company's success. Difficulties in recruiting, hiring and retaining urgently needed specialized employees (on a regional level) – also in view of competition among employers – and in employee development could have significant adverse consequences for the company's future development. It is also possible that organizational changes that are not implemented appropriately or transparently may impair employee motivation or increase employee turnover. Based on our analysis of future requirements, we counter these risks by designing appropriate employee recruitment and development measures. In addition, the alignment of our corporate culture toward diversity and employee needs enables us to tap the full potential of the employment market. Furthermore, deliberate and transparent change management forms an integral part of our human resources management and supports our efforts to constantly motivate our employees.

See also A 1.4

Information technology (High: Group)

Our business and production processes and our internal and external communications are dependent on global IT systems. This means that system reliability and the confidentiality of internal and external data is of fundamental importance to us. If the risk of a breach of data confidentiality, integrity or authenticity, for example due to (cyber) attacks, were to materialize, it could lead to the manipulation and / or the uncontrolled outflow of data and knowledge, and to reputational damage. Such attacks may also be carried out by in-house personnel. Our business and / or production processes could also be temporarily disrupted by (cyber) attacks. The steps we take to counter these risks include the testing of new technologies that we plan to use. Projects and measures have also been implemented to keep technical security precautions up to date and proactively identify and examine new threats. In addition, security measures implemented by the Corporate Cyber Defense Center protect the existing IT infrastructure against unauthorized access.

Finance and tax (Medium: Group)

Liquidity risk

Liquidity risks are defined as the possible inability of the Bayer Group to meet current or future payment obligations. They are determined and managed by the Treasury unit of the Group Finance enabling function as part of our same-day and medium-term liquidity planning. We hold sufficient liquidity to ensure the fulfillment of all planned payment obligations throughout the Bayer Group at maturity. For unbudgeted shortfalls in cash receipts or unexpected disbursements, furthermore, a reserve is maintained and its balance is regularly reviewed and adjusted. Credit facilities also exist with banks, including, in particular, an undrawn €4.5 billion syndicated revolving credit facility with a current maturity of 2024 that can be extended by one year.

Credit risks

Credit risks arise from the possibility that the value of receivables or other financial assets of the Bayer Group may be impaired because counterparties cannot meet their payment or other performance obligations. The maximum default risk is reduced by existing collateral, especially our global credit insurance programs. To manage credit risks from trade receivables, the invoicing companies appoint credit managers who regularly analyze customers' creditworthiness. We generally agree reservation of title with our customers. Credit limits are set for all customers. In addition, all credit limits for debtors where total exposure is €10 million or more are evaluated both locally and centrally. Credit risks from financial transactions are managed centrally in the Treasury unit of our Group Finance enabling function. To minimize risks, financial transactions are only conducted within predefined exposure limits and with banks and other partners that preferably have investment-grade ratings.

Opportunities and risks resulting from market price changes

Opportunities and risks resulting from fluctuations in currency exchange rates, interest rates and commodity prices are managed by the Treasury unit of our Group Finance enabling function. Risks are avoided or mitigated through the use of derivative financial instruments. The type and level of currency, interest-rate and commodity price risks are determined using sensitivity analyses as per IFRS 7 that are based on hypothetical changes in risk variables (such as interest curves) to determine the potential effects of market fluctuations on equity and earnings. Although they fall below the external reporting threshold under our ERM system, we report on interest-rate and commodity price risks in this section due to the provisions of IFRS 7.

See also A 3.2.1/3 Risk Assessment Matrix

Foreign currency opportunities and risks for the Bayer Group result from changes in exchange rates and the related changes in the value of financial instruments (including receivables and payables) and of anticipated payment receipts and disbursements not in the functional currency. Receivables and payables in liquid currencies from operating activities and financial items are generally fully exchange-hedged through cross-currency interest-rate swaps and forward exchange contracts. Anticipated exposure from planned payment receipts and disbursements in the future is hedged through forward exchange contracts and currency options according to management guidelines. Sensitivities were determined on the basis of a hypothetical scenario in which the euro appreciates or depreciates by 10% against all other currencies compared with the year-end exchange rates. In this scenario, the estimated hypothetical increase or decrease in cash flows from derivative and nonderivative financial instruments would have improved or diminished earnings as of December 31, 2019, by €29 million (December 31, 2018: €12 million). Derivatives used to hedge anticipated currency exposure that are designated for hedge accounting would have improved or diminished equity (other comprehensive income) by €408 million (December 31, 2018: €358 million). Currency effects on anticipated exposure are not taken into account. Of the amount impacting equity, €112 million is related to the Chinese renminbi (CNY), €51 million to the U.S. dollar (USD), €51 million to the Brazilian real (BRL) and €51 million to the Canadian dollar (CAD).

Interest-rate opportunities and risks result for the Bayer Group from changes in capital market interest rates, which in turn could lead to changes in the fair value of fixed-rate financial instruments and changes in interest payments in the case of floating-rate instruments. Interest-rate swaps are concluded to achieve the target structure for Bayer Group debt. A sensitivity analysis conducted on the basis of our net floating-rate receivables and payables position at the end of 2019 gave the following result: A hypothetical increase of one percentage point in these interest rates (assuming constant currency exchange rates) as of January 1, 2019, would have raised our interest expense for the year ended December 31, 2019, by €62 million (December 31, 2018: €69 million).

Commodity price opportunities and risks for the Bayer Group result from the volatility of raw material prices, which can lead to an increase in the prices we pay for seeds and energy. The commodity price risk is reduced by the use of commodity price derivatives such as futures, which are mainly designated as hedge accounting. A sensitivity analysis with a 10% change in commodity prices would have an effect of €40 million on equity (December 31, 2018: €30 million).

The volatility of our current and future shareholdings in other companies also gives rise to further opportunities and risks.

Financial risks associated with pension obligations

The Bayer Group has obligations to current and former employees related to pensions and other post-employment benefits. Changes in relevant measurement parameters such as interest rates, mortality and salary increase rates may raise the present value of our pension obligations. This may lead to increased costs for pension plans or diminish equity due to actuarial losses being recognized in other comprehensive income in the statement of comprehensive income. A large proportion of our pension and other post-employment benefit obligations is covered by plan assets including fixed-income securities, shares, real estate and other investments. Declining or even negative returns on these investments may adversely affect the future fair value of plan assets. Both of these effects may negatively impact the development of equity and / or earnings and / or may necessitate additional payments by our company. We address the risk of market-related fluctuations in the fair value of our plan assets through balanced strategic investment, and we constantly monitor investment risks in regard to our global pension obligations.

Tax risks

Bayer AG and its subsidiaries operate worldwide and are thus subject to many different national tax laws and regulations. Bayer Group companies are regularly audited by the tax authorities in various countries. Amendments to tax laws and regulations, legal judgments and their interpretation by the tax authorities, and the findings of tax audits in these countries may result in higher tax expense and payments, thus also influencing the level of tax receivables, tax liabilities and deferred tax assets and liabilities. Significant acquisitions, divestments, restructuring programs and other reorganizational measures undertaken by Bayer could also have an impact. We counter the resulting risks by continuously identifying and evaluating the tax framework. The Bayer Group establishes provisions for taxes, based on estimates, for liabilities to the tax authorities of the respective countries that are uncertain as to their amount and the probability of their occurrence. It cannot be ruled out that these provisions are insufficient to cover all the risks.

External partner compliance (Medium: Group)

From the perspective of the Bayer Group as a whole, there is a risk that our partners, such as suppliers, do not give due attention to our corporate values and ethical, compliance and sustainability requirements.

See also A 1.5 Procurement

Clear sustainability criteria and standards are in place for our supply chain on both a global and regional level. With the goal of improving sustainable practices in our supply chain, we operate a Group-wide four-stage management process that comprises the following elements: raising awareness, supplier selection, supplier evaluation and supplier development. The suppliers of the acquired agriculture business were included in this four-stage management process with the exception of seed producers, which are subject to a separate human rights evaluation process.

Health, safety and environment (Medium: Group)

We attach great importance not only to product safety but also to protecting our employees and the environment. Misconduct or noncompliance with legal requirements or Bayer Group standards, including those safeguarding the rights to genetic resources, may result in personal injury, property, reputational or environmental damage, loss of production, business interruptions and / or liability for compensation payments. This includes the risk of hazardous substances being released due to an incident in production. Our principles, standards and measures ensure that our requirements are adequately communicated and optimally implemented.

Intellectual property (Medium: Crop Science, Pharmaceuticals)

Our portfolio largely consists of patent-protected products. Generic manufacturers, in particular, attempt to contest patents prior to their expiration. We are currently involved in legal proceedings to enforce patent protection for our products. On the other hand, legal action by third parties for alleged infringement of patent or other property rights by Bayer may impede or even halt the development or manufacturing of certain products. We may also be required to pay monetary damages or royalties to third parties. Our patents department regularly reviews the patent situation in collaboration with the respective operating units and monitors for potential patent infringements so that legal action can be taken if necessary.

See also Note [30] to B Consolidated Financial Statements

Legal / compliance (Group[24])

We are exposed to risks from legal disputes or proceedings to which we are currently a party or which could arise in the future. The general risks to which we are potentially exposed include those in the areas of product liability, competition and antitrust law, anticorruption law, patent law, tax law, data privacy and environmental protection. Investigations of possible legal or regulatory violations may result in the imposition of civil or criminal penalties – including substantial monetary fines – and / or other adverse financial consequences. Payments may also need to be made under out-of-court settlements. These risks may harm our reputation and hamper our commercial success. We have established a global compliance management system to ensure the observance of laws and regulations.

See also A 1.6, A 4.2 and Note 30 to B Consolidated Financial Statements

The glyphosate matter

As of February 6, 2020, lawsuits from approximately 48,600 plaintiffs claiming to have been exposed to glyphosate-based products manufactured by Bayer’s subsidiary Monsanto had been served upon Monsanto in the United States. Glyphosate is the active ingredient contained in a number of Monsanto’s herbicides, including Roundup™-branded products. Plaintiffs allege personal injuries resulting from exposure to those products, including non-Hodgkin lymphoma (NHL) and multiple myeloma, and seek compensatory and punitive damages. Plaintiffs claim, inter alia, that the glyphosate-based herbicide products are defective and that Monsanto knew, or should have known, of the risks allegedly associated with such products and failed to adequately warn its users. Additional lawsuits are anticipated. The majority of plaintiffs have brought actions in state courts in Missouri and California. Cases pending in U.S. federal courts have been consolidated in an MDL in the Northern District of California for common pre-trial management.

[24] See Note [30] to B Consolidated Financial Statements (Legal Risks). The legal proceedings outlined there are those currently considered to involve material risks and do not represent an exhaustive list.

The first three cases that went to trial before state courts and a federal court in California resulted in jury verdicts in favor of the plaintiffs. Our post-trial motions subsequently filed with the trial courts only resulted in a reduction of the damages and punitive damages awards, respectively. We filed appeals in all three cases. In one of the appeals, the briefing is concluded and oral argument will likely be scheduled in March or April 2020. In the two other appeals, the briefing is still ongoing. We believe that the verdicts are not supported by the evidence at trial and the law and therefore intend to pursue the appeals vigorously. A number of trials that were originally scheduled to begin in 2019 and early 2020 have been continued. This continuance is intended to provide room for the parties to continue the court-ordered mediation process in good faith and explore whether a settlement can be reached on reasonable terms that includes a process to bring reasonable resolution to the overall litigation. The next trial is scheduled to begin in late March 2020 in Missouri state court.

As of February 6, 2020, 11 Canadian lawsuits relating to Roundup™ seeking class action certification had been served upon Bayer.

Bayer believes it has meritorious defenses and intends to defend the safety of glyphosate and our glyphosate-based formulations vigorously.

We may incur considerable financial disadvantages from the pending lawsuits and / or potential future cases if, for example, we are ordered to pay compensatory and possibly punitive damages or if we assume payment obligations under out-of-court settlements. We could be compelled to cover any such increased financial requirements by issuing additional external debt, increasing our equity capital or divesting assets – possibly on unfavorable terms – or through combinations of these measures. The terms on which we obtain external financing could become less favorable as a result of any increased financial requirements. These risks may also adversely affect our reputation.

Product safety and stewardship (High: Crop Science; Medium: Pharmaceuticals)

See also A 1.6 Product Stewardship

Despite extensive studies prior to approval or registration, products may be partially or completely withdrawn from the market due to the occurrence of unexpected side-effects or negative effects of our products, for example. Such a withdrawal may be voluntary or result from legal or regulatory measures. In the agriculture business particularly, there is an additional risk that our customers could use our products incorrectly. Furthermore, the presence of traces of unwanted genetically modified organisms in agricultural products and / or foodstuffs may have wide-ranging negative repercussions.

We counter these risks, which could give rise to liability claims and also harm our reputation, through comprehensive measures in the areas of pharmaceutical and crop protection product safety and testing, including in particular a comprehensive stewardship program for genetic product integrity and quality with regard to seeds. These measures are based on globally defined principles and include analysis and monitoring measures, an alert system and training programs.

Quality and regulatory requirements (Medium: Crop Science, Pharmaceuticals, Group)

In almost every country in which we operate, our business activity is subject to extensive regulations, standards, requirements and inspections that also apply to our local contract manufacturers. In the area of health, this pertains to clinical studies and production processes, for example. Acquisitions may at times also be subject to requirements, compliance with which must be ensured both during and after the integration process. Potential infringements of regulatory requirements may result in the imposition of civil or criminal penalties, including substantial monetary fines, restrictions on our freedom to operate, and / or other adverse financial consequences. They could also harm Bayer's reputation and lead to declining sales and / or margins.

See also A 1.6

We counter these risks through binding principles, standards and the control mechanisms implemented. Quality requirements are defined and implemented in global quality management systems.

Security (Medium: Group)

Potential criminal activities targeting our employees, property or business activities represent a risk for Bayer. These include intellectual property theft, vandalism and sabotage. In addition, counterfeit or adulterated versions of our products could be put into circulation. There is also the risk of crises such as a pandemic or a prolonged power outage that could lead to a breakdown of our information technology infrastructure and our production.

See also A 1.7 Environmental Protection and Safety

We counter these risks – which in addition to financial effects could negatively affect our reputation in some cases – through our local crisis organizations, which produce response plans and other measures. We have implemented early warning systems, ensure continuous reporting and carry out regular crisis simulation exercises. In addition, we have established a global safety community. The Business Continuity Management unit within the Risk Management function assesses business continuity risks and defines appropriate measures together with the responsible specialist units.

3.2.3 Overall Assessment of Opportunities and Risks by the Board of Management

No risks that could jeopardize the company's existence

In the opinion of the Board of Management, based on the current evaluations, none of the risks described above endanger the company's continued existence. Nor could we identify any risk interdependencies that could combine to endanger the company's continued existence. Our risk status in connection with the lawsuits pending in the glyphosate matter increased during 2019 in view of two jury verdicts issued against us, which were only partially altered by the courts of first instance. Apart from this, we are not currently aware of any significant changes in our risk status compared with the previous year. We remain convinced that we can take advantage of the opportunities resulting from our entrepreneurial activity and successfully master the challenges resulting from the risks stated above.

4. Corporate Governance Report

Bayer conforms with all recommendations of the German Corporate Governance Code

Special committee formed to oversee glyphosate litigations

The Corporate Governance Report of the Bayer Group conforms with the recommendations of the German Corporate Governance Code and includes a Declaration by Corporate Management pursuant to Sections 289f and 315d of the German Commercial Code as well as all the information and explanations required by Section 289a through e and Section 315a through d of the German Commercial Code. The contents of the Corporate Governance Report are also included in the management report. The information contained in the Declaration by Corporate Management is unaudited pursuant to Section 317, Paragraph 2, Sentence 6 of the German Commercial Code.

4.1 Declaration by Corporate Management Pursuant to Sections 289f and 315d of the German Commercial Code

With the Declaration by Corporate Management pursuant to Sections 289f and 315d of the German Commercial Code for Bayer AG and the Bayer Group, the company provides information on the main elements of the Bayer Group's corporate governance structures, relevant corporate governance practices, the composition and procedures of the Board of Management, the Supervisory Board and their committees, and the objectives and concepts that must be established when composing the Board of Management and the Supervisory Board.

See also C Governance Bodies

See A 4.4 for information on the compensation of the Board of Management

Declaration concerning the German Corporate Governance Code pursuant to Section 161 of the German Stock Corporation Act

In December 2019, the Board of Management and Supervisory Board of Bayer AG issued the annual declaration concerning the German Corporate Governance Code. As stated in this declaration, Bayer AG has fully complied with the recommendations of the German Corporate Governance Code since its previous declaration and intends to fully comply with them in the future as well.

The declaration issued in December 2019 concerning the German Corporate Governance Code is published on the Bayer website along with previous declarations: www.bayer.com/en/corporate-governance.aspx

Information on corporate governance practices

Bayer AG is subject to German stock corporation law and therefore has a dual governance system consisting of the Board of Management and the Supervisory Board, which manage the company based on a transparent strategy that is geared toward its long-term success and complies with applicable law and ethical standards.

Corporate governance practices that go beyond the legal requirements are derived from our vision and our common values, which form the basis of the respectful working relationship between our employees and with our external partners. Compliance with responsible practices at every stage of the value chain is crucial in corporate governance. The main guidelines are summarized primarily in our corporate policies on compliance, human rights, and fairness and respect at work, as well as our Supplier Code of Conduct. The organization and oversight obligations of the Board of Management and the Supervisory Board are mainly ensured by compliance management and risk management systems.

See also A 1.1

www.bayer.com/en/corporate-compliance-policy.aspx

www.bayer.com/en/supplier-code-of-conduct.aspx

Board of Management

Composition and objectives (diversity concept)

The Board of Management of Bayer AG comprised seven members in 2019. The Board of Management runs the company on its own responsibility with the goal of achieving defined corporate objectives and sustainably increasing the company's enterprise value.

Members of the Board of Management and offices they hold: see C Governance Bodies

In the composition of the Board of Management, the Supervisory Board takes into account specialist expertise and personal aptitude, as well as aspects such as age, gender, education and professional background. With regard to the proportion of women on the company's Board of Management, the Supervisory Board aims to ensure that there is at least one woman serving on the Board of Management.

Another aspect relating to the composition of the Board of Management that the Supervisory Board has resolved to pursue is diversity. Without basing selection decisions on this aspect in individual cases, the Supervisory Board aims to ensure that different age groups are adequately represented on the Board of Management, while also taking into account the experience required for a position on the Board of Management. Irrespective of this, members of the Board of Management should generally step down from that office when they turn 62. The composition of the Board of Management should adequately reflect the company's international operations. The Supervisory Board therefore endeavors to include on the Board of Management several members of different nationalities or with an international background (e.g. several years of career experience outside Germany or the oversight of foreign business activities). The Supervisory Board also strives to ensure diversity with regard to the educational and professional background of the members of the Board of Management. In addition to the specific professional expertise, management and leadership experience required for the given task, members of the Board of Management should cover the broadest possible spectrum of knowledge, experience, and educational and professional backgrounds.

These objectives are taken into account in the selection of candidates to fill open positions on the Board of Management. With this concept for the composition of the Board of Management, the Supervisory Board pursues the goal of ensuring not just the greatest possible individual suitability of its various members, but also that as many different perspectives as possible are represented in the leadership of the company through a balanced and diverse Board of Management structure and that the candidate selection pool is as large as possible.

In accordance with the statutory requirements, furthermore, there are also targets pertaining to the proportion of women at the first and second management levels below the Board of Management. The Board of Management has set objectives of 20% women on the first management level of Bayer AG and 25% women on the second management level. These objectives are to be attained by June 30, 2022.

The size of the Board of Management of Bayer AG will be reduced from seven to five members effective January 1, 2020.

Implementation status of the objectives

Currently there are no women on the Board of Management. We will continue to pursue our target of having one woman on the Board of Management by June 30, 2022, or beforehand if at all possible. The goal of adequate representation of different age groups, while also taking into account the experience required for Board of Management positions, was achieved. The ages of the members of the Board of Management were relatively evenly spread across a range of 50 to 63 years as of December 31, 2019. Three of the seven members of the Board of Management are citizens of a country other than Germany. All members of the Board of Management have amassed many years of career experience outside Germany. The members of the Board of Management also have diverse educational and professional backgrounds: Some have completed various business-related courses of study or training, while others have studied in various scientific fields including medicine.

The Board of Management should in the future return to having at least one female member

Procedure and committees

The Board of Management performs its tasks according to the law, the Articles of Incorporation and the Board's rules of procedure, and works with the company's other governance bodies in a spirit of trust.

For more information on the procedure and committees of the Board of Management, see www.bayer.com/en/corporate-governance.aspx

Supervisory Board

Composition and objectives (diversity concept and expertise profile)

Under the German Codetermination Act, half of the Supervisory Board's 20 members are elected by the stockholders, and half by the company's employees.

Members of the Supervisory Board and offices they hold: see C Further Information / Governance Bodies

Compensation of the members of the Supervisory Board: see A 4.4.4

The Supervisory Board endeavors to ensure that its members collectively possess the necessary expertise, skills and professional experience to properly perform their duties. This includes the following areas: management and leadership of international companies, a business understanding with regard to the company's main areas of activity, research and development, finance, controlling / risk management, human resources and governance / compliance.

The Supervisory Board has also resolved to pursue diversity in its composition, for instance with regard to age, gender, education and professional background. With respect to the international business alignment of Bayer AG, the Supervisory Board strives to ensure at all times that several of its members have international business experience or an international background in other respects. Further objectives concerning the composition of the Supervisory Board are that different age groups be suitably represented on the Supervisory Board and that, absent special circumstances, a member should not hold office beyond the end of the next Annual Stockholders' Meeting following their 72nd birthday. With a view to avoiding potential conflicts of interest and taking into account the ownership structure of the company and the number of independent Supervisory Board members, the Supervisory Board has set itself the goal that more than half of the stockholder representatives be independent. In addition, the Supervisory Board aims for at least three quarters of its total membership (stockholder and employee representatives) to be independent. The Supervisory Board assesses the independence of its members according to the recommendation contained in Section 5.4.2 of the German Corporate Governance Code. In assessing independence, the Supervisory Board also considers the criteria given in the recommendation of the European Commission of February 15, 2005.[25] Finally, the Supervisory Board has set a standard limit on the duration of any person's membership of the Supervisory Board in line with the recommendation in Section 5.4.1, Paragraph 2 of the Code. Absent special circumstances, no person should remain a member of the Supervisory Board for more than three full terms of office. For members of the Supervisory Board serving at the time the standard limit was introduced (September 2015) who have already exceeded this limit or will exceed it by the end of their current term of office, the limit will be applied with effect from the conclusion of their current term of office.

The Nominations Committee and the full Supervisory Board take these objectives into consideration when nominating candidates to fill open positions on the Supervisory Board. The stated objectives refer to the Supervisory Board as a whole unless otherwise determined. However, since the Supervisory Board can only nominate candidates for election as stockholder representatives, it can only take the objectives into account in these nominations. One objective for Supervisory Board elections is that neither women nor men account for less than 30% of the membership.

The Supervisory Board aims to achieve a balanced and diverse composition, to the extent that it can influence this. The aim is to ensure that oversight of the company's management is based on as many different perspectives as possible and that the candidate selection pool is as large as possible.

[25] Annex 2 to the recommendation of the European Commission of February 15, 2005, on the role of nonexecutive or supervisory directors of listed companies and on the committees of the (supervisory) board (2005/162/EC)

Implementation status of the objectives

The Supervisory Board has several members with international business experience or an international background. The ages of the members of the Supervisory Board were relatively evenly spread across a range of 49 to 73 years as of December 31, 2019. One Supervisory Board member, Werner Wenning, has exceeded the standard age limit of 72. The Supervisory Board has addressed this matter and, in view of the company being in a period of transition in several respects, unanimously requested that Wenning remain in office beyond the 2019 Annual Stockholders' Meeting. Two members of the Supervisory Board were previously members of the company's Board of Management: Werner Wenning was Chairman of the Board of Management until 2010, and Prof. Dr. Wolfgang Plischke was a member of the Board of Management until 2014. One member of the Supervisory Board, Dr. Paul Achleitner, has been a member of the Supervisory Board for more than three terms of office. However, neither Werner Wenning nor Prof. Dr. Wolfgang Plischke nor Dr. Paul Achleitner has any personal or business relationship with the company or a governance body of the company that in the opinion of the Supervisory Board gives rise to a material conflict of interest of a more than temporary nature.

There are no indications of any possible lack of independence in the case of the other Supervisory Board members. This also applies to Prof. Norbert Winkeljohann, who was a partner in PricewaterhouseCoopers GmbH and chairman of its management board until June 30, 2018. PricewaterhouseCoopers GmbH was the auditor of the financial statements of Bayer AG until 2016 and works for Bayer AG and other Group companies in an advisory capacity. Norbert Winkeljohann was never involved in audits of financial statements at Bayer. He fully ended his service with all PricewaterhouseCoopers companies as of June 30, 2018, and no longer participates in their success, not even through his pension plan. The Supervisory Board therefore considers all of its members to be independent. The proportion of women on the Supervisory Board is currently 35% for the full Supervisory Board, 30% for the employee representatives and 40% for the stockholder representatives. Five of the 20 members of the Supervisory Board are citizens of a country other than Germany. Numerous other members have many years of international business experience. The members of the Supervisory Board have also completed a whole range of vocational training and study courses.

In the opinion of the Supervisory Board, the stockholder representatives have the following special competencies and experience that should be represented to satisfy the objectives of the Supervisory Board:

A 4.1/1

Expertise and Experience of Shareholder Representatives on the Supervisory Board

	International Business Experience	R&D	Agriculture / Food	Healthcare	Finance	Controlling / Risk Management	HR	Governance / Compliance	Digital	Sustainability
Dr. Paul Achleitner	X				X	X	X	X		
Dr. Simone Bagel-Trah	X					X	X	X		X
Dr. Norbert W. Bischofberger	X	X		X						
Ertharin Cousin	X		X				X	X		X
Johanna W. (Hanneke) Faber	X		X		X	X			X	X
Colleen A. Goggins	X			X			X			
Prof. Dr. Wolfgang Plischke	X	X	X	X						X
Werner Wenning (Chairman)	X		X	X	X	X	X	X		
Prof. Dr. Otmar D. Wiestler	X	X		X						
Prof. Dr. Norbert Winkeljohann	X				X	X	X	X	X	

Procedure and committees

The role of the Supervisory Board is to oversee and advise the Board of Management. The Supervisory Board is directly involved in decisions on matters of fundamental importance to the company, regularly conferring with the Board of Management on the company's strategic alignment and the implementation status of the business strategy. The Report of the Supervisory Board in this Annual Report provides details about the work of the Supervisory Board and its committees. In 2019, the Supervisory Board established a special committee to address the glyphosate litigations.

See the Report of the Supervisory Board for information on the committees' responsibilities

The Supervisory Board regularly assesses the efficiency of its work. The most recent assessment was conducted in 2018 with the support of an external consultant. The findings of this assessment and the recommendations derived from it were addressed in detail by the Supervisory Board in 2019.

Further information

Securities transactions by members of governance bodies

Members of the Board of Management or Supervisory Board and persons with whom they have close relationships are legally obligated to report own-account transactions in shares or debt securities of Bayer AG, associated derivatives or other associated financial instruments to Bayer AG and the German Federal Financial Supervisory Authority (BaFin) as soon as the total volume of transactions made by a member of the Board of Management or Supervisory Board, or a person with whom they have a close relationship, within a calendar year has reached the €5,000 threshold. The transactions reported to Bayer AG in 2019 were duly published and can be viewed on the company's website.

www.bayer.com/en/disclosure-of-securities-transactions.aspx

4.2 Compliance

We define compliance as legally and ethically impeccable conduct by all employees in their daily work, because the way they carry out their duties affects our company's reputation. We do not tolerate any violation of laws, codes of conduct or internal regulations. Compliance is essential for our long-term economic success.

www.bayer.com/compliance

The following compliance principles apply throughout the Bayer Group:

// We compete fairly in every market.
// We act with integrity in all our business dealings.
// We balance economic growth with ecological and social responsibility.
// We observe trade controls that regulate our global business.
// We safeguard equal opportunity in securities trading.
// We keep accurate books and records.
// We treat each other with fairness and respect.
// We protect and respect intellectual property rights.
// We act in Bayer's best interest.
// We protect and secure personal data.

All employees are required to observe the compliance principles and to immediately report any violation of the Corporate Compliance Policy. Infringements are sanctioned. This applies in particular to managerial employees, who, for example, may lose their entitlement to variable compensation components and be subject to further disciplinary measures if violations have occurred in their sphere of responsibility. Compliant and lawful conduct also factors into the performance evaluations of all managerial employees.

The global compliance management system is steered by a central compliance organization within the Bayer Group that reports to the Chairman of the Board of Management and to the Audit Committee of the Supervisory Board.

Potential compliance risks are identified together with the operational units to ensure the systematic and preventive detection and assessment of risks. Potential risks are then entered into a global compliance risk management database that we use to develop suitable measures for specific processes, business activities or countries, for example. In addition, we assess our business partners according to risk criteria as we look to identify potential compliance risks. Adherence to the corporate compliance principles is among the subjects covered in audits conducted by Bayer's Internal Audit and in the analyses and investigations by the legal and compliance organization. The heads of these organizations provide regular reports on the findings of the audits and analyses to the Audit Committee of the Supervisory Board, while summary reports are presented at least once a year.

Handling of suspected and actual compliance violations

Suspected compliance violations can be reported – anonymously if desired and if permitted by respective national law – to a central, worldwide compliance hotline that is also accessible to the general public. In 2019, the compliance organization received a total of 372 reports in this way. Alternatively, suspected violations may also be reported to the respective compliance functions or to Internal Audit.

Compliance violations are systematically sanctioned. The action taken depends on factors including the gravity of the compliance violation and applicable law.

Compliance training and communications activities

We support all employees in acting with integrity and proactively avoiding potential violations by implementing Bayer-wide training measures and communication campaigns that are tailored to target groups and based on identified needs. Both supervisors and compliance managers can answer employees' questions about lawful and ethical behavior.

In 2019, 95% of Bayer's managerial employees worldwide completed at least one compliance training program. Overall, 66% of employees (excluding the acquired agriculture business) took part in a web-based training program.

Training measures on product-related communication, antitrust law, data protection and anti-corruption are fundamental elements of our compliance management system.

Marketing compliance

We do not tolerate bribery or any other form of improper exertion of influence on our business partners.

The most important internal Bayer corporate policy in this context is our Anti-Corruption Policy, which is supplemented by the rules of conduct established in our corporate policy entitled "Responsible Marketing & Sales." Bayer has also put in place directives and corporate policies that are designed to prevent price fixing and ensure data protection. Various industry codes such as those of the International Federation of Pharmaceutical Manufacturers & Associations and the European Federation of Pharmaceutical Industries and Associations (EFPIA) also apply in marketing and distribution.

www.bayer.com/
responsible-marketing

Crop Science's Product Stewardship Commitment applies to all products, services and technologies and is in alignment with the International Code of Conduct on Pesticide Management issued by the Food and Agriculture Organization (FAO) of the United Nations and the Code of Conduct on Plant Biotechnology issued by CropLife International, for example.

The WHO Ethical Criteria for Medicinal Drug Promotion, together with national ethical standards, represent the minimum global standards for the advertising of human pharmaceutical products at Bayer.

Based on the EFPIA transparency code and the corresponding local interpretations, Pharmaceuticals annually discloses any payments and other remunerations made to health care professionals and organizations for the preceding calendar year.

Lobbying

Forming part of our commitment to ensuring transparent lobbying, our corporate policy entitled "Code of Conduct for Responsible Lobbying" sets out binding rules for our involvement in political matters and creates transparency in our interactions with the representatives of political institutions.

www.bayer.com/code-of-conduct-lobbying

As set out in this corporate policy, Bayer as a company did not make any donations to political parties, politicians or candidates for political office in 2019. This does not include political donations in the United States, which permits Bayer to make donations in support of candidates and elections at the state level. Such donations are subject to stringent conditions and mandatory transparency measures that include a publicly accessible list documenting donations made at state level.

In 2019, Bayer also decided to launch the Bayer Societal Engagement (BASE) principles. Afforded the status of a corporate policy, these principles serve to codify Bayer's standards and values to an even greater degree.

4.3 Disclosures Pursuant to Sections 289b Through e and 315b and c of the German Commercial Code (HGB)

The Bayer Group meets the requirements for the nonfinancial statement pursuant to Sections 289 b through e and 315 b and c of the German Commercial Code (HGB). The relevant disclosures pertaining to the nonfinancial statement in accordance with the Corporate Social Responsibility Directive Implementation Act (CSR-RUG) are integrated into the management report, with the GRI standards (Section 289d HGB) serving as a framework.

The Supervisory Board fulfilled its auditing duty for the nonfinancial statement pursuant to Section 170, Paragraph 1 and Section 171, Paragraph 1 of the German Stock Corporation Act (AktG).

A 4.3/1

Index to Nonfinancial Statement

Subject area	Chapter	
Business model	A 1.1	Corporate Profile and Structure
Aspects		
Environmental aspects	A 1.2.1	Strategy and Targets
	A 1.5	Procurement and Supplier Management
	A 1.6	Product Stewardship
	A 1.7	Environmental Protection and Safety
Employee-related aspects	A 1.2.2	Sustainability Management
	A 1.5	Procurement and Supplier Management
	A 1.4	Commitment to Employees
	A 1.7	Environmental Protection and Safety
Social aspects	A 1.2.2	Sustainability Management
	A 1.6	Product Stewardship
	A 1.7	Environmental Protection and Safety
Instruments for combating corruption and bribery	A 1.2.2	Sustainability Management
	A 1.5	Procurement and Supplier Management
	A 4.2	Compliance
Respect for human rights	A 1.2.2	Sustainability Management
	A 1.4	Commitment to Employees
	A 1.5	Procurement and Supplier Management
Material risks	A 3.2.2	Opportunity and Risk Status
Diversity concept	A 1.4	Commitment to Employees
	A 4.1	Declaration by Corporate Management

4.4 Compensation Report

The Guidelines for Sustainable Management Board Remuneration Systems were developed by supervisory board chairpersons, investor representatives, scientists and corporate governance experts

The Compensation Report describes the essential features of the compensation packages for the members of the Board of Management and the Supervisory Board of Bayer AG and explains the compensation the individual members were granted or received for the 2019 fiscal year. The report complies with the requirements of the applicable financial reporting standards for publicly traded companies (German Commercial Code [HGB], German Accounting Standards [DRS] and the International Financial Reporting Standards [IFRS]) as well as with the recommendations contained in the current versions of the German Corporate Governance Code and the guidelines for the sustainable compensation of management board members. In addition, the Compensation Report already largely takes into account the requirements resulting from the law, dated December 12, 2019, to transpose the European Shareholder Rights Directive II (SRD II) into German law (ARUG II).

4.4.1 Compensation of the Board of Management

Objective

The compensation system for the Board of Management of Bayer AG applies in the version approved by a large majority (81.1%) at the Annual Stockholders' Meeting on April 29, 2016. It is aligned to the corporate strategy and geared toward performance-driven, sustainable corporate governance and an appropriate compensation structure and level. The compensation system for the Board of Management largely corresponds to the system applying to all managerial employees not covered by collective bargaining agreements.

Key elements in Board of Management compensation include not only the absolute amount and appropriate and clear limits, but also a balanced mix of fixed income and short- and long-term variable compensation components. In accordance with the recommendations of the German Corporate Governance Code and the guidelines for the sustainable compensation of management board members, the variable portion of target compensation at Bayer has a predominantly long-term character. The fixed compensation accounts for 28.6%, the annual bonus also for 28.6% and the long-term stock-based cash compensation for 42.8% of the target compensation (fixed compensation plus variable cash compensation components).

The compensation of the Board of Management is reviewed each year and is usually increased in line with the consumer price index for Germany. If the Supervisory Board considers an additional adjustment necessary, the Human Resources Committee discusses the matter in detail with the aid of background information and prepares a corresponding resolution proposal for the Supervisory Board. The benchmark for the compensation review, for which an external independent expert is consulted, is the DAX 30 companies excluding financial services companies. All of the assessment criteria recommended in Section 4.2.2 of the German Corporate Governance Code are taken into account. The full Supervisory Board then resolves on the proposed adjustment.

An overview of the compensation system for the Board of Management is given below:

A 4.4.1/1

Board of Management Compensation Policy for 2019

	Objective	Basis of calculation
Fixed annual compensation	Compensation in line with market rates	The level of fixed annual compensation reflects a person's role on the Board of Management, their experience, the scope of responsibility to be exercised and market conditions.
Fringe benefits	Reimbursement of costs that arise in connection with, or facilitate, service on the Board of Management	Fringe benefits include a company car with driver, the costs of health screening examinations, various types of insurance, and private home security installations. They also include indemnity payments to new members of the Board of Management for variable compensation components granted to them by former employers that lapse due to their joining Bayer.
Short-term variable cash compensation (Short-term incentive [STI]) = annual bonus	Attainment of short-term corporate targets	Target attainment in relation to the following compensation components, each of which accounts for one-third of the performance assessment: 1. Group component: core earnings per share 2. Divisional component: 30% qualitative and 70% quantitative targets (currency- and portfolio-adjusted sales growth and EBITDA margin before special items of the divisions, plus cash flow performance for Crop Science) 3. Individual component: individual targets and team targets
Discretionary power of the Supervisory Board in setting the annual bonus	Ensuring the relative fairness of bonuses for the individual members of the Board of Management	The Supervisory Board assesses the personal performance of the members of the Board of Management based on their attainment of the annual targets agreed with them. Personal performance accounts for one-third of the target annual bonus. The Supervisory Board also assesses target attainment for the qualitative element of the divisional component.
Malus and clawback	Ensuring appropriate compensation	If a Board of Management member commits a breach of duty that results in financial loss, there is a legal basis for reducing payments or demanding their return.
Long-term four-year stock-based cash compensation Aspire 2.0 (long-term incentive [LTI])	Supporting a sustained increase in corporate value	Virtual, stock-based compensation program: The LTI payout after four years is based on the LTI target value, which is then adjusted to reflect the development of Bayer's share price and its performance relative to the EURO STOXX 50 along with dividends paid in the meantime on the virtually acquired number of shares (total shareholder return approach). Payments are made automatically after four years in the month after the tranche expires.
Payment limits (caps)	Avoiding inappropriately high payments	Caps apply to both variable compensation components. STI: Target value = 100% of fixed annual compensation Cap = 200% of the target value LTI: Target value = 150% of fixed annual compensation multiplied by the personal STI payment factor for the previous fiscal year Cap = 250% of the target value In addition, the total cash compensation (fixed annual compensation + STI + LTI) received by each member of the Board of Management is capped on an individual basis. The caps amount to €10.0 million for Werner Baumann, €6.0 million for Liam Condon, €5.5 million for Stefan Oelrich and €5.0 million for each of the other members.
Share ownership guidelines	Promotion of sustainable corporate development and identification with the company	At the end of a four-year position-building period, members of the Board of Management are contractually obligated to purchase Bayer shares equating to one-half of the LTI target value (75% of fixed annual compensation) and to retain these shares for the duration of their subsequent service on the Board of Management.
Retirement and surviving dependents' pensions	Provision of contributions to provide an adequate pension	Company contributions of currently 8% to Bayer-Pensionskasse or 2% to Rheinische Pensionskasse are made on fixed annual compensation up to the ceiling for statutory pension contributions in Germany. Company contributions of 42% of the amount by which the respective fixed compensation exceeds that ceiling are also granted provided that Board of Management members make a personal contribution of 9%. These amounts are converted into pension entitlements. Benefits accrue from the sum total of the pension entitlements.
Contract termination	Avoiding inappropriately high payments	If the company early terminates a Board of Management member's contract, severance payments will be capped at two years' annual compensation (severance cap) but shall not exceed the compensation for the remainder of the original contract term. This does not apply in the case of a termination for cause.
Change of control	Ensuring independence in acquisition situations	Indemnity payments amounting to 250% of fixed annual compensation, capped as per the German Corporate Governance Code at the lower of (i) three years' compensation or (ii) the compensation for the remainder of the contract term

Performance-related components

Short-term variable cash compensation

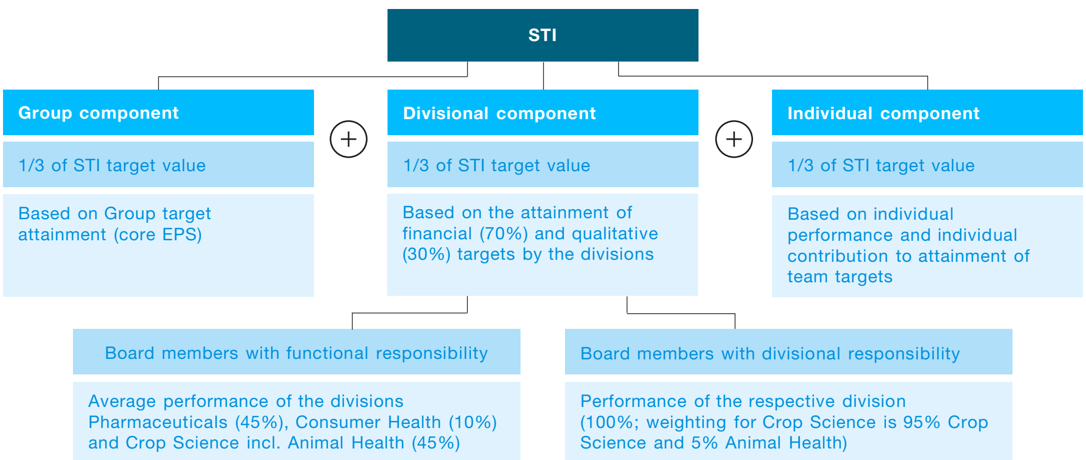
The short-term variable cash compensation (STI) is based on a contractually agreed target rate of 100% of fixed annual compensation. The level of the STI payout is determined by the target attainment for three subcomponents – the Group component, the divisional component and the individual performance component – each of which is given a one-third weighting in the performance evaluation. The performance evaluation takes into account both positive and negative developments.

- The Group component is based on the core earnings per share of the Group and is capped at 200%.
- The divisional component is incentivized based on the average performance of the divisions. For the members of the Board of Management with functional responsibility, this component is calculated using the following weighting: Crop Science including Animal Health 45% (of which Crop Science accounts for 95% and Animal Health for 5%), Pharmaceuticals 45% and Consumer Health 10%. For the Board members with divisional responsibility, however, this one-third of the STI is incentivized entirely on the basis of the respective division's earnings. The assessment of divisional performance comprises a 70% component linked to the attainment of financial targets, measured in terms of the EBITDA margin before special items and divisional sales growth on a currency- and portfolio-adjusted basis (Fx & portfolio adj.). For Crop Science, cash flow performance is also taken into account using a correction factor that may increase or reduce the quantitative target attainment by up to 50%. Target attainment is determined by setting the cash flow from operating activities (taking one-time effects into account) against a reference value based on internal planning. The remaining 30% component of divisional performance is based on the attainment of qualitative targets in areas such as innovative progress, safety, compliance and sustainability. The qualitative components can also be used as a correction factor at the reasonable discretion of the Supervisory Board. The divisional component is capped at 300%.
- The target attainment criteria for the individual performance component are based on the duties and resulting personal targets of the respective member of the Board of Management, as well as on his or her individual contribution to the attainment of the Group targets. The individual targets for the members of the Board of Management are determined annually by the Supervisory Board, which also assesses their attainment. The individual performance component is capped at 200%.

The entire amount of the STI is paid out in the second quarter of the following year.

A 4.4.1/2

Short-Term Variable Cash Compensation Components (STI)



For fiscal 2019, the core EPS target for the Group component was originally set at €6.80 when the targets were originally established at the start of the year. However, this target also took into account the earnings contributions from Animal Health and the Currenta Group, the divestment of which was agreed during the year. Taking into account these earnings contributions reported under discontinued operations – reduced by the depreciation amount which, under IFRS 5, was no longer recognized on assets held for sale but had been included in the original planning – the core EPS target to ensure comparability in determining target attainment was €6.77 per share. This corresponds to a target attainment level of 96.6%. The performance evaluation corridor set for 2019 was between €5.80 (payout from this component = 0) and €7.30 (200% payout = cap).

For the quantitative performance evaluation for the divisional component, sales growth (Fx & portfolio adj.) and the EBITDA margin before special items are considered in a two-dimensional matrix. Awards above 100% of the target value can occur, for example, if one performance target is met and the other is exceeded, or if both performance targets are exceeded.

A 4.4.1/3

STI Payment Matrix[1] 2019

							EBITDA margin before special items				
							< Target value		Target value		> Target value
						CS	23.8%	…	24.8%	…	25.8%
						PH	32.3%	…	33.3%	…	34.3%
						CH	19.2%	…	20.2%	…	21.2%
						AH	21.8%	…	22.8%	…	23.8%
		CS	PH	CH	AH						
Sales growth (Fx & p. adj.)[2]	< Target value	0.7%	1.6%	–1.8%	1.4%		*0%*	…	*50%*	…	*100%*
		…	…	…	…		…	…	…	…	…
	Target value	3.2%	4.1%	0.7%	3.9%		*50%*	…	*100%*	…	*150%*
		…	…	…	…		…	…	…	…	…
	> Target value	5.7%	6.6%	3.2%	6.4%		*100%*	…	*150%*	…	*200%*

Fx & p. adj. = currency- and portfolio-adjusted
[1] Financial targets for the respective division (70% weighting)
[2] Currency-adjusted pro-forma sales growth is used at Crop Science in view of the agriculture business acquired in 2018.

For fiscal 2019, the following target values for sales growth and the EBITDA margin before special items were budgeted and achieved, respectively, for the divisions.[26]

Crop Science

// Pro-forma sales growth vs. 2018 (Fx adj.): Target value: 3.2% / Attainment: minus 1.4%
// EBITDA margin before special items: Target value: 24.8% / Attainment: 24.2%
// The target value for the cash flow from operating activities was €2 billion. The positive cash flow performance led to a 25% increase in target attainment.

See A 2.2.2 and A 2.3 for information on pro-forma sales

Pharmaceuticals

// Sales growth vs. 2018 (Fx & portfolio adj.): Target value: 4.1% / Attainment: 5.6%
// EBITDA margin before special items: Target value: 33.3% / Attainment: 33.3%

Consumer Health

// Sales growth vs. 2018 (Fx & portfolio adj.): Target value: 0.7% / Attainment: 2.1%[27]
// EBITDA margin before special items Target value: 20.2% / Attainment: 20.0%

Animal Health

// Sales growth vs. 2018 (Fx & portfolio adj.): Target value: 3.9% / Attainment: 2.1%
// EBITDA margin before special items: Target value: 22.8% / Attainment: 24.0%

[26] The following attainment levels were calculated based on figures that have not been rounded.
[27] Increase in sales after currency and portfolio effects adjusted by minus 0.5 percentage points due to growth in Argentina being driven by hyperinflation

The quantitative and qualitative elements that make up the divisional component for 2019 resulted in the following overall target attainment levels:

- // Crop Science: 53.5%
- // Pharmaceuticals: 129.9%
- // Consumer Health: 118.7%
- // Animal Health: 119.1%

This led to a 95.9% target attainment for Board of Management members with functional responsibility.

In accordance with a resolution of the Human Resources Committee and the Supervisory Board, all members of the Board of Management receive individual targets that are tailored to their respective areas of responsibility. Target attainment is individually evaluated following the end of the fiscal year. The following table provides an overview of the subject areas taken into account for the individual performance targets agreed upon.

A 4.4.1/4

Individual Targets Agreed 2019

Board of Management member	Topic areas for individual targets
Werner Baumann	Driving forward integration of Monsanto, operationalizing Bayer 2022 project, defending glyphosate litigation, divestment of Animal Health, Currenta, Dr. Scholl’s and Coppertone
Dr. Hartmut Klusik	Attracting and developing talented employees, quality assurance, safety in production, sustainability and social responsibility strategy
Wolfgang Nickl	Driving the Bayer 2022 project, realizing Monsanto synergies, divestment of Animal Health, Currenta, Dr. Scholl’s and Coppertone, continued refinement of equity story
Kemal Malik	Strengthening research, innovation and Leaps by Bayer
Liam Condon	Driving forward integration of Monsanto, business continuity at Crop Science, digital transformation at Crop Science and Bayer in general, sustainability and social responsibility strategy
Heiko Schipper	Advancing quality of brand strategies, strengthening Consumer Health innovation pipeline, divestment of prescription dermatology business, Dr. Scholl’s and Coppertone
Stefan Oelrich	Refining the Pharmaceuticals strategy (strengthening research and the product pipeline, inlicensing, key markets, digital transformation), quality assurance, strengthening our gene therapy activities

In addition, team targets are agreed to reflect the collective responsibility of the members of the Board of Management as a governance body. The team targets are based on the Group targets set by the Board of Management for 2019 and approved by the Supervisory Board. The following table provides an overview of the subject areas taken into account.

A 4.4.1/5

Team Targets 2019

Subject area	Targets
Alignment against growth markets	// Achieve successful integration within the Crop Science Division
	// Drive organic growth by further focusing activities on 'must-wins' anchored in the divisional strategies
	// Drive value-creating external growth opportunities, with particular emphasis on inlicensing at Pharmaceuticals
Innovation powered by science	// Drive pipeline progress in the divisions and advance the transformation of the innovation model
	// Drive breakthrough innovation through Leaps by Bayer
	// Drive digital transformation in the divisions and functions and advance development of disruptive business models
Excellence in execution	// Drive production reliability to deliver planned quantities at agreed service levels
	// Regain investor confidence by delivering business performance that meets expectations and by driving efficiency programs at the divisions
	// Develop and execute transformation plan in platform functions as part of Bayer 2022
Commitment to people and sustainability	// Elevate digital capabilities to support divisional and functional strategies
	// Attract and engage the best talents by modernizing our employer proposition, cultivating an agile culture, enhancing our leadership and developing our people and their capabilities in line with our defined behaviors to prepare for a digital future
	// Develop and activate a comprehensive sustainability strategy addressing the direct impact of Bayer and our broader contribution to the ecosystem
	// Develop and activate a comprehensive reputation management strategy

The attainment of the individual targets and the team targets is assessed by the Human Resources Committee and the Supervisory Board following the end of the fiscal year. It amounted to between 100% and 135% for the individual members of the Board of Management.

Long-term stock-based cash compensation (LTI)
Members of the Board of Management are eligible to participate in the annual tranches of the long-term stock-based compensation program Aspire on condition that they purchase a certain number of Bayer shares – determined for each individual according to specific guidelines – as a personal investment and hold them for as long as they continue in the service of the Bayer Group.

The LTI target values for the Aspire 2.0 tranches issued each year since 2016 are generally based on a contractually agreed target rate of 150% of fixed annual compensation. The starting value is also multiplied by the individual STI payment factor for the Board member concerned for the year prior to the issuance of the respective tranche.

$$\text{LTI target value} = 150\% * \text{fixed annual compensation} * \text{STI payment factor prior to issuance of the tranche}$$

The LTI payout after four years is based on the LTI target value, with is then adjusted to reflect the development of Bayer's share price and its performance relative to the EURO STOXX 50 along with the dividends paid in the meantime based on the virtually acquired number of shares (total stockholder return approach):

$$\text{LTI payout} = \text{LTI target value} * \frac{\text{average share price on the last 30 trading days prior to expiration of the tranche}}{\text{average share price on the last 30 trading days prior to issuance of the tranche}} * \text{performance relative to EURO STOXX 50} + \text{total dividend equivalents}$$

For the Board of Management, an additional performance measure has been included in the form of the comparison with the EURO STOXX 50. This increases or decreases the payout by the percentage of overperformance or underperformance, respectively, but by no more than 50% either way.

The payments made under the tranches of the Aspire program issued in the years up to 2015 continued to be based until their expiration on the Aspire Target Opportunity, which is a contractually agreed percentage of fixed annual compensation. Depending on the performance of Bayer stock, both in absolute terms and relative to the EURO STOXX 50 benchmark index, participants are granted an award of between 0% and a maximum 300% of their individual Aspire Target Opportunity at the end of the respective performance periods.

The payout/performance matrix according to the absolute and relative development of Bayer's share price is explained at www.investor.bayer.de/en/stock/stock-programs/aspire/.

The following table provides an overview of the 2015 and 2016 Aspire tranches, including the starting and final prices/values for Bayer stock and the EURO STOXX 50 – which are the average prices/values on the 30 trading days preceding the respective reference date – and the percentage payouts.

A 4.4.1/6

Aspire Target Attainment

	2015 Tranche[1]	2016 Tranche
Bayer stock starting price	€113.82	€117.27
Bayer stock final price	€63.08	€69.95
EURO STOXX 50 starting value	3,162.29	3,346.47
EURO STOXX 50 final value	3,094.29	3,709.77
Percentage payout	0.0%	38.9%

[1] Tranche of the Aspire program that applied until 2015

If a member of the Board of Management enters retirement during the year or steps down from the Board of Management during the year due to the nonextension of their service contract by mutual agreement or by the company's decision, the Aspire tranche granted for that year is reduced on a prorated basis according to the duration of the member's active service on the Board of Management during this first year of the tranche. In this case, tranches granted for previous years remain in effect without any changes.

Pension entitlements (retirement and surviving dependents' pensions)
The annual pension entitlement for members of the Board of Management is based on contributions. Each member of the Board of Management is a member of one of the two corporate pension funds. Bayer makes company contributions to complement the personal contributions of 2%. The company contributions are currently set at 8% to Bayer-Pensionskasse or 2% to Rheinische Pensionskasse on fixed annual compensation up to the ceiling for statutory pension contributions in Germany. In addition, Bayer provides a hypothetical annual contribution equal to 42% of the amount by which the respective fixed compensation exceeds that ceiling. This percentage is comprised of a basic contribution of 6% and a matching contribution of 36%, which is four times the member's personal contribution of 9%. The total annual contribution is converted into a pension entitlement according to the annuity table for the applicable tariff of the Rheinische Pensionskasse VVaG pension fund. The annual pension entitlement upon retirement is the total amount of the accumulated pension entitlements including any investment bonus, the amount of which is determined annually based on the net return on the assets of the Rheinische Pensionskasse VVaG minus the minimum return on the contributions that is guaranteed under the tariff and approved by the German Financial Supervisory Authority (BaFin). Future pension payments are annually reviewed and adjusted in line with the respective entitlements.

Furthermore, additional arrangements are in place for the following members of the Board of Management:

// Werner Baumann has been granted a vested entitlement to an annual pension of €200 thousand starting on his 60th birthday. This is subject to a prorated reduction in the event that his term of office ends prior to his 60th birthday under certain conditions.
// Kemal Malik was granted a vested entitlement to an annual pension of €80 thousand starting on his 65th birthday. This was proportionately reduced because his term of office ended prior to his 65th birthday.
// In view of his split contract, Heiko Schipper participates in pension plans in Germany (30%) – for his service on the Board of Management of Bayer AG – and in Switzerland (70%) – under his contract as head of Consumer Health at BCC AG in Basel – on a prorated basis. Mr. Schippers' pension entitlement in Switzerland is from a defined benefit plan in which contributions accumulate in an account and are then disbursed as a retirement annuity.

Certain assets are administered by Bayer Pension Trust e.V. under a contractual trust arrangement (CTA) to cover pension entitlements resulting from direct commitments in Germany. This provides substantial additional security – beyond the benefits from the Pension Insurance Association – for the respective pension entitlements of the members of the Board of Management in Germany.

Benefits upon termination of service on the Board of Management

When a service contract of a Board of Management member terminates (by expiration or nonextension), all previously obligatory payments for fixed compensation, the annual bonus (STI), the company pension plan and all fringe benefits cease. Long-term variable compensation (LTI), meanwhile, is only paid out once the respective four-year tranche has expired, although the entitlements are earned during the regular contract term.

See the section Long-term stock-based cash compensation (LTI)

Post-contractual noncompete agreements

Post-contractual noncompete agreements exist with the members of the Board of Management, providing for compensatory payments to be made by the company for the two-year duration of these agreements. The compensatory payment for each of the two years amounts to 100% of the average fixed compensation for the 12 months preceding their departure. In line with legal requirements, other work-related income is taken into account when determining the compensatory payment. The company can opt to waive the noncompete agreement when a service contract terminates, in which case no compensatory payment is made. This is also the case when a member of the Board of Management retires after leaving the company.

Unfitness for work

In the event of temporary unfitness for work, members of the Board of Management continue to receive the contractually agreed compensation. Bayer AG may early terminate the service contract if the Board member has been continuously unfit for work for at least 18 months and is likely to be permanently incapable of fully performing their duties (permanent incapacity to work). A disability pension is paid in the event of contract termination before the age of 60 due to permanent incapacity to work. For members of the Board of Management, the amount of the disability pension under the service contract corresponds to the entitlement accrued on the date of contract termination, taking into account a fictitious period of service between that date and the member’s 55th birthday, where applicable.

Planned changes from 2020/2021

In December 2019, the Supervisory Board resolved on a new compensation system for the Board of Management that can be applied from 2020. A motion to this effect will be presented at the 2020 Annual Stockholders’ Meeting for approval. A description of the new compensation system will be provided together with the Notice of the Annual Stockholders' Meeting.

Compensation of the Board of Management in 2019

The aggregate compensation (HGB) for the members of the Board of Management in 2019 totaled €26,075 thousand (2018: €24,509 thousand), comprising €8,227 thousand (2018: €8,212 thousand) in non-performance-related components and €17,848 thousand

(2018: €16,297 thousand) in performance-related components. The pension service cost amounted to €2,753 thousand (2018: €2,745 thousand).

As of December 31, 2019, the Board of Management of Bayer AG consisted of seven members. The service of Dr. Hartmut Klusik and Kemal Malik on the Board of Management ended on that date. There were no changes in the membership of the Board of Management during 2019.

The following table shows the aggregate compensation, according to the German Commercial Code, of the individual members of the Board of Management who served in 2018 and / or 2019:

A 4.4.1/7

Board of Management Compensation (German Commercial Code)

€ thousand	Fixed annual compensation 2018	Fixed annual compensation 2019	Fringe benefits 2018	Fringe benefits 2019	Short-term variable cash compensation 2018	Short-term variable cash compensation 2019	Long-term stock-based cash compensation (Aspire)[1] 2018	Long-term stock-based cash compensation (Aspire)[1] 2019	Aggregate compensation 2018	Aggregate compensation 2019	Pension service cost[2] 2018	Pension service cost[2] 2019
Serving members of the Board of Management as of December 31, 2019												
Werner Baumann (Chairman)	1,511	1,650	46	47	1,708	1,717	2,039	2,804	5,304	6,218	874	1,014
Liam Condon	819	950	45	44	1,056	896	793	1,841	2,713	3,731	348	457
Dr. Hartmut Klusik	768	787	39	39	805	819	864	1,240	2,476	2,885	331	223
Kemal Malik[3]	794	814	37	37	813	792	923	1,253	2,567	2,896	315	355
Wolfgang Nickl	523	787	41	68	571	859	1,056	1,319	2,191	3,033	133	188
Stefan Oelrich[4]	137	840	142	854	133	983	973	1,226	1,385	3,903	19	202
Heiko Schipper[5]	640	787	1,431	523	639	918	1,104	1,181	3,814	3,409	178	314
Former members												
Johannes Dietsch	320	–	17	–	346	–	432	–	1,115	–	141	–
Erica Mann	192	–	3	–	192	–	145	–	532	–	204	–
Dieter Weinand	683	–	24	–	674	–	1,031	–	2,412	–	202	–
Total[6]	**6,387**	**6,615**	**1,825**	**1,612**	**6,937**	**6,984**	**9,360**	**10,864**	**24,509**	**26,075**	**2,745**	**2,753**

[1] Fair value at the grant date
[2] Including company contributions to Bayer-Pensionskasse VVaG, Rheinische Pensionskasse VVaG and to a pension fund outside Germany
[3] A severance payment of €6,831 thousand (HGB valuation) was agreed with Kemal Malik in view of his leaving the company on December 31, 2019. This puts him in the same position as if he had held office until December 31, 2021, and had then retired.
[4] The fringe benefits for Stefan Oelrich contain an indemnity payment of €808 thousand (2018: €135 thousand) for variable compensation components granted to him by his former employer that lapsed due to his joining Bayer. This indemnity amounts to €2,424 thousand in total and is being paid over a period of three years on a pro rata temporis basis.
[5] The fringe benefits for Heiko Schipper contain an indemnity payment of €495 thousand (2018: €894 thousand) for variable compensation components granted to him by his former employer that lapsed due to his joining Bayer. This indemnity amounts to a maximum of €1,950 thousand. A quarter of this amount was paid at the date he joined the Board of Management. The remaining three-quarters is being paid over a period of three years on a pro rata temporis basis.
[6] The total compensation of the Board of Management includes fixed annual compensation of €551 thousand (2018: €583 thousand), fringe benefits of €374 thousand (2018: €1,000 thousand), short-term variable cash compensation of €643 thousand (2018: €581 thousand) and long-term stock-based cash compensation of €827 thousand (2018: €874 thousand) that Erica Mann and Heiko Schipper received in 2018 and in 2018 and 2019, respectively, from our subsidiary Bayer Consumer Care AG, Switzerland, in their capacities as head of the Consumer Health Division.

Fixed annual compensation

The fixed annual compensation of the members of the Board of Management was adjusted in 2019. The total fixed annual compensation of all the members was €6,615 thousand (2018: €6,387 thousand). In addition to the adjustment of the fixed annual compensation of all the members of the Board of Management based on the development of the consumer price index, Werner Baumann and Liam Condon received unscheduled increases of 6.6% and 13.1%, respectively, in view of the higher business volume and extension of their responsibilities arising from the agriculture business acquired in 2018.

Short-term variable cash compensation

The total short-term variable cash compensation for all the members of the Board of Management in 2019 amounted to €6,984 thousand (2018: €6,937 thousand) after deduction of the solidarity contribution. Provisions of €6,984 thousand (2018: €5,725 thousand) were established for payment of this compensation component to the members of the Board of Management serving as of December 31, 2019. The solidarity contribution is made by all employees of the companies covered by the respective agreements with the employee representatives to help safeguard jobs at the German sites. For 2019 it amounted to 0.14% (2018: 0.22%) of each person's STI award.

Long-term variable cash compensation based on virtual Bayer shares

This is no longer a component of long-term compensation following the adjustment of the compensation system for the Board of Management effective January 1, 2016, and now forms part of short-term cash compensation. The conversion of 50% of the STI into virtual Bayer shares took place for the last time in 2015 and was based on an average price of €119.17. The aggregate compensation for 2018 according to IFRS included a negative change of €978 thousand in the value of existing entitlements. As of December 31, 2019, there were no provisions (December 31, 2018: provisions of €1,824 thousand) for future cash disbursements under this program.

Long-term stock-based cash compensation (Aspire)

The long-term stock-based cash compensation under the Aspire program is included in the aggregate compensation according to the German Commercial Code at its fair value of €10,864 thousand (2018: €9,360 thousand) at the respective grant date.

The aggregate compensation according to IFRS includes the fair value of the partial entitlement earned in the respective year. Grants of stock-based compensation with a four-year performance period are therefore expensed at their respective fair values over four years starting with the grant year. The stock-based compensation according to IFRS also includes the change in the value of existing entitlements under ongoing Aspire tranches granted in prior years.

A 4.4.1/8

Board of Management Compensation – Aspire Program (IFRS)

		Serving members of the Board of Management as of December 31, 2019							Former members			
€ thousand		**Werner Baumann (Chairman)**	**Liam Condon**	**Dr. Hartmut Klusik**	**Kemal Malik**	**Wolfgang Nickl**	**Stefan Oelrich**	**Heiko Schipper**	**Johannes Dietsch**	**Erica Mann**	**Dieter Weinand**	**Total**
Stock-based compensation entitlements earned in the respective year[1]	2019	1,849	1,071	2,471	897	553	536	512	–	–	–	7,889
	2018	1,029	537	524	536	105	28	131	1,197	475	2,098	6,660
Change in the value of existing entitlements[2]	2019	(48)	(40)	(37)	(38)	3	1	3	–	–	–	(156)
	2018	(972)	(604)	(565)	(581)	–	–	–	(26)	(491)	(529)	(3,768)
Total[3]	**2019**	**1,801**	**1,031**	**2,434**	**859**	**556**	**537**	**515**	**–**	**–**	**–**	**7,733**
	2018	57	(67)	(41)	(45)	105	28	131	1,171	(16)	1,569	2,892

[1] The newly earned entitlements are derived from the 2016 – 2019 (2018: 2015 – 2018) tranches of the Aspire program because this compensation was or is being earned over a four-year period. They are stated at their prorated fair values in 2018 and 2019, respectively. Dr. Hartmut Klusik earned his entitlements at an accelerated rate until he left the company on December 31, 2019, which is why the entitlements he earned in 2019 are higher than those of the other members of the Board of Management serving as of December 31, 2019. Johannes Dietsch, Erica Mann and Dieter Weinand earned their entitlements at an accelerated rate until they left the company on May 31, 2018, March 31, 2018, and October 31, 2018, respectively. Accordingly, the entitlements they earned during their respective periods of service in 2018 are higher than for the members of the Board of Management serving as of December 31, 2018. The Aspire entitlements earned in 2018 and the value changes for Liam Condon, Dr. Hartmut Klusik, Erica Mann and Dieter Weinand relate in part to Aspire tranches granted to them before they joined the Board of Management but not yet fully earned.

[2] This line shows the change in the value of the entitlements already earned in 2016, 2017 and 2018 (2018: 2015, 2016 and 2017).

[3] €359 thousand of the entitlements earned in 2019 (2018: €425 thousand) and €2 thousand of the change in the value of existing entitlements (2018: minus €344 thousand) pertain to entitlements against our subsidiary Bayer Consumer Care AG, Switzerland.

Provisions of €13,323 thousand (2018: €5,590 thousand) were established for the Aspire entitlements of the members of the Board of Management serving as of December 31, 2019. Of this amount, €8,993 thousand relates to the tranches issued up to 2018 and €4,330 thousand to the 2019 tranche. In addition, provisions of €4,092 thousand also exist for Aspire tranches forming part of severance payments.

Pension entitlements

The pension service cost recognized for the members of the Board of Management in 2019 according to the German Commercial Code was €2,753 thousand (2018: €2,745 thousand), while the current service cost for pension entitlements recognized according to IFRS was €3,439 thousand (2018: €3,489 thousand). The following table shows the service cost and the settlement or present value of the pension obligations attributable to the individual members of the Board of Management.

A 4.4.1/9

Pension Entitlements (German Commercial Code and IFRS)

	German Commercial Code				IFRS			
	Pension service cost[1]		Settlement value of pension obligation as of December 31[2]		Current service cost for pension entitlements		Present value of defined benefit pension obligation as of December 31	
€ thousand	**2018**	**2019**	**2018**	**2019**	**2018**	**2019**	**2018**	**2019**
Serving members of the Board of Management as of December 31, 2019								
Werner Baumann (Chairman)	874	1,014	11,217	13,953	1,254	1,310	15,075	20,325
Liam Condon	348	457	3,063	4,289	539	627	4,618	6,220
Dr. Hartmut Klusik	331	223	6,141	6,820	433	267	7,769	9,234
Kemal Malik	315	355	2,606	4,247	448	456	3,110	5,494
Wolfgang Nickl	133	188	148	367	206	257	207	573
Stefan Oelrich	19	202	21	236	27	274	28	362
Heiko Schipper	178	314	3,312	5,075	142	248	3,331	5,141
Former members								
Johannes Dietsch	141	–	–	–	87	–	–	–
Erica Mann	204	–	–	–	75	–	–	–
Dieter Weinand	202	–	–	–	278	–	–	–
Total	**2,745**	**2,753**	**26,508**	**34,987**	**3,489**	**3,439**	**34,138**	**47,349**

[1] Including company contribution to Bayer-Pensionskasse VVaG, Rheinische Pensionskasse VVaG and a pension fund outside Germany
[2] The pension obligations of foreign subsidiaries and Bayer pension funds are included at present value according to IFRS.

The difference between the pension service cost according to the German Commercial Code and the service cost for pension entitlements according to IFRS arises from the difference in the valuation principles used in calculating the settlement value according to the German Commercial Code and the present value of the defined benefit pension obligation according to IFRS.

Benefits upon termination of service on the Board of Management

It was agreed with Kemal Malik in October 2019 that his contract, which originally ran until January 31, 2022, be terminated early by mutual agreement on December 31, 2019, because the position he held on the Board of Management was being abolished as part of the Bayer 2022 efficiency program. The severance payment totals €8,714 thousand and mainly comprises the amounts granted with respect to fixed compensation (€1,627 thousand in total), some of which was allocated to the indemnity to be paid for the noncompete agreement, the short-term compensation component (€1,713 thousand), the amount for Aspire entitlements earned at an accelerated rate from the tranches issued in the years 2017 through 2019 (€1,617 thousand), the amount for newly granted Aspire entitlements from the tranches to be issued in 2020 and 2021 (€2,475 thousand), the loss of a company car with driver (€100 thousand) and pension plan modules (€1,182 thousand). Kemal Malik's entitlements under the company pension plan and the Aspire program were set at the levels they would have reached if he had been eligible to participate until December 31, 2021. The severance payment with respect to his fixed compensation and short-term variable compensation component amounted to €3,440 thousand in total after deducting his personal contributions to the company pension plan and was disbursed in January 2020. The payments from the Aspire tranches will be made upon the expiration of each tranche, with the personal STI payout factor for 2019 to be applied for the 2020 tranche and a personal STI payout factor of 105.3% for the 2021 tranche. A noncompete agreement exists with Kemal Malik until December 31, 2021.

Dr. Hartmut Klusik ended his service on the Board of Management on December 31, 2019, when his contract expired. Starting in January 2020, Dr. Klusik is receiving pension benefits based on the entitlements he earned under the company pension plan up to the date he left the company. Since Bayer did not request Dr. Klusik to enter into a noncompete agreement, no indemnity payment will be due.

The following table shows the present values of the contractually agreed indemnity payments for members of the Board of Management resulting from noncompete agreements as of December 31, 2019. For currently serving members of the Board of Management, it is assumed that these payments will commence when their current contracts expire. Expected inflation-based adjustments to fixed annual compensation are taken into account in the calculation.

A 4.4.1/10

Indemnity Payments in Event of Contract Termination

€ thousand	Fixed annual compensation in 2019	End of current contract	Present value of potential indemnity payments as of Dec. 31, 2019
Serving members of the Board of Management			
Werner Baumann	1,650	April 30, 2021	3,396
Liam Condon	950	Dec. 31, 2023	2,012
Dr. Hartmut Klusik[1]	787	Dec. 31, 2019	0
Kemal Malik[2]	814	Dec. 31, 2019	–
Wolfgang Nickl	787	April 25, 2021	1,620
Stefan Oelrich	840	Oct. 31, 2021	1,727
Heiko Schipper	787	Feb. 28, 2021	1,620

[1] Dr. Klusik will not receive an indemnity payment after his service on the Board of Management ends.
[2] Mr. Malik's severance payment implicitly includes an indemnity payment.

Aggregate Board of Management compensation (IFRS)

The aggregate Board of Management compensation according to IFRS is shown in the following table.

A 4.4.1/11

Board of Management Compensation according to IFRS

€ thousand	2018	2019
Fixed annual compensation	6,387	6,615
Fringe benefits	1,825	1,612
Total short-term non-performance-related compensation	**8,212**	**8,227**
Short-term performance-related cash compensation	6,937	6,984
Total short-term compensation	**15,149**	**15,211**
Change in value of existing entitlements to stock-based compensation (virtual Bayer shares)	(978)	–
Stock-based compensation (Aspire) earned in the respective year	6,660	7,889
Change in value of existing entitlements to stock-based compensation (Aspire)	(3,768)	(156)
Total stock-based compensation (long-term incentive)	**1,914**	**7,733**
Service cost for pension entitlements earned in the respective year	3,489	3,439
Total long-term compensation	**5,403**	**11,172**
Severance indemnity in connection with the termination of a service contract	–	8,714
Aggregate compensation (IFRS)	**20,552**	**35,097**

4.4.2 Disclosures Pursuant to the Recommendations of the German Corporate Governance Code

In accordance with the recommendations of the German Corporate Governance Code, the following tables show the compensation – including fringe benefits – granted for 2019, indicating the target values and the maximum and minimum achievable values for the variable compensation components, along with the allocation of compensation.

A 4.4.2/1

Compensation and Benefits Granted (Part I)

	Serving members of the Board of Management as of December 31, 2019											
	Werner Baumann (Chairman)				Liam Condon (Crop Science)				Dr. Hartmut Klusik (Human Resources, Technology & Sustainability)			
	Joined Jan. 1, 2010				Joined Jan. 1, 2016				Joined Jan. 1, 2016			
€ thousand	Target value 2018	Target value 2019	Min. 2019	Max.[1] 2019	Target value 2018	Target value 2019	Min. 2019	Max.[1] 2019	Target value 2018	Target value 2019	Min. 2019	Max.[1] 2019
Fixed annual compensation	1,511	1,650	1,650	1,650	819	950	950	950	768	787	787	787
Fringe benefits	46	47	47	47	45	44	44	44	39	39	39	39
Total fixed annual compensation	**1,557**	**1,697**	**1,697**	**1,697**	**864**	**994**	**994**	**994**	**807**	**826**	**826**	**826**
Short-term variable cash compensation	1,511	1,650	0	3,300	819	950	0	1,900	768	787	0	1,575
Long-term stock-based compensation (Aspire)												
2018 (Jan. 1, 2018–Dec. 31, 2021)	2,039	–	–	–	793	–	–	–	864	–	–	–
2019 (Jan. 1, 2019–Dec. 31, 2022)		2,804	0	7,010		1,841	0	4,603		1,240	0	3,100
Total	**5,107**	**6,151**	**1,697**	**12,007**	**2,476**	**3,785**	**994**	**7,497**	**2,439**	**2,853**	**826**	**5,501**
Service cost/benefit expense (IFRS)	1,254	1,310	1,310	1,310	539	627	627	627	433	267	267	267
Total compensation	**6,361**	**7,461**	**3,007**	**13,317**	**3,015**	**4,412**	**1,621**	**8,124**	**2,872**	**3,120**	**1,093**	**5,768**

Continuing A 4.4.2/1

Compensation and Benefits Granted (Part II)

	Serving members of the Board of Management as of December 31, 2019											
	Kemal Malik[2] (Innovation)				Wolfgang Nickl (Finance)				Stefan Oelrich[3] (Pharmaceuticals)			
	Joined Feb. 1, 2014				Joined April 26, 2018				Joined Nov. 1, 2018			
€ thousand	Target value 2018	Target value 2019	Min. 2019	Max.[1] 2019	Target value 2018	Target value 2019	Min. 2019	Max.[1] 2019	Target value 2018	Target value 2019	Min. 2019	Max.[1] 2019
Fixed annual compensation	794	814	814	814	523	787	787	787	137	840	840	840
Fringe benefits	37	37	37	37	41	68	68	68	142	854	854	854
Total fixed annual compensation	**831**	**851**	**851**	**851**	**564**	**855**	**855**	**855**	**279**	**1,694**	**1,694**	**1,694**
Short-term variable cash compensation	794	814	0	1,627	512	787	0	1,575	137	840	0	1,680
Long-term stock-based compensation (Aspire)												
2018 (Jan. 1, 2018–Dec. 31, 2021)	923	–	–	–	1,056	–	–	–	973	–	–	–
2019 (Jan. 1, 2019–Dec. 31, 2022)		1,253	0	3,133		1,319	0	3,298		1,226	0	3,064
Total	**2,548**	**2,918**	**851**	**5,611**	**2,132**	**2,961**	**855**	**5,728**	**1,389**	**3,760**	**1,694**	**6,438**
Service cost/benefit expense (IFRS)	448	456	456	456	206	257	257	257	27	274	274	274
Total compensation	**2,996**	**3,374**	**1,307**	**6,067**	**2,338**	**3,218**	**1,112**	**5,985**	**1,416**	**4,034**	**1,968**	**6,712**

Continuing A 4.4.2/1

Compensation and Benefits Granted (Part III)

	Serving members of the Board of Management as of December 31, 2019				Former members			
	Heiko Schipper[4] (Consumer Health)				Johannes Dietsch[5] (Finance)			
	Joined March 1, 2018				Stepped down May 31, 2018			
€ thousand	**Target value 2018**	**Target value 2019**	**Min. 2019**	**Max.[1] 2019**	**Target value 2018**	**Target value 2019**	**Min. 2019**	**Max.[1] 2019**
Fixed annual compensation	640	787	787	787	320	–	–	–
Fringe benefits	1,431	523	523	523	17	–	–	–
Total fixed annual compensation	**2,071**	**1,310**	**1,310**	**1,310**	**337**	**–**	**–**	**–**
Short-term variable cash compensation	640	787	0	1,575	320	–	0	–
Long-term stock-based compensation (Aspire)								
2018 (Jan. 1, 2018 – Dec. 31, 2021)	1,104	–	–	–	432	–	–	–
2019 (Jan. 1, 2019 – Dec. 31, 2022)		1,181	0	2,952		–	0	–
Total	**3,815**	**3,278**	**1,310**	**5,837**	**1,089**	**–**	**–**	**–**
Service cost / benefit expense (IFRS)	142	248	248	248	87	–	–	–
Total compensation	**3,957**	**3,526**	**1,558**	**6,085**	**1,176**	**–**	**–**	**–**

Continuing A 4.4.2/1

Compensation and Benefits Granted (Part IV)

	Former members							
	Erica Mann (Consumer Health)				Dieter Weinand (Pharmaceuticals)			
	Stepped down March 31, 2018				Stepped down October 31, 2018			
€ thousand	**Target value 2018**	**Target value 2019**	**Min. 2019**	**Max.[1] 2019**	**Target value 2018**	**Target value 2019**	**Min. 2019**	**Max.[1] 2019**
Fixed annual compensation	192	–	–	–	683	–	–	–
Fringe benefits	3	–	–	–	24	–	–	–
Total fixed annual compensation	**195**	**–**	**–**	**–**	**707**	**–**	**–**	**–**
Short-term variable cash compensation	192	–	0	–	683	–	0	–
Long-term stock-based compensation (Aspire)	**–**	**–**	**0**	**–**	**–**	**–**	**0**	**–**
2018 (Jan. 1, 2018 – Dec. 31, 2021)	145	–	–	–	1,031	–	–	–
2019 (Jan. 1, 2019 – Dec. 31, 2022)	–	–	0	–	–	–	0	–
Total	**532**	**–**	**–**	**–**	**2,421**	**–**	**–**	**–**
Service cost / benefit expense (IFRS)	75	–	–	–	278	–	–	–
Total compensation	**607**	**–**	**–**	**–**	**2,699**	**–**	**–**	**–**

[1] The maximum achievable variable compensation shown here does not yet take into account the total caps applicable (see A 4.4.1/1).
[2] In 2019, Kemal Malik received a severance payment of €6,831 thousand (HGB valuation) in addition.
[3] The fringe benefits for Stefan Oelrich contain an indemnity payment of €808 thousand (2018: €135 thousand) for variable compensation components granted to him by his former employer that lapsed due to his joining Bayer. This indemnity amounts to €2,424 thousand in total and is being paid over a period of three years on a pro rata temporis basis.
[4] The fringe benefits for Heiko Schipper contain an indemnity payment of €495 thousand (2018: €894 thousand) for variable compensation components granted to him by his former employer that lapsed due to his joining Bayer. This indemnity amounts to a maximum of €1,950 thousand. A quarter of this amount was paid at the date he joined the Board of Management. The remaining three-quarters is being paid over a period of three years on a pro rata temporis basis.
[5] Under his termination agreement, Johannes Dietsch was granted an indemnity payment of a maximum of €1,522 thousand for his post-contractual noncompete agreement. This is being granted monthly over a period of two years on a pro rata temporis basis.

A 4.4.2/2

Allocation of Compensation (Part I)

	Serving members of the Board of Management as of December 31, 2019									
	Werner Baumann (Chairman)		Liam Condon (Crop Science)		Dr. Hartmut Klusik (Human Resources, Technology & Sustainability)		Kemal Malik (Innovation)		Wolfgang Nickl (Finance)	
	Joined Jan. 1, 2010		Joined Jan. 1, 2016		Joined Jan. 1, 2016		Joined Feb. 1, 2014		Joined April 26, 2018	
€ thousand	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019
Fixed annual compensation	1,511	1,650	819	950	768	787	794	814	523	787
Fringe benefits	46	47	45	44	39	39	37	37	41	68
Total	**1,557**	**1,697**	**864**	**994**	**807**	**826**	**831**	**851**	**564**	**855**
Short-term variable cash compensation	1,708	1,717	1,056	896	805	819	813	792	571	859
Long-term cash compensation (virtual Bayer shares)										
2014 (Jan. 1, 2015–Dec. 31, 2017)	1,037	–	1,125	–	–	–	760	–	–	–
2015 (Jan. 1, 2016–Dec. 31, 2018)	–	738	–	539	–	–	–	547	–	–
Long-term stock-based cash compensation (Aspire)[1]										
2014 (Jan. 1, 2014–Dec. 31, 2017)	72	–	44	–	26	–	27	–	–	–
2015 (Jan. 1, 2015–Dec. 31, 2018)	–	–	–	–	–	–	–	–	–	–
Total	**4,374**	**4,152**	**3,089**	**2,429**	**1,638**	**1,645**	**2,431**	**2,190**	**1,135**	**1,714**
Service cost / benefit expense	1,254	1,310	539	627	433	267	448	456	206	257
Total compensation	**5,628**	**5,462**	**3,628**	**3,056**	**2,071**	**1,912**	**2,879**	**2,646**	**1,341**	**1,971**

Continuing A 4.4.2/2

Allocation of Compensation (Part II)

	Serving members of the Board of Management as of December 31, 2019				Former members					
	Stefan Oelrich[2] (Pharmaceuticals)		Heiko Schipper[3] (Consumer Health)		Johannes Dietsch (Finance)		Erica Mann[4] (Consumer Health)		Dieter Weinand (Pharmaceuticals)	
	Joined Nov. 1, 2018		Joined Mar. 1, 2018		Stepped down May 31, 2018		Stepped down March 31, 2018		Stepped down Oct. 31, 2018	
€ thousand	2018	2019	2018	2019	2018	2019	2018	2019	2018	2019
Fixed annual compensation	137	840	640	787	320	–	192	–	683	–
Fringe benefits	8	854	538	523	17	–	3	–	24	–
Total	**145**	**1,694**	**1,178**	**1,310**	**337**	**–**	**195**	**–**	**707**	**–**
Short-term variable cash compensation	133	983	639	918	346	–	192	–	674	–
Long-term cash compensation (virtual Bayer shares)										
2014 (Jan. 1, 2015–Dec. 31, 2017)	–	–	–	–	276	–	–	–	–	–
2015 (Jan. 1, 2016–Dec. 31, 2018)	–	–	–	–	–	–	–	–	–	–
Long-term stock-based cash compensation (Aspire)[1]										
2014 (Jan. 1, 2014–Dec. 31, 2017)	–	–	–	–	21	–	106	–	33	–
2015 (Jan. 1, 2015–Dec. 31, 2018)	–	–	–	–	–	–	–	–	–	–
Total	**278**	**2,677**	**1,817**	**2,228**	**980**	**–**	**493**	**–**	**1,414**	**–**
Service cost / benefit expense	27	274	142	248	87	–	75	–	278	–
Total compensation	**305**	**2,951**	**1,959**	**2,476**	**1,067**	**–**	**568**	**–**	**1,692**	**–**

[1] The payments in 2018 to Johannes Dietsch, Liam Condon, Dr. Hartmut Klusik, Kemal Malik, Erica Mann and Dieter Weinand from the 2014 Aspire tranche partly relate to entitlements earned prior to their joining the Board of Management. The payments in 2019 from the 2015 Aspire tranche to Liam Condon and Dr. Hartmut Klusik partly relate to entitlements earned prior to their joining the Board of Management. The tranches of these members were not yet fully earned at the dates on which they joined the Board of Management.

[2] The fringe benefits for Stefan Oelrich contain an indemnity payment of €808 thousand (2018: €0 thousand) for variable compensation components granted to him by his former employer that lapsed due to his joining Bayer.

[3] The fringe benefits for Heiko Schipper contain an indemnity payment of €495 thousand (2018: €495 thousand) for variable compensation components granted to him by his former employer that lapsed due to his joining Bayer.

[5] In 2018, Erica Mann also received a severance payment of €1,686 thousand, a payment of €3,825 thousand to settle pension entitlements in the United States, and current pension payments.

4.4.3 Development of Board of Management Compensation Relative to Employee Compensation and the Financial Performance of the Company

The following overview shows the development of the compensation earned by the individual members of the Board of Management in the respective fiscal year according to IFRS in relation to selected financial performance indicators used by the Bayer Group. The total earned compensation may be impacted, for example, by changes in the number of Board of Management members or overlaps between joining and departing Board members, as well as one-time effects of fringe benefits. The performance indicators are affected by the acquisition of Monsanto (2018) and by the divestments of Covestro (2017), various Crop Science businesses to BASF (2018), the prescription dermatology business of Consumer Health (2018 and 2019), the Dr. Scholl's and Coppertone brands (2019) and our stake in Currenta (2019). They are also particularly affected by the recognition of Covestro (2017), Currenta (2019) and Animal Health (2019) as discontinued operations. In addition, core earnings per share are impacted by the increase in the number of shares in 2018.

A 4.4.3/1

Compensation Earned by Board of Management in Relation to Company's Financial Performance

€ thousand	2015	Change %	2016	Change %	2017	Change %	2018	Change %	2019
Compensation earned (€ thousand)									
Serving members of the Board of Management as of December 31, 2019									
Werner Baumann	4,671	+3.1	4,818	+19.1	5,740	−27.2	4,180	+56.1	6,525
Liam Condon	–	–	2,475	+16.5	2,883	−27.1	2,103	+68.7	3,548
Dr. Hartmut Klusik[1]	–	–	2,709	−5.0	2,573	−22.1	2,004	+116.9	4,346
Kemal Malik[2]	3,283	−26.8	2,402	+17.1	2,812	−37.6	1,754	.	11,672
Wolfgang Nickl	–	–	–	–	–	–	1,446	+74.8	2,527
Stefan Oelrich	–	–	–	–	–	–	467	.	3,488
Heiko Schipper	–	–	–	–	–	–	2,983	+0.3	2,991
Former members of the Board of Management									
Marijn Dekkers[2]	8,243	−11.3	7,311	–	–	–	–		
Johannes Dietsch	3,204	−24.2	2,429	+65.9	4,030	−51.8	1,941		
Michael König[2]	4,407	–	–	–	–	–	–		
Erica Mann[2]	–	–	2,701	+93.3	5,220	−91.5	446		
Dieter Weinand	–	–	2,730	+6.6	2,910	+10.9	3,228		
Total	**23,808**	**+15.8**	**27,575**	**−5.1**	**26,168**	**−21.5**	**20,552**	**+70.8**	**35,097**
Financial KPIs[3]									
EBITDA before special items (€ million)	10,266	+10.1	11,302	−17.8	9,288	+2.8	9,547	+20.5	11,503
Core EPS[4] (€)	6.83	+7.2	7.32	−7.9	6.74	−11.9	5.94	+14.0	6.77
Sales[5] (€ million)	46,324	+3.5	46,769	+1.5	35,015	+4.5	39,586	+3.5	43,545

[1] Dr. Hartmut Klusik earned his Aspire entitlements in 2019 at an accelerated rate until he left the company on December 31, 2019.
[2] These amounts contain severance payments for Marijn Dekkers in 2016, Michael König in 2015, Erica Mann in 2017 and Kemal Malik in 2019.
[3] Reporting is based on the financial performance indicators initially published for the respective year and their development without regard to any subsequent restatements thereof.
[4] The 2019 figure includes continuing and discontinued operations.
[5] The change in sales on a currency- and portfolio-adjusted basis is reported as a key indicator for corporate management.

The following overview shows the development of the target cash compensation of the Board of Management in relation to the compensation of all employees in Germany and that of nonmanagerial employees under collective bargaining agreements in Germany. This is calculated based on contractually agreed target entitlements – in accordance with the German Corporate Governance Code – with regard to fixed compensation, the annual bonus and the four-year stock-based compensation (where the respective employee groups are eligible to participate). For nonmanagerial employees in Germany, the 13th monthly salary and the contractually agreed vacation bonus were taken into account. Variable compensation components for both the Board of Management and the other employee groups were based on the assumption of 100% target attainment. Expenditures for fringe benefits (such as home security equipment, indemnity payments for lapsed variable compensation components granted by former employers) were not taken into account due to their irregular nature. Expenditures for pensions were also disregarded in view of the interest sensitivity of the expenses. The aim of this approach is to enhance comparability in the development of compensation.

A 4.4.3/2

Development of Average Target Cash Compensation[1] of the Board of Management and Employees

€ thousand	2015	Change %	2016	Change %	2017	Change %	2018	Change %	2019
Board of Management	2,993,141	+1.9	3,050,000	+0.8	3,074,400	+1.6	3,123,600	+5.9	3,307,600
All employees[2] in Germany[3]	89,361	+9.7	98,004	+3.7	101,662	+2.6	104,336	+8.9	113,636
Nonmanagerial employees in Germany[3]	61,613	+3.5	63,749	+2.8	65,512	+3.2	67,628	+0.2	67,791

[1] Fixed annual compensation, STI and LTI (not taking into account individual STI payout factor), excluding pensions and fringe benefits; calculated on the basis of full-time equivalents (FTEs)

[2] Excluding the Board of Management

[3] Including the employees of the companies Bayer AG, Leverkusen, Bayer Animal Health GmbH, Leverkusen, Bayer Intellectual Property GmbH, Monheim am Rhein, Bayer Business Services GmbH, Leverkusen, and Pallas Versicherung Aktiengesellschaft, Leverkusen (all Germany). The figures for 2018 and 2019 do not include Animal Health employees.

The relative changes in average target cash compensation can be influenced by a range of factors and can vary both over time and across the Board of Management, the overall workforce and nonmanagerial employees. These factors include changes in the composition of the workforce, various salary adjustments within and outside of collective bargaining agreements, the integration and carving out of business entities, or measures relating to HR policy. The 9.7% increase in the average target cash compensation of all employees in 2016 compared with 2015 was mainly attributable to the carve-out of Covestro, a change in workforce structure, and an increase in the proportion of managerial employees.

The difference in the rates at which target cash compensation increased for nonmanagerial employees and all employees in Germany between 2018 and 2019 is primarily due to a change in the structure of the workforce as a result of the restructuring measures as well as to absence of a salary increase for employees covered by collective bargaining agreements. The salaries of this group of employees will next be adjusted effective July 1, 2020, as agreed in the 2019 collective bargaining agreement.

In 2019, the ratio between the average compensation of a Board of Management member and that of all employees in Germany stood at 29:1 (2018: 30:1), while the ratio between the average compensation of a Board of Management member and that of nonmanagerial employees in Germany was 49:1 (2018: 46:1). For the Chairman of the Board of Management, the ratios were 51:1 (2018: 51:1) in relation to all employees in Germany and 85:1 (2018: 78:1) in relation to nonmanagerial employees in Germany.

4.4.4 Compensation of the Supervisory Board

The Supervisory Board is compensated based on the relevant provisions of the Articles of Incorporation as last amended at the Annual Stockholders' Meeting on April 28, 2017.

The members of the Supervisory Board receive fixed annual compensation of €132 thousand (2018: €132 thousand) plus reimbursement of their expenses.

In accordance with the recommendations of the German Corporate Governance Code, additional compensation is paid to the Chairman and Vice Chairman of the Supervisory Board and for chairing and membership of committees. The Chairman of the Supervisory Board receives fixed annual compensation of €396 thousand (2018: €396 thousand), the Vice Chairman €264 thousand (2018: €264 thousand). These amounts also cover membership and chairmanship of committees. The other members receive additional compensation for committee membership. The chairman of the Audit Committee receives an additional €132 thousand (2018: €132 thousand) and the other members of the Audit Committee €66 thousand (2018: €66 thousand) each. The chairmen of the remaining committees receive €66 thousand (2018: €66 thousand) each and the other members of those committees €33 thousand (2018: €33 thousand) each. As before, no additional compensation is paid for membership of the Nominations Committee. A Supervisory Board member who is a member of more than two committees receives compensation only for the two committees with the highest compensation. If changes are made to the Supervisory Board and / or its committees during the year, members receive compensation on a prorated basis. As in the past, the members of the Supervisory Board also receive an attendance fee of €1 thousand each time they personally attend a meeting of the Supervisory Board or a committee. The attendance fee is limited to €1 thousand per day.

The members of the Supervisory Board have given a voluntary pledge that they will each purchase Bayer shares for 25% of their pretax fixed compensation, including any additional compensation for committee membership, and hold these shares for as long as they remain members of the Supervisory Board. This does not apply to members who under a service or employment contract are prevented from purchasing shares or who transfer at least 85% of their fixed annual compensation and additional compensation to the Hans Böckler Foundation in accordance with the rules of the German Trade Union Confederation or whose service or employment contract requires them to transfer such compensation to their employer. If less than 85% of the fixed compensation is transferred, the voluntary pledge applies to the portion not transferred. The obligation to purchase Bayer shares was adjusted in 2017 and now only applies for the first five years of membership of the Supervisory Board; these shares must then be held until membership of the Supervisory Board ceases. Bayer shares acquired prior to 2017 in connection with the voluntary pledge are taken into account for this purpose. By voluntarily pledging to invest in and hold Bayer shares, the Supervisory Board members reinforce their interest in the long-term, sustainable success of the company.

Compensation of the Supervisory Board in 2019

The following table shows the components of each Supervisory Board member's compensation for 2019.

A 4.4.3/2

Compensation of the Members of the Supervisory Board of Bayer AG in 2019

	Fixed compensation		Attendance fees		Total	
€ thousand	2018	2019	2018	2019	2018	2019
Members of the Supervisory Board serving as of December 31, 2019						
Dr. Paul Achleitner	198	198	6	6	204	204
Dr. Simone Bagel-Trah	132	132	5	5	137	137
Dr. Norbert W. Bischofberger	165	165	5	6	170	171
André van Broich	198	198	7	7	205	205
Ertharin Cousin[1]	–	33	–	1	–	34
Dr. Thomas Elsner	198	215	10	10	208	225
Johanna W. (Hanneke) Faber	132	132	4	3	136	135
Colleen A. Goggins	132	149	4	5	136	154
Robert Gundlach[2]	–	5	–	–	–	5
Heike Hausfeld	165	165	7	7	172	172
Reiner Hoffmann	132	132	4	3	136	135
Frank Löllgen	198	198	10	10	208	208
Prof. Dr. Wolfgang Plischke	264	264	10	11	274	275
Petra Reinbold-Knape	198	198	6	7	204	205
Sabine Schaab	165	165	6	7	171	172
Michael Schmidt-Kießling	132	132	6	5	138	137
Werner Wenning (Chairman)	396	396	11	11	407	407
Prof. Dr. Otmar D. Wiestler	165	165	5	6	170	171
Prof. Dr. Norbert Winkeljohann	160	281	5	9	165	290
Oliver Zühlke (Vice Chairman)	264	264	9	6	273	270

[1] Member of the Supervisory Board since October 1, 2019
[2] Member of the Supervisory Board since December 18, 2019

A 4.4.3/2 (continued)

Compensation of the Members of the Supervisory Board of Bayer AG in 2019

€ thousand	Fixed compensation		Attendance fees		Total	
	2018	2019	2018	2019	2018	2019
Members who left the Supervisory Board in 2018 and 2019						
Thomas Ebeling[3]	132	99	3	4	135	103
Detlef Rennings[4]	132	120	6	3	138	123
Dr. Klaus Sturany[5]	105	–	5	–	110	–
Total	**3,763**	**3,806**	**134**	**132**	**3,897**	**3,938**

[3] Member of the Supervisory Board until September 30, 2019
[4] Member of the Supervisory Board until November 29, 2019
[5] Member of the Supervisory Board until May 25, 2018

In addition to their compensation as members of the Supervisory Board, those employee representatives who are employees of Bayer Group companies receive compensation unrelated to their service on the Supervisory Board. The total amount of such compensation in 2019 was €813 thousand (2018: €757 thousand), including fixed and variable compensation components. Pension obligations to all employee representatives on the Supervisory Board amounted to €5,700 thousand (2018: €4,072 thousand).

No compensation was paid or benefits granted to members of the Supervisory Board for personally performed services such as consultancy or agency services. The company has purchased insurance for the members of the Supervisory Board to cover their personal liability arising from their service on the Supervisory Board.

4.4.5 Further Information

Advances or loans to members of the Board of Management or Supervisory Board

There were no advances or loans to members of the Board of Management or the Supervisory Board outstanding as of December 31, 2019, or at any time during 2019 or 2018.

Pension payments to former members of the Board of Management or their surviving dependents

We currently pay retired members of the Board of Management a monthly pension equal to a maximum of 80% of the fixed compensation received immediately prior to retirement. The pensions paid to former members of the Board of Management or their surviving dependents are reassessed annually and adjusted, taking into account the development of consumer prices. The pensions paid to former members of the Board of Management or their surviving dependents in 2019 totaled €12,078 thousand (2018: €17,183 thousand). These benefits are paid in addition to any amounts they receive under previous employee pension arrangements. The present value of the defined benefit pension obligation for former members of the Board of Management and their surviving dependents according to IFRS amounted to €199,454 thousand (2018: €185,736 thousand), while the settlement value of the pension obligation according to the German Commercial Code amounted to €162,948 thousand (2018: €161,427 thousand).

4.5 Takeover-Relevant Information

Explanatory report pursuant to Section 289a, Paragraph 1 and Section 315a, Paragraph 1 of the German Commercial Code (HGB)

The capital stock of Bayer AG amounted to **€2,515,005,649.92** as of December 31, 2019 (December 31, 2018: €2,387,333,027.84), divided into **982,424,082** no-par registered shares (December 31, 2018: 932,551,964). Each share confers one voting right. A small number of shares may be subject to temporary trading restrictions, such as retention periods, in connection with employee stock participation programs. We received no notifications in 2019 of direct or indirect holdings of shares in Bayer AG that exceed 10% of the capital stock. The company thus is not in possession of any notifications of holdings that exceed 10% of the capital stock.

See also
www.bayer.com/
ownership-structure

The appointment and dismissal of members of the Board of Management are subject to the provisions of Sections 84 and 85 of the German Stock Corporation Act, Section 31 of the German Codetermination Act and Section 6 of the company's Articles of Incorporation. Pursuant to Section 84, Paragraph 1 of the German Stock Corporation Act, the members of the Board of Management are appointed and dismissed by the Supervisory Board. Since Bayer AG falls within the scope of the German Codetermination Act, the appointment or dismissal of members of the Board of Management requires a majority of two-thirds of the votes of the members of the Supervisory Board on the first ballot pursuant to Section 31, Paragraph 2 of that act. If no such majority is achieved, the appointment is resolved pursuant to Section 31, Paragraph 3 of the Codetermination Act on a second ballot by a simple majority of the votes of the members of the Supervisory Board. If the required majority still is not achieved, a third ballot is held. Here again, a simple majority of the votes suffices, but in this ballot the Chairman of the Supervisory Board has two votes pursuant to Section 31, Paragraph 4 of the Codetermination Act. Under Section 6, Paragraph 1 of the Articles of Incorporation of Bayer AG, the number of members of the Board of Management is determined by the Supervisory Board but must be at least two. The Supervisory Board may appoint one member of the Board of Management to be the Chairman of the Board of Management pursuant to Section 84, Paragraph 2 of the German Stock Corporation Act and Section 6, Paragraph 1 of the Articles of Incorporation.

Any amendments to the Articles of Incorporation are made pursuant to Section 179 of the German Stock Corporation Act and Sections 10 and 17 of the Articles of Incorporation. Under Section 179, Paragraph 1 of the German Stock Corporation Act, amendments to the Articles of Incorporation require a resolution of the Stockholders' Meeting. Pursuant to Section 179, Paragraph 2 of the German Stock Corporation Act, this resolution must be passed by a majority of three quarters of the voting capital represented at the meeting, unless the Articles of Incorporation provide for a different majority. However, where an amendment relates to a change in the object of the company, the Articles of Incorporation may only specify a larger majority. Section 17, Paragraph 2 of the Articles of Incorporation of Bayer AG utilizes the scope for deviation pursuant to Section 179, Paragraph 2 of the German Stock Corporation Act and provides that resolutions may be passed by a simple majority of the votes cast or, where a capital majority is required, by a simple majority of the capital represented. Pursuant to Section 10, Paragraph 9 of the Articles of Incorporation, the Supervisory Board may resolve on amendments to the Articles of Incorporation that relate solely to their wording.

The Annual Stockholders' Meeting held on April 26, 2019, resolved that the Board of Management be authorized to purchase and dispose of own shares representing up to 10% of the capital stock existing at the time the resolution was adopted. The authorization expires on April 25, 2024. The authorization to purchase own shares also includes the purchase of own shares using put or call options (derivatives) up to a volume of 5% of the capital stock existing at the time the resolution was adopted or at the time the authorization is exercised. Stockholders' subscription rights may be excluded, depending on the purpose for which the purchased own shares are to be used.

A material agreement that is subject to the condition precedent of a change of control pertains to the undrawn €4.5 billion syndicated credit facility arranged by Bayer AG and its U.S. subsidiary

Bayer Corporation. This facility is available until December 2024 with an extension option until December 2025. The participating banks are entitled to terminate the credit facility in the event of a change of control at Bayer and demand repayment of any loans that may have been granted under this facility up to that time.

A similar clause is also contained in the agreement on a syndicated credit facility in the original amount of US$56.9 billion granted to Bayer US Finance II LLC and Bayer AG in September 2016 to finance the acquisition of Monsanto (the “Monsanto credit facility”). Pursuant to the agreement, the Monsanto credit facility was reduced in 2016 by the US$4.2 billion net proceeds from the issuance of mandatory convertible notes, to US$52.7 billion, and in 2017 by the US$1.2 billion net proceeds from the issuance of an exchangeable bond, to US$51.5 billion. The mandatory convertible notes were issued by Bayer Capital Corporation B.V., guaranteed by Bayer AG and matured in November 2019. The terms on which holders could convert these notes into shares before the maturity date were more favorable in the event of a change of control than they would have been otherwise. The exchangeable bond was issued by Bayer AG and matures in 2020, and Bayer AG can flexibly exchange bonds for cash, Covestro AG shares or a combination of the two. Holders of these notes have the right to demand the redemption of unexchanged notes by Bayer AG in the event of a change of control if Bayer AG’s credit rating is downgraded within 120 days after such change of control becomes effective.

The Monsanto credit facility was drawn in 2018 to finance the acquisition of Monsanto. The resulting loan had a value of US$3.8 billion as of December 31, 2019. The reduction of the Monsanto credit facility and of the loan in 2018 and 2019 was achieved partly through the proceeds from the aforementioned capital increases, a further reduction of Bayer’s interest in Covestro AG, a series of divestments to fulfill antitrust requirements, a bond with a nominal volume of €5 billion issued by Bayer Capital Corporation B.V. and guaranteed by Bayer AG, and a US$15 billion bond in 144A / RegS format issued by Bayer US Finance II LLC and guaranteed by Bayer AG. Both bonds have largely the same terms in the event of a change of control as the aforementioned exchangeable bond, although the period for a potential deterioration of Bayer AG’s credit rating is only 60 days in the case of the US$15 billion bond.

The terms of the nominal €1.4 billion (as of December 31, 2019) in notes issued by Bayer in the years 2013 to 2017 under its Debt Issuance Programme also contain a corresponding change-of-control clause associated with a deterioration of the credit rating within 120 days. The terms of the US$7 billion bond in 144A / Reg S format issued in 2014 also contain a clause to this effect. The outstanding amount of this bond as of December 31, 2019, was US$3.3 billion.

Agreements exist for the members of the Board of Management in compliance with Section 4.2.3 of the February 7, 2017, version of the German Corporate Governance Code to cover the eventuality of a takeover offer being made for Bayer AG. Under these agreements, payments promised in the event of early termination of the service contract of a Board of Management member due to a change of control are limited to the value of three years’ compensation and may not compensate more than the remaining term of the contract.

5. Information on Bayer AG

Bayer AG has both holding and parent company functions in the Bayer Group

Business lease agreements exist between Bayer AG on the one hand, and Bayer Pharma AG and Bayer CropScience AG – the former parent companies of the respective divisions – on the other. Bayer AG as lessee manages these two companies' operational businesses on the basis of these agreements. In addition to its holding company function, Bayer AG thus also performs the parent company functions with respect to the two divisions.

Bayer AG is a generator and supplier of utilities at multiple locations and thus an energy utility as defined in Section 3, No. 18 of the German Energy Industry Act (EnWG). Since utility supply networks are operated by a subsidiary, Bayer AG also constitutes a vertically integrated energy utility under Section 3, No. 38 of the EnWG. However, regarding its own activities, it is only subject to the separate accounting obligation and not the obligation to prepare activity reports.

The financial statements of Bayer AG are prepared in accordance with the German Commercial Code (HGB) and the German Stock Corporation Act (AktG). Because the company is an integrated energy utility, the provisions of Section 6b of the EnWG are also observed.

5.1 Earnings Performance of Bayer AG

A 5.1/1

Bayer AG Summary Income Statements According to the German Commercial Code

€ million	2018	2019
Net sales	14,647	14,833
Cost of goods sold	(8,219)	(7,882)
Gross profit	**6,428**	**6,951**
Selling expenses	(4,509)	(4,524)
Research and development expenses	(2,331)	(2,131)
General administration expenses	(1,056)	(1,409)
Other operating income	268	481
Other operating expenses	(115)	(123)
Operating income	**(1,315)**	**(755)**
Income from investments in affiliated companies – net	4,739	5,605
Interest income / expense – net	(562)	85
Other financial income / expense – net	(511)	(66)
Nonoperating income	**3,666**	**5,624**
Income taxes	(234)	(312)
Income after taxes / Net income	**2,117**	**4,557**
Profit carried forward from previous year	498	–
Allocation to other retained earnings	(4)	(1,806)
Distributable profit	**2,611**	**2,751**

Earnings growth reflects improvement in nonoperating income

Sales at Bayer AG posted a small increase of €0.2 billion or 1.3% in 2019, to €14.8 billion (2018: €14.6 billion). Business development varied between the divisions. At Crop Science, sales declined by €0.8 billion, or 13.2%, to €5.2 billion (2018: €6.0 billion), while at Pharmaceuticals they rose significantly by €1.0 billion, or 11.2%, to €9.5 billion (2018: €8.5 billion). Nondivisional sales were unchanged at €0.1 billion.

The decrease of €276 million in sales at Crop Science was due to the absence of the businesses divested to BASF, which were included in the prior-year figures up to the respective divestment dates, and to a change in the business model. While sales at Insecticides rose by €55 million to €1.1 billion, the other principal business units showed negative development. Sales at Herbicides were down by €302 million to €1.4 billion and at Fungicides by €195 million to €2.2 billion. Sales at SeedGrowth receded by €227 million compared with the prior year to €0.2 billion, mainly as a result of the divestment to BASF. From a geographical standpoint, the steepest drop in sales occurred in Europe / Middle East / Africa, where business shrank by €652 million to €2.3 billion. Sales also declined in North America (by €199 million to €0.7 billion) and in Asia / Pacific (by €76 million to €0.9 billon). The only region to see an increase in product sales was Latin America, where sales advanced by €137 million to €1.3 billion. The core business, at 97%, comprised intra-Group sales to Bayer companies.

At Pharmaceuticals, Xarelto™ remained by far the best-selling product, with sales of €3.5 billion, and recorded the strongest growth (+€846 million). Sales gains were also achieved for products including Adalat™ (+ €170 million to €422 million), YAZ™ / Yasmin™ / Yasminelle™ (+ €76 million to €474 million) and Mirena™ (+ €57 million to €495 million), whereas sales of Glucobay™ (– €59 million to €350 million) and Betaferon™ (– €50 million to €400 million), in particular, were below the prior year. Business with Bayer Group companies accounted for 91% of total sales, and business with third parties for 9%.

The cost of goods sold declined in 2019 by €0.3 billion to €7.9 billion, mainly due to the absence of the €320 million in restructuring expenses included in the prior-year figure. After deducting the cost of goods sold from sales, gross profit amounted to €7.0 billion (2018: €6.4 billion), or 47% (2018: 44%) of sales. The gross margin at Crop Science came in at 21% (2018: 31%), compared to 64% (2018: 57%) at Pharmaceuticals. The drop in the gross margin at Crop Science was due to a change in the business model. At Pharmaceuticals, positive factors included economies of scale, the absence of the €256 million in restructuring expenses recorded in 2018, and a €47 million decline in costs relating to unused capacities. Selling expenses, at €4.5 billion, were on the level of the previous year. Apart from the sales-based €0.7 billion share of the business lease payment (2018: €0.7 billion), they mainly included expenses of €3.5 billion (2018: €3.3 billion) for royalty payments, almost entirely to rights owners within the Group. In the Crop Science Division, these payments were mainly made to Bayer CropScience AG (€0.6 billion), and in the Pharmaceuticals Division primarily to Bayer Intellectual Property GmbH (€2.1 billion) and Bayer Pharma AG (€0.4 billion). The €0.2 billion decline in research and development expenses to €2.1 billion was due to the inclusion of €287 million in restructuring costs in 2018. Without these prior-year costs, there would have been a slight increase of €87 million, entirely attributable to Pharmaceuticals. Of the total research and development expenses, Pharmaceuticals accounted for €1.5 billion and Crop Science for €0.4 billion. General administration expenses rose by €422 million to €1.4 billion (2018: €1.1 billion) due to restructuring charges. The balance of other operating income and expenses was positive as in the previous year, at €358 million (2018: €153 million). While the positive effect in the prior year mainly resulted from intra-Group payments of €129 million made to offset the restructuring expenses in connection with the impairment loss realized on the Factor VIII facility in Wuppertal, the positive factors in 2019 were the charging-on of €276 million in ancillary acquisition costs for Monsanto within the Group and a €66 million increase in income from the reversal of unutilized provisions. The latter largely pertained to restructuring.

The overall operating loss of €755 million in 2019 was €544 million less than in the prior year (€1,315 million) and also significantly lower than we had anticipated at the start of the year. This was mainly because the Pharmaceuticals business was substantially stronger and more profitable than planned.

Income from investments in affiliated companies (net) advanced by €866 million to €5,605 million (2018: €4,739 million). Dividends and similar income from subsidiaries and income from profit and loss transfer agreements with subsidiaries moved ahead significantly to €1,817 million (2018: €152 million) and €2,698 million (2018: €1,337 million), respectively. The increase in dividends and similar income from subsidiaries was driven by the dividend payments received in 2019 from Bayer Animal Health GmbH (€1,075 million), Bayer CropScience AG (€500 million) and Bayer (China) Ltd. (€128 million), which were not matched by equivalent income in the prior year. The growth in income from profit and loss transfer agreements was largely attributable to the earnings transfer from Bayer Pharma AG, which amounted to €2,863 million (2018: €1,438 million). This mainly consisted of dividends and similar income, the income from the business lease with Bayer AG, intra-Group financing measures and the divestment gain in 2019 on the sale of the prescription dermatology business Intendis GmbH to LEO Pharma A/S, Denmark. The income transferred to Bayer AG by Bayer Real Estate GmbH was also higher at €105 million (2018: €30 million), driven by gains from real estate sales to Currenta GmbH & Co. OHG in connection with Bayer's divestment of Currenta. However, Bayer AG had to absorb a considerably greater loss of €257 million (2018: €127 million) transferred from Bayer Business Services GmbH, which primarily resulted from higher restructuring expenses. The balance of other income and expenses from investments in affiliated companies declined markedly to €1,090 million (2018: €3,250 million). These items mainly included gains and losses from the sale of investments in affiliated companies together with write-downs and write-backs thereof. The net decrease resulted from the inclusion in the prior year of €3,314 million in gains from the sale of shares in Covestro AG, compared with gains of only €1,088 million from the sale of Currenta in 2019. However, write-downs of investments in affiliated companies, net of write-backs, amounted to only €16 million in 2019 against €77 million in the prior year.

The net interest position improved in 2019 by a substantial €647 million, from minus €562 million in the prior year to a positive €85 million. This was mainly due to a €538 million increase in the value of the plan assets of Bayer Pension Trust e.V., which administers the assets covering pension and other longer-term personnel commitments of Bayer AG and other companies as trustee; in the previous year this figure was negative by €230 million. The balance of interest, both with banks and with Group companies, improved in 2019. While net interest expense to banks decreased by €164 million to €127 million (2018: €291 million), net interest income from Group companies rose by €153 million to €357 million (2018: €204 million). Since the previous year's net interest position had benefited from a one-time net gain of €284 million from hedging transactions in connection with the financing of the Monsanto acquisition, there was a corresponding negative effect in 2019. The remaining net interest expense of €680 million (2018: €613 million) included €508 million (2018: €447 million) in expense for the unwinding of discount on noncurrent (mainly pension) provisions, €155 million (2018: €169 million) of bond interest, net expense of €19 million for (2018: net income of €56 million from) interest-rate swaps and options, and net expense of €1 million for (2018: net income of €31 million from) miscellaneous items.

The other financial expenses, net of other financial income, amounted to €66 million, which was well below the prior-year level of €511 million. The main reason for the lower expenses was the €459 million in write-downs recorded in 2018 on the Covestro AG shares still held by Bayer AG, compared with expenses of only €1 million for write-downs and the sale of the Covestro shares in 2019. In addition, earnings were improved by the absence of the €97 million in expenses for the capital increase implemented in 2018 and of the €50 million in charges resulting in 2018 from the derecognition of Monsanto shares held by Bayer AG that were called in due to the acquisition. Earnings also benefited from a €132 million decrease in credit facility fees paid. However, the net exchange loss of €206 million in 2019, following a net exchange gain of €77 million in 2018, had an opposing effect.

Income before income taxes at Bayer AG advanced in 2019 by €2,518 million to €4,869 million (2018: €2,351 million). After deduction of €312 million (2018: €234 million) in taxes, net income amounted to €4,557 million (2018: €2,117 million). Of this amount, €1,806 million was allocated to other retained earnings, leaving a distributable profit of €2,751 million.

The Board of Management and Supervisory Board will propose to the Annual Stockholders' Meeting on April 28, 2020, that the distributable profit be used to pay a dividend of €2.80 per share on the capital stock entitled to the dividend.

5.2 Asset and Financial Position of Bayer AG

A 5.2/1

Bayer AG Summary Statements of Financial Position According to the German Commercial Code

€ million	Dec. 31,2018	Dec. 31,2019
ASSETS		
Noncurrent assets		
Intangible assets, property, plant and equipment	163	165
Investments	73,530	70,388
	73,693	70,553
Current assets		
Inventories	2,197	2,209
Trade accounts receivable	2,113	1,631
Receivables from subsidiaries	1,829	6,421
Other assets and deferred charges	492	989
Cash and cash equivalents, marketable securities	3,178	2,783
	9,809	14,033
Total assets	**83,502**	**84,586**
EQUITY AND LIABILITIES		
Equity	**27,659**	**33,603**
Provisions	**3,159**	**3,244**
Liabilities and deferred income		
Bonds and notes, liabilities to banks	10,496	9,550
Trade accounts payable	1,913	1,724
Payables to subsidiaries	39,680	35,954
Remaining liabilities and deferred income	595	511
	52,684	47,739
Total equity and liabilities	**83,502**	**84,586**

Financial structures stable; equity base strengthened

As in previous years, Bayer AG’s financial position reflected the management function it performs for the Group, particularly with respect to the company’s shareholdings and Group financing. The statement of financial position is characterized by these shareholdings and the receivables and payables vis-à-vis Group companies.

See also A 2.3.2/1

Total assets grew in 2019 by €1.1 billion, or 1.3%, to €84.6 billion. The increase was entirely due to a €4.2 billion rise in current assets to €14.0 billion, while noncurrent assets declined by €3.1 billion to €70.6 billion.

Within noncurrent assets, investments in affiliated companies showed a slight decline of €0.5 billion, mainly due to a capital decrease of €0.5 billion implemented at Bayer CropScience AG. Investments in affiliated companies totaled €49.1 billion (2018: €49.6 billion) and continued to account for the majority of total assets, at 58.1% (2018: 59.4%). Loans to subsidiaries also decreased by €2.5 billion to €20.0 billion (2018: €22.5 billion), mainly due to the repayment of a €2.6 billion loan by Bayer CropScience AG that had been granted to that company as part of the financing of the Monsanto acquisition. The total of property, plant and equipment and intangible assets remained practically unchanged at €0.2 billion.

Among the current asset items, inventories stood at the prior-year level of €2.2 billion. Here there was a slight shift between the divisions, with Crop Science inventories decreasing by €0.1 billion to €1.0 billion and inventories at Pharmaceuticals increasing by the same amount to €1.2 billion. Trade accounts receivable were reduced by €0.5 billion to €1.6 billion (2018: €2.1 billion), with decreases of €0.2 billion each at Crop Science and Pharmaceuticals and €0.1 billion at the enabling functions. They mainly comprised receivables from Group companies (€1.3 billion) as in the previous year (€1.8 billion). Among the current asset items, receivables from subsidiaries showed the largest change from the prior year, rising by €4.6 billion to €6.4 billion (2018: €1.8 billion), primarily due to an increase in intra-Group financing. Receivables from subsidiaries accounted for 7.6% (2018: 2.2%) of total assets. The other receivables reflected in current assets (including deferred charges) increased by €0.5 billion to €1.0 billion (2018: €0.5 billion), principally because of short-term claims for capital gains tax on dividends received from subsidiaries. Cash and cash equivalents, which exclusively comprised bank deposits, declined by €0.4 billion in 2019 to €2.8 billion (2018: €3.2 billion).

Bayer AG had equity of €33.6 billion (2018: €27.7 billion); thus 39.7% (2018: 33.1%) of total assets were financed by equity. The €5.9 billion increase in equity resulted from the net income of €4,557 million and the equity inflow of €3,998 million from the conversion of the mandatory convertible notes issued in 2016 by our subsidiary Bayer Capital Corporation N.V., Netherlands, into Bayer AG shares. On the other hand, equity was diminished by the dividend payment of €2,611 million for 2018.

Total provisions rose by €0.1 billion to €3.2 billion. Pension provisions, at €1.0 billion, were €0.1 billion lower than at the beginning of the year. Allocations of €610 million, including €334 million due to the change in the discount rate, were more than offset by the combination of a €496 million decrease due to higher fund assets and a €263 million decrease resulting from benefit payments. Provisions for taxes also declined by €0.1 billion and amounted to €0.4 billion on the closing date. Miscellaneous provisions, however, rose by €0.3 billion against the previous year, to €1.9 billion. This increase was driven by allocations of a net €221 million to provisions for ongoing restructuring programs.

Liabilities (including deferred income) – net of deductible receivables – receded by €4.9 billion to €47.7 billion. Gross of deductible receivables, however, there was a much smaller decrease of €0.1 billion. The decline in liabilities was mainly due to a €0.3 billion reduction in operating liabilities to Group companies and a €0.2 billion decrease in trade accounts payable. Financial debt, on the other hand, rose by €0.4 billion. Intra-Group financial debt increased by €1.4 billion to €41.5 billion, while liabilities to banks and to other third-party financial creditors were reduced by €0.9 billion to €3.3 billion and by €0.1 billion to €0.1 billion, respectively. Debt in the form of bonds was level with the prior year at €6.3 billion. Gross financial debt as of the closing date amounted to €51.1 billion (2018: €50.7 billion). After deduction of cash and cash equivalents of €2.8 billion (2018: €3.2 billion), net debt rose by €0.8 billion to €48.4 billion (2018: €47.6 billion).

5.3 Forecast, Opportunities and Risks for Bayer AG

Bayer AG is largely exposed to the same opportunities and risks as the Bayer Group, which is why reference is made to the corresponding chapters in this Annual Report.

For Bayer AG we expect sales of approximately €15 billion and an operating loss in the region of €1.2 billion in 2020. These figures include Bayer AG's own operational business and the businesses leased from Bayer Pharma AG and Bayer CropScience AG. In addition, the earnings of most German subsidiaries are transferred directly to Bayer AG under profit and loss transfer agreements. Also, specific intra-Group dividend measures ensure the availability of sufficient distributable income. On account of the interdependencies between Bayer AG and its subsidiaries, the outlook for the Bayer Group thus largely also reflects the expectations for Bayer AG. In the coming year we again expect Bayer AG to report a distributable profit that will enable our stockholders to adequately participate in the Bayer Group's earnings.

5.4 Nonfinancial and Other Disclosures by Bayer AG

Due to the importance of Bayer AG within the Bayer Group, further disclosures are required. This pertains especially to the reporting of significant nonfinancial information, which also became mandatory for the parent company Bayer AG as a result of the CSR Directive Implementation Act, which came into effect in 2017.

The integrated presentation was selected in the management report for the nonfinancial statement to be issued in 2019 pursuant to Section 289b through e of the German Commercial Code (HGB). All disclosures, provisions, described processes and key data contained in the preceding statements in the management report apply to the Bayer Group including Bayer AG. No additional aspects were identified pursuant to the CSR Directive Implementation Act that apply exclusively to Bayer AG.

The following table contains significant nonfinancial and other key data of Bayer AG.

A 5.4/1

Significant Nonfinancial and Other Key Data of Bayer AG

	2018	2019
R&D expenses (€ million)	2,331	2,131
Employees[1]	17,276	17,614
Employees by function[1]		
Production	9,188	9,417
Marketing and distribution	887	976
R&D	5,368	5,211
Administration	1,833	2,010
Employees by gender[1]		
Women	6,241	6,439
Men	11,035	11,175
Personnel expenses (€ million)	2,571	2,512
Pension obligations[2] (€ million)	4,514	4,900
Short-term incentive program (€ million)	277	238
Procurement spend (€ million)	4.2	3.6
Safety		
Recordable Incident Rate (RIR)	0.50	0.52
Lost Time Recordable Incident Rate (LTRIR)	0.37	0.38
Process Safety Incident Rate (PSI-R)[3]	–	0.25
Environmental protection		
Total energy consumption (terajoules)	7,239	6,565
Total greenhouse gas emissions (million metric tons of CO_2 equivalents)	0.55	0.46
Water use (million cubic meters)	4.92	5.46
Total waste generated (1,000 metric tons)	268	270

[1] Full-time equivalents as of 31st December 2019
[2] Defined benefit obligation
[3] In 2019, we changed over to the reporting criteria of the International Council of Chemical Associations (ICCA) and now report the discharge of chemical substances or utilities as Process Safety Incidents (PSI). Previously we reported according to the criteria of the European Chemical Association (CEFIC).

B Consolidated Financial Statements

Bayer Group Consolidated Income Statements

B 1

€ million	Note	2018	2019
Net sales	**[6]**	**36,742**	**43,545**
Cost of goods sold		(15,381)	(17,467)
Gross profit		**21,361**	**26,078**
Selling expenses		(12,210)	(12,274)
Research and development expenses		(5,105)	(5,342)
General administration expenses		(2,657)	(3,890)
Other operating income	[7]	5,043	1,633
Other operating expenses	[8]	(2,978)	(2,016)
EBIT[1]		**3,454**	**4,189**
Equity-method income (loss)	[10.1]	68	160
Financial income		908	475
Financial expenses		(2,544)	(1,944)
Financial result	**[10]**	**(1,568)**	**(1,309)**
Income before income taxes		**1,886**	**2,880**
Income taxes	[11]	(496)	(450)
Income from continuing operations after income taxes		**1,390**	**2,430**
of which attributable to noncontrolling interest		16	19
of which attributable to Bayer AG stockholders		1,374	2,411
Income from discontinued operations after income taxes	**[5.3]**	**321**	**1,680**
of which attributable to noncontrolling interest		–	–
of which attributable to Bayer AG stockholders		321	1,680
Income after income taxes		**1,711**	**4,110**
of which attributable to noncontrolling interest	[12]	16	19
of which attributable to Bayer AG stockholders (net income)		**1,695**	**4,091**
€			
Earnings per share	**[13]**		
From continuing operations	**[13]**		
Basic		1.46	2.46
Diluted		1.46	2.46
From discontinued operations	**[13]**		
Basic		0.34	1.71
Diluted		0.34	1.71
From continuing and discontinued operations	**[13]**		
Basic		1.80	4.17
Diluted		1.80	4.17

2018 figures restated
[1] For definition see A 2.3 "Alternative Performance Measures Used by the Bayer Group."

Bayer Group Consolidated Statements of Comprehensive Income

B 2

€ million	Note	2018	2019
Income after income taxes		**1,711**	**4,110**
of which attributable to noncontrolling interest	[12]	16	19
of which attributable to Bayer AG stockholders		1,695	4,091
Remeasurements of the net defined benefit liability for post-employment benefit plans	[22]	(612)	(1,347)
Income taxes	[11]	129	381
Other comprehensive income from remeasurements of the net defined benefit liability for post-employment benefit plans		**(483)**	**(966)**
Change in the fair value of own credit risk component of financial liabilities measured at fair value		(6)	(3)
Income taxes	[11]	2	1
Other comprehensive income relating to own credit risk component of financial liabilities measured at fair value		**(4)**	**(2)**
Changes in fair values of equity instruments measured at fair value		48	201
Income taxes	[11]	(2)	(6)
Other comprehensive income from equity instruments measured at fair value		**46**	**195**
Other comprehensive income relating to associates accounted for using the equity method		**19**	**21**
Other comprehensive income that will not be reclassified subsequently to profit or loss		**(422)**	**(752)**
Changes in fair values of derivatives designated as cash flow hedges	[27.3]	125	(115)
Reclassified to profit or loss		124	107
Income taxes	[11]	(80)	6
Other comprehensive income from cash flow hedges		**169**	**(2)**
Changes in exchange differences recognized on translation of operations outside the eurozone		1,008	790
Reclassified to profit or loss		118	(130)
Other comprehensive income from exchange differences		**1,126**	**660**
Other comprehensive income relating to associates accounted for using the equity method		**1**	**1**
Other comprehensive income that may be reclassified subsequently to profit or loss		**1,296**	**659**
Total other comprehensive income[1]		**874**	**(93)**
of which attributable to noncontrolling interest		(8)	(1)
of which attributable to Bayer AG stockholders		882	(92)
Total comprehensive income		**2,585**	**4,017**
of which attributable to noncontrolling interest		8	18
of which attributable to Bayer AG stockholders		2,577	3,999

[1] Other comprehensive income is recognized outside profit or loss in equity.

Bayer Group Consolidated Statements of Financial Position

B 3

€ million	Note	Dec. 31, 2018	Dec. 31, 2019
Noncurrent assets			
Goodwill	[14]	38,442	39,126
Other intangible assets	[14]	36,696	34,709
Property, plant and equipment	[15]	12,943	12,479
Investments accounted for using the equity method	[16]	515	522
Other financial assets	[17]	2,212	1,536
Other receivables	[20]	526	751
Deferred taxes	[11]	4,333	4,576
		95,667	**93,699**
Current assets			
Inventories	[18]	11,132	10,770
Trade accounts receivable	[19]	11,714	11,678
Other financial assets	[17]	1,166	2,326
Other receivables	[20]	1,958	1,811
Claims for income tax refunds		809	1,652
Cash and cash equivalents		4,052	3,185
Assets held for sale	[5.3]	234	1,137
		31,065	**32,559**
Total assets		**126,732**	**126,258**
Equity	**[21]**		
Capital stock		2,387	2,515
Capital reserves		18,388	18,261
Other reserves		25,202	26,561
Equity attributable to Bayer AG stockholders		**45,977**	**47,337**
Equity attributable to noncontrolling interest		171	180
		46,148	**47,517**
Noncurrent liabilities			
Provisions for pensions and other post-employment benefits	[22]	8,717	8,213
Other provisions	[23]	3,418	3,766
Refund liabilities	[6]	160	105
Contract liabilities	[6]	986	733
Financial liabilities	[24]	37,712	36,912
Income tax liabilities		1,433	1,603
Other liabilities	[26]	366	439
Deferred taxes	[11]	4,667	3,755
		57,459	**55,526**
Current liabilities			
Other provisions	[23]	3,365	3,251
Refund liabilities	[6]	3,622	4,134
Contract liabilities	[6]	3,235	3,319
Financial liabilities	[24]	3,682	2,182
Trade accounts payable	[25]	6,038	6,426
Income tax liabilities		1,050	758
Other liabilities	[26]	2,121	2,483
Liabilities directly related to assets held for sale	[5.3]	12	662
		23,125	**23,215**
Total equity and liabilities		**126,732**	**126,258**

2018 figures restated

Bayer Group Consolidated Statements of Changes in Equity

B 4

€ million	Capital stock	Capital reserves	Retained earnings incl. net income	Exchange differences	Fair-Value measurement of equity instruments
Dec. 31, 2017	**2,117**	**9,658**	**26,851**	**(1,870)**	**98**
Adjustments on adoption of IFRS 9 (after tax)			(43)		(17)
Adjustments on adoption of IFRS 15 (after tax)			86		
Jan. 1, 2018, adjusted	**2,117**	**9,658**	**26,894**	**(1,870)**	**81**
Equity transactions with owners					
Capital increase	270	8,730			
Dividend payments			(2,402)		
Other changes			1		
Other comprehensive income			(478)	1,134	61
Miscellaneous other changes			24		(20)
Income after income taxes			1,695		
Dec. 31, 2018	**2,387**	**18,388**	**25,734**	**(736)**	**122**
Equity transactions with owners					
Capital increase	128	(128)			
Dividend payments			(2,611)		
Other changes		1	(19)		
Other comprehensive income			(965)	661	216
Miscellaneous other changes			5		(28)
Income after income taxes			4,091		
Dec. 31, 2019	**2,515**	**18,261**	**26,235**	**(75)**	**310**

B4 (continued)

€ million	Cash flow hedges	Other reserves[1]	Equity attributable to Bayer AG stockholders	Equity attributable to non-controlling interest	Equity
Dec. 31, 2017	**(66)**	**13**	**36,801**	**60**	**36,861**
Adjustments on adoption of IFRS 9 (after tax)			(60)		(60)
Adjustments on adoption of IFRS 15 (after tax)			86		86
Jan. 1, 2018, adjusted	**(66)**	**13**	**36,827**	**60**	**36,887**
Equity transactions with owners					
Capital increase			9,000		9,000
Dividend payments			(2,402)	(5)	(2,407)
Other changes			1	(53)	(52)
Other comprehensive income	169	(4)	882	(8)	874
Miscellaneous other changes	(26)	(4)	(26)	161	135
Income after income taxes			1,695	16	1,711
Dec. 31, 2018	**77**	**5**	**45,977**	**171**	**46,148**
Equity transactions with owners					
Capital increase					
Dividend payments			(2,611)	(4)	(2,615)
Other changes			(18)	(4)	(22)
Other comprehensive income	(2)	(2)	(92)	(1)	(93)
Miscellaneous other changes	16	(3)	(10)	(1)	(11)
Income after income taxes			4,091	19	4,110
Dec. 31, 2019	**91**	**–**	**47,337**	**180**	**47,517**

[1] Other reserves include the reserve for changes in own credit risk amounting to minus €6 million and the revaluation reserve of €6 million (2018: €5 million).

Bayer Group Consolidated Statements of Cash Flows

B 5

€ million	Note	2018	2019
Income from continuing operations after income taxes		1,390	2,430
Income taxes		496	450
Financial result		1,568	1,309
Income taxes paid		(2,028)	(2,561)
Depreciation, amortization and impairments		6,241	5,365
Change in pension provisions		(281)	(168)
(Gains) losses on retirements of noncurrent assets		(4,251)	(448)
Decrease (increase) in inventories		636	(103)
Decrease (increase) in trade accounts receivable		2,520	14
(Decrease) increase in trade accounts payable		257	759
Changes in other working capital, other noncash items		985	954
Net cash provided by (used in) operating activities from continuing operations		**7,533**	**8,001**
Net cash provided by (used in) operating activities from discontinued operations		384	206
Net cash provided by (used in) operating activities		**7,917**	**8,207**
Cash outflows for additions to property, plant, equipment and intangible assets		(2,593)	(2,650)
Cash inflows from sales of property, plant, equipment and other assets		230	283
Cash inflows from divestments less divested cash		7,563	2,546
Cash inflows from noncurrent financial assets		4,212	149
Cash outflows for noncurrent financial assets		(1,333)	(421)
Cash outflows for acquisitions less acquired cash		(45,316)	(410)
Interest and dividends received		247	135
Cash inflows from (outflows for) current financial assets		2,838	(303)
Net cash provided by (used in) investing activities		**(34,152)**	**(671)**
Capital contributions		8,986	–
Dividend payments		(2,407)	(2,615)
Issuances of debt		65,090	7,464
Retirements of debt		(47,271)	(11,760)
Interest paid including interest-rate swaps		(1,331)	(1,517)
Interest received from interest-rate swaps		412	39
Cash outflows for the purchase of additional interests in subsidiaries		(47)	–
Net cash provided by (used in) financing activities		**23,432**	**(8,389)**
Change in cash and cash equivalents due to business activities	**[31]**	**(2,803)**	**(853)**
Cash and cash equivalents at beginning of year		**7,435**	**4,052**
Change in cash and cash equivalents due to changes in scope of consolidation		1	(20)
Change in cash and cash equivalents due to exchange rate movements		(581)	6
Cash and cash equivalents at end of year		**4,052**	**3,185**

2018 figures restated

Notes to the Consolidated Financial Statements of the Bayer Group

1. General information

Bayer Aktiengesellschaft (Bayer AG), which is entered in the commercial register of the Local Court of Cologne, Germany, HRB 48248, is a global enterprise based in Germany. Its registered office is at Kaiser-Wilhelm-Allee 1, 51368 Leverkusen. The material business activities of the Bayer Group in the fields of agriculture and health care took place in the reporting period in the Crop Science, Pharmaceuticals and Consumer Health segments. The activities of each segment are outlined in Note [4] .

The declarations required under Section 161 of the German Stock Corporation Act concerning the German Corporate Governance Code have been issued and made available to stockholders.

The Board of Management of Bayer AG prepared the consolidated financial statements of the Bayer Group as of December 31, 2019, at its meeting on February 18, 2020, submitted the prepared statements to the Audit Committee and the Supervisory Board for examination and approval, and released them for publication. The consolidated financial statements were discussed by the Audit Committee of the Supervisory Board of Bayer AG at its meeting on February 25, 2020, and approved by the Supervisory Board at its plenary meeting on February 26, 2020.

2. Effects of new financial reporting standards

Financial reporting standards applied for the first time in 2019
Details of the new standards whose first-time application has a material impact on the Group's financial position and results of operations are given below.

In January 2016, the IASB published the new standard for lease accounting, IFRS 16 (Leases), which replaces the rules contained in IAS 17 (Leases) and the associated interpretations. The new standard is to be applied for annual periods beginning on or after January 1, 2019. The standard introduces a single lessee accounting model, requiring lessees to recognize right-of-use assets for granted rights of use and corresponding lease liabilities. It eliminates the requirement for lessees to differentiate between operating leases – without recognizing the respective assets or liabilities – and finance leases. However, IFRS 16 contains the option of exercising exemptions for the recognition of short-term leases and those pertaining to low-value assets. As under the previous standard, IAS 17, lessors still have to differentiate between operating and finance leases. According to IFRS 16, subleases are classified with reference to the right-of-use asset arising from the sublease in relation to the head lease.

Bayer applied IFRS 16 for the first time as of January 1, 2019, retrospectively without restating the prior-year figures. In this connection, various options and practical expedients were exercised as of the transition date for contracts in which a Bayer company is the lessee. Thus no additional assessment was undertaken upon the first-time application of the new standard with regard to whether a contract is or contains a lease. For contracts previously classified as operating leases, Bayer measured the lease liabilities as of the date of first-time application of IFRS 16 at the present value of the outstanding lease payments, using as the discount rate the respective incremental borrowing rate as of that date. On the date of first-time application, right-of-use assets were generally measured at the amount of the lease liability, adjusted by the amounts of any prepaid or accrued lease payments and / or provisions for onerous leases recognized in the statement of financial position as of December 31, 2018. Initial direct costs were not taken into account in the measurement of right-of-use assets as of the date of first-time application. The terms of leases with extension or termination options were determined retrospectively.

Bayer exercised the option of exempting intangible assets from the scope of application of IFRS 16 and applying the exemptions for short-term leases to certain leases ending in 2019. It is also applying these exemptions for short-term leases beginning after December 31, 2018.

The first-time application of IFRS 16 as of January 1, 2019, resulted in the recognition of additional lease liabilities of €1.0 billion and a corresponding increase in net financial debt. Right-of-use assets, including those recognized as finance leases according to IAS 17 until December 31, 2018, rose in line with the lease liabilities by €1.0 billion as of January 1, 2019, after the adjustments resulting from the first-time application of IFRS 16.

The significant effects on the individual items in the statement of financial position that were recognized as of December 31, 2018, in line with previous requirements were as follows:

B 2/1

IFRS 16 Accounting Changes: Consolidated Statement of Financial Position as of January 1, 2019

€ million	Dec. 31, 2018	Adjustments due to IFRS 16	Jan. 1, 2019
Property, plant and equipment	12,943	1,012	13,955
Financial liabilities	41,394	1,012	42,406

In the statement of comprehensive income, Bayer ceased recognizing expenses for operating leases in operating income and instead recognized the depreciation of the right-of-use assets and the interest expense for the lease liabilities under IFRS 16. An analogous effect occurred in the statement of cash flows, where IFRS 16 had a positive effect on the operating cash flow by reducing cash outflows for operating activities, while the repayment component of lease payments and the interest expense were recognized in the financing cash flow.

Material items in connection with the reconciliation of the operating lease commitments of €1,271 million as of December 31, 2018, under IAS 17 to the lease liabilities recognized as of January 1, 2019, under IFRS 16 comprised €399 million in finance leases already recognized as liabilities, the €187 million discount on the lease liabilities initially recognized under IFRS 16 and €35 million in lease commitments not recognized under IFRS 16 that pertained to intangible assets.

The weighted average incremental borrowing rate for leases initially recognized upon the first-time application of IFRS 16 was 5.0%.

In addition to IFRS 16, the following changes were applied as of January 1, 2019, but did not have any material impact on the Group's financial position or results of operations.

B 2/2

Financial Reporting Standards Amendments With No Material Impact

Amendments to standards / interpretations		Mandatory application
IFRS 9	Amendments to IFRS 9: Prepayment Features with Negative Compensation	Jan. 1, 2019
IAS 19	Amendments to IAS 19 – (Employee Benefits): Plan Amendment, Curtailment or Settlement	Jan. 1, 2019
IAS 28	Amendment to IAS 28: Long-term Interests in Associates and Joint Ventures	Jan. 1, 2019
IFRIC 23	Uncertainty over Income Tax Treatments	Jan. 1, 2019
	Annual Improvements to IFRS Standards 2015-2017 Cycle	Jan. 1, 2019

Published financial reporting standards that have not yet been applied

The IASB has issued the following standards and amendments to standards whose application was not yet mandatory for the 2019 fiscal year and for some of which the European Union had not yet completed the endorsement process. The following standards have not yet been applied by Bayer:

B 2/3

Published Financial Reporting Standards That Have Not Yet Been Applied

Amendments to standards / interpretations		Mandatory application	Anticipated effects
Conceptual Framework	Amendments to References to the Conceptual Framework in IFRS Standards	Jan. 1, 2020	No material effects expected
IFRS 3	Amendment to IFRS 3 Business Combinations	Jan. 1, 2020	No material effects expected
IFRS 9, IAS 39, IFRS 7	Amendments to IFRS 9, IAS 39 and IFRS 7: Interest Rate Benchmark Reform	Jan. 1, 2020	No material effects expected
IFRS 17	Insurance Contracts	Jan. 1, 2021	Effects currently being evaluated
IAS 1, IAS 8	Definition of Material (Amendments to IAS 1 and IAS 8)	Jan. 1, 2020	No material effects expected
IAS 1	Classification of Liabilities as Current or Non-current (Amendments to IAS 1)	Jan. 1, 2022	Effects currently being evaluated

3. Reporting policies, methods and critical accounting estimates

The consolidated financial statements as of December 31, 2019, of Bayer AG and its subsidiaries (Bayer Group) were prepared according to the International Financial Reporting Standards (IFRS) issued by the International Accounting Standards Board (IASB), London, United Kingdom, and the interpretations of the IFRS Interpretations Committee (IFRS IC) as endorsed by the European Union. The applicable further requirements of Section 315e of the German Commercial Code were also taken into account.

The consolidated financial statements were drawn up in euros. Except where otherwise indicated, amounts are stated in millions of euros (€ million) and rounded to the nearest million. Adding the individual figures may therefore not always result in the exact total given.

In the income statement and statement of comprehensive income, statement of financial position, statement of cash flows and statement of changes in equity, certain items are combined for the sake of clarity. These are explained in the Notes. The income statement was prepared using the cost-of-sales method. Assets and liabilities are classified by maturity. They are regarded as current if they mature within one year or within the normal business cycle of the company or the Group, or are held for sale. The normal business cycle is defined for this purpose as beginning with the procurement of the resources necessary for the production process and ending with the receipt of cash or cash equivalents as consideration for the sale of the goods or services produced in that process. Inventories and trade accounts receivable and payable are always presented as current items. Deferred tax assets and liabilities, and pension provisions are always presented as noncurrent items.

The financial statements of the individual companies consolidated are prepared according to uniform recognition and measurement methods. The consolidated financial statements are based on the principle of the historical cost of acquisition, construction or production, with the exception of the items reflected at fair value, such as equity instruments held, debt instruments held that do not solely comprise principal and interest payments, and derivatives and liabilities designated at fair value through profit or loss.

In preparing the consolidated financial statements, management has to make certain assumptions and estimates that may substantially impact the presentation of the Group's financial position and / or results of operations. Such estimates, assumptions or the exercise of discretion mainly relate to the useful life of noncurrent assets, the discounted cash flows used for impairment testing and purchase price allocations, and the recognition of provisions, including those for litigation-related expenses, pensions and other benefits, taxes, environmental compliance and remediation costs, product liability and guarantees, as well as the recognition of refund liabilities. Essential estimates and assumptions that may affect reporting in the various item categories of the financial statements are described in the following sections of this Note. Estimates are based on historical experience and other assumptions that are considered reasonable under given circumstances. They are continually reviewed but may vary from the actual values.

New or revised financial reporting standards often contain options regarding the first-time application of new recognition and measurement methods. The income statement for the previous year and the opening statement of financial position for that year may be adjusted depending on the option Bayer exercises. For detailed information on the standards to be applied for the first time from January 1, 2019, see Note [2].

Consolidation

The consolidated financial statements include subsidiaries, joint operations, joint ventures and associates. The financial statements of the individual companies consolidated are prepared as of the closing date of the Group financial statements.

Subsidiaries are companies over which Bayer AG is currently able to exercise power by virtue of existing rights. Power means the ability to direct the relevant activities that significantly affect a company's profitability. Control is therefore only deemed to exist if Bayer AG is exposed, or has rights, to variable returns from its involvement with a company and has the ability to use its power over that company to affect the amount of that company's returns. The ability to control another company generally derives from Bayer AG's direct or indirect ownership of a majority of the voting rights. In the case of structured entities, however, control is based on contractual agreements. Inclusion of an entity's accounts in the consolidated financial statements begins when the Bayer Group is able to exercise control over the entity and ceases when it is no longer able to do so.

A joint operation or a joint venture exists where the Bayer Group controls an entity's activities jointly with a third party on the basis of a contractual agreement and decisions about the relevant activities require the unanimous consent of the parties sharing control. The parties to a joint operation have rights to the assets, and obligations for the liabilities, relating to the arrangement. The Bayer Group recognizes its share of the assets, liabilities, revenues and expenses in the consolidated financial statements in accordance with its rights and obligations. The parties jointly controlling a joint venture have rights to the net assets of the arrangement. Joint ventures are accounted for using the equity method.

Associates are companies over which Bayer AG exerts significant influence, generally through an ownership interest between 20% and 50%. They also are accounted for using the equity method. The carrying amount of a company accounted for using the equity method is adjusted annually by the change in its equity corresponding to Bayer's percentage interest in the company. Differences arising upon first-time inclusion using the equity method are accounted for according to full-consolidation principles. Bayer's share of changes – recognized in profit or loss – in these companies' equity and impairment losses recognized on goodwill are reflected in equity-method income / loss. Gains and losses from the sale of investments accounted for using the equity method are recognized in financial income or expenses, respectively, within income from investments in affiliated companies.

Interests in subsidiaries, joint ventures and associates that do not have a material impact on the Group's financial position or results of operations, either individually or in aggregate, are not consolidated but recognized as financial investments in equity instruments.

Foreign currency translation

The assets and liabilities of the subsidiaries that do not use the euro as their functional currency are translated into euros at closing rates. All changes occurring during the year and all income and expense items and cash flows are translated into euros at average monthly rates. Equity components are translated at the historical exchange rates prevailing at the respective dates of their first-time recognition in Group equity. The exchange differences arising between the resulting amounts and those obtained by translating at closing rates are recognized outside profit or loss as "Exchange differences on translation of operations outside the eurozone" (in other comprehensive income) or presented as "Exchange differences" in the tables in the Notes. When a company is deconsolidated or the net investment in a foreign operation is reduced, such exchange differences are reclassified from equity to profit or loss and recognized in the financial result. The exchange rates for major currencies against the euro varied as follows:

B 3/1

Exchange Rates for Major Currencies

		BRL	CAD	CNY	GBP	JPY	RUB	USD
		Brazil	**Canada**	**China**	**U.K.**	**Japan**	**Russia**	**U.S.A.**
Closing rate	2018	4.44	1.56	7.87	0.89	125.87	79.76	1.15
	2019	4.52	1.46	7.82	0.85	121.87	69.94	1.12
Average rate	2018	4.29	1.53	7.80	0.88	130.38	73.87	1.18
	2019	4.41	1.49	7.74	0.88	122.01	72.44	1.12

Since July 1, 2018, IAS 29 (Financial Reporting in Hyperinflationary Economies) has been applied for Bayer S.A., Argentina. On the date of first-time application, the adjustment of the carrying amounts of nonmonetary assets and liabilities was recognized in equity based on the general price index. Gains and losses incurred from the current hyperinflation of nonmonetary assets and liabilities and of equity are recognized in the income statement as other operating income and expenses.

Foreign currency measurement

Monetary items, such as receivables and liabilities, that are denominated in currencies other than a Group company's functional currency are measured at closing rates. Related exchange differences are recognized as exchange gains or losses under other financial income or expenses.

Sales, refund liabilities, right-of-return assets and contract liabilities

All revenues derived from the selling of products, rendering of services or from licensing agreements are recognized as sales. This is done on the basis of customer contracts and the performance obligations contained therein, which are individually identified and may be presented separately for the purpose of revenue recognition. Revenues are recognized in profit or loss when or as soon as the entity transfers control of goods or services to a customer either over time or at a point in time. Control lies with the customer if the customer can independently determine the use of and consume the benefit derived from a product or service. Revenues from product deliveries are recognized at a point in time based on an overall assessment of the existence of a right to payment, the allocation of ownership rights, the transfer of physical possession, the transfer of risks and rewards, and acceptance by the customer. In the case of product deliveries undertaken by the Bayer Group, the transfer of risks and rewards and the right to determine the product shipment destination are particularly important. Revenues from services, on the other hand, are recognized over the period of time when services are rendered and in accordance with a reasonable measure of progress.

Net sales are limited to the amount the Bayer Group expects to receive for the fulfillment of performance obligations. Payment components to be withheld for third parties are deducted. Sales are therefore reduced by sales taxes and by actual and expected sales deductions resulting from rebates, discounts and bonuses. Sales deductions are estimated primarily on the basis of historical experience, specific contractual terms and thus future expectations of sales development. Revenues from contracts involving noncash consideration, such as exchange transactions, are measured at the fair value of the assets received. Furthermore, sales are reduced by the amount of the refund liability for expected returns of defective goods or of saleable products that may be returned under contractual arrangements. The net sales are reduced on the date of sale or on the date when the amount of future product returns can be reasonably estimated. **Refund liabilities** are recognized for expected sales deductions and product returns.

Assets from expected product returns are recognized in inventories as **right-of-return assets** at the previous carrying amounts less any recovery and processing costs and potential impairments. For unilaterally fulfilled customer contracts where more than one year passes between performance and payment, significant financing components are accounted for separately based on their present values and the subsequent unwinding of the discount. The underlying discount rate takes into account the individual credit risk of the contracting party that receives the financing.

Some of the Bayer Group’s revenues are generated on the basis of licensing agreements under which third parties have been granted the right to use or access products and technologies. A right-to-use license is characterized by the underlying technology remaining essentially unchanged over the period for which the rights are granted. With a right-to-access license, by contrast, the customer’s interest is directed toward the consistent further development of that intellectual property (IP). Revenues from right-to-use licenses are recognized at a specific point in time, while those from right-to-access licenses are recognized over time according to the underlying measure of progress. Milestone payments related to right-to-access licenses are allocated to satisfied and unsatisfied portions of the underlying performance obligation, as applicable. Consideration relating to already satisfied obligations is recognized as catch-up adjustments to revenue. Payment elements still to be earned are deferred as **contract liabilities**. Sales- or usage-based royalties agreed in connection with outlicensing arrangements are only recognized if the sale or the usage is sufficiently verified and the underlying performance obligation has been fulfilled.

Research and development expenses

Research expenses are recognized through profit or loss. Development expenses are only capitalized as internally generated intangible assets if the recognition criteria of IAS 38 are met. These include sufficient certainty that the development activity will give rise to future financial cash flows that also cover the respective development expenses. Since our own development projects are often subject to regulatory approval procedures and other uncertainties, the conditions for the capitalization of costs incurred before receipt of approvals generally are not satisfied. Capitalized development expenses are recognized at the cost of generation and amortized over their expected useful lives. Impairment testing is also performed on an annual or event-driven basis.

Income taxes

Income taxes comprise the taxes levied on taxable income in the individual countries along with changes in deferred tax assets and liabilities that are recognized in profit or loss. The income taxes recognized are reflected at the amounts likely to be payable under the statutory regulations in force, or already enacted in relation to future periods, at the end of the reporting period. Complex tax regulations may give rise to uncertainties with respect to their interpretation and the amounts and timing of future taxable income. Given the wide range of international business relationships and the long-term nature and complexity of existing contractual agreements, differences arising between the actual results and the assumptions made, or future changes to such assumptions, could necessitate adjustments to tax income and expense in future periods. Liabilities to tax authorities that are uncertain as to their amount and the probability of their occurrence are recognized as tax liabilities based on reasonable estimates. The amounts recognized are based on various factors, such as experience with previous tax audits and differing legal interpretations by the taxable entity and the responsible tax authority.

In compliance with IAS 12 (Income Taxes), deferred taxes are recognized for temporary differences between the carrying amounts of assets and liabilities in the statement of financial position prepared according to IFRS and their tax bases. Deferred taxes are also recognized for consolidation measures and for loss carryforwards, interest carryforwards and tax credits that are likely to be usable. Deferred tax assets relating to deductible temporary differences, tax credits, loss carryforwards and interest carryforwards are recognized where it is probable that taxable income or sufficiently taxable temporary differences will be available in the future to enable them to be used. Deferred tax liabilities are recognized on temporary differences taxable in the future. Deferred taxes are calculated at the rates which – on the basis of the statutory regulations in force, or already enacted in relation to future periods, as of the closing date – are expected to apply in the individual countries at the time of realization. Deferred tax assets and deferred tax liabilities are offset if they relate to income taxes levied by the same taxation authority and Bayer has a legal right to settle on a net basis. Material effects of changes in tax rates or tax law on deferred tax assets and liabilities are generally accounted for in the period in which the changes are enacted. Such effects are recognized in profit or loss except where they relate to deferred taxes that were recognized outside profit or loss, in which case they are recognized in other comprehensive income or directly in equity.

Deferred and current taxes are recognized in profit or loss unless they relate to items recognized outside profit or loss, in which case they, too, are recognized in other comprehensive income or directly in equity. The probability that deferred tax assets resulting from temporary differences, loss carryforwards or interest carryforwards can be used in the future is the subject of forecasts by the individual consolidated companies regarding their future earnings situation and other parameters. Deferred tax liabilities are recognized on planned dividend payments by subsidiaries. Where no dividend payment is planned for the foreseeable future, no deferred tax liability is recognized on the difference between the proportionate net assets according to IFRS and the tax base of the investment in the subsidiary.

Goodwill

In a business combination, goodwill is capitalized at the acquisition date (see “Acquisition accounting”). Goodwill is not amortized but is tested for impairment at least annually or when there is an indication of possible impairment.

Other intangible assets

Other intangible assets are capitalized at the acquisition date at their cost of acquisition or generation. Those with a definite useful life are amortized on a straight-line basis over the following periods, except where their actual depletion demands a different amortization pattern.

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Useful Lives of Other Intangible Assets

Patents and technologies	8 to 30 years
Trademarks	10 to 35 years
Marketing and distribution rights	5 to 30 years
Production rights	14 to 19 years
Other rights	2 to 12 years

The expected useful lives of such assets and the amortization patterns are determined based on estimates of the period for which they will generate cash flows. In addition, impairment testing is performed.

Property, plant and equipment

Property, plant and equipment is initially recognized at the cost of acquisition or construction plus the estimated amounts of any redevelopment or decommissioning costs. Thereafter it is depreciated by the straight-line method over its expected useful life, except where use-related depreciation is more appropriate.

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Useful Lives of Property, Plant and Equipment

Buildings	5 to 50 years
Plant installations and machinery	4 to 40 years
Furniture, fixtures and other equipment	2 to 15 years

In addition, impairment testing is performed. When assets are sold, closed down or scrapped, the difference between the net proceeds and the net carrying amount of the assets is recognized as a gain or loss in other operating income or expenses, respectively.

Grants and subsidies from third parties that serve to promote investment are reflected in the statement of financial position under other liabilities and amortized to income over the useful lives of the respective investments or in line with the terms of the grant or subsidy.

Investment property comprises land and buildings not being used for operational or administrative purposes. It is measured using the cost model. The fair values of buildings and developed sites reported in the Notes are primarily determined on the basis of internal valuations using the income approach, while those of undeveloped sites are mainly calculated using the market comparison approach.

Impairment testing

An impairment test is performed if there is an indication of possible impairment for an intangible asset, an item of property, plant and equipment, or a cash-generating unit or unit group to which goodwill has been allocated. Other intangible assets with an indefinite useful life (such as the Bayer Cross trademark), intangible assets that are not yet available for use (such as R&D projects) and cash-generating units or unit groups to which goodwill has been allocated are tested annually for impairment.

A cash-generating unit is the smallest identifiable group of assets generating cash inflows that are largely independent of the cash inflows from other assets or groups of assets. The Bayer Group primarily regards product families as well as seeds and the corresponding traits as cash-generating units and subjects them to global impairment testing. Goodwill is tested for impairment at segment level.

Impairment testing involves comparing the carrying amount of each cash-generating unit or unit group, intangible asset or item of property, plant and equipment to the recoverable amount, which is the higher of its fair value less costs of disposal or value in use. If the carrying amount exceeds the recoverable amount, an impairment loss must be recognized for the difference. In this case an impairment loss is first recognized on any goodwill allocated to the cash-generating unit or unit group. Any remaining impairment loss is allocated among the other noncurrent nonfinancial assets in proportion to their carrying amounts, unless this is prohibited under any other rule. The resulting expense is reflected in the operating expense item in which the depreciation or amortization of the respective asset is recognized. The same applies to income from impairment loss reversals. Impairment losses recognized on goodwill are included in other operating expenses.

The recoverable amount is generally determined on the basis of the fair value less costs of disposal, taking into account the present value of the future net cash flows as market prices for the individual units are not normally available. These are forecasted on the basis of the Bayer Group's current planning, the planning horizon being up to four years. Forecasting involves making assumptions, especially regarding future selling prices, sales volumes, costs, market growth rates, economic cycles and exchange rates. These assumptions are based on internal estimates along with external market studies. Where the recoverable amount is the fair value less costs of disposal, measurement is undertaken from the viewpoint of an independent market participant. Where the recoverable amount is the value in use, the object of valuation is measured as currently used. In either case, net cash flows beyond the planning period are determined on the basis of long-term business expectations using the respective individual growth rates derived from market information. The fair value less costs of disposal is determined on the basis of unobservable inputs (Level 3).

The net cash inflows are discounted at a rate equivalent to the weighted average cost of equity and debt capital. To allow for the different risk and return profiles of the Bayer Group's principal businesses, the after-tax cost of capital is calculated separately for each reporting segment while taking into account regional focus areas, and a segment-specific capital structure is defined by benchmarking against comparable companies in the same industry sector. The cost of equity corresponds to the return expected by stockholders, while the cost of debt is based on the conditions on which comparable companies can obtain long-term financing. Both components are derived from capital market information.

Although the estimates of the useful lives of certain assets, assumptions concerning the macroeconomic environment and industry developments, and estimates of the discounted future cash flows are believed to be appropriate, changes in assumptions or circumstances could require changes in the carrying amounts. This could lead to the recognition of additional impairment losses in the future or – except in the case of goodwill – to reversals of previously recognized impairment losses if developments are contrary to expectations.

Financial assets

Financial assets comprise receivables, acquired equity and debt instruments, cash and cash equivalents, and derivatives with positive fair values. A financial asset (other than a derivative) is initially recognized at fair value, plus transaction costs in most cases, on the settlement date.

The classification and measurement of financial assets is based in each case on the business model and the characteristics of the cash flows. Trade accounts receivable are measured at amortized cost. Other debt instruments are measured at amortized cost or at fair value through profit or loss. Equity instruments are generally held for medium- to long-term strategic purposes and are therefore measured at fair value through other comprehensive income. In special cases they are measured at fair value through profit or loss; this applies to the shares in Covestro AG.

Loss allowances for expected credit losses are recognized for financial assets measured at amortized cost. Under the simplified impairment model, a default on receivables expected over the respective term (stage 2 of the impairment model) is determined for trade accounts receivable based on portfolio-specific default rates. These expected default rates are mainly based on the average defaults on receivables in recent years. These default rates are adjusted during the year for the respective customer portfolio if a significant change in the default rate is expected in the future. When determining the expected default rates, the business model, the respective customer and the economic environment of the geographic region are accounted for as follows. Specific default rates are applied for the individual Group companies; a standard calculation for countries with a comparable credit risk is undertaken for smaller companies. Further differentiation is achieved by taking into account the segments' various customer groups. Throughout the Bayer Group, customers are also assigned to risk classes with different expected default rates depending on their individual credit risk assessments.

Where action such as insolvency or comparable proceedings has been initiated against a defaulter or other objective indications exist that receivables are impaired (such as a considerable worsening of creditworthiness or a financial restructuring), the receivables are individually tested for impairment (stage 3 of the impairment model). In addition, all receivables more than 90 days past due are individually tested for impairment during the year.

For other financial assets, the expected credit loss for the next 12 months is determined on first-time recognition and on subsequent measurement using the Monte Carlo simulation method (stage 1 of the impairment model). In the event of a significant increase in the default risk, which is defined as a more than 0.25% increase in the probability of default, the expected credit losses over the respective term of the asset are taken into account (stage 2 of the impairment model). An impairment loss is recognized if there are objective indications of an impairment.

Financial assets are derecognized when contractual rights to receive cash flows from the financial assets expire or the financial assets were transferred together with all material risks and benefits. Receivables are also derecognized if they have been finally assessed as irrecoverable and we have ceased efforts to collect them following the completion of insolvency proceedings, for example. Receivables are not derecognized while they remain subject to enforcement.

Inventories

Inventories are recognized at their cost of acquisition or production (production-related full costs) – calculated by the weighted-average method – or at their net realizable value, whichever is lower.

Cash and cash equivalents

Cash includes cash in hand, checks received and balances with banks and companies. Cash equivalents are financial investments with maximum maturities of three months from the acquisition date that are subject to no more than insignificant fluctuations in value and will give rise to predefined cash inflows. Cash and cash equivalents are measured at amortized cost.

Provisions for pensions and other post-employment benefits

Within the Bayer Group, post-employment benefits are provided under defined contribution and / or defined benefit plans. In the case of defined contribution plans, the company pays contributions to publicly or privately administered pension plans on a mandatory, contractual or voluntary basis. Once the contributions have been paid, the company has no further payment obligations. The regular contributions constitute operating expenses and as such are included in the respective income statement items.

All remaining commitments under pension and other post-employment benefit plans are measured in terms of the defined benefit obligation (DBO) using the projected unit credit method, with entitlements already earned being measured at the present value of the DBO. This is based on factors such as expected future salary and pension increases, changes in health care costs, mortality rates and beneficiary structure. The uniform discount rates are based on the yields of high-quality bond portfolios (AA-rated corporate bonds) in specific currencies with weighted residual maturities approximately equal to the duration of the expected disbursements from the pension plans. The pension service cost and the net interest on the net liability are determined on the basis of the assumptions as of the previous closing date.

For funded obligations, the net liability is determined by deducting the fair value of plan assets. The obligations and plan assets are measured at regular intervals. Where no quoted prices for plan assets exist in active markets, their fair values are determined by applying the usual measurement methods and on the basis of freely accessible data such as interest rate curves and credit spreads. The net defined benefit asset is recognized in other receivables.

Current and past service cost and effects of plan settlements are recognized in operating income. The net interest on the net liability is reflected in the financial result under other financial income and expenses. The effects of remeasurements of the net defined benefit liability are reflected in the statement of comprehensive income as other comprehensive income. They consist of actuarial gains and losses, the return on plan assets and changes in the effects of the asset ceiling, less the amounts included in net interest and related deferred taxes.

Other provisions

Other provisions are recognized for present legal and constructive obligations arising from past events that will probably give rise to a future outflow of resources, provided that a reliable estimate can be made of the amount of the obligations. They are established at the present value of the expected future cash outflows and recognized in the respective operating expense items. The interest cost is reflected in the financial result under other financial income and expenses. If the projected obligation declines as a result of a change in the estimate, the provision is reversed by the corresponding amount and the resulting income recognized in the operating expense item(s) in which the original charge was recognized.

Costs arising from obligations to decommission or dismantle property, plant and equipment are included as a component of the acquisition or construction costs if they can be reliably estimated. If changes in the estimates require the provisions to be adjusted, the carrying amounts of the respective assets are reduced or increased accordingly.

Estimating the future costs for environmental protection and similar measures involves, in particular, uncertainties with regard to the applicable laws and regulations and the actual local conditions. Significant factors in estimating the costs include previous experiences in similar cases, expert opinions, current costs and new developments affecting costs, management's interpretation of current environmental regulations, the financial position of third parties that may become obligated to participate in any remediation costs on the basis of joint liability, and the remediation methods likely to be deployed. Changes in these assumptions could impact future reported results of the Group. Taking into consideration the experience gained to date and the knowledge and circumstances as of the closing date, provisions are believed to be adequate. However, material additional costs could be incurred beyond the amounts accrued that result in additional expenses in subsequent periods.

Provisions for employment termination benefits are established where the amounts of severance payments, additional pension plan modules to be granted or other benefits can be reliably estimated. However, material additional costs could be incurred beyond the amounts accrued that result in additional expenses in subsequent periods.

Provisions for stock-based compensation are established for the programs offered collectively to different groups of employees. As required by IFRS 2 (Share-based Payment) for compensation systems involving cash settlement, awards to be made under the stock-based programs are covered by provisions in the amount of the fair value of the obligations existing as of the date of the financial statements vis-à-vis the respective employee group. All resulting valuation adjustments are recognized in profit or loss.

Provisions for litigations are established under certain conditions in the case of legal risks. Litigations and other judicial proceedings often raise complex issues and are subject to many uncertainties and complexities including, but not limited to, the facts and circumstances of each particular case, the jurisdiction in which each suit is brought and differences in applicable law. The outcomes of currently pending and future proceedings generally cannot be predicted. It is particularly difficult to assess the likely outcomes of class actions for damages or mass compensation claims in the United States, which may give rise to significant financial risks for the Bayer Group. As a result of a final judgment in court proceedings, regulatory decisions or the conclusion of a settlement, the Bayer Group may incur charges for which no accounting measures have yet been taken for lack of reasonable estimability or which exceed presently established provisions and the insurance coverage.

The Bayer Group considers the need for accounting measures in respect of pending or future litigations, and the extent of any such measures, on the basis of the information available to its legal department and in close consultation with legal counsel acting for the Bayer Group. Where it is more likely than not that such a litigation will result in an outflow of resources that is already reasonably estimable, a provision for litigation is recorded in the amount of the present value of the expected cash outflows. Such provisions cover the estimated payments to the plaintiffs, court and procedural costs, attorney costs and the cost of potential settlements.

It is frequently impossible to reliably determine the existence of a present obligation or reasonably estimate the probability that a potential outflow of resources will result from a pending or future litigation. The status of the material “legal risks” is described in Note [30]. Due to the special nature of these litigations, provisions generally are not established until initial settlements allow an estimate of potential amounts or judgments have been issued. Provisions for legal defense costs are established if it is probable that material costs will have to be incurred for external legal counsel to defend the company’s legal position.

Internal and external legal counsel evaluate the current status of the Bayer Group’s material legal risks at the end of each reporting period. The need to establish or adjust a provision and the amount of the provision or adjustment are determined on this basis. Adjusting events are reflected up to the date of preparation of the consolidated financial statements. The measurement of provisions in the case of class actions or mass compensation claims is mainly based on any settlements reached during the past year and on pending or anticipated future claims.

Under IAS 37.92, further information on aspects such as the processes, risks and related measures as well as on estimated financial effects, uncertainties, the amounts of individual provisions and contingent liabilities and their maturities can be withheld in exceptional cases if disclosing it could prejudice the company’s position. Such information may include, in particular, risks in the areas of product liability, competition and antitrust law, patent disputes, tax assessments and environmental matters.

Financial liabilities

Financial liabilities are generally measured at amortized cost using the effective-interest method. Derivatives with negative fair values, liabilities for contingent consideration in business combinations and liabilities designated at fair value through profit or loss are measured at fair value.

Mandatory convertible notes are assessed to determine whether they should be accounted for entirely as debt or split into an equity component and a debt component. This involves examining whether Bayer’s early conversion rights have economic substance. These rights may have economic substance with respect to maintaining the current credit rating if early conversion can prevent a rating downgrade. In this event, future savings of credit interest would more than offset the cost of early conversion by Bayer. If the right to early conversion is deemed to have economic substance, components of the mandatory convertible notes are classified as equity.

The mandatory convertible notes issued are accounted for as a hybrid financial instrument. The directly attributable costs along with the debt component, which corresponds to the present value of the future interest payments, are deducted from the proceeds of the issue. The debt component is included in financial liabilities. The remaining amount is the equity component, which is reflected in capital reserves. The mandatory convertible notes issued in 2016 were redeemed at maturity in November 2019.

Financial liabilities with one or multiple embedded derivatives (hybrid financial instruments), where at least one of the derivatives has to be separated from the host contract and significantly modifies the contractual cash flows, can be designated in their entirety at fair value through profit or loss. Use was made of this option for the debt instruments issued in June 2017 (exchangeable bond 2017 / 2020), which are exchangeable into Covestro shares. Changes in the fair value of these instruments are recognized in other financial income and expenses with the exception of those attributable to Bayer's own credit risk, which are recognized in other comprehensive income in the statement of comprehensive income.

Financial liabilities are derecognized when the contractual obligation is discharged or canceled, or has expired.

Derivatives

The Bayer Group uses derivatives to mitigate the risk of changes in exchange rates, interest rates or commodity prices (such as for soybeans and corn) and to hedge stock-based compensation programs. The instruments used include forward exchange contracts, interest-rate swaps, forward commodity contracts and forward stock transactions. Derivatives are recognized at the trade date and are remeasured to fair value on each closing date. Positive fair values are reflected in financial assets, negative fair values in financial liabilities.

Raw material supply contracts (at Crop Science, for example) that are concluded in order to receive or deliver nonfinancial items for the company's own purposes are not accounted for as derivatives but treated as pending transactions (own-use exemption).

Where embedded derivatives are identified in contracts, they are assessed for any close economic relationship with the host contract. If no such relationship is found, they are accounted for separately as derivatives.

Derivatives are designated as held for trading at fair value through profit or loss unless they qualify for hedge accounting. This mainly applies to the exchange hedging of accounting risks, the effects of which are reflected in other financial income and expenses as exchange gains or losses.

The effective portion of derivatives designated as cash flow hedges is initially recognized outside profit or loss in other comprehensive income. Any ineffective portions are recognized directly in profit or loss. Only when the hedged item is recognized through profit or loss is the effective portion of the hedging instrument also recognized in the income statement. In the case of commodity futures and options, reclassification is to the cost of goods sold. The effects of interest-rate hedges in the income statement are reflected in interest income or expense. The effects of the hedging of forecasted sales transactions in foreign currencies are recognized in other operating income or expenses at the time of revenue recognition. The hedging of stock-based employee compensation is recognized in the respective operating expense items over the duration of the Aspire programs.

Changes in the fair values of derivatives designated as fair value hedges are recognized in income along with the adjustments in the carrying amounts of the hedged items (for example, in inventories or as separate assets). This mainly applies to the hedging of firm purchase commitments for goods at Crop Science. These effects are recognized in the cost of goods sold. The effects of interest-rate hedges are reflected in interest income or expense.

Acquisition accounting

Acquired businesses are accounted for using the acquisition method, which in principle requires that the assets acquired and liabilities assumed be recorded at their respective fair values on the date Bayer obtains control. The difference between the consideration transferred (plus the fair value of the pre-existing equity interest in the acquiree in the case of step acquisitions) and the fair values of the acquired assets and assumed liabilities is recognized as goodwill. The results of foreign currency cash flow hedges are factored into the translation of foreign currency purchase price payments. For significant acquisitions, the purchase price allocation is carried out with assistance from independent third-party valuation specialists. The related valuations are based on the information available at the acquisition date. Ancillary acquisition costs are recognized as expenses in the periods in which they occur.

The application of the acquisition method requires certain estimates and assumptions to be made, especially concerning the fair values of the acquired intangible assets, property, plant and equipment and the liabilities assumed at the acquisition date, and the useful lives of the acquired intangible assets, property, plant and equipment. Measurement is based to a large extent on anticipated cash flows. If actual cash flows vary from those used in calculating fair values, this may materially affect the Group's future results of operations. In particular, the estimation of discounted cash flows from intangible assets under development, patented and unpatented technologies, customer relationships and brands is based on assumptions concerning, for example:

- The outcomes of R&D activities regarding the efficacy of a crop protection product, trait, seed or compound, and results of clinical trials
- The probability of obtaining regulatory approvals in individual countries
- Long-term sales projections
- Possible selling price erosion due to offerings of unpatented products following patent expirations
- The behavior of competitors (launch of competing products, marketing initiatives, etc.)

Divestment accounting

Divestments of shares in subsidiaries that result in a loss of control are generally accounted for in profit or loss. When shares in a subsidiary are gradually divested in several tranches, a reduction in the majority shareholding without the loss of control is reflected outside profit or loss and results in an increase in the equity attributable to noncontrolling interest. After the loss of control, the interest remaining at the time of the loss of control is recognized at fair value.

Leases

Leases are accounted for as described in Note [2].

4. Segment reporting

At Bayer, the Board of Management – as the chief operating decision-maker – allocates resources to the operating segments and assesses their performance. The reportable segments and regions are identified, and the disclosures selected, in line with the internal financial reporting system (management approach) and based on the Group accounting policies outlined in Note [3].

As of December 31, 2019, the Bayer Group comprised the three reportable segments Crop Science, Pharmaceuticals and Consumer Health. Their activities are as follows:

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Activities of the Segments

Segment	Activities
Crop Science	Development, production and marketing of a broad portfolio of products in seeds and plant traits, crop protection, digital solutions and customer services to promote sustainable agriculture
Pharmaceuticals	Development, production and marketing of prescription products, especially for cardiology and women's health; specialty therapeutics in the areas of oncology, hematology and ophthalmology; diagnostic imaging equipment and the necessary contrast agents
Consumer Health	Development, production and marketing of mainly nonprescription (OTC = over-the-counter) products in the categories of pain, cardiovascular risk prevention, dermatology, nutritional supplements, digestive health, allergy, and cough and cold

The operational businesses of Animal Health and the Currenta Group are no longer included in segment reporting for continuing operations because they were reclassified to discontinued operations under IFRS 5. The service company Currenta is no longer part of the Bayer Group after the sale of our majority stake closed in November 2019.

Business activities that cannot be allocated to any other segment are reported under "All Other Segments" within the Reconciliation. These mainly include the services provided by Business Services. Also recognized are gains and losses incurred upon the ongoing revaluation of assets and liabilities and of equity under IAS 29 for Bayer S.A. in Argentina.

The items in "Enabling Functions and Consolidation" as part of the Reconciliation mainly comprise the Bayer holding companies and Leaps by Bayer, which focuses on the development of crucial, cross-species innovations. They also include the increase or decrease in expenses for Group-wide long-term stock-based compensation (Aspire) arising from fluctuations in the performance of Bayer stock, and the consolidation of intersegment sales (2019: €2.4 billion; 2018: €2.4 billion). In addition, they contain certain contingent liabilities unrelated to the current business along with expenses, income, assets and liabilities of comparable central functions of the acquired Monsanto Group.

The segment data is calculated as follows:

- // The intersegment sales reflect intra-Group transactions effected at transfer prices fixed on an arm's-length basis.
- // The net cash provided by operating activities is the cash flow from operating activities as defined in IAS 7 (Statement of Cash Flows).

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Key Data by Segment

€ million	Crop Science 2018	Crop Science 2019	Pharmaceuticals 2018	Pharmaceuticals 2019	Consumer Health 2018	Consumer Health 2019
Net sales (external)	14,266	19,832	16,746	17,962	5,450	5,462
Currency-and portfolio-adjusted change[1]	+6.1%	+1.4%	+3.4%	+5.6%	−0.7%	+2.6%
Intersegment sales	14	16	21	32	1	10
Net sales (total)	14,280	19,848	16,767	17,994	5,451	5,472
EBIT[1]	3,138	582	3,213	4,762	(2,077)	713
EBITDA before special items[1]	2,651	4,796	5,598	5,975	1,096	1,090
EBITDA margin before special items[1]	18.6%	24.2%	33.4%	33.3%	20.1%	20.0%
ROCE[1]	6.3%	0.8%	16.6%	24.1%	(12.9)%	5.1%
Net cash provided by operating activities	3,743	4,209	4,376	4,523	727	841
Capital expenditures	1,030	1,414	888	974	228	222
Depreciation, amortization and impairments	1,362	3,313	1,584	1,189	3,112	590
of which impairment losses/impairment loss reversals	13	567	603	127	2,732	232
Depreciation and amortization before special items[1]	1,354	2,791	1,023	1,076	397	359
Research and development expenses	1,950	2,344	2,893	2,752	226	230

2018 figures restated
[1] For definition see A 2.3 "Alternative Performance Measures Used by the Bayer Group."

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Key Data by Segment

€ million	All Other Segments 2018	All Other Segments 2019	Reconciliation: Enabling Functions and Consolidation 2018	Reconciliation: Enabling Functions and Consolidation 2019	Group 2018	Group 2019
Net sales (external)	262	277	18	12	36,742	43,545
Currency-and portfolio-adjusted change[1]	+8.7%	+2.7%	–	–	+3.5%	+3.5%
Intersegment sales	2,383	2,370	(2,419)	(2,428)	–	–
Net sales (total)	2,645	2,647	(2,401)	(2,416)	36,742	43,545
EBIT[1]	249	(108)	(1,069)	(1,760)	3,454	4,189
EBITDA before special items[1]	515	293	(891)	(651)	8,969	11,503
EBITDA margin before special items[1]	–	–	–	–	24.4%	26.4%
ROCE[1]	–	–	–	–	4.0%	3.8%
Net cash provided by operating activities	211	522	(1,524)	(2,094)	7,533	8,001
Capital expenditures	213	283	9	27	2,368	2,920
Depreciation, amortization and impairments	168	258	15	15	6,241	5,365
of which impairment losses/impairment loss reversals	–	2	–	–	3,348	928
Depreciation and amortization before special items[1]	167	255	15	15	2,956	4,496
Research and development expenses	3	–	33	16	5,105	5,342

2018 figures restated
[1] For definition see A 2.3 "Alternative Performance Measures Used by the Bayer Group."

Leases between fully consolidated companies continue to be recognized as operating leases under IAS 17 within the segment data in the consolidated financial statements of the Bayer Group even after the first-time application of IFRS 16 as of January 1, 2019. This does not have any relevant impact on the respective key data used in the steering of the company and internal reporting to the Board of Management as the chief operating decision maker.

Reconciliations

The reconciliation of EBITDA before special items, EBIT before special items and EBIT to Group income before income taxes is given in the following table:

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Reconciliation of Segments' EBITDA Before Special Items to Group Income Before Income Taxes

€ million	2016	2019
EBITDA before special items of segments	9,860	12,154
EBITDA before special items of Enabling Functions and Consolidation	(891)	(651)
EBITDA before special items[1]	**8,969**	**11,503**
Depreciation, amortization and impairment losses / loss reversals before special items of segments	(2,941)	(4,481)
Depreciation, amortization and impairment losses / loss reversals before special items of Enabling Functions and Consolidation	(15)	(15)
Depreciation, amortization and impairment losses / loss reversals before special items	**(2,956)**	**(4,496)**
EBIT before special items of segments	6,919	7,673
EBIT before special items of Enabling Functions and Consolidation	(906)	(666)
EBIT before special items[1]	**6,013**	**7,007**
Special items of segments	(2,396)	(1,724)
Special items of Enabling Functions and Consolidation	(163)	(1,094)
Special items[1]	**(2,559)**	**(2,818)**
EBIT of segments[2]	4,523	5,949
EBIT of Enabling Functions and Consolidation[2]	(1,069)	(1,760)
EBIT[1]	**3,454**	**4,189**
Financial result	(1,568)	(1,309)
Income before income taxes	**1,886**	**2,880**

2018 figures restated

[1] For definition see A 2.3 "Alternative Performance Measures Used by the Bayer Group."

[2] Prior to April 1, 2019, special items in EBIT pertaining to the integration of Monsanto's corporate functions were included in the acquisition / integration category at Crop Science (2019: €30 million; 2018: €130 million). Effective April 1, 2019, these special items were included in restructuring under Enabling Functions and Consolidation as part of the Bayer 2022 platform program.

Information on geographical areas

The following table provides a regional breakdown of external sales by market and of intangible assets, property, plant and equipment:

B 4/4

Information on Geographical Areas

	Net sales (external) – by market		Intangible assets and property, plant and equipment	
€ million	2018	2019	2018	2019
Europe / Middle East / Africa	12,393	13,184	26,478	24,877
of which Germany	2,439	2,364	16,167	15,267
of which Switzerland	446	505	5,469	5,310
North America	10,942	15,087	55,644	55,585
of which United States	9,190	13,556	54,073	53,889
Asia / Pacific	7,796	8,611	1,997	2,074
of which China	3,114	3,726	529	554
Latin America	5,611	6,663	3,717	3,764
of which Brazil	2,826	3,539	2,573	2,547
Total	**36,742**	**43,545**	**87,836**	**86,300**

2018 figures restated

Information on major customers

Revenues from transactions with a single customer in no case exceeded 10% of Bayer Group sales in 2019 or 2018.

5. Scope of consolidation; subsidiaries and affiliates

5.1 Changes in the scope of consolidation

Changes in the scope of consolidation in 2019 were as follows:

B 5.1/1

Change in the Number of Consolidated Companies

Bayer AG and consolidated companies	Germany	Other countries	Total
December 31, 2018	55	365	420
Changes in scope of consolidation	–	(15)	(15)
Additions	–	–	–
Retirements	(6)	(7)	(13)
December 31, 2019	**49**	**343**	**392**

In conjunction with the acquisition of the consumer care business of Merck & Co., Inc., United States, Bayer entered into a strategic collaboration with that company in 2014. This collaboration is included in the consolidated financial statements as a joint operation. Bayer and Merck & Co., Inc., have mutually agreed to collaborate on the development, production, life-cycle management and marketing of active ingredients and products in the field of soluble guanylate cyclase (sGC) modulation.

With the acquisition of Bayer's prescription dermatology business by LEO Pharma A/S, Ballerup, Denmark, the U.S. business was transferred in 2018 and the business in all other countries on July 1, 2019.

The sale of Bayer's 60% interest in the chemical park operator Currenta to funds managed by Macquarie Infrastructure and Real Assets (MIRA) was completed on November 29, 2019, and accounted for most of the decrease in the number of consolidated companies in Germany.

Following the establishment of BlueRock Therapeutics in 2016 as a joint venture with Versant Ventures, Bayer acquired the remaining interest in 2019, thus completing the full acquisition of this unlisted U.S.-based biotech company.

Twelve (2018: five) associates and five (2018: ten) joint ventures were accounted for in the consolidated financial statements using the equity method. Details of these companies are given in Note [16].

Flagship Ventures V Agricultural Fund, L.P., United States, was included in the consolidated financial statements for the first time in 2015 and classified as an associate. Bayer has no control over this associate despite owning 99.9% of the capital, but is able to significantly influence its financial and operating policy decisions.

Nanjing Baijingyu Pharmaceutical Co., Ltd., China, was classified as an associate in view of Bayer's representation on its executive committee and supervisory board. This enables Bayer to significantly influence its financial and operating policy decisions despite owning only 15% of its voting rights and capital.

A total of 62 (2018: 67) subsidiaries, including one (2018: one) structured entity and 12 (2018: 17) associates or joint ventures that in aggregate are immaterial to the Bayer Group's financial position and results of operations are neither consolidated nor accounted for using the equity method, but are recognized at fair value. The immaterial subsidiaries accounted for less than 0.1% of Group sales, less than 0.1% of equity and less than 0.2% of total assets.

Details of the companies included in the consolidated financial statements, the subsidiary and affiliated companies of the Bayer Group pursuant to Section 313, Paragraph 2 of the German Commercial Code, and a list of domestic subsidiaries that availed themselves in 2019 of certain exemptions granted under Section 264, Paragraph 3, and Section 264b of the German Commercial Code, are included in the audited consolidated financial statements that have been submitted for publication in the electronic version of the Federal Gazette. This information can also be accessed at www.bayer.com/shareownership2019.

5.2 Business combinations and other acquisitions

Acquisitions in 2019

On September 20, 2019, Bayer raised its stake in the joint venture BlueRock Therapeutics L.P., Cambridge, Massachusetts, United States, from 40.8% to 100%. Bayer made an upfront payment of €201 million for the remaining stake. Further amounts totaling up to €325 million are payable upon the achievement of pre-defined research-based milestones. A liability of €185 million was recognized for this purpose. This company, previously accounted for using the equity method, was therefore fully consolidated. Remeasurement of the shares previously accounted for using the equity method resulted in an amount of €296 million. The gain of €245 million resulting from the derecognition of the shares previously accounted for using the equity method was recognized in the financial result. The consideration transferred pertained to goodwill of €501 million, internally developed IP R&D of €114 million and other net assets of €67 million. The goodwill primarily pertains to the expected innovation potential. BlueRock Therapeutics is allocated to the Pharmaceuticals segment and focuses on the development of cell therapies across neurology, cardiology and immunology indications using its proprietary CELL+GENE™ platform for induced pluripotent stem cells (iPSC). Sales of €0 million and after-tax income of minus €14 million were recorded for the acquired business since the date of first-time consolidation. Had the above-mentioned acquisition already been made as of January 1, 2019, this would have had no effect on sales, after-tax income or earnings per share of the Bayer Group owing to the way the joint venture agreement governing profit realization had been structured.

On June 21, 2019, Bayer acquired 28% of the shares of Century Therapeutics LLC, Philadelphia, Pennsylvania, United States. The purchase price was €129 million, comprising an initial payment of €67 million and an assumed liability of €62 million. A further payment of €62 million will be made upon the achievement of certain milestones, bringing Bayer’s interest in Century Therapeutics LLC to 36%. In view of Bayer’s significant influence, the investment is accounted for in the consolidated financial statements as an associate using the equity method. Century Therapeutics LLC, founded in 2018 by U.S. companies Versant Ventures, San Francisco, and Fujifilm Cellular Dynamics, Inc., Madison, develops allogeneic immune cell therapies for cancer. The foundational technology is built on induced pluripotent stem cells that have unlimited self-renewing capacity.

Acquisitions in 2018

On June 7, 2018, Bayer acquired 100% of the outstanding shares of Monsanto Company, St. Louis, Missouri, United States. The acquisition of Monsanto brought together two strong and highly complementary businesses: Bayer’s innovative chemical and biological crop protection portfolio and Monsanto’s exceptional expertise in the field of seeds and traits. Monsanto has production facilities in locations including Luling, Muscatine and Soda Springs (all United States), Antwerp (Belgium), Zarate (Argentina) and Camacari (Brazil). Monsanto’s portfolio of established brands includes DEKALB™, Asgrow™ and Roundup™, among others. The purchase price of €48,029 million pertained mainly to intangible assets for technologies in the areas of seeds and traits (useful lives of between 9 and 30 years), herbicides (useful lives of 20 years) and digital platforms (useful lives of 15 years), as well as for R&D projects and brands (useful lives of between 10 and 30 years), property, plant and equipment, inventories and goodwill. No value was assigned to the company name “Monsanto.”

The goodwill included expected synergies in administration processes and infrastructure, including cost savings in the selling, R&D and general administration functions, as well as expected sales synergies resulting from the combined offering of products. The goodwill is non-tax-deductible.

The following bonds with total nominal volumes of US$15 billion and €5 billion in total were issued in June 2018 to finance the acquisition:

B 5.2/1

Newly Issued Bonds

Issuer	Coupon (%)	Nominal volume	Issue date	Maturity date
Bayer U.S. Finance II LLC, U.S.A.				
	3.5	US$1,250 million	Jun. 25, 2018	Jun. 25, 2021
	3-month USD LIBOR + 0.63	US$1,250 million	Jun. 25, 2018	Jun. 25, 2021
	3.875	US$2,250 million	Jun. 25, 2018	Dec. 15, 2023
	3-month USD LIBOR + 1.01	US$1,250 million	Jun. 25, 2018	Dec. 15, 2023
	4.25	US$2,500 million	Jun. 25, 2018	Dec. 15, 2025
	4.375	US$3,500 million	Jun. 25, 2018	Dec. 15, 2028
	4.625	US$1,000 million	Jun. 25, 2018	Jun. 25, 2038
	4.875	US$2,000 million	Jun. 25, 2018	Jun. 25, 2048
Bayer Capital Corporation B.V., Netherlands				
	3-month EURIBOR + 0.55	€750 million	Jun. 26, 2018	Jun. 26, 2022
	0.625	€1,000 million	Jun. 26, 2018	Dec. 15, 2022
	1.5	€1,750 million	Jun. 26, 2018	Jun. 26, 2026
	2.125	€1,500 million	Jun. 26, 2018	Dec. 15, 2029

As part of the acquisition, bonds with a nominal volume of US$6.9 billion were taken over from Monsanto.

The purchase price allocation for Monsanto was completed in the second quarter of 2019. The effects of adjustments to the purchase price allocation in 2018 and through the second quarter of 2019 on the Group’s assets and liabilities were as follows:

B 5.2/2

Acquired Assets and Assumed Liabilities (Fair Values at the Respective Acquisition Dates) and Adjustments (Monsanto)

€ million	Prior to adjustment of the purchase price allocation	Adjustment of the purchase price allocation	After adjustment of the purchase price allocation
Goodwill	22,998	1,746	24,744
Patents and technologies	17,350	(212)	17,138
Trademarks	4,195	(254)	3,941
Marketing and distribution rights	821	24	845
R&D projects	4,300	302	4,602
Production rights	–	11	11
Other rights	394	(34)	360
Property, plant and equipment	6,293	(639)	5,654
Investments accounted for using the equity method	52	–	52
Other financial assets	250	(52)	198
Inventories	4,882	(153)	4,729
Receivables	7,201	54	7,255
Other current assets	27	(1)	26
Cash and cash equivalents	2,657	–	2,657
Deferred tax assets	1,548	302	1,850
Provisions for pensions and other post-employment benefits	(367)	(22)	(389)
Other provisions	(1,297)	(632)	(1,929)
Refund liabilities	(3,321)	8	(3,313)
Financial liabilities	(8,656)	1	(8,655)
Miscellaneous liabilities	(3,102)	(566)	(3,668)
Deferred tax liabilities	(8,019)	117	(7,902)
Net assets	**48,206**	**–**	**48,206**

Adjustments to the purchase price allocation for Monsanto after December 31, 2018, had no effect on income after income taxes.

On May 2, 2018, Bayer increased its interest in the joint venture Bayer Zydus Pharma Private Limited, Thane, India, from 50% to 75% plus one share. A purchase price of €28 million was agreed. Bayer is obligated to purchase the remaining 25% minus one share of Bayer Zydus Pharma by 2021 and has recognized a liability of €9 million in connection with this obligation. As a result, the accounting method used for this business changed from the equity method to full consolidation, with 100% of the shares of Bayer Zydus Pharma being consolidated. Remeasurement of the shares previously accounted for using the equity method resulted in an amount of €18 million. The gain of €15 million resulting from the derecognition of the shares previously accounted for using the equity method was recognized in the financial result. The purchase price pertained mainly to goodwill that in turn was based primarily on a control premium. Bayer Zydus Pharma is active in core segments of the Indian pharmaceutical market and focuses on women's health, diagnostic imaging, cardiovascular disease, diabetes treatment and oncology. This acquisition increases Bayer's presence in the Indian pharmaceutical market.

5.3 Discontinued operations, assets and liabilities held for sale, and divestments

Discontinued operations

On August 20, 2019, Bayer and Elanco Animal Health LLC (Elanco), Greenfield, Indiana, United States, signed an agreement for Bayer to sell its Animal Health business to Elanco for a purchase price of €6,845 million consisting of €4,791 million in cash, subject to customary purchase price adjustments, and €2,053 million in Elanco stock based on the unaffected 30-day volume-weighted average price of €30.26 as of August 6, 2019. The number of shares constituting the equity component is fixed within a 7.5% collar. This means the number of shares will be increased (decreased) for share price decreases (increases) within this corridor of €28.15 to €32.71. Based on Elanco's share price of €26.52 as of December 31, 2019, the value of the equity consideration, taking into account the corresponding fair value, would be €1,868 million and Bayer would receive 73 million Elanco shares.

On November 29, 2019, Bayer completed the sale of its shares in the chemical park operator Currenta. Bayer had signed an agreement on August 6, 2019, to sell the stake in Currenta to InfraChem Holdings S.à r.l., Luxembourg, Luxembourg, a company managed by Macquarie Infrastructure and Real Assets. Currenta manages and operates infrastructure, energy supply and other essential services across the chemical parks in Leverkusen, Dormagen and Krefeld-Uerdingen. The preliminary sale price for Bayer's interest in Currenta is €1,104 million. In addition, Bayer sold a real estate and infrastructure portfolio to Currenta for €180 million. Other divested net assets mainly included pension provisions of €1,584 million. The provisional divestment gain amounts to €1,637 million.

Animal Health and Currenta are being presented as discontinued operations in the income statements from the third quarter of 2019 onward and for all prior periods.

The income statements for the discontinued operations are given below:

B 5.3/1

Income Statements for Discontinued Operations

€ million	Currenta 2018	Currenta 2019	Animal Health 2018	Animal Health 2019	Covestro 2018	Covestro 2019	Total 2018	Total 2019
Net sales	**1,343**	**1,171**	**1,501**	**1,571**	**–**	**–**	**2,844**	**2,742**
Cost of goods sold	(1,156)	(954)	(473)	(501)	–	–	(1,629)	(1,455)
Gross profit	**187**	**217**	**1,028**	**1,070**	**–**	**–**	**1,215**	**1,287**
Selling expenses	(11)	(9)	(530)	(535)	–	–	(541)	(544)
Research and development expenses	2	1	(143)	(143)	–	–	(141)	(142)
General administration expenses	(24)	(59)	(46)	(127)	–	–	(70)	(186)
Other operating income / expenses	(6)	1,624	3	(4)	8	–	5	1,620
EBIT[1]	**148**	**1,774**	**312**	**261**	**8**	**–**	**468**	**2,035**
Financial result	**(24)**	**(44)**	**(5)**	**(4)**	**–**	**–**	**(29)**	**(48)**
Income before income taxes	**124**	**1,730**	**307**	**257**	**8**	**–**	**439**	**1,987**
Income taxes	(27)	(226)	(83)	(81)	(8)	–	(118)	(307)
Income after income taxes	**97**	**1,504**	**224**	**176**	**–**	**–**	**321**	**1,680**
of which attributable to noncontrolling interest	–	–	–	–	–	–	–	–
of which attributable to Bayer AG stockholders (net income)	97	1,504	224	176	–	–	321	1,680

[1] For definition see A 2.3 "Alternative Performance Measures Used by the Bayer Group."

The cash flows for the discontinued operations are as follows:

B 5.3/2

Cash Flows from Discontinued Operations

€ million	Currenta 2018	Currenta 2019	Animal Health 2018	Animal Health 2019	Total 2018	Total 2019
Net cash provided by (used in) operating activities	129	37	255	169	384	206
Net cash provided by (used in) investing activities	(144)	(116)	(55)	(82)	(199)	(198)
Net cash provided by (used in) financing activities	15	79	(200)	(87)	(185)	(8)
Change in cash and cash equivalents	**–**	**–**	**–**	**–**	**–**	**–**

As no cash is assigned to the discontinued operations, the balance of the cash provided is deducted again in financing activities.

Assets and liabilities held for sale

The assets and liabilities held for sale in 2019 were mainly those of the businesses to be divested to Elanco, and were comprised as follows:

B 5.3/3

Assets and Liabilities Held for Sale

€ million	Dec. 31, 2018	Dec. 31, 2019
Goodwill	156	99
Other intangible assets	32	145
Property, plant and equipment	42	421
Other assets	4	–
Deferred taxes	–	130
Inventories	–	314
Trade accounts receivable	–	6
Other receivables	–	17
Claims for income tax refunds	–	4
Cash and cash equivalents	–	1
Assets held for sale	**234**	**1,137**
Provisions for pensions and other post-employment benefits	5	454
Other provisions	–	39
Refund liabilities	–	53
Financial liabilities	–	2
Miscellaneous liabilities	–	18
Deferred taxes	7	19
Income tax liabilities	–	29
Trade accounts payable	–	48
Liabilities directly related to assets held for sale and discontinued operations	**12**	**662**

The assets and liabilities held for sale in 2018 were mainly those of the businesses sold to LEO Pharma in the United States.

Divestments in 2019

On December 13, 2019, Bayer and CRISPR Therapeutics AG, Zug, Switzerland, agreed to terminate their collaboration in the joint venture Casebia, which was established in 2015. As part of the agreement, Bayer transferred its interest in the joint venture to CRISPR and received co-marketing rights and a payment of €14 million. A capital contribution of €59 million, previously recognized in liabilities, to which Bayer had committed but was still outstanding, must no longer be made.

Bayer completed the sale of its Dr. Scholl’s business on November 1, 2019. Yellow Wood Partners LLC, Boston, United States, had signed an agreement with Bayer on July 19, 2019, to acquire this business. Under IFRS 5 the assets and liabilities pertaining to the business were recognized since the second quarter of 2019 as held for sale. Impairment losses of €429 million on the disposal groups, including €208 million on goodwill, were recognized through profit or loss. The preliminary purchase price amounts to €516 million and corresponds to the carrying amount of the derecognized net assets.

On August 30, 2019, Bayer completed the sale of the Coppertone™ business to Beiersdorf AG, Hamburg, Germany, the two companies having signed a purchase agreement in May 2019. Under IFRS 5 the assets and liabilities pertaining to the business were recognized in the second quarter of 2019 as held for sale. The preliminary purchase price amounts to €501 million and corresponds to the carrying amount of the derecognized net assets.

On July 27, 2018, Bayer signed the agreements to sell the prescription dermatology business to LEO Pharma A/S, Ballerup, Denmark. On September 4, 2018, the prescription dermatology business of the Consumer Health segment in the United States was transferred to the acquirer. The final purchase price amounted to €58 million and the final divestment gain to €35 million. The remaining global business outside the United States was transferred to the acquirer on July 1, 2019. The divested portfolio comprises prescription brands including Advantan™, Skinoren™ and Travocort™. The final purchase price amounted to €617 million and the final divestment gain to €347 million.

Divestments in 2018

In connection with the acquisition of Monsanto, Bayer had signed an agreement with BASF SE, Ludwigshafen, Germany, on October 13, 2017, concerning the sale of selected Crop Science businesses. All of the respective transactions closed on August 1, 2018, except for the sale of the vegetable seed business, which closed on August 16, 2018. In accordance with the conditions imposed by antitrust authorities, the divestment of Crop Science businesses to BASF also comprises further significant obligations by Bayer that will be fulfilled over a number of years subsequent to the date of divestment. Another of these conditions is for deliveries under the supply agreement (finished products and active ingredients) to be made at prices based on the respective variable costs. In this connection, a contract liability of €0.2 billion was determined based on customary sales prices and recognized in the statement of financial position. It will be dissolved as the obligations are fulfilled. The final purchase price received from BASF amounted to €7.4 billion, and the divestment gain before taxes to €4.0 billion. The divested net assets amounted to €2.8 billion and pertained mainly to property, plant and equipment, goodwill and other assets and provisions.

On June 30, 2018, the Pharmaceuticals segment sold its MK Generics business in Central America and the Caribbean to Tecnoquímicas S.A., Cali, Colombia. The divested business includes the Bonima production plant in El Salvador. The base purchase price was €44 million.

Bayer ceded de facto control of Covestro and deconsolidated the company at the end of September 2017. From the loss of control and through the second quarter of 2018, Covestro fulfilled the conditions for presentation as a discontinued operation. In connection with the sale of Covestro AG shares in 2017, Bayer AG entered into derivative contracts. These resulted in gains of €8 million through the second quarter of 2018.

Notes to the Income Statements

6. Net sales

Total reported net sales in 2019 posted year-on-year growth of €6,803 million, or 18.5 %, to €43,545 million. Sales were derived primarily from product deliveries and licenses. Breakdowns of net sales by segment and geographical area are given in the overview in Note [4].

Sales of €1,685 million were recognized in 2019 (2018: €664 million) from performance obligations already satisfied in previous years. These sales primarily resulted from right-to-use licenses granted against sales-based royalties and from adjustments to refund liabilities for expected product returns and rebates to be granted.

Contractually agreed sales volumes pertaining to performance obligations not yet satisfied as of December 31, 2019, are expected to be reclassified to profit or loss as follows, taking into account anticipated sales deductions:

B 6/1

Allocation of Transaction Price to Unfulfilled Performance Obligations

€ million	2018	2019
Transaction price outstanding as of Dec. 31	**2,023**	**1,204**
of which to be recognized within 1 year	265	238
of which to be recognized between 1 and 2 years	250	177
of which to be recognized between 2 and 3 years	203	121
of which to be recognized between 3 and 4 years	146	118
of which to be recognized between 4 and 5 years	137	97
of which to be recognized after more than 5 years	1,022	453

2018 figures restated

The description above only accounts for customer contracts with an original contractual term of more than one year.

Contract liabilities mainly result from advance payments by customers for product deliveries and are predominantly recognized as sales within one year. In connection with the acquisition of Monsanto, certain Crop Science businesses were transferred to BASF. Portions of the purchase price were recognized as contract liabilities since certain payment components were not yet earned. Further significant amounts of contract liabilities comprise milestone payments already received for right-to-access licenses and are recognized as sales over a period of more than five years.

The change in contract liabilities was due to the following factors:

B 6/2

Roll-Forward of Contract Liabilities

€ million	2018	2019
Contract liability balance as of Jan. 1	**1,530**	**4,221**
Changes due to business combinations	418	–
Additions	5,845	7,122
Revenue recognized in the current year that was included in the contract liability balance as of Jan. 1	(770)	(3,266)
Revenue recognized in the current year that was not included in the contract liability balance as of Jan. 1	(2,782)	(3,970)
Other	–	(115)
Exchange differences	(20)	60
Contract liability balance as of Dec. 31	**4,221**	**4,052**

Amounts for rebates, which are reported separately as refund liabilities, amounted to 8.5% of total net sales in 2019 (2018: 8.9%).

The refund liabilities for product returns in 2019 amounted to 1.3% of total net sales (2018: 1.3%).

7. Other operating income

Other operating income was comprised as follows:

B 7/1

Other Operating Income

€ million	2018	2019
Gains on retirements of noncurrent assets	4,309	563
Income from reversals of impairment losses on receivables	183	148
Income from reversals of unutilized provisions	12	11
Gains from derivatives	217	421
Miscellaneous operating income	322	490
Total	**5,043**	**1,633**

2018 figures restated

Gains on retirements of noncurrent assets included proceeds of €347 million in connection with the sale of the prescription dermatology business to LEO Pharma A/S, Ballerup, Denmark (Consumer Health segment). The sale of two active ingredients in the Crop Science segment resulted in a further gain of €59 million. The divestment of several noncore brands at Consumer Health yielded a gain of €35 million. In addition, the sale of activated transfer rights at Bayer 04 Leverkusen Fussball GmbH, Germany, brought a gain of €32 million (All Other Segments).

Miscellaneous operating income included €255 million in payments from insurers. This included €202 million in reimbursements for the Xarelto™ litigation in the Pharmaceuticals segment less expenses of €27 million due to the membership of Bayer subsidiary Pandias Re AG, Luxembourg, in the insurance consortium.

Also reflected here is a net gain of €34 million incurred on the ongoing revaluation of nonmonetary assets and liabilities and of equity in hyperinflationary economies.

8. Other operating expenses

Other operating expenses were comprised as follows:

B 8/1

Other Operating Expenses

€ million	2018	2019
Losses on retirements of noncurrent assets	(32)	(124)
Impairment losses on receivables	(197)	(209)
Expenses related to significant legal risks	(677)	(546)
Losses from derivatives	(213)	(596)
Miscellaneous operating expenses	(1,859)	(541)
Total	**(2,978)**	**(2,016)**

2018 figures restated

Of the impairment losses on receivables, €64 million pertained to receivables in Brazil.

The miscellaneous operating expenses included €208 million in impairment losses on the share of goodwill pertaining to the divested Dr. Scholl's™ brand (Consumer Health segment). Also reflected here were €58 million in expenses from the retrospective final purchase price adjustment in connection with the divestments to BASF.

The remaining amount comprised a number of individually immaterial items at the subsidiaries.

Information on the legal risks can be found in Note [30].

9. Personnel expenses and employee numbers

Personnel expenses for continuing operations rose by €1,010 million in 2019 to €11,788 million (2018: €10,778 million). The increase was mainly due to the first-time inclusion of the employees of the acquired agriculture business for the full year and the allocations to provisions for restructuring measures.

B 9/1

Personnel Expenses

€ million	2018	2019
Salaries	8,588	9,849
Social expenses and expenses for pensions and other benefits	2,190	1,939
of which for defined contribution pension plans	449	456
of which for defined benefit and other pension plans	382	512
Total	**10,778**	**11,788**

2018 figures restated

The interest portion of the allocation to personnel-related provisions – mainly for pensions and other post-employment benefits – is included in the financial result under other financial expenses (Note [10.3]).

The average numbers of employees, classified by functional area, were as shown in the table below:

B 9/2

Employees

	2018	2019
Production	38,271	42,037
Marketing and distribution	38,433	38,152
Research and development	16,121	16,308
General administration	8,968	9,595
Total	**101,793**	**106,092**
Apprentices	1,428	1,343

2018 figures restated

The number of employees on either permanent or temporary contracts is stated in full-time equivalents (FTE), with part-time employees included on a pro-rated basis in line with their contractual working hours. The figures do not include apprentices.

10. Financial result

The financial result for 2019 was minus €1,309 million (2018: minus €1,568 million), comprising equity-method income of €160 million (2018: €68 million), financial expenses of €1,944 million (2018: €2,544 million) and financial income of €475 million (2018: €908 million). Details of the components of the financial result are provided in the following sections.

10.1 Income (loss) from investments in affiliated companies

The net income (loss) from investments in affiliated companies was comprised as follows:

B 10.1/1

Income (Loss) from Investments in Affiliated Companies

€ million	2018	2019
Net income (loss) from investments accounted for using the equity method (equity-method income / loss)	68	160
Expenses		
Losses from the sale of investments in affiliated companies	–	–
Miscellaneous expenses from investments in affiliated companies	(459)	(19)
Income		
Gains from the sale of investments in affiliated companies	304	–
Miscellaneous income from investments in affiliated companies	–	49
Total	**(87)**	**190**

Income from investments accounted for using the equity method mainly comprised equity-method income of €200 million (2018: equity-method loss of €26 million) pertaining to the BlueRock joint ventures and an equity-method loss of €31 million (2018: €22 million) pertaining to the Casebia Group. The equity-method result from the investment in BlueRock contains a gain of €246 million resulting from the remeasurement of the interest that was accounted for using the equity method until September 2019. Once the remaining interest had been acquired, BlueRock was fully consolidated.

In 2018, income from investments in affiliated companies accounted for using the equity method primarily comprised equity-method income of €103 million from the interest in Covestro, which until May 2018 was accounted for in the Bayer Group consolidated financial statements as an associate using the equity method.

Miscellaneous expenses from investments in affiliated companies included changes in the fair value of the interest in Covestro, which has been presented as an equity instrument since May 2018.

In 2018, gains from the sale of investments in affiliated companies included the income from the partial sale of the interest in Covestro.

The miscellaneous income from investments in affiliated companies consisted of the €31 million dividend received on the Covestro shares.

Further details of the companies accounted for using the equity method are given in Note [16].

10.2 Net interest expense

The net interest expense was comprised as follows:

B 10.2/1

Net Interest Expense

€ million	2018	2019
Interest and similar expenses	**(1,383)**	**(1,575)**
of which interest expense relating to nonfinancial liabilities	(91)	(18)
Interest and similar income	**319**	**294**
of which interest income relating to nonfinancial assets	65	56
Total	**(1,064)**	**(1,281)**

2018 figures restated

10.3 Other financial income and expenses

Other financial income and expenses were comprised as follows:

B 10.3/1

Other Financial Income and Expenses

€ million	2018	2019
Expenses		
Interest portion of interest-bearing provisions	(177)	(273)
Net exchange loss	(269)	–
Miscellaneous financial expenses	(256)	(77)
Income		
Net exchange gain	–	58
Miscellaneous financial income	285	74
Total	**(417)**	**(218)**

2018 figures restated

The interest portion of noncurrent provisions comprised €159 million (2018: €144 million) in interest expense for pension and other post-employment benefit provisions and minus €114 million (2018: minus €33 million) in effects of interest expense and interest-rate fluctuations for other provisions and corresponding overfunding. The interest expense for pension and other post-employment benefit provisions included €595 million (2018: €535 million) for the unwinding of discount on the present value of the defined benefit obligation and €436 million (2018: €391 million) in interest income from plan assets.

The €3 million in negative fair value changes (2018: €230 million in positive fair value changes) of the debt instruments (exchangeable bond) issued in June 2017 was recognized in miscellaneous financial expenses.

In 2018, the exchange losses included a €132 million currency translation loss resulting from the deconsolidation of Bayer S.A., Venezuela, as of September 30, 2018.

In 2018, the miscellaneous financial expenses included €124 million in commitment fees and other fees related to the syndicated bank financing for the acquisition of Monsanto.

11. Taxes

The breakdown of tax expenses by origin was as follows:

B 11/1

Tax Expense by Origin

€ million	2018	Of which income taxes	2019	Of which income taxes
Taxes paid or accrued				
Current income taxes				
Germany	(1,134)	(1,134)	(1,087)	(1,087)
Other countries	(1,289)	(1,289)	(704)	(704)
Other taxes				
Germany	(30)		(47)	
Other countries	(162)		(181)	
	(2,615)	**(2,423)**	**(2,019)**	**(1,791)**
Deferred taxes				
from temporary differences	2,053	2,053	1,352	1,352
from tax loss and interest carryforwards and tax credits	(126)	(126)	(11)	(11)
	1,927	**1,927**	**1,341**	1,341
Total	**(688)**	**(496)**	**(678)**	**(450)**

2018 figures restated

Other taxes mainly included land, vehicle and other indirect taxes and are included in the respective operating expense items.

The deferred tax assets and liabilities were allocable to the following items in the statements of financial position:

B 11/2

Deferred Tax Assets and Liabilities

€ million	Dec. 31, 2018 Deferred tax assets	Dec. 31, 2018 Deferred tax liabilities	Dec. 31, 2019 Deferred tax assets	Dec. 31, 2019 Deferred tax liabilities
Intangible assets	860	6,995	1,155	6,671
Property, plant and equipment	451	882	241	533
Financial assets	158	193	68	88
Inventories	1,405	214	1,722	362
Receivables	154	568	121	410
Other assets	177	176	104	60
Provisions for pensions and other post-employment benefits	2,792	408	2,676	367
Other provisions	1,580	54	1,633	64
Liabilities	887	331	932	269
Tax loss and interest carryforwards	540	–	570	–
Tax credits	483	–	423	–
	9,487	**9,821**	**9,645**	**8,824**
Set-off	(5,154)	(5,154)	(5,069)	(5,069)
Total	**4,333**	**4,667**	**4,576**	**3,755**

2018 figures restated

The use of tax loss carryforwards reduced current income taxes in 2019 by €162 million (2018: €157 million). The use of tax credits reduced current income taxes by €278 million (2018: €78 million).

Of the total tax loss and interest carryforwards of €10,446 million, including interest carryforwards of €189 million (2018: €8,677 million, including interest carryforwards of €174 million), an amount of €3,772 million, including interest carryforwards of €0 million (2018: €4,254 million, including interest carryforwards of €0 million) is expected to be usable within a reasonable period. The increase in tax loss and interest carryforwards mainly resulted from the general business development in Germany and the United States. Deferred tax assets of €570 million (2018: €540 million) were recognized for the amount of tax loss and interest carryforwards expected to be usable.

The use of €6,674 million of tax loss and interest carryforwards, including interest carryforwards of €189 million (2018: €4,422 million, including interest carryforwards of €174 million) was subject to legal or economic restrictions. Consequently, no deferred tax assets were recognized for this amount. If these tax loss and interest carryforwards had been fully usable, deferred tax assets of €412 million (2018: €378 million) would have been recognized.

Tax credits of €423 million were recognized in 2019 (2018: €483 million) as deferred tax assets. The decrease in tax credits mainly resulted from their utilization within the U.S. consolidated tax group. The use of €65 million (2018: €32 million) of tax credits was subject to legal or economic restrictions. Consequently, no deferred tax assets were recognized for this amount.

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Expiration of Unusable Tax Credits, Tax Loss Carryforwards and Interest Carryforwards

	Tax credits		Tax loss and interest carryforwards	
€ million	**Dec. 31, 2018**	**Dec. 31, 2019**	**Dec. 31, 2018**	**Dec. 31, 2019**
Within one year	1	1	22	105
Within two years	1	4	105	69
Within three years	2	–	222	279
Within four years	2	1	91	44
Within five years	–	2	69	212
Thereafter	26	57	3,913	5,965
Total	**32**	**65**	**4,422**	**6,674**

In 2019, subsidiaries that reported losses for 2019 or 2018 recognized net deferred tax assets totaling €1,569 million (2018: €1,487 million) from temporary differences and tax loss carryforwards. These assets were considered to be unimpaired because the companies concerned were expected to generate taxable income in the future or sufficiently taxable temporary differences.

Deferred tax liabilities of €16 million were recognized in 2019 (2018: €44 million) for planned dividend payments by subsidiaries. Deferred tax liabilities were not recognized for differences on €17,557 million (2018: €15,827 million) of retained earnings of subsidiaries because these earnings are to be reinvested for an indefinite period.

The reconciliation of expected to actual income tax expense (2019: €184 million; 2018: €61 million) and of the expected to the effective tax rate for the Group was as follows:

B 11/4

Reconciliation of Expected to Actual Income Tax Expense

	2018		2019	
	€ million	%	€ million	%
Expected income tax expense[1] and expected tax rate	**435**	**23.1**	**634**	**22.0**
Reduction in taxes due to tax-free income				
Income related to the operational business	(164)	(8.7)	(27)	(0.9)
Income from affiliated companies and divestment proceeds	(272)	(14.4)	(189)	(6.6)
First-time recognition of previously unrecognized deferred tax assets on tax loss and interest carryforwards[2]	(58)	(3.1)	(159)	(5.5)
Use of tax loss and interest carryforwards on which deferred tax assets were not previously recognized	(11)	(0.6)	(59)	(2.1)
Increase in taxes due to non-tax-deductible expenses				
Expenses related to the operational business	222	11.8	255	8.8
Impairment losses on investments in affiliated companies	13	0.7	36	1.3
New tax loss and interest carryforwards unlikely to be usable	64	3.4	146	5.1
Existing tax loss and interest carryforwards on which deferred tax assets were previously recognized but which are unlikely to be usable	76	4.0	12	0.4
Tax income (–) and expenses (+) relating to other periods	(42)	(2.2)	(131)	(4.5)
Tax effects of changes in tax rates	(208)	(11.0)	107	3.7
Other tax effects	441	23.4	(175)	(6.1)
Actual income tax expense and effective tax rate	**496**	**26.4**	**450**	**15.6**

2018 figures restated
[1] Expected income tax expense is calculated by applying an expected weighted average tax rate to the pre-tax income of the Group. This average rate was determined on the basis of expected tax rates for the individual Group companies.
[2] Including the first-time recognition of a deferred tax asset on new loss carryforwards in the Netherlands

The other tax effects primarily comprised an amount of minus €65 million due to a change in the accounting method applied for the investment in BlueRock Therapeutics L.P. from equity method to full consolidation, and an amount of minus €109 million pertaining to tax credits.

The reported tax expense for 2018 contained €175 million in one-time effects recognized under other tax effects that related to the integration of Monsanto into Bayer’s corporate structures, along with an amount of €140 million resulting from the impairment losses recognized on the goodwill of Consumer Health.

12. Income / losses attributable to noncontrolling interest

Income attributable to noncontrolling interest amounted to €19 million (2018: €16 million). Losses attributable to noncontrolling interest amounted to €0 million (2018: €0 million). This income primarily related to BCS Limited, India.

13. Earnings per share

Earnings per share are determined according to IAS 33 by dividing the net income for the period attributable to Bayer AG stockholders by the weighted average number of shares. As no dilutive financial instruments were in circulation at the end of the reporting period, diluted earnings per share were equivalent to basic earnings per share.

In November 2016, Bayer placed €4 billion in mandatory convertible notes without granting subscription rights to existing stockholders of the company. According to IAS 33.23, the weighted average number of shares increases as soon as the notes contract is signed, and this increase must be taken into account in calculating earnings per share. The new weighted average number of shares is based on the maximum conversion ratio resulting from the final minimum conversion price of €80.15. An adjustment is not undertaken for financing expenses incurred in connection with the mandatory convertible notes because the interest component was recognized outside profit or loss when the notes were placed.

The mandatory convertible notes matured on November 22, 2019, resulting in the issuance of a total of 49,832,614 new shares. The final conversion price was €80.15 per share.

Further details of the mandatory convertible notes are provided in Note [21].

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Earnings per Share

	€ million		Earnings per share (€)	
	2018	**2019**	**2018**	**2019**
Income after income taxes (attributable to Bayer AG stockholders)	**1,695**	**4,091**	**1.80**	**4.17**
of which income after income taxes from continuing operations (attributable to Bayer AG stockholders)	1,374	2,411	1.46	2.46
of which income after income taxes from discontinued operations (attributable to Bayer AG stockholders)	321	1,680	0.34	1.71
Weighted average number of shares[1]	**940.76**	**981.69**		

[1] The weighted average number of shares was restated for all periods prior to June 2018 to reflect the effect of the bonus component of the subscription rights issued for the June 2018 capital increase.

Notes to the Statements of Financial Position

14. Goodwill and other intangible assets

Changes in intangible assets in 2019 were as follows:

B 14/1

Changes in Intangible Assets

€ million	Acquired goodwill	Patents and technol-ogies	Trade-marks	Marketing and distribution rights	Production rights	R&D projects	Other rights and advance payments	Total
Cost of acquisition or generation, December 31, 2018	**39,989**	**30,253**	**14,642**	**3,427**	**1,857**	**5,286**	**2,075**	**97,529**
Acquisitions	586	–	69	–	–	114	–	769
Capital expenditures	–	90	–	245	–	144	432	911
Retirements	–	(9)	(53)	(22)	–	(15)	(117)	(216)
Transfers	–	6	–	43	(5)	(38)	(6)	–
Transfers (IFRS 5)	(503)	(15)	(1,328)	(56)	(48)	(10)	(78)	(2,038)
Divestments / changes in scope of consolidation	–	(2)	(3)	–	–	2	(1)	(4)
Inflation adjustment (IAS 29)	8	3	–	1	–	–	3	15
Exchange differences	615	364	187	39	2	89	25	1,321
December 31, 2019	**40,695**	**30,690**	**13,514**	**3,677**	**1,806**	**5,572**	**2,333**	**98,287**
Accumulated amortization and impairments, December 31, 2018	**1,547**	**10,738**	**5,538**	**1,418**	**1,782**	**79**	**1,289**	**22,391**
Retirements	–	(7)	(44)	(22)	–	(6)	(81)	(160)
Amortization and impairment losses	208	1,850	677	199	18	7	272	3,231
Amortization	–	1,829	456	199	18	–	268	2,770
Impairment losses	208	21	221	–	–	7	4	461
Impairment loss reversals	–	–	(214)	–	–	–	–	(214)
Transfers	–	–	–	–	(5)	–	5	–
Transfers (IFRS 5)	(208)	(21)	(595)	(24)	(47)	–	(34)	(929)
Divestments / changes in scope of consolidation	–	(2)	(1)	–	–	–	(1)	(4)
Inflation adjustment (IAS 29)	3	3	1	–	–	–	3	10
Exchange differences	19	28	50	15	–	1	14	127
December 31, 2019	**1,569**	**12,589**	**5,412**	**1,586**	**1,748**	**81**	**1,467**	**24,452**
Carrying amounts, December 31, 2019	**39,126**	**18,101**	**8,102**	**2,091**	**58**	**5,491**	**866**	**73,835**
Carrying amounts, December 31, 2018	**38,442**	**19,515**	**9,104**	**2,009**	**75**	**5,207**	**786**	**75,138**

2018 figures restated

In the Crop Science segment, a €21 million impairment loss was recognized on an intangible asset in the area of insecticides in connection with a streamlining of the portfolio.

In the Consumer Health segment, a €429 million impairment loss was recognized prior to the formation of a disposal group under IFRS 5 for the sale of the Dr. Scholl's™ foot care brand. Of this amount, €208 million pertained to goodwill and €221 million to the trademark. The carrying amount exceeded the sale proceeds. For the Claritin™ allergy brand, however, a €211 million impairment loss reversal was recorded based on the annual impairment testing, mainly in light of lower capital costs.

Changes in intangible assets in 2018 were as follows:

B 14/2

Changes in Intangible Assets (Previous Year)

€ million	Acquired goodwill	Patents and technologies	Trademarks	Marketing and distribution rights	Production rights	R&D projects	Other rights and advance payments	Total
Cost of acquisition or generation, December 31, 2017	**14,751**	**12,861**	**10,453**	**1,911**	**1,923**	**1,044**	**1,564**	**44,507**
Acquisitions	24,792	17,138	3,941	845	11	4,602	360	51,689
Capital expenditures	–	46	–	358	–	53	243	700
Retirements	–	(26)	(7)	(55)	–	(149)	(41)	(278)
Transfers	–	3	–	334	–	(280)	(57)	–
Transfers (IFRS 5)	(318)	(273)	(40)	(17)	(76)	(109)	(22)	(855)
Divestments / changes in scope of consolidation	–	–	(4)	–	–	–	(2)	(6)
Inflation adjustment (IAS 29)	20	6	–	1	–	–	6	33
Exchange differences	744	498	299	50	(1)	125	24	1,739
December 31, 2018	**39,989**	**30,253**	**14,642**	**3,427**	**1,857**	**5,286**	**2,075**	**97,529**
Accumulated amortization and impairments, December 31, 2017	**–**	**9,638**	**4,041**	**1,283**	**1,836**	**117**	**1,167**	**18,082**
Retirements	–	(23)	(10)	(31)	–	(149)	(27)	(240)
Amortization and impairment losses	1,547	1,300	1,477	149	23	65	202	4,763
Amortization	–	1,300	429	138	23	–	200	2,090
Impairment losses	1,547	–	1,048	11	–	65	2	2,673
Impairment loss reversals	–	–	–	–	–	–	–	–
Transfers	–	–	–	–	–	46	(46)	–
Transfers (IFRS 5)	–	(230)	(29)	(8)	(76)	–	(24)	(367)
Divestments / changes in scope of consolidation	–	–	3	–	–	–	–	3
Inflation adjustment (IAS 29)		6		1			5	12
Exchange differences	–	47	56	24	(1)	–	12	138
December 31, 2018	**1,547**	**10,738**	**5,538**	**1,418**	**1,782**	**79**	**1,289**	**22,391**
Carrying amounts, December 31, 2018	**38,442**	**19,515**	**9,104**	**2,009**	**75**	**5,207**	**786**	**75,138**
Carrying amounts, December 31, 2017	**14,751**	**3,223**	**6,412**	**628**	**87**	**927**	**397**	**26,425**

2018 figures restated

The growth rates and capital cost factors used in the impairment testing of goodwill in 2018 and 2019 are shown in the following table:

B 14/3

Impairment Testing Parameters

	Growth rate		After-tax cost of capital	
%	2018	2019	2018	2019
Crop Science	2.0	2.0	7.8	6.7
Pharmaceuticals	0.0	0.0	7.6	5.9
Consumer Health	1.0	1.0	7.9	6.4

Testing goodwill for impairment involves calculating the fair value less costs to sell. No impairment loss was recognized on goodwill in 2019 (2018: €1,547 million in the Consumer Health segment).

A sensitivity analysis undertaken for the impairment testing of goodwill in the Pharmaceuticals and Consumer Health segments was based on a 10% reduction in future cash flows, a 10% increase in the weighted average cost of capital or a one-percentage-point reduction in the long-term growth rate. The sensitivity analysis showed that no impairment loss (2018: €1.1 billion) would need to be recognized for the cash-generating unit Consumer Health in the event of a 10% reduction in future cash flows or a 10% increase in the weighted average cost of capital. Likewise, a one percentage point reduction in Consumer Health's long-term growth rate would not require any impairment losses to be recognized (2018: €0.6 billion). Crop Science operates in a volatile market environment that shows a robust long-term growth trend driven by an increasing world population, declining acreages per capita and Crop Science's own innovation strength. For the goodwill impairment test a mid-term market recovery is expected, leading to a steady state on which the terminal value calculation is based. The assumptions used for the forecast period were average sales growth of 4% and an increase in the EBITDA margin before special items (for definition see A 2.3 "Alternative Performance Measures Used by the Bayer Group") to 30%. If the cash flow decreased by 8.0%, the weighted average cost of capital increased by 0.5 percentage points or the long-term growth rate decreased by 0.5 percentage points, the recoverable amount of the Crop Science goodwill would correspond to the carrying amount.

The levels at which impairment testing is performed are explained in Note [3]. Unamortized intangible assets and goodwill that are of material significance for the Bayer Group are allocated to the following segments:

B 14/4

Unamortized Intangible Assets

	Goodwill (€ million)		Material unamortized assets (€ million)	
Reporting segment	2018	2019	2018	2019
Crop Science	26,817	27,410	4,753	4,834
Pharmaceuticals	7,247	7,797	510	731
Consumer Health	4,274	3,919	32	34

Research and development projects were capitalized in unamortized intangible assets at a total amount of €5,491 million as of the end of 2019 (2018: €5,207 million).

Another unamortized intangible asset is the Bayer Cross, which was reacquired for the North America region in 1994, having been awarded to the United States and Canada under the reparations agreements at the end of the First World War. The period for which the Bayer Group will derive an economic benefit from this name cannot be determined as Bayer intends to make continuous use of it. The Bayer Cross is capitalized at €108 million (2018: €108 million).

15. Property, plant and equipment

Changes in property, plant and equipment in 2019 were as follows:

B 15/1

Changes in Property, Plant and Equipment

€ million	Land and buildings	Plant installations and machinery	Furniture, fixtures and other equipment	Construction in progress and advance payments	Total
Cost of acquisition or construction, December 31, 2018	**9,195**	**11,332**	**2,036**	**2,895**	**25,458**
Additions from leases	726	13	273	–	1,012
Cost of acquisition or construction, January 1, 2019	**9,921**	**11,345**	**2,309**	**2,895**	**26,470**
Acquisitions	15	–	4	7	26
Capital expenditures	320	313	240	1,366	2,239
Retirements	(145)	(231)	(164)	(74)	(614)
Transfers	378	798	130	(1,306)	–
Transfers (IFRS 5)	(1,212)	(2,084)	(450)	(216)	(3,962)
Divestments / changes in the scope of consolidation	(5)	(1)	(4)	1	(9)
Inflation adjustment (IAS 29)	44	39	6	(4)	85
Exchange differences	51	49	16	29	145
December 31, 2019	**9,367**	**10,228**	**2,087**	**2,698**	**24,380**
Accumulated depreciation and impairments, December 31, 2018	**4,045**	**6,694**	**1,291**	**485**	**12,515**
Retirements	(98)	(198)	(144)	(64)	(504)
Depreciation and impairment losses	638	941	383	592	2,554
Depreciation	602	896	364	–	1,862
Impairment losses	36	45	19	592	692
Impairment loss reversals	–	(1)	(2)	(8)	(11)
Transfers	32	193	24	(249)	–
Transfers (IFRS 5)	(866)	(1,630)	(177)	(18)	(2,691)
Divestments / changes in the scope of consolidation	(12)	(10)	(4)	(5)	(31)
Inflation adjustment (IAS 29)	17	26	6	–	49
Exchange differences	12	5	7	(4)	20
December 31, 2019	**3,768**	**6,020**	**1,384**	**729**	**11,901**
Carrying amounts, December 31, 2019	**5,599**	**4,208**	**703**	**1,969**	**12,479**
Carrying amounts, December 31, 2018	**5,150**	**4,638**	**745**	**2,410**	**12,943**

2018 figures restated

Impairment losses on property, plant and equipment amounted to €692 million, mainly including impairment losses of €522 million in the Crop Science segment on the dicamba production facilities (Herbicides unit) due to a higher investment requirement and an expected adverse development of volumes in view of additional capacities in the market and reduced or delayed sales potential in Argentina in particular. At Pharmaceuticals, a €116 million impairment loss became necessary in connection with the sale of a facility under construction as the asset's carrying amount could not be realized upon the sale due to the specific nature of the facility.

In 2019, borrowing costs of €45 million (2018: €55 million) were capitalized as components of the cost of acquisition or construction of qualifying assets, applying an average interest rate of 3.0% (2018: 3.5%).

Right-of-use assets totaling €1,273 million held under leases were capitalized in property, plant and equipment. Further information on leases is given in Note [28].

Changes in property, plant and equipment in 2018 were as follows:

B 15/2

Changes in Property, Plant and Equipment (Previous Year)

€ million	Land and buildings	Plant installations and machinery	Furniture, fixtures and other equipment	Construction in progress and advance payments	Total
Cost of acquisition or construction, December 31, 2017	**6,706**	**8,646**	**1,721**	**1,763**	**18,836**
Acquisitions	2,209	2,166	318	961	5,654
Capital expenditures	196	378	183	1,108	1,865
Retirements	(79)	(370)	(174)	(6)	(629)
Transfers	370	704	49	(1,123)	–
Transfers (IFRS 5)	(356)	(329)	(79)	170	(594)
Divestments / changes in the scope of consolidation	(2)	–	4	1	3
Inflation adjustment (IAS 29)	63	58	13	10	144
Exchange differences	88	79	1	11	179
December 31, 2018	**9,195**	**11,332**	**2,036**	**2,895**	**25,458**
Accumulated depreciation and impairments, December 31, 2017	**3,661**	**6,267**	**1,256**	**19**	**11,203**
Retirements	(39)	(353)	(150)	(6)	(548)
Depreciation and impairment losses	473	802	235	471	1,981
Depreciation	316	752	233	–	1,301
Impairment losses	157	50	2	471	680
Impairment loss reversals	–	–	–	–	–
Transfers	4	7	(11)	–	–
Transfers (IFRS 5)	(116)	(101)	(47)	–	(264)
Divestments / changes in the scope of consolidation	–	–	2	–	2
Inflation adjustment (IAS 29)	34	46	10	–	90
Exchange differences	28	26	(4)	1	51
December 31, 2018	**4,045**	**6,694**	**1,291**	**485**	**12,515**
Carrying amounts, December 31, 2018	**5,150**	**4,638**	**745**	**2,410**	**12,943**
Carrying amounts, December 31, 2017	**3,045**	**2,379**	**465**	**1,744**	**7,633**

2018 figures restated

Investment property

The total carrying amount of investment property as of December 31, 2019, was €96 million (December 31, 2018: €96 million). The fair value of this property was €444 million (2018: €383 million). The rental income from investment property was €16 million (2018: €14 million), and the operating expenses directly allocable to this property amounted to €5 million (2018: €5 million).

16. Investments accounted for using the equity method

Twelve (2018: five) associates and five (2018: ten) joint ventures were accounted for in the consolidated financial statements using the equity method. A list of these companies is available at www.bayer.com/shareownership2019.

The following table contains a summary of the aggregated income statement data and aggregated carrying amounts of the associates and joint ventures accounted for using the equity method (excluding the Covestro Group):

B 16/1

Earnings Data and Carrying Amounts of Companies Accounted for Using the Equity Method

	Associates		Joint Ventures	
€ million	2018	2019	2018	2019
Income after income taxes	(2)	(24)	(75)	(136)
Other comprehensive income after income taxes	30	32	–	–
Total comprehensive income after income taxes	28	8	(75)	(136)
Share of income after income taxes	**(1)**	**(6)**	**(34)**	**166**
Share of total comprehensive income after income taxes	17	21	(34)	166
Carrying amount as of December 31	**95**	**356**	**420**	**166**

Information on the Covestro Group

Until May 2018, the interest in Covestro was accounted for in the Bayer Group consolidated financial statements as an associate using the equity method. Various share disposals led to the loss of significant influence on the financial and business policy decisions of Covestro. This in turn resulted in a change in the accounting method. Since May 2018, Bayer has reported its interest in Covestro as an equity instrument, with changes in fair value recognized through profit or loss. In 2018, the equity-method income of the Covestro Group amounted to €103 million.

17. Other financial assets

The other financial assets were comprised as follows:

B 17/1

Other Financial Assets

	Dec. 31, 2018		Dec. 31, 2019	
€ million	Total	Of which current	Total	Of which current
AC[1]	430	285	809	643
FVTPL[1]	2,355	665	2,304	1,291
of which debt instruments	1,759	665	1,821	808
of which equity instruments	596	–	483	483
FVTOCI[1]	330	–	568	285
of which equity instruments (no recycling)	330	–	568	285
Receivables from derivatives	253	216	181	107
Lease receivables	10	–	–	–
Total	**3,378**	**1,166**	**3,862**	**2,326**

[1] Measurement categories in accordance with IFRS 9:
AC: at amortized cost
FVTOCI: at fair value through other comprehensive income
FVTPL: at fair value through profit or loss

The AC category included €630 million (2018: €270 million) in bank deposits. No material impairment losses were recognized for expected credit losses in 2019 or 2018.

The debt instruments in the FVTPL category included capital of €652 million (2018: €643 million) provided to Bayer-Pensionskasse VVaG (Bayer-Pensionskasse) for its effective initial fund, and jouissance right capital *(Genussrechtskapital)* of €154 million (2018: €152 million), also provided to Bayer-Pensionskasse. Also reported in this category were investments of €634 million (2018: €598 million) in money market funds.

The equity instruments in the FVTPL category comprised the interest in Covestro AG.

The equity instruments in the FVTOCI category comprised the following investments:

B 17/2

Equity Instruments Measured at Fair Value Through Other Comprehensive Income

Company name	Fair value as of Dec. 31, 2018	Fair value as of Dec. 31, 2019
CRISPR Therapeutics AG, Switzerland	143	285
Innovative Seed Solutions LLC, U.S.A.	41	55
Arvinas Inc., U.S.A.	–	49
Flagship Ventures Fund V, L.P., U.S.A.	20	28
Matys Healthy Products LLC, U.S.A.	–	19
Medopad Ltd., U.K.	13	13
Hokusan Co. Ltd., Japan	12	13
Other investments	101	106
Total	**330**	**568**

No material equity investments were deconsolidated, nor were any material dividends received, in 2019 or 2018.

Further information on the accounting for receivables from derivatives is given in Note [27].

18. Inventories

Inventories were comprised as follows:

B 18/1

Inventories

€ million	Dec. 31, 2018	Dec. 31, 2019
Raw materials and supplies	2,802	2,531
Work in process, finished goods and goods purchased for resale	8,231	8,123
Rights of return	85	111
Advance payments	14	5
Total	**11,132**	**10,770**

2018 figures restated

Impairment losses recognized on inventories were reflected in the cost of goods sold. They were comprised as follows:

B 18/2

Impairments of Inventories

€ million	2018	2019
Accumulated impairment losses, January 1	**(331)**	**(131)**
Impairment losses in the reporting period	(240)	(102)
Impairment loss reversals or utilization	321	107
Exchange differences	24	(1)
Transfers (IFRS 5)	95	–
Accumulated impairment losses, December 31	**(131)**	**(127)**

The cost of goods sold included acquisition and production costs of inventories amounting to €13,486 million (2018: €10,375 million) that were recognized as expenses.

19. Trade accounts receivable

Trade accounts receivable less impairment losses amounted to €11,678 million (2018: €11,714 million) on the closing date and pertained to the following regions and countries:

B 19/1

Trade Accounts Receivable

€ million	2018	2019
North America	3,126	3,255
of which U.S.A.	2,944	3,009
Europe / Middle East / Africa	3,764	3,575
of which Germany	1,202	823
Asia / Pacific	2,054	2,203
Latin America	3,413	3,326
of which Brazil	1,952	1,712
Trade accounts receivable (before impairments)	**12,357**	**12,359**
Accumulated impairment losses	(643)	(681)
Carrying amount, December 31	11,714	11,678
of which noncurrent	665	509

2018 figures restated

Trade accounts receivable mainly comprise amounts outstanding from diverse customer groups and distribution channels (including dealers and retailers for all units of the company, pharmacies for Pharmaceuticals and Consumer Health, and farmers for Crop Science). These receivables expose the company to a credit risk, though not to significant credit risk concentrations because the risk is spread among a large number of counterparties and customers. The unimpaired receivables were classified as recoverable on the basis of established credit management processes and individual estimates of customer risks. The impairment losses recognized at the closing date contained appropriate risk provisions.

Noncurrent trade accounts receivable comprised receivables of €436 million (2018: €540 million) in connection with rights to use technologies outlicensed to a customer that were acquired through the acquisition of Monsanto.

The gross carrying amounts of trade accounts receivable were as follows:

B 19/2

Trade Accounts Receivable – Gross Carrying Amounts

€ million	Trade accounts receivable for which lifetime expected credit losses are calculated (collectively assessed)	Trade accounts receivable that are credit-impaired	Total
Gross carrying amounts as of January 1, 2018	**8,209**	**798**	**9,007**
Changes resulting from trade accounts receivables recognized, derecognized or written-off in the reporting period	(1,714)	(535)	(2,249)
Transfer to credit-impaired trade accounts receivable	(367)	367	–
Other changes:			
from acquisitions / divestments	5,893	16	5,909
from exchange differences	(276)	(34)	(310)
Gross carrying amounts as of December 31, 2018	**11,745**	**612**	**12,357**
Changes resulting from trade accounts receivables recognized, derecognized or written-off in the reporting period	429	–	429
Transfer to credit-impaired trade accounts receivable	(377)	377	–
Transfer from credit-impaired trade accounts receivable	93	(93)	–
Changes due to write-offs	–	(28)	(28)
Other changes:			
From acquisitions / divestments	(323)	(17)	(340)
From exchange differences	(50)	(9)	(59)
Gross carrying amounts as of December 31, 2019	**11,517**	**842**	**12,359**

2018 figures restated

Credit losses on trade accounts receivable were as follows:

B 19/3

Trade Accounts Receivable – Loss Allowances

€ million	Lifetime expected credit losses (collectively assessed)	Loss allowance for credit-impaired trade accounts receivable	Total
Loss allowances as of January 1, 2018	**113**	**405**	**518**
Changes resulting from loss allowances newly recognized or derecognized in the reporting period and additions / reductions to existing loss allowances	23	78	101
Transfer to loss allowances for credit-impaired trade accounts receivable	(106)	106	–
Changes due to write-offs	–	(27)	(27)
Other changes:			
From acquisitions / divestments	101	16	117
From exchange differences	(19)	(47)	(66)
Loss allowances as of December 31, 2018	**112**	**531**	**643**
Changes resulting from loss allowances newly recognized or derecognized in the reporting period and additions/reductions to existing loss allowances	76	5	81
Transfer to loss allowances for credit-impaired trade accounts receivable	(53)	53	–
Transfer from loss allowances for credit-impaired trade accounts receivable	20	(20)	–
Changes due to write-offs	–	(28)	(28)
Other changes:			
From acquisitions / divestments	(7)	–	(7)
From exchange differences	(3)	(5)	(8)
Loss allowances as of December 31, 2019	**145**	**536**	**681**

The expected loss rates were as follows:

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Trade Accounts Receivable – Expected Loss Rates

€ million	Expected loss rates 0 to 1%	>1 to 5%	>5 to 10%	>10%	Credit impaired	Total
Gross carrying amount	8,498	2,432	81	506	842	**12,359**
Loss allowance provision	23	60	6	56	536	**681**

Receivables from government health service institutions, especially in Greece, Italy, Portugal and Spain, are under special observation in view of the government debt crisis. Although there were no material defaults on such receivables in 2019 or 2018, it is possible that future developments in these countries could result in payment delays and / or defaults. This could necessitate the recognition of impairment losses due to new occurrences. Trade accounts receivable from government health service institutions in the above countries at the end of 2019 totaled €103 million (2018: €103 million).

An excess-of-loss policy exists for the Pharmaceuticals, Consumer Health and Animal Health segments as part of a global credit insurance program. More than 80% of the receivables of these segments are insured up to a maximum total annual compensation payment of €150 million (2018: €150 million). A global excess-of-loss policy is in place for the Crop Science segment (excluding the newly acquired Monsanto business). In this global credit insurance program, more than 80% of this segment's receivables are insured up to a maximum total annual compensation payment of €300 million (2018: €300 million). Local credit insurance contracts are in place in certain countries for the newly acquired Monsanto business.

A further €992 million (2018: €992 million) of receivables was secured by advance payments, letters of credit or guarantees or by liens on land, buildings or harvest yields.

20. Other receivables

Other receivables were comprised as follows:

B 20/1

Other Receivables

€ million	Dec. 31, 2018 Total	Dec. 31, 2018 Of which current	Dec. 31, 2019 Total	Dec. 31, 2019 Of which current
Other tax receivables	794	734	859	840
Deferred charges	390	344	316	290
Reimbursement claims	84	80	290	282
Net defined benefit asset	84	–	237	–
Receivables from employees	46	46	40	40
Miscellaneous receivables	1,086	754	820	359
Total	**2,484**	**1,958**	**2,562**	**1,811**

2018 figures restated

Other receivables are stated net of impairment losses of €69 million (2018: €71 million). As in the previous year, the impairment losses included €66 million related to already impaired tax reimbursement claims.

21. Equity

The foremost objectives of our financial management are to help bring about a sustained increase in Bayer's value for the benefit of all stakeholders and to ensure the Group's creditworthiness and liquidity. The pursuit of these goals means reducing our cost of capital, optimizing our capital structure, improving our financing cash flow and effectively managing risk.

The contracted rating agencies assess Bayer as follows: S & P Global assigns a long-term rating of BBB and a short-term rating of A-2 with a stable outlook, Moody's a Baa1 / P-2 with a negative outlook, and Fitch Ratings a BBB+ / F2 with a negative outlook. These investment grade ratings from all three agencies reflect the company's high solvency and ensure access to a broad investor base for financing purposes. The Group's capital management is based on the debt indicators published by the rating agencies. These indicators, which vary in their design, represent the ratio of cash inflows and outflows in a period to debt. The aim of our financial strategy is to regain long-term "A" ratings in the future.

Apart from utilizing cash inflows from our operational business to reduce net financial debt, we are implementing our financial strategy by way of vehicles such as the subordinated hybrid bonds issued in July 2014, April 2015 and November 2019, and a potential share buyback program.

The individual equity components and the changes therein during 2018 and 2019 are shown in the Bayer Group Consolidated Statements of Changes in Equity.

Capital stock and capital reserves

The capital stock of Bayer AG on December 31, 2019, amounted to €2,515 million (2018: €2,387 million), divided into 982,424,082 (2018: 932,551,964) registered no-par shares, and was fully paid in. Each no-par share confers one voting right.

On November 22, 2016, Bayer had placed mandatory convertible notes in the amount of €4.0 billion without granting subscription rights to existing stockholders of the company. The notes, denominated in units of €100,000, were issued by Bayer Capital Corporation B.V., Mijdrecht, Netherlands, under the subordinated guarantee of Bayer AG. Where holders had not already exercised the right of conversion, the notes were mandatorily converted into registered no-par shares of Bayer AG when they matured on November 22, 2019. Fractional amounts that could not be exchanged for shares upon the conversion of the bond units of €100,000 each were repaid in cash.

The authorizations issued by the Annual Stockholders' Meeting on April 29, 2014, to increase the capital stock out of authorized and conditional capital expired in 2019 and were not renewed.

Capital reserves contain premiums from the issuance of shares.

Accumulated comprehensive income

Accumulated comprehensive income comprises retained earnings and accumulated other comprehensive income. The retained earnings comprise prior years' undistributed income of consolidated companies and all remeasurements of the net defined benefit liability for pension or other post-employment benefits that are recognized outside profit or loss. The accumulated other comprehensive income comprises exchange differences, the changes in fair values of cash flow hedges and equity instruments, the revaluation surplus and reserves for the change in the company's own credit risk.

Dividend

Under the German Stock Corporation Act (AktG), the dividend payment is determined by the distributable profit reported in the annual financial statements of Bayer AG, which are prepared according to the German Commercial Code. Retained earnings were diminished by payment of the dividend of €2.80 per share for 2018. The proposed dividend for the 2019 fiscal year is €2.80 per share, which – based on the current number of shares – would result in a total dividend payment of €2,751 million. Payment of the proposed dividend is contingent upon approval by the stockholders at the Annual Stockholders' Meeting and therefore is not recognized as a liability in the consolidated financial statements.

Equity attributable to non-controlling interest

The changes in noncontrolling interest in equity during 2018 and 2019 are shown in the following table:

B 21/1

Changes in Noncontrolling Interest in Equity

€ million	2018	2019
January 1	**60**	**171**
Changes in equity not recognized in profit or loss		
Remeasurements of the net liability under defined benefit pension plans	(1)	(1)
Exchange differences on translation of operations outside the eurozone	(7)	(1)
Other changes in equity	108	(4)
Dividend payments	(5)	(4)
Income after income taxes	**16**	**19**
December 31	**171**	**180**

As of December 31, 2019, a material subsidiary with third-party noncontrolling interest holders was Bayer CropScience Limited, India, where the interest and share of voting rights attributable to noncontrolling interest amounted to 28.6% as of December 31, 2019 (December 31, 2018: 31.3%). Monsanto India Ltd, India, reported under this item in the prior year, was merged with Bayer CropScience Limited, India, in 2019. The equity attributable to noncontrolling interest as of December 31, 2019, amounted to €170 million (2018: €163 million).

22. Provisions for pensions and other post-employment benefits

Provisions were established for defined benefit obligations pertaining to pensions and other post-employment benefits. The net liability was accounted for as follows:

B 22/1

Net Defined Benefit Liability Reflected in the Statement of Financial Position

	Pensions		Other post-employment benefits		Total	
€ million	Dec. 31, 2018	Dec. 31, 2019	Dec. 31, 2018	Dec. 31, 2019	Dec. 31, 2018	Dec. 31, 2019
Provisions for pensions and other post-employment benefits (net liability)	**8,445**	**7,987**	**272**	**226**	**8,717**	**8,213**
of which Germany	7,215	6,878	–	–	7,215	6,878
of which other countries	1,230	1,109	272	226	1,502	1,335
Net defined benefit asset	**83**	**237**	**1**	**–**	**84**	**237**
of which Germany	23	21	–	–	23	21
of which other countries	60	216	1	–	61	216
Net defined benefit liability	**8,362**	**7,750**	**271**	**226**	**8,633**	**7,976**
of which Germany	7,192	6,857	–	–	7,192	6,857
of which other countries	1,170	893	271	226	1,441	1,119

The expenses for defined benefit plans for pensions and other post-employment benefits comprised the following components:

B 22/2

Expenses for Defined Benefit Plans

	Pension plans						Other post-employment benefit plans	
	Germany		Other countries		Total		Other countries	
€ million	2018	2019	2018	2019	2018	2019	2018	2019
Current service cost	252	394	130	105	382	499	13	14
Past service cost	9	5	(22)	(7)	(13)	(2)	(6)	(2)
of which plan curtailments	–	–	(48)	(8)	(48)	(8)	(6)	–
Plan settlements	–	–	–	(10)	–	(10)	–	1
Plan administration cost paid out of plan assets	3	2	3	10	6	12	–	–
Net interest	101	108	29	38	130	146	13	14
Total	**365**	**509**	**140**	**136**	**505**	**645**	**20**	**27**

2018 figures restated

In addition, a total of minus €1,347 million (2018: minus €612 million) in effects of remeasurements of the net defined benefit liability was recognized in 2019 outside profit or loss. Of this amount, minus €1,398 million (2018: minus €654 million) related to pension obligations, €47 million (2018: €34 million) to other post-employment benefit obligations, and €4 million (2018: €8 million) to the effects of the asset ceiling. There were no significant plan curtailments in 2019 (2018: €54 million).

The net defined benefit liability developed as follows:

B 22/3

Changes in Net Defined Benefit Liability

€ million	Defined benefit obligation	Fair value of plan assets	Effects of the asset ceiling	Net defined benefit liability
Germany				
January 1, 2019	**(17,948)**	**10,756**	**–**	**(7,192)**
Acquisitions	–	–	–	–
Divestments / changes in the scope of consolidation	–	–	–	–
Current service cost	(423)			(423)
Past service cost	(5)			(5)
Net interest	(322)	196	–	(126)
Net actuarial gain / (loss)	(2,680)			(2,680)
of which due to changes in financial parameters	(2,692)			(2,692)
of which due to changes in demographic parameters	–			–
of which experience adjustments	12			12
Return on plan assets excluding amounts recognized as interest income		1,101		1,101
Employer contributions		49		49
Employee contributions	(35)	35		–
Payments due to plan settlements	–	–		–
Benefits paid out of plan assets	195	(195)		–
Benefits paid by the company	409			409
Plan administration cost paid out of plan assets		(2)		(2)
Reclassification to current assets / liabilities held for sale	3,634	(1,622)		2,012
December 31, 2019	**(17,175)**	**10,318**	**–**	**(6,857)**
Other countries				
January 1, 2019	**(8,621)**	**7,203**	**(23)**	**(1,441)**
Acquisitions	(6)	1	–	(5)
Divestments / changes in the scope of consolidation	1	–	–	1
Current service cost	(120)			(120)
Past service cost	10			10
Gains / (losses) from plan settlements	10			10
Net interest	(311)	261	(2)	(52)
Net actuarial gain / (loss)	(808)			(808)
of which due to changes in financial parameters	(1,013)			(1,013)
of which due to changes in demographic parameters	178			178
of which experience adjustments	27			27
Return on plan assets excluding amounts recognized as interest income		1,038		1,038
Remeasurement of asset ceiling			4	4
Employer contributions		81		81
Employee contributions	(18)	18		–
Payments due to plan settlements	15	(15)		–
Benefits paid out of plan assets	413	(413)		–
Benefits paid by the company	181			181
Plan administration costs paid out of plan assets		(10)		(10)
Reclassification to current assets / liabilities held for sale	11	(7)	–	4
Exchange differences	(194)	182	–	(12)
December 31, 2019	**(9,437)**	**8,339**	**(21)**	**(1,119)**
of which other post-employment benefits	(733)	507	–	(226)
Total, December 31, 2019	**(26,612)**	**18,657**	**(21)**	**(7,976)**

Currenta and Animal Health are included in the development of the net defined benefit liability.

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Changes in Net Defined Benefit Liability (Previous Year)

€ million	Defined benefit obligation	Fair value of plan assets	Effects of the asset ceiling	Net defined benefit liability
Germany				
January 1, 2018	**(17,837)**	**11,081**	**–**	**(6,756)**
Acquisitions	(18)	–	–	(18)
Divestments / changes in the scope of consolidation	–	–	–	–
Current service cost	(295)			(295)
Past service cost	(11)			(11)
Net interest	(333)	209	–	(124)
Net actuarial gain / (loss)	(62)			(62)
of which due to changes in financial parameters	175			175
of which due to changes in demographic parameters	(232)			(232)
of which experience adjustments	(5)			(5)
Return on plan assets excluding amounts recognized as interest income		(498)		(498)
Employer contributions		141		141
Employee contributions	(35)	35		–
Payments due to plan settlements	(53)	38		(15)
Benefits paid out of plan assets	201	(201)		–
Benefits paid by the company	424			424
Plan administration cost paid out of plan assets		(3)		(3)
Reclassification to current assets / liabilities held for sale	71	(46)		25
December 31, 2018	**(17,948)**	**10,756**	**–**	**(7,192)**
Other countries				
January 1, 2018	**(6,655)**	**5,458**	**(31)**	**(1,228)**
Acquisitions	(2,384)	2,192	–	(192)
Divestments / changes in the scope of consolidation	–	–	–	–
Current service cost	(145)			(145)
Past service cost	28			28
Gains / (losses) from plan settlements	–			–
Net interest	(251)	210	(3)	(44)
Net actuarial gain / (loss)	423			423
of which due to changes in financial parameters	448			448
of which due to changes in demographic parameters	42			42
of which experience adjustments	(67)			(67)
Return on plan assets excluding amounts recognized as interest income		(483)		(483)
Remeasurement of asset ceiling			8	8
Employer contributions		75		75
Employee contributions	(15)	15		–
Payments due to plan settlements	(87)	65		(22)
Benefits paid out of plan assets	350	(350)		–
Benefits paid by the company	148			148
Plan administration costs paid out of plan assets		(3)		(3)
Reclassification to current assets / liabilities held for sale	145	(79)	–	66
Exchange differences	(178)	103	3	(72)
December 31, 2018	**(8,621)**	**7,203**	**(23)**	**(1,441)**
of which other post-employment benefits	(700)	429	–	(271)
Total, December 31, 2018	**(26,569)**	**17,959**	**(23)**	**(8,633)**

Currenta and Animal Health are included in the development of the net defined benefit liability.

The benefit obligations pertained mainly to Germany (65%; 2018: 68%), the United States (20%; 2018: 19%) and the United Kingdom (7%; 2018: 7%). In Germany, current employees accounted for about 42% (2018: 43%), retirees or their surviving dependents for about 50% (2018: 50%) and former employees with vested pension rights for about 8% (2018: 7%) of entitlements under defined benefit plans. In the United States, current employees accounted for about 27% (2018: 30%), retirees or their surviving dependents for about 58% (2018: 56%) and former employees with vested pension rights for about 15% (2018: 14%) of entitlements under defined benefit plans.

The actual return on the assets of defined benefit plans for pensions and for other post-employment benefits amounted to €2,512 million (2018: minus €537 million) and €84 million (2018: minus €24 million), respectively.

The following table shows the defined benefit obligations for pensions and other post-employment benefits along with the funded status of the funded obligations.

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Defined Benefit Obligation and Funded Status

	Pension obligation		Other post-employment benefit obligation		Total	
€ million	2018	2019	2018	2019	2018	2019
Defined benefit obligation	**25,869**	**25,879**	**700**	**733**	**26,569**	**26,612**
of which unfunded	1,244	652	136	153	1,380	805
of which funded	24,625	25,227	564	580	25,189	25,807
Funded status of funded obligation						
Overfunding	106	258	1	–	107	258
Underfunding	7,196	7,279	136	74	7,332	7,353

Pension and other post-employment benefit obligations

Group companies provide retirement benefits for most of their employees, either directly or by contributing to privately or publicly administered funds. The benefits vary depending on the legal, fiscal and economic conditions of each country. The obligations relate both to existing retirees' pensions and to pension entitlements of future retirees.

Bayer has set up funded pension plans for its employees in various countries. The most appropriate investment strategy is determined for each defined benefit pension plan based on the risk structure of the obligations (especially demographics, the current funded status, the structure of the expected future cash flows, interest sensitivity, biometric risks, etc.), the regulatory environment and the existing level of risk tolerance or risk capacity. A strategic target investment portfolio is then developed in line with the plan's risk structure, taking capital market factors into consideration. Further determinants are risk diversification, portfolio efficiency and the need for both a country-specific and a global risk / return profile centered on ensuring the payment of all future benefits. As the capital investment strategy for each pension plan is developed individually in light of the plan-specific conditions listed above, the investment strategies for different pension plans may vary considerably. The investment strategies are generally aligned less toward maximizing absolute returns and more toward the maximum probability of being able to finance pension commitments over the long term. For pension plans, stress scenarios are simulated and other risk analyses (such as value at risk) undertaken with the aid of risk management systems.

Bayer-Pensionskasse VVaG (Bayer-Pensionskasse), Leverkusen, Germany, is by far the most significant of the pension plans. It has been closed to new members since 2005. This legally independent fund is regarded as a life insurance company and therefore is subject to the German Insurance Supervision Act. The benefit obligations covered by Bayer-Pensionskasse comprise retirement, surviving dependents' and disability pensions. It constitutes a multi-employer plan, to which the active members and their employers contribute. The company contribution is a certain percentage of the employee contribution. This percentage is the same for all participating employers, including those outside the Bayer Group, and is set by agreement between the plan's executive committee and its supervisory board, acting on a proposal from the responsible actuary. It takes into account the differences between the actuarial estimates and the actual values for the factors used to determine liabilities and contributions. Bayer may also adjust the company contribution in agreement with the plan's executive committee and its supervisory board, acting on a proposal from the responsible actuary. The plan's liability is governed by Section 1, Paragraph 1, Sentence 3 of the German Law on the Improvement of Occupational Pensions (BetrAVG). This means that if the pension plan exercises its right under the articles of association to reduce benefits, each participating employer has to make up the resulting difference. Bayer is not liable for the obligations of participating employers outside the Bayer Group, even if they cease to participate in the plan.

Pension entitlements for people who joined Bayer in Germany in 2005 or later are granted via Rheinische Pensionskasse VVaG, Leverkusen. Future pension payments from this plan are based on contributions and the return on plan assets; a guaranteed interest rate applies.

Another important pension provision vehicle is Bayer Pension Trust e. V. (BPT). This covers further retirement provision arrangements of the Bayer Group, such as deferred compensation, pension obligations previously administered by Schering Altersversorgung Treuhand e. V., and components of other direct commitments.

The defined benefit pension plans in the United States are frozen and no significant new entitlements can be earned under these plans. The assets of all the U.S. pension plans are held by a master trust for reasons of efficiency. The applicable regulatory framework is based on the Employee Retirement Income Security Act (ERISA), which includes a statutory 80% minimum funding requirement to avoid benefit restrictions. The actuarial risks, such as investment risk, interest-rate risk and longevity risk, remain with the company.

The defined benefit pension plans in the United Kingdom have been closed to new members for some years. Plan assets in the U.K. are administered by independent trustees, who are legally obligated to act solely in the interests of the beneficiaries. A technical assessment is performed every three years in line with U.K. regulations. This serves as the basis for developing a plan to cover any potential financing requirements. Here, too, the actuarial risks remain with the company.

The other post-employment benefit obligations outside Germany mainly comprised health care benefit payments for retirees in the United States.

The fair value of the plan assets to cover pension and other post-employment benefit obligations was as follows:

B 22/6

Fair Value of Plan Assets as of December 31

			Pension obligations		Other post-employment obligations	
		Germany		Other countries		Other countries
€ million	2018	2019	2018	2019	2018	2019
Plan assets based on quoted prices in active markets						
Real estate and special real estate funds	–	–	214	216	15	5
Equities and equity funds	1,988	2,832	2,443	2,004	146	104
Callable debt instruments	–	–	27	78	–	–
Noncallable debt instruments	–	–	565	2,920	124	317
Bond funds	4,777	4,695	2,592	1,635	93	23
Derivatives	10	5	3	3	–	–
Cash and cash equivalents	611	297	77	87	9	10
Other	–	–	25	130	–	–
	7,386	**7,829**	**5,946**	**7,073**	**387**	**459**
Plan assets for which quoted prices in active markets are not available						
Real estate and special real estate funds	514	418	296	195	–	–
Equities and equity funds	143	143	69	89	–	–
Callable debt instruments	1,241	843	–	–	–	–
Noncallable debt instruments	1,366	978	–	–	–	–
Bond funds	–	–	73	88	–	–
Derivatives	–	–	–	2	–	–
Other	106	107	390	385	42	48
	3,370	**2,489**	**828**	**759**	**42**	**48**
Total plan assets	**10,756**	**10,318**	**6,774**	**7,832**	**429**	**507**

Plan assets included assets with a carrying amount of €3,296 million (2018: €4,240 million) whose fair values are not determined based on quoted prices in active markets.

The fair value of plan assets in Germany included real estate leased by Group companies, recognized at a fair value of €77 million (2018: €82 million), and Bayer AG shares and bonds held through investment funds, recognized at their fair values of €33 million (2018: €21 million) and €10 million (2018: €6 million), respectively.

The other plan assets comprised mortgage loans granted, other receivables and qualified insurance policies.

Risks

The risks from defined benefit plans arise partly from the defined benefit obligations and partly from the investment in plan assets. These risks include the possibility that additional contributions will have to be made to plan assets in order to meet current and future pension obligations, and negative effects on provisions and equity.

Demographic / biometric risks

Since a large proportion of the defined benefit obligations comprises lifelong pensions or surviving dependents' pensions, longer claim periods or earlier claims may result in higher benefit obligations, higher benefit expense and / or higher pension payments than previously anticipated.

Investment risks

If the actual return on plan assets were below the return anticipated on the basis of the discount rate, the net defined benefit liability would increase, assuming there were no changes in other parameters. This could happen as a result of a drop in share prices, increases in market rates of interest for certain bonds, default of individual debtors or the purchase of low-risk but low-interest bonds, for example.

Interest-rate risk

A decline in capital market interest rates, especially for high-quality corporate bonds, would increase the defined benefit obligation. This effect would be at least partially offset by the ensuing increase in the market values of the debt instruments held.

Measurement parameters and their sensitivities

The following weighted parameters were used to measure the obligations for pensions and other post-employment benefits as of December 31 of the respective year:

B 22/7

Parameters for Benefit Obligations

	Germany		Other countries		Total	
%	2018	2019	2018	2019	2018	2019
Pension obligations						
Discount rate	1.90	1.00	3.55	2.60	2.40	1.55
of which U.S.A.			4.20	3.20	4.20	3.20
of which U.K.			2.80	1.95	2.80	1.95
Projected future salary increases	2.75	2.50	3.65	3.10	3.00	2.70
Projected future benefit increases	1.60	1.40	3.05	2.80	2.05	1.85
Other post-employment benefit obligations						
Discount rate	–	–	4.85	3.90	4.85	3.90

In Germany the Heubeck RT 2018 G mortality tables were used, in the United States the MP-2019 Mortality Tables, and in the United Kingdom 95% of S1NXA.

The following weighted parameters were used to measure the expense for pension and other post-employment benefits in the respective year:

B 22/8

Parameters for Benefit Expense

	Germany		Other countries		Total	
%	2018	2019	2018	2019	2018	2019
Pension obligations						
Discount rate	1.90	1.90	2.95	3.55	2.15	2.40
Projected future salary increases	2.75	2.75	3.60	3.65	2.95	3.00
Projected future benefit increases	1.70	1.60	3.25	3.05	2.10	2.05
Other post-employment benefit obligations						
Discount rate	–	–	4.25	4.85	4.25	4.85

The parameter sensitivities were computed by expert actuaries based on a detailed evaluation similar to that performed to obtain the data presented in Table B 22/3. Altering individual parameters by 0.5 percentage points or mortality by 10% per beneficiary while leaving the other parameters unchanged would have impacted pension and other post-employment benefit obligations as of year-end 2019 as follows:

B 22/9

Sensitivity of Benefit Obligations

	Germany		Other countries		Total	
€ million	**Increase**	**Decrease**	**Increase**	**Decrease**	**Increase**	**Decrease**
Pension obligations						
0.5%-pt. change in discount rate	(1,489)	1,711	(559)	620	(2,048)	2,331
0.5%-pt. change in projected future salary increases	81	(75)	61	(58)	142	(133)
0.5%-pt. change in projected future benefit increases	881	(803)	203	(155)	1,084	(958)
10% change in mortality	(628)	712	(240)	242	(868)	954
Other post-employment benefit obligations						
0.5%-pt. change in discount rate	–	–	(36)	40	(36)	40
10% change in mortality	–	–	(22)	25	(22)	25

B 22/10

Sensitivity of Benefit Obligations (prior year)

	Germany		Other countries		Total	
€ million	**Increase**	**Decrease**	**Increase**	**Decrease**	**Increase**	**Decrease**
Pension obligations						
0.5%-pt. change in discount rate	(1,408)	1,608	(479)	536	(1,887)	2,144
0.5%-pt. change in projected future salary increases	81	(76)	42	(40)	123	(116)
0.5%-pt. change in projected future benefit increases	903	(825)	132	(101)	1,035	(926)
10% change in mortality	(584)	658	(197)	203	(781)	861
Other post-employment benefit obligations						
0.5%-pt. change in discount rate	–	–	(33)	36	(33)	36
10% change in mortality	–	–	(18)	20	(18)	20

Provisions are also established for the obligations, mainly of U.S. subsidiaries, to provide post-employment benefits in the form of health care cost payments for retirees. The valuation of health care costs was based on the assumption that they will increase at a rate of 7.0% (2018: 6.3%), which should gradually decline to 5% by 2028 (assumption in 2018: gradually decline to 5.0% by 2023). The following table shows the impact on other post-employment benefit obligations and total benefit expense of a one-percentage-point change in the assumed cost increase rates:

B 22/11

Sensitivity to Health Care Cost Increases

	Increase of 1%-pt.		Decrease of 1%-pt.	
€ million	**2018**	**2019**	**2018**	**2019**
Impact on other post-employment benefit obligations	47	51	(41)	(43)
Impact on benefit expense	3	2	(2)	(2)

Payments made and expected future payments

The following payments or asset contributions correspond to the employer contributions made or expected to be made to funded benefit plans:

B 22/12

Employer Contributions Paid or Expected

€ million	Germany 2018	Germany 2019	Germany 2020 expected	Other countries 2018	Other countries 2019	Other countries 2020 expected
Pension obligations	141	49	109	90	96	79
Other post-employment benefit obligations	–	–	–	(15)	(15)	2
Total	**141**	**49**	**109**	**75**	**81**	**81**

Bayer is currently committed to making deficit contributions for its U.K. pension plans of approximately GBP27 million annually through 2023. For its U.S. pension plans, Bayer made no payments in 2019 (2018: US$50 million) and expects to make zero or only very low regular payments in 2020 as most of these plans are closed and frozen.

Pensions and other post-employment benefits payable in the future from funded and unfunded plans are estimated as follows:

B 22/13

Future Benefit Payments

	Payments out of plan assets				Payments by the company			
	Pensions		Other post-employment benefits		Pensions		Other post-employment benefits	
€ million	Germany	Other countries	Other countries	Total	Germany	Other countries	Other countries	Total
2020	179	415	25	619	431	108	27	566
2021	182	415	23	620	433	84	25	542
2022	182	423	24	629	435	89	24	548
2023	184	424	24	632	438	94	25	557
2024	184	434	26	644	439	96	26	561
2025–2029	933	2,153	132	3,218	2,201	542	132	2,875

The weighted average term of the pension obligations is 17.9 years (2018: 17.0 years) in Germany and 13.2 years (2018: 12.8 years) in other countries. The weighted average term of the obligations for other post-employment benefits in other countries is 11.0 years (2018: 10.5 years).

23. Other provisions

Changes in the various provision categories in 2019 were as follows:

B 23/1

Changes in Other Provisions

€ million	Other Taxes	Environ-mental protec-tion	Restruc-turing	Trade-related commit-ments	Litigations	Personnel commit-ments	Miscella-neous	Total
December 31, 2018	**35**	**754**	**773**	**190**	**1,419**	**2,497**	**1,115**	**6,783**
Acquisitions	–	–	–	–	–	3	1	4
Additions	138	23	973	627	576	2,758	475	5,570
Utilization	(92)	(52)	(340)	(518)	(826)	(2,096)	(438)	(4,362)
Reversal	(3)	(32)	(137)	(36)	(25)	(550)	(113)	(896)
Reclassification to liabilities held for sale	–	(106)	(4)	(23)	–	(136)	(25)	(294)
Interest cost	–	55	–	–	44	26	26	151
Exchange differences	–	13	2	–	18	18	10	61
December 31, 2019	**78**	**655**	**1,267**	**240**	**1,206**	**2,520**	**1,051**	**7,017**
of which current	29	98	270	229	482	1,784	359	3,251

2018 figures restated

The provisions were partly offset by claims for refunds in the amount of €77 million (2018: €74 million), which were recognized as receivables. These claims were primarily for refunds related to product liability.

Environmental protection

Provisions for environmental protection are mainly established for the expected costs of ensuring compliance with environmental regulations, remediation work on contaminated land, recultivation of landfills, and redevelopment and water protection measures.

Restructuring

Provisions for restructuring only cover expenses that arise directly from restructuring measures, are necessary for restructuring and are not related to future business operations. Such expenses include severance payments to employees and compensation payments in respect of rented property that is no longer used.

Restructuring measures may include the sale or termination of business units, site closures, relocations of business activities or fundamental reorganizations of business units.

Provisions for restructuring included €1,203 million (2018: €691 million) for severance payments and €64 million (2018: €82 million) for other restructuring expenses, which mainly comprised other costs related to the outsourcing of research activities. The breakdown of provisions by segment was as follows: €185 million (2018: €240 million) at Crop Science, €292 million at Pharmaceuticals (2018: €351 million), €31 million at Consumer Health (2018: €57 million), €0 million at Animal Health (2018: €6 million) and €759 million at Enabling Functions / All Other Segments (2018: €119 million).

Provisions were recognized in all segments in 2019 in connection with an extensive restructuring program aimed at strengthening Bayer's core businesses, adapting the infrastructure and increasing productivity and earning power through a series of measures to be implemented through 2022. Provisions had already been recorded in 2018 for programs communicated in sufficient detail at that time. In 2019, provisions were established primarily in Germany, the United States and Japan. Further provisions are expected to be recognized in 2020.

As in the previous year, the main focus of restructuring activities in the Crop Science segment was on organizational adjustments following the integration of Monsanto.

In the Pharmaceuticals segment, provisions had already been recorded in 2018, mainly in view of the planned reorganization of R&D. By integrating research and development within a common organization, Bayer is looking to grow the value and productivity of the Pharmaceuticals portfolio. Extensive restructuring of the sales function was carried out in Japan in order to better address future market requirements.

At Consumer Health, the "Fit to Win" restructuring program was continued with the aim of making this segment a market leader by driving the transformation in the health care industry and creating a more agile and faster organization with fewer decision-making levels.

Under Enabling Functions and Consolidation, which forms part of the Reconciliation, provisions were established for early retirement programs and for severance payments, primarily in Germany. Restructuring was carried out in nearly all of the enabling functions. Appropriate accounting measures were also taken in connection with the planned site closures in Pittsburgh, Pennsylvania, and Mishawaka, Indiana, in the United States.

Trade-related commitments

Trade-related provisions are recorded mainly for obligations related to services performed but not yet invoiced and to sales commissions not recognized under trade accounts payable.

Litigations

The legal risks currently considered to be material, and their development, are described in Note [30].

Personnel commitments

Personnel-related provisions include those for variable, performance-related one-time payments to employees, stock-based payments, and payments related to long-service anniversaries, early retirement programs and pre-retirement part-time working arrangements. Provisions for severance payments resulting from restructuring are reflected in provisions for restructuring.

Stock-based compensation programs

Bayer offers stock-based compensation programs collectively to different groups of employees. As required by IFRS 2 (Share-based Payment) for compensation systems involving cash settlement, awards to be made under the stock-based programs are covered by provisions in the amount of the fair value of the obligations existing as of the date of the financial statements. All resulting valuation adjustments are recognized in profit or loss.

The following table shows the changes in provisions for the various programs:

B 23/2

Changes in Provisions for Stock-Based Compensation Programs

€ million	Aspire 2.0
December 31, 2018	**289**
Acquisitions / divestments	–
Additions	514
Reclassification to liabilities held for sale	(4)
Utilization	–
Reversal	(216)
Exchange differences	(1)
December 31, 2019	**582**

The value of the Aspire tranches that were fully earned at the end of 2019, resulting in payments at the beginning of 2020, was €132 million (2018: €0 million).

The net expense for all stock-based compensation programs was €303 million (2018: €21 million), including €5 million (2018: €5 million) for the BayShare stock participation program and income of €0 million (2018: €1 million) pertaining to grants of virtual Bayer shares. For information on the hedging of obligations under stock-based employee compensation programs see Note [27.3].

Long-term incentive program Aspire 2.0

Aspire 2.0 is based on a percentage of each employee's annual base salary, the percentage varying according to their position. This target value is multiplied by the employee's STI (short-term incentive) payment factor for the previous year to give the Aspire grant value. The STI payment factor reflects the business performance under the global short-term incentive program. The Aspire grant value is converted into virtual Bayer shares by dividing it by the share price at the start of the program. The program's performance is based on these virtual shares. For the Board of Management, there is an additional hurdle in the form of a comparison between the performance of Bayer stock and that of the EURO STOXX 50. Each tranche runs for four years.

The fair value of the obligations is determined from the price of Bayer stock at year-end and the dividends paid up to that time. The payment made at the end of each tranche is determined by multiplying the number of virtual shares by the Bayer share price at that time and adding an amount equivalent to the dividends paid during the period of the tranche. The maximum payment for Aspire 2.0 is 250% of the Aspire grant value.

At the start of 2020, a payment of 69% was made for the tranche issued in 2016. The payment for the Board of Management amounted to 39%.

BayShare 2019

All management levels and nonmanagerial employees are offered an annual stock participation program known as BayShare, under which Bayer subsidizes their personal investments in the company's stock. The discount under this program in 2019 was 20% (2018: 20%) of the subscription amount. Employees stated a fixed amount that they wished to invest in shares. The maximum subscription amount in Germany was set at €2,500 (2018: €2,500) or €5,000 (2018: €5,000), depending on the employee's position. The shares purchased must be retained until December 31, 2020.

In 2019, employees purchased a total of about 334,000 shares (2018: 358,000 shares purchased by employees of continuing operations) under the BayShare program.

Other

Miscellaneous provisions include those for **other liabilities**, contingent liabilities from business combinations, except where these are allocable to other provision categories, and asset retirement obligations other than those included in provisions for environmental protection.

A sensitivity analysis undertaken for certain provisions that examined the impact of a five percentage point change in the probabilities of occurrence in each case did not produce any material deviations from the amount of provisions established.

24. Financial liabilities

Financial liabilities were comprised as follows:

B 24/1

Financial Liabilities

	Dec. 31, 2018		Dec. 31, 2019	
€ million	Total	Of which current	Total	Of which current
Bonds and notes / promissory notes	35,402	2,302	33,569	1,001
Liabilities to banks	4,865	606	4,062	675
Lease liabilities	399	50	1,251	299
Liabilities from derivatives	172	172	123	122
Other financial liabilities	556	552	89	85
Total	**41,394**	**3,682**	**39,094**	**2,182**

A breakdown of financial liabilities by contractual maturity is given below:

B 24/2

Maturities of Financial Liabilities

€ million	Dec. 31, 2018
2019	3,682
2020	1,043
2021	9,035
2022	2,062
2023	3,558
2024 or later	22,014
Total	**41,394**

€ million	Dec. 31, 2019
2020	2,182
2021	8,513
2022	2,205
2023	3,715
2024	2,274
2025 or later	20,205
Total	**39,094**

In addition to promissory notes in the amount of €0 million (2018: €45 million), the Bayer Group has issued the following bonds and notes:

B 24/3

Bonds and Notes

	Nominal volume as of Dec. 31, 2018	Carrying amount as of Dec. 31, 2018 € million	Nominal volume as of Dec. 31, 2019	Carrying amount as of Dec. 31, 2019 € million
Hybrid bonds[1]				
Hybrid bond 2014 / 2024[2] / 2074	EUR 1,500 million	1,496	EUR 1,500 million	1,497
Hybrid bond 2015 / 2022[2] / 2075	EUR 1,300 million	1,293	EUR 1,300 million	1,295
Hybrid bond[3] 2014 / 2020[2] / 2075	EUR 1,750 million	1,748	–	–
Hybrid bond 2019 / 2025[2] / 2079	–	–	EUR 1,000 million	990
Hybrid bond 2019 / 2027[2] / 2079	–	–	EUR 750 million	746
Mandatory convertible notes[1] / exchangeable bond[1]				
Mandatory convertible notes[4] 2016 / 2019	EUR 4,000 million	–	–	–
Exchangeable bond[5] 2017 / 2020	EUR 1,000 million	996	EUR 1,000 million	1,001
USD bonds[1, 6]				
Maturity < 1 year	USD 2,500 million	2,178	–	–
Maturity > 1 year < 5 years	USD 8,250 million	7,160	USD 10,750 million	9,510
Maturity > 5 years	USD 16,414 million	14,031	USD 13,914 million	12,144
EUR bonds[1, 6]				
Maturity < 1 year	–	–	–	–
Maturity > 1 year < 5 years	EUR 3,000 million	2,996	EUR 3,000 million	2,997
Maturity > 5 years	EUR 3,250 million	3,222	EUR 3,250 million	3,225
JPY bonds[1]				
Maturity < 1 year	JPY 10 billion	79	–	–
Maturity > 1 year < 5 years	JPY 20 billion	158	JPY 20 billion	164
Maturity > 5 years	–	–	–	–
Total		**35,357**		**33,569**

[1] The bonds are issued in the functional currency of the issuing entity and mainly have a fixed coupon.
[2] Date of first option to redeem the bond early at par
[3] The hybrid bond was repurchased before the first call date.
[4] The mandatory convertible notes were initially recognized in capital reserves and other financial liabilities.
[5] Bond can be redeemed in cash, Covestro shares or a combination thereof.
[6] Bonds with nominal volumes of USD2,500 million and €750 million bear variable rates of interest.

Hybrid bonds

The hybrid bonds issued by Bayer AG are subordinated, and 50% of their amount is treated by the rating agencies as equity. They therefore have a more limited effect on the Group's rating-specific debt indicators than senior borrowings.

In 2019, Bayer AG repurchased the €1.75 billion hybrid bond maturing in 2075 (callable on July 1, 2020) before the first call date. The repurchase was financed through the issuance of two hybrid bonds with nominal volumes of €1 billion and €750 million.

Mandatory convertible notes

On November 22, 2016, Bayer Capital Corporation B.V., Mijdrecht, Netherlands, placed subordinated mandatory convertible notes in the amount of €4 billion, which were converted into no-par shares of Bayer AG at maturity on November 22, 2019.

Exchangeable bond

On June 14, 2017, Bayer AG issued bonds with a nominal value of €1 billion which mature in 2020. These bonds can be settled in cash, by delivery of Covestro shares or by a combination thereof. They were designated as financial liabilities at fair value through profit or loss upon first-time recognition. As of December 31, 2019, the fair value was €1 billion, and Bayer AG held 11.7 million Covestro shares with a fair value of €0.5 billion. Assuming repayment is made in Covestro shares, Bayer AG would have to make an additional payment of €0.5 billion.

Other bonds

Three bonds with a total nominal volume of US$2.5 billion and a bond with a nominal volume of JPY 10 billion were redeemed at maturity in 2019.

Measures undertaken to finance the Monsanto acquisition included the issuance in June 2018 of US$15 billion and €5 billion in bonds via our subsidiaries Bayer U.S. Finance II LLC, Pittsburgh, United States, and Bayer Capital Corporation B.V., Mijdrecht, Netherlands, respectively.

As part of the acquisition, bonds with a nominal volume of US$6.9 billion were taken over from Monsanto. In July 2018, about 83% of these bonds were exchanged for Bayer bonds through a bond exchange program.

Liabilities to banks

The decrease in liabilities to banks mainly resulted from the continued repayment of the acquisition financing, which amounted to US$3.8 billion as of December 31, 2019 (December 31, 2018: US$4.9 billion).

Lease liabilities

The increase in lease liabilities in 2019 was mainly due to the change in lease accounting resulting from the first-time application of IFRS 16. Further information on lease liabilities is given in Note [28].

Other financial liabilities

The decrease in other financial liabilities was mainly due to the repayment of liabilities pertaining to the mandatory convertible notes.

Other information

A total of €4.5 billion in undrawn credit facilities remained available to the Bayer Group as of December 31, 2019 (December 31, 2018: €4.5 billion).

Further information on the accounting for liabilities from derivatives is given in Note [27].

The development of financial liabilities in 2019 is outlined in Note [31].

25. Trade accounts payable

Trade accounts payable comprised €6,404 million (2018: €6,004 million) due within one year and €22 million (2018: €34 million) due after one year.

26. Other liabilities

Other liabilities comprised the following:

B 26/1

Other Liabilities

€ million	Dec. 31, 2018 Total	Dec. 31, 2018 Of which current	Dec. 31, 2019 Total	Dec. 31, 2019 Of which current
Other tax liabilities	672	653	693	682
Deferred income	65	19	50	27
Liabilities to employees	252	231	230	215
Liabilities for social expenses	141	136	130	128
Accrued interest on liabilities	268	257	266	253
Liabilities from derivatives	327	165	219	166
Miscellaneous liabilities	762	660	1,334	1,012
Total	**2,487**	**2,121**	**2,922**	**2,483**

2018 figures restated

The deferred income included €20 million (2018: €30 million) in grants and subsidies received from governments, of which €3 million (2018: €3 million) was reversed through profit or loss.

Other miscellaneous liabilities included a commitment in the amount of €346 million for the settlement payment due in connection with the Xarelto™ litigation. The payment was made in January 2020. Upon the acquisition of the remaining interest in BlueRock Therapeutics L.P., Cambridge, Massachusetts, United States, a €185 million liability was recognized for potential future milestone payments that become due when predefined research-based milestones are achieved. Also included here are financial commitments of €116 million (2018: €175 million) for joint ventures and a €105 million payment obligation for acquired trademark rights in the Crop Science segment.

27. Financial instruments

The system used by the Bayer Group to manage credit risks, liquidity risks and the different types of market price risk (interest-rate, currency and commodity price risks), together with its objectives, methods and procedures, is outlined in the Opportunity and Risk Report, which forms part of the Combined Management Report.

27.1 Financial instruments by category

The following table shows the carrying amounts and fair values of financial assets and liabilities by category of financial instrument under IFRS 9 and a reconciliation to the corresponding line items in the statements of financial position. Since the line items “Trade accounts receivable,” “Other receivables” and “Other liabilities” contain both financial instruments and nonfinancial assets or liabilities (such as other tax receivables), the reconciliation is shown in the column headed “Nonfinancial assets / liabilities.”

B 27.1/1

Carrying Amounts and Fair Values of Financial Instruments

Dec. 31, 2019

Measurement category (IFRS 9)[1]	Measured at amortized cost	Measured at fair value [fair value for information[5]] Based on quoted prices in active markets (Level 1)	Based on observable market data (Level 2)	Based on unobservable inputs (Level 3)	Nonfinancial assets/liabilities	
€ million	**Carrying amount**	**Carrying amount**	**Carrying amount**	**Carrying amount**	**Carrying amount**	**Total**
Trade accounts receivable	11,430		80		168	11,678
AC	11,430					11,430
FVTPL, mandatory[2]			80			80
Nonfinancial assets					168	168
Other financial assets	809	1,692	195	1,166		3,862
AC	809		[809]			809
FVTPL, mandatory[2]		1,353	29	922		2,304
FVTOCI (no Recycling), designated[3]		336		232		568
Derivatives - hedge accounting			71			71
Derivatives - no hedge accounting		3	95	12		110
Other receivables	287			65	2,210	2,562
AC	287		[287]			287
FVTPL, mandatory[2]				65		65
Nonfinancial assets					2,210	2,210
Cash and cash equivalents	3,185					3,185
AC	3,185		[3,185]			3,185
Total financial assets	**15,711**	**1,692**	**275**	**1,231**		**18,909**
of which AC	15,711					15,711
of which FVTPL		1,353	109	987		2,449
Financial liabilities	37,896	1,001	123		74	39,094
AC	37,896	[33,285]	[6,774]			37,896
FVTPL (nonderivative), designated[4]		1,001				1,001
Derivatives – no hedge accounting			123			123
Nonfinancial liabilities					74	74
Trade accounts payable	6,426					6,426
AC	6,426					6,426
Other liabilities	1,156	3	211	198	1,354	2,922
AC	1,156		[1,156]			1,156
FVTPL (nonderivative), mandatory[2]				193		193
Derivatives – hedge accounting			177			177
Derivatives – no hedge accounting		3	34	5		42
Nonfinancial liabilities					1,354	1,354
Total financial liabilities	**45,478**	**1,004**	**334**	**198**		**47,014**
of which AC	45,478					45,478
of which FVTPL (nonderivative)		1,001		193		1,194
of which derivatives – hedge accounting			177			177
of which derivatives – no hedge accounting		3	157	5		165

[1] AC: at amortized cost
FVTOCI: at fair value through other comprehensive income
FVTPL: at fair value through profit or loss
[2] Measured at fair value through profit or loss as required by IFRS 9
[3] Measured at fair value through other comprehensive income under IFRS 9, paragraph 5.7.5
[4] Designated as FVTPL upon first-time recognition under IFRS 9
[5] Fair value of the financial instruments at amortized cost under IFRS 7, paragraph 29(a)

B 27.1/2

Carrying Amounts and Fair Values of Financial Instruments

Dec. 31, 2018

Measurement category (IFRS 9)[1]	Measured at amortized cost	Measured at fair value [fair value for information[5]] Based on quoted prices in active markets (Level 1)	Based on observable market data (Level 2)	Based on unobservable inputs (Level 3)	Nonfinancial assets/ liabilities	
€ million	**Carrying amount**	**Carrying amount**	**Carrying amount**	**Carrying amount**	**Carrying amount**	**Total**
Trade accounts receivable	11,564				150	11,714
AC	11,564					11,564
Nonfinancial assets					150	150
Other financial assets	440	1,584	241	1,113		3,378
AC	440		[441]			440
FVTPL, mandatory[2]		1,432	28	895		2,355
FVTOCI (no Recycling), designated[3]		144		186		330
Derivatives – hedge accounting			101			101
Derivatives – no hedge accounting		8	112	32		152
Other receivables	614			42	1,828	2,484
AC	614		[614]			614
FVTPL, mandatory[2]				42		42
Nonfinancial assets					1,828	1,828
Cash and cash equivalents	4,052					4,052
AC	4,052		[4,052]			4,052
Total financial assets	**16,670**	**1,584**	**241**	**1,155**		**19,650**
of which AC	16,670					16,670
of which FVTPL		1,432	28	937		2,397
Financial liabilities	40,226	996	172			41,394
AC	40,226	[32,395]	[7,091]			40,226
FVTPL (nonderivative), designated[4]		996				996
Derivatives – hedge accounting			35			35
Derivatives – no hedge accounting			137			137
Trade accounts payable	6,038					6,038
AC	6,038					6,038
Other liabilities	1,136	7	320	20	1,004	2,487
AC	1,136		[1,136]			1,136
FVTPL (nonderivative), mandatory[2]				20		20
Derivatives – hedge accounting			297			297
Derivatives – no hedge accounting		7	23			30
Nonfinancial liabilities					1,004	1,004
Total financial liabilities	**47,400**	**1,003**	**492**	**20**		**48,915**
of which AC	47,400					47,400
of which FVTPL (nonderivative)		996		20		1,016
of which derivatives – hedge accounting			332			332
of which derivatives – no hedge accounting		7	160			167

2018 figures restated
[1] AC: at amortized cost
FVTOCI: at fair value through other comprehensive income
FVTPL: at fair value through profit or loss
[2] Measured at fair value through profit or loss as required by IFRS 9
[3] Measured at fair value through other comprehensive income under IFRS 9, paragraph 5.7.5
[4] Designated as FVTPL upon first-time recognition under IFRS 9
[5] Fair value of the financial instruments at amortized cost under IFRS 7 paragraph 29(a)

The category “AC – measured at amortized cost” within other financial assets and in financial liabilities also includes finance lease receivables and lease liabilities in which Bayer is the lessor or lessee and which were therefore measured according to IFRS 16 (in 2019) or IAS 17 (in 2018).

Due to the short maturities of most trade accounts receivable and payable, other receivables and liabilities, and cash and cash equivalents, their carrying amounts at the closing date do not significantly differ from the fair values.

The fair values of financial assets and liabilities measured at amortized cost that are given for information are the present values of the respective future cash flows. The present values are determined by discounting the cash flows at a closing-date interest rate, taking into account the term of the assets or liabilities and also the creditworthiness of the counterparty in certain cases. Where a market price is available, however, this is deemed to be the fair value.

The fair values of financial assets measured at fair value correspond to quoted prices in active markets (Level 1), or are determined using valuation techniques based on observable market data as of the end of the reporting period (Level 2) or are the present values of the respective future cash flows, determined on the basis of unobservable inputs (Level 3).

The fair values of derivatives for which no publicly quoted prices exist in active markets (Level 1) are determined using valuation techniques based on observable market data as of the end of the reporting period (Level 2). In applying valuation techniques, credit or debt value adjustments are determined to account for the credit risk of the contractual party or Bayer.

Currency and commodity forward contracts are measured individually at their forward rates or forward prices on the closing date. These depend on spot rates or prices, including time spreads. The fair values of interest-rate hedging instruments and cross-currency interest-rate swaps were determined by discounting future cash flows over the remaining terms of the instruments at market rates of interest, taking into account any foreign currency translation as of the closing date in certain cases.

Fair values measured using unobservable inputs are categorized within Level 3 of the fair value hierarchy. This applies to certain debt or equity instruments, in some cases to the fair values of embedded derivatives, and to obligations for contingent consideration in business combinations. Credit risk is frequently the principal unobservable input used to determine the fair values of debt instruments classified as “FVTPL – at fair value through profit or loss” by the discounted cash flow method. Here the credit spreads of comparable issuers are applied. A significant increase in credit risk could result in a lower fair value, whereas a significant decrease could result in a higher fair value. However, a relative change of 10% in the credit spread does not materially affect the fair value.

Embedded derivatives are separated from their respective host contracts, provided these are not financial instruments. Such host contracts are generally sale or purchase agreements relating to the operational business. The embedded derivatives cause the cash flows from the contracts to vary with exchange-rate or price fluctuations, for example. The internal measurement of embedded derivatives is mainly performed using the discounted cash flow method, which is based on unobservable inputs. These include planned sales and purchase volumes, and prices derived from market data. Regular monitoring is carried out based on these fair values as part of quarterly reporting.

The maximum default risk from financial assets that are measured at amortized cost and are subject to the impairment model is €15,711 million (2018: €16,670 million).

The maximum default risk from existing loan commitments that are subject to the impairment model is €1,165 million (2018: €965 million).

The maximum default risk from financial assets not subject to the impairment model is €3,198 million (2018: €2,980 million).

The exchangeable bond issued in June 2017 that can be converted into Covestro shares are measured at fair value through profit or loss. This bond is a hybrid financial instrument containing a debt instrument as a nonderivative host contract and multiple embedded derivatives.

Until May 2018, the interest in Covestro was accounted for in the Bayer Group consolidated financial statements as an associate using the equity method. Various share disposals led to the loss of significant influence on the financial and business policy decisions of Covestro. This in turn resulted in a change in the accounting method. Since May 2018, Bayer has reported its interest in Covestro as an equity instrument. Changes in fair value are recognized through profit or loss.

The changes in the amount of financial assets and liabilities recognized at fair value based on unobservable inputs (Level 3) for each financial instrument category were as follows:

B 27.1/3

Development of Financial Assets and Liabilities (Level 3)

€ million	Assets – FVTPL[1]	FVTOCI[1] (no recycling)	Derivatives (net)	Liabilities – FVTPL[1] (non-derivative)	Total
Carrying amounts (net), January 1, 2019	**937**	**186**	**32**	**(20)**	**1,135**
Gains (losses) recognized in profit or loss	44	–	(1)	4	47
of which related to assets / liabilities recognized in the statement of financial position	44	–	(1)	4	47
Gains (losses) recognized outside profit or loss	–	2	–	–	2
Additions of assets / (liabilities)	5	37	–	(187)	(145)
Settlements of (assets) / liabilities	–	–	(26)	6	(20)
Changes in scope of consolidation	–	6	–	–	6
Exchange differences	1	1	2	4	8
Carrying amounts (net), December 31, 2019	**987**	**232**	**7**	**(193)**	**1,033**

[1] See table B 27.1/1 for definition of measurement categories.

B 27.1/4

Development of Financial Assets and Liabilities (Level 3)

€ million	Assets – FVTPL[1]	FVTOCI[1] (no recycling)	Derivatives (net)	Liabilities – FVTPL[1] (non-derivative)	Total
Carrying amounts (net), January 1, 2018	**821**	**68**	**10**	**(7)**	**892**
Gains (losses) recognized in profit or loss	28	–	5	(5)	28
of which related to assets / liabilities recognized in the statement of financial position	28	–	–	(5)	23
Gains (losses) recognized outside profit or loss	–	13	–	–	13
Additions of assets / (liabilities)	102	116	17	(10)	225
Settlements of (assets) / liabilities	(14)	(7)	–	1	(20)
Disposals from divestments	–	–	–	1	1
Changes in scope of consolidation	–	(4)	–	–	(4)
Carrying amounts (net), December 31, 2018	**937**	**186**	**32**	**(20)**	**1,135**

[1] See table B 27.1/2 for definition of measurement categories.

The changes recognized in profit or loss were included in other operating income / expenses, as well as in the financial result in interest income, exchange gains or losses and in other financial income and expenses.

Income, expense, gains and losses on financial instruments can be assigned to the following categories:

B 27.1/5

Income, Expense, Gains and Losses on Financial Instruments

€ million	Assets – AC[1]	Assets – FVTPL[1]	FVTOCI[1] (no recycling)	Derivatives – no hedge accounting	Liabilities – AC[1]	Liabilities – FVTPL[1] (non-derivative)	Total
							2019
Interest income	147	39	–	–	52	–	238
Interest expense	(56)	–	–	(10)	(1,490)	(1)	(1,557)
Income/expenses from investments in affiliated companies	–	31	–	–	–	–	31
Changes in fair value	–	52	–	11	–	(1)	62
Impairment losses[2]	(214)	–	–	–	–	–	(214)
Impairment loss reversals	148	–	–	–	–	–	148
Exchange gains/losses	125	–	–	83	(290)	–	(82)
Other financial income/expenses	(3)	(12)	–	–	(33)	–	(48)
Net result	**147**	**110**	**–**	**84**	**(1,761)**	**(2)**	**(1,422)**

[1] See table B 27.1/1 for definitions of measurement categories.
[2] Also including expected credit losses from loan commitments

B 27.1/6

Income, Expense, Gains and Losses on Financial Instruments

€ million	Assets – AC[1]	Assets – FVTPL[1]	FVTOCI[1] (no Recycling)	Derivatives – no hedge accounting	Liabilities – AC[1]	Liabilities – FVTPL[1] (non-derivative)	Total
							2018
Interest income	109	95	–	–	50	–	254
Interest expense	(65)	–	–	(2)	(1,224)	(1)	(1,292)
Income/expenses from investments in affiliated companies	–	–	1	–	–	–	1
Changes in fair value	–	(444)	–	41	–	230	(173)
Impairment losses	(197)	–	–	–	–	–	(197)
Impairment loss reversals	184	–	–	–	–	–	184
Exchange gains/losses	247	–	–	89	(496)	–	(160)
Other financial income/expenses	(11)	–	–	–	(15)	(2)	(28)
Net result	**267**	**(349)**	**1**	**128**	**(1,685)**	**227**	**(1,411)**

2018 figures restated
[1] See table B 27.1/2 for definitions of measurement categories.

The interest income and expense from assets and liabilities within the AC category also included income and expenses from interest-rate derivatives that qualified for hedge accounting.

The changes in the fair value of assets within the FVTPL category also included changes in the fair value of the Covestro interest, which has been presented as an equity instrument since May 2018. The changes in the fair value of derivatives that do not qualify for hedge accounting related mainly to forward commodity contracts and embedded derivatives.

In 2018, changes in the fair value of (nonderivative) liabilities within the FVTPL category mainly comprised the fair value adjustments for the exchangeable bond issued in June 2017. The changes in fair value relating to credit risks were not material.

Derivatives that form part of a master netting arrangement, constitute a financial asset or liability and can only be netted in the event of breach of contract by, or insolvency of, one of the contracting parties do not satisfy, or only partially satisfy, the criteria for offsetting in the statement of financial position according to IAS 32. The volume of such derivatives with positive fair values was €109 million (2018: €166 million), and the volume with negative fair values was €298 million (2018: €455 million). Included here is an amount of €74 million (2018: €104 million) in positive and negative fair values of derivatives concluded with the same contracting party.

27.2 Maturity analysis

The liquidity risks to which the Bayer Group was exposed from its financial instruments at the end of the reporting period comprised obligations for future interest and repayment installments on financial liabilities and the liquidity risk arising from derivatives.

There were also loan commitments under an as yet unpaid €965 million (2018: €965 million) and €200 million (2018: €0 million) portion of the effective initial funds of Bayer-Pensionskasse VVaG and Rheinische Pensionskasse VVag, respectively, which may result in further payments by Bayer AG in subsequent years.

B 27.2/1

Maturity Analysis of Financial Instruments

€ million	Dec. 31, 2019 **Carrying amount**	2020	2021	2022	2023	2024	after 2024 **Interest and repayment**
Refund liabilities	4,239	4,134	103	2	–	–	–
Financial liabilities							
Bonds and notes / promissory notes	33,569	1,900	5,895	3,010	4,528	3,025	27,171
Liabilities to banks	3,988	672	3,455	–	–	–	–
Remaining liabilities	1,340	443	335	193	137	98	377
Trade accounts payable	6,426	6,404	11	2	1	1	7
Other liabilities							
Accrued interest on liabilities	266	253	2	2	1	1	7
Remaining liabilities	1,083	788	87	150	31	1	26
Liabilities from derivatives							
Derivatives – hedge accounting	177	127	49	–	1	–	–
Derivatives – no hedge accounting	165	165	2	1	–	–	–
Receivables from derivatives							
Derivatives – hedge accounting	71	10	8	28	2	1	–
Derivatives – no hedge accounting	110	66	17	1	–	–	–
Loan commitments	–	1,165	–	–	–	–	–
Financial guarantees	–	–	–	–	–	–	1

B 27.2/2

Maturity Analysis of Financial Instruments

€ million	Dec. 31, 2018 Carrying amount	2019	2020	2021	2022	2023	after 2023
							Interest and repayment
Refund liabilities	3,782	3,622	145	15	–	–	–
Financial liabilities							
Bonds and notes / promissory notes	35,402	3,235	2,094	5,762	2,951	4,414	29,610
Liabilities to banks	4,865	751	158	4,345	–	–	3
Remaining liabilities	955	627	60	53	43	32	303
Trade accounts payable	6,038	6,004	32	1	1	–	–
Other liabilities							
Accrued interest on liabilities	268	257	1	1	1	1	7
Remaining liabilities	888	791	56	17	8	3	13
Liabilities from derivatives							
Derivatives – hedge accounting	332	172	66	70	26	–	–
Derivatives – no hedge accounting	167	167	–	–	–	–	–
Receivables from derivatives							
Derivatives – hedge accounting	101	42	9	3	–	–	–
Derivatives – no hedge accounting	152	121	(1)	(10)	–	–	–
Loan commitments	–	965	–	–	–	–	–
Financial guarantees	–	–	–	–	–	–	–

2018 figures restated

27.3 Information on derivatives

Asset and liability fair values and future cash flows are exposed to currency, interest-rate and commodity price risks. Derivatives are used to reduce this risk. In some cases they are designated as hedging instruments in a hedge accounting relationship.

Currency risks

Foreign currency receivables and liabilities are hedged using foreign exchange derivatives without the existence of a hedge accounting relationship. In addition, cross-currency interest-rate swaps are concluded to hedge intra-Group loans. Some of these swaps are designated as cash flow hedges in hedge accounting.

Fluctuations in future cash flows resulting from forecasted foreign currency transactions and procurement activities are avoided partly through derivatives contracts, most of which are designated as cash flow hedges.

Interest-rate risk

The interest-rate risks from fixed-interest borrowings are managed in part using interest-rate swaps.
Two interest-rate swaps in the total amount of €200 million were designated as fair value hedges for the €750 million bond issued in 2014 and maturing in 2021. In addition, two interest-rate swaps totaling US$500 million were designated as a fair value hedge for the US$2.5 billion bond issued in 2018 and maturing in 2025. The carrying amounts of these bonds as of December 31, 2019, were €748 million and €2,216 million, respectively. Hedge-related fair value adjustments of €4 million and €9 million increased the carrying amounts to €752 million and €2,225 million, respectively. No material ineffective portions of these hedges required recognition through profit or loss.

Interest-rate risks in connection with the financing of the Monsanto acquisition were partially hedged through interest-rate derivatives designated as cash flow hedges. The fair values of these derivatives as of the acquisition date will be amortized from reserves for cash flow hedges into interest income and expense over the term of the bonds issued to finance the acquisition.

Commodity price risks

Hedging contracts are also used to partly reduce exposure to fluctuations in future cash outflows and inflows resulting from price changes on procurement and selling markets. Some of these contracts are designated as cash flow hedges or fair value hedges.

Hedging of obligations under stock-based employee compensation programs

A portion of the obligations to make variable payments to employees under stock-based compensation programs (Aspire) is hedged against share price fluctuations using derivatives contracts that are settled in cash at maturity. These derivatives are designated as cash flow hedges.

Further information on cash flow hedges

Other comprehensive income from cash flow hedges decreased in 2019 by €115 million (2018: increased by €125 million) due to changes in the fair values of derivatives. Total changes of €107 million in the fair values of derivatives were recognized through profit or loss in 2019 (2018: €124 million).

The following table shows changes in reserves for cash flow hedges (before taxes), broken down by risk category:

B 27.3/1

Changes in Reserves for Cash Flow Hedges (before taxes)

€ million	Currency hedging of recorded transactions	Currency hedging of forecasted transactions	Interest-rate hedging of forecasted transactions	Commodity price hedging	Hedging of stock-based employee compensation programs	Total
December 31, 2017	**21**	**(95)**	**(19)**	**–**	**(4)**	**(97)**
Changes in fair values	(10)	100	283	(17)	(231)	125
Reclassified to profit or loss	–	(3)	(19)	–	146	124
Reclassified to goodwill	–	(37)	–	–	–	(37)
December 31, 2018	**11**	**(35)**	**245**	**(17)**	**(89)**	**115**
Changes in fair values	–	(236)	–	(1)	122	(115)
Reclassified to profit or loss	(11)	196	(36)	–	(42)	107
Reclassified to inventories	–	–	–	17	–	17
December 31, 2019	**0**	**(75)**	**209**	**(1)**	**(9)**	**124**

No material ineffective portions of these hedges required recognition through profit or loss in 2019.

The fair values of the derivatives in the major categories as of year-end are indicated in the following table together with the included volumes of hedges.

B 27.3/2

Fair Values of Derivatives

	Dec. 31, 2018			Dec. 31, 2019		
€ million	Notional amount[1]	Positive fair value[3]	Negative fair value[4]	Notional amount[1]	Positive fair value[3]	Negative fair value[4]
Currency hedging of recorded transactions[2, 3]	**18,165**	**129**	**(172)**	**15,895**	**60**	**(123)**
Forward exchange contracts	16,942	83	(137)	15,711	59	(122)
Cross-currency interest-rate swaps	1,223	46	(35)	184	1	(1)
of which cash flow hedges	1,198	45	(35)	–	–	–
Currency hedging of forecasted transactions[2, 4]	**4,233**	**35**	**(70)**	**5,395**	**17**	**(91)**
Forward exchange contracts	4,169	35	(69)	5,279	16	(91)
of which cash flow hedges	3,941	34	(64)	5,121	14	(85)
Currency options	64	–	(1)	116	1	–
of which cash flow hedges	64	–	(1)	116	1	–
Interest-rate hedging of recorded transactions[2, 3]	**200**	**8**	**–**	**645**	**16**	**–**
Interest-rate swaps	200	8	–	645	16	–
of which fair value hedges	200	8	–	645	16	–
Commodity price hedging[2, 4]	**936**	**32**	**(14)**	**823**	**23**	**(22)**
Forward commodity contracts	934	31	(14)	797	21	(22)
of which fair value hedges	87	–	(3)	–	–	–
of which cash flow hedges	464	14	(3)	426	14	(5)
Commodity option contracts	2	1	–	26	2	–
Hedging of stock-based employee compensation programs[2, 4]	**731**	**–**	**(226)**	**706**	**26**	**(87)**
Forward share transactions	731	–	(226)	706	26	(87)
of which cash flow hedges	731	–	(226)	706	26	(87)
Total	**24,265**	**204**	**(482)**	**23,464**	**142**	**(323)**
of which derivatives with maturities of 12 months or less	23,169	171	(320)	21,793	86	(272)
for currency hedging	22,253	145	(242)	20,913	65	(213)
for interest-rate hedging[5]	–	–	–	–	2	–
for commodity price hedging	746	26	(14)	690	19	(22)
for hedging of stock-based employee compensation programs	170	–	(64)	190	–	(37)

[1] The notional amount is reported as gross volume, which also contains economically closed hedges.
[2] Derivatives with positive fair values are recognized under “Other financial assets” in the statement of financial position.
[3] Derivatives with negative fair values are recognized under “Financial liabilities” in the statement of financial position.
[4] Derivatives with negative fair values are recognized under “Other liabilities” in the statement of financial position.
[5] Including the portion of the fair value of long-term interest-rate swaps that relates to interest payments within one year.

The following table provides an overview of the hedging rates for the material derivatives existing at year end that qualified for hedge accounting:

B 27.3/3

Hedging Rates of Derivatives – Hedge Accounting

	Dec. 31, 2018				Dec. 31, 2019			
	Derivatives with maturities of 12 months or less		Derivatives with maturities of over 12 months		Derivatives with maturities of 12 months or less		Derivatives with maturities of over 12 months	
	Nominal value (million)	**Average hedging rate**	**Nominal value (million)**	**Average hedging rate**	**Nominal value (million)**	**Average hedging rate**	**Nominal value (million)**	**Average hedging rate**
Currency hedging of recorded transactions								
Cross-currency interest-rate swaps – cash flow hedges								
	Sell							
EUR/TRY	120 TRY	3.23						
EUR/USD	1,350 USD	1.15						
Currency hedging of forecasted transactions								
Forward exchange contracts – cash flow hedges								
	Sell				Sell		Sell	
EUR/AUD	243 AUD	1.62			248 AUD	1.64		
EUR/BRL	1,685 BRL	4.54			2,294 BRL	4.62		
EUR/CAD	499 CAD	1.58			654 CAD	1.52		
EUR/CNH	5,900 CNH	8.12			8,785 CNH	7.99		
EUR/GBP	326 GBP	0.89			254 GBP	0.89		
EUR/JPY	51,690 JPY	130.19			52,020 JPY	121.88		
EUR/KRW	122,670 KRW	1,322.75			107,650 KRW	1,324.68		
EUR/MXN	2,629 MXN	24.76			2,462 MXN	23.28		
EUR/RUB	16,835 RUB	78.89			16,415 RUB	77.92		
EUR/TWD	1,929 TWD	35.51			1,575 TWD	34.78		
EUR/USD	883 USD	1.20			1,507 USD	1.14	113 USD	1.14
EUR/ZAR	1,236 ZAR	16.99			1,221 ZAR	17.35		
USD/CAD	151 CAD	1.31			105 CAD	1.32		
	Buy	–			Buy			
EUR/USD	150 USD	1.18			67 USD	1.12		
EUR/AUD					9 AUD	1.64		
EUR/CAD					22 CAD	1.48		
EUR/GBP					9 GBP	0.89		
AUD/USD	14 USD	0.71						
Hedging of stock-based employee compensation programs	**Number of shares (thousands)**	**Average hedging rate (€)**	**Number of shares (thousands)**	**Average hedging rate (€)**	**Number of shares (thousands)**	**Average hedging rate (€)**	**Number of shares (thousands)**	**Average hedging rate (€)**
Forward share transactions – cash flow hedges								
	Buy		Buy		Buy		Buy	
Bayer shares	1,517	104.29	6,971	82.42	2,156	90.07	6,799	74.08

28. Leases

The transition effects resulting from the change in the accounting method for leases as of the date of first-time application of IFRS 16 and the options chosen are described in Note [2] under “Financial reporting standards applied for the first time in 2019.”

Lease contracts in which Bayer is the lessee mainly pertain to real estate, machinery, equipment or vehicles. Lease contracts are negotiated individually and each contain different arrangements on extension, termination or purchase options, for example.

Land and building leases in which Bayer is the lessee have average terms of 6.5 years. In many cases the payments agreed under these leases are adjusted annually based on the development of the consumer price index for the respective country. Building leases generally contain clauses that prohibit subleasing except with the consent of the lessor. Leases of assets other than land or buildings have average terms of 4.2 years.

Approximately half of all contracts (excluding vehicle leases) contain an option for Bayer as lessee to terminate the lease on a date specified in the contract, while roughly one-third of all contracts with a fixed minimum term (excluding vehicle leases) grant Bayer as lessee an extension option. Vehicle leases generally contain a right of early return and an extension option.

The following right-of-use assets are recognized under property, plant and equipment:

B 28/1

Right-of-Use Assets

€ million	Dec. 31, 2019
Land and buildings	765
Investment property	4
Plant installations and machinery	165
Furniture, fixtures and other equipment	243
Construction in progress and advance payments	96
Total	**1,273**

Additions to right-of-use assets recognized in 2019 amounted to €333 million.

The maturities of the outstanding lease payments were as follows:

B 28/2

Maturities of Lease Payments

€ million	2020	2021	2022	2023	2024	2025 or later	Total
Lease payments	358	332	192	137	98	377	1,494

Further details of lease liabilities are given in Note [24].

The depreciation of right-of-use assets in 2019 pertained to the following asset groups:

B 28/3

Depreciation of Right-of-Use Assets

€ million	2019
Land and buildings	236
Plant installations and machinery	29
Furniture, fixtures and other equipment	119
Total	**384**

In addition, the following amounts were recognized in the income statement in 2019 in connection with lease contracts in which Bayer was the lessee:

B 28/4

Income Statement Impact of Leases

€ million	2019
Interest expense for the unwinding of discount on lease liabilities	(65)
Expenses for short-term leases with terms longer than one month and up to 12 months	(275)
Expenses low-value asset leases (excluding short-term leases)	(8)
Expenses for variable lease payments not included in the measurement of the lease liability	(10)
Income from subleasing of right-of-use assets	5
Gains or losses on sale and leaseback transactions	1
Total	**(352)**

Cash outflows related to lessee activities in 2019 amounted to €793 million. Unrecognized liabilities of €15 million existed as of December 31, 2019, for short-term leases that had not yet commenced. Leases signed but not yet commenced (other than short-term leases) amounted to €31 million as of December 31, 2019.

29. Contingent liabilities and other financial commitments

Contingent liabilities

The following warranty contracts, guarantees and other contingent liabilities existed at the end of the reporting period:

B 29/1

Contingent Liabilities

€ million	Dec. 31, 2018	Dec. 31, 2019
Warranties	88	98
Guarantees	82	–
Other contingent liabilities	816	3,099
Total	**986**	**3,197**

The guarantees mainly comprise a declaration issued by Bayer AG to the trustees of the U.K. pension plans guaranteeing the pension obligations of Bayer Public Limited Company, Reading, United Kingdom, and Bayer CropScience Limited, Cambridge, United Kingdom. Under the declaration, Bayer AG – in addition to the two companies – undertakes to make further payments into the plans upon receipt of a payment request from the trustees. The net liability with respect to these defined benefit plans as of December 31, 2019, declined to €0 million (December 31, 2018: €82 million).

Other contingent liabilities as of December 31, 2019, amounted to approximately €3.1 billion (December 31, 2018: €0.8 billion) and primarily related to tax, labor or tort law and other matters in countries including Germany, the United States, Brazil, India, Greece and Italy.

Other financial commitments

The other financial commitments were as follows:

B 29/2

Other Financial Commitments

€ million	Dec. 31, 2018	Dec. 31, 2019
Commitments under purchase agreements for property, plant and equipment	811	841
Contractual obligation to acquire intangible assets	224	227
Capital contribution commitments	464	413
Unpaid portion of the effective initial fund	965	1,165
Potential payment obligations under collaboration agreements	2,121	2,620
Revenue-based milestone payment commitments	2,187	3,084
Total	**6,772**	**8,350**

2018 figures restated

The maturities of the other financial commitments are as follows:

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Maturities of Other Financial Liabilities

	Payment obligations under collaboration agreements		Revenue-based milestone payment commitments	
€ million	2018	2019	2018	2019
Maturing within 1 year	315	215	87	75
Maturing in 1–5 years	715	661	65	1
Maturing after 5 years	1,091	1,744	2,035	3,008
Total	**2,121**	**2,620**	**2,187**	**3,084**

The Bayer Group has entered into cooperation agreements with third parties under which it has agreed to fund various projects or has assumed other payment obligations based on the achievement of certain milestones or other specific conditions. The amounts shown represent the maximum payments to be made, and it is unlikely that they will all fall due. Since the achievement of the conditions for payment is highly uncertain, both the amounts and the dates of the actual payments may vary considerably from those stated in the table. The increase in 2019 in potential payment obligations under collaboration agreements and in commitments to make revenue-based milestone payments was largely due to the full acquisition of BlueRock Therapeutics L.P., Cambridge, Massachusetts, United States, and to collaboration and licensing agreements with Arvinas Operations, Inc., New Haven, United States, and Broad Institute, Inc., Cambridge, United States.

30. Legal risks

As a global company with a diverse business portfolio, the Bayer Group is exposed to numerous legal risks, particularly in the areas of product liability, competition and antitrust law, anticorruption, patent disputes, tax assessments and environmental matters. The outcome of any current or future proceedings cannot normally be predicted. It is therefore possible that legal or regulatory judgments or future settlements could give rise to expenses that are not covered, or not fully covered, by insurers' compensation payments and could significantly affect our sales and earnings.

Legal proceedings we currently consider to be material are outlined below. The legal proceedings referred to do not represent an exhaustive list.

Product-related litigation

Mirena™: As of February 6, 2020, lawsuits from approximately 730 users of Mirena™, a levonorgestrel-releasing intrauterine system providing long-term contraception, had been served upon Bayer in the United States (excluding lawsuits no longer pending or subject to pending dismissal motions). Plaintiffs allege personal injuries resulting from the use of Mirena™, including intracranial hypertension, and seek compensatory and punitive damages. Plaintiffs claim, inter alia, that Mirena™ is defective and that Bayer knew or should have known of the risks associated with its use and failed to adequately warn its users. In 2017, most of the cases pending in U.S. federal courts in which plaintiffs allege idiopathic intracranial hypertension were consolidated in a multidistrict litigation ("MDL") proceeding for common pre-trial management. In June 2019, the MDL court granted summary judgment dismissing all of the approximately 730 cases pending before that court. Plaintiffs are appealing the decision. Another MDL proceeding concerning perforation cases has been dismissed. Cases in which plaintiffs allege perforation have been settled for a total amount of US$12 million. The settlement was funded in November 2019. All served cases alleging injuries other than idiopathic intracranial hypertension have been dismissed or have dismissals pending.

As of February 6, 2020, five Canadian lawsuits relating to Mirena™ seeking class action certification had been served upon Bayer. Bayer believes it has meritorious defenses and intends to defend itself vigorously.

Bayer believes the risks remaining in this litigation are no longer material.

Xarelto™: As of February 6, 2020, U.S. lawsuits from approximately 27,200 recipients of Xarelto™, an oral anticoagulant for the treatment and prevention of blood clots, had been served upon Bayer and Janssen Pharmaceuticals, Inc., the company distributing Xarelto™ in the United States. Plaintiffs allege personal injuries from the use of Xarelto™, including cerebral, gastrointestinal or other bleeding and death, and seek compensatory and punitive damages. They claim, among other things, that Xarelto™ is defective and that Bayer knew or should have known of these risks associated with the use of Xarelto™ and failed to adequately warn its users. Additional lawsuits are anticipated. In March 2019, after prevailing in all six cases that went to trial, Bayer and Janssen reached a global agreement to settle virtually all pending US cases for US$ 775 million. In January 2020, the settlement – split equally between the two companies – was fully funded and all pending appeals have been dismissed. The claims administrator has begun the process of fund allocation and dismissals of the settled cases will follow. Any remaining cases will need to satisfy requirements or be subject to dismissal.

As of February 6, 2020, ten Canadian lawsuits relating to Xarelto™ seeking class action certification had been served upon Bayer. One of the proposed class actions has been certified. Bayer has filed a motion for leave to appeal. Bayer believes it has meritorious defenses and intends to defend itself vigorously.

Essure™: As of February 6, 2020, U.S. lawsuits from approximately 33,100 users of Essure™, a medical device offering permanent birth control with a nonsurgical procedure, had been served upon Bayer. Plaintiffs allege personal injuries from the use of Essure™, including hysterectomy, perforation, pain, bleeding, weight gain, nickel sensitivity, depression and unwanted pregnancy, and seek compensatory and punitive damages. Additional lawsuits are anticipated.

As of February 6, 2020, two Canadian lawsuits relating to Essure™ seeking class action certification had been served upon Bayer. One of the proposed class actions was certified. Bayer believes it has meritorious defenses and intends to defend itself vigorously.

Class actions over neonicotinoids in Canada: Proposed class actions against Bayer were filed in Quebec and Ontario (Canada) concerning crop protection products containing the active substances imidacloprid and clothianidin (neonicotinoids). The plaintiffs are honey producers, who have filed a proposed nationwide class action in Ontario and a Quebec-only class action in Quebec. Plaintiffs claim for compensatory damages and punitive damages and allege Bayer and another crop protection company were negligent in the design, development, marketing and sale of neonicotinoid pesticides. The proposed Ontario class action is in a very early procedural phase. In Quebec, a court certified a class proposed by plaintiffs in 2018. Bayer believes it has meritorious defenses and intends to defend itself vigorously.

Roundup™ (Glyphosate): As of February 6, 2020, lawsuits from approximately 48,600 plaintiffs claiming to have been exposed to glyphosate-based products manufactured by Bayer’s subsidiary Monsanto had been served upon Monsanto in the United States. Glyphosate is the active ingredient contained in a number of Monsanto’s herbicides, including Roundup™-branded products. Plaintiffs allege personal injuries resulting from exposure to those products, including non-Hodgkin lymphoma (NHL) and multiple myeloma, and seek compensatory and punitive damages. Plaintiffs claim, inter alia, that the glyphosate-based herbicide products are defective and that Monsanto knew, or should have known, of the risks allegedly associated with such products and failed to adequately warn its users. Additional lawsuits are anticipated. The majority of plaintiffs have brought actions in state courts in Missouri and California. Cases pending in U.S. federal courts have been consolidated in an MDL in the Northern District of California for common pre-trial management.

The first three cases that went to trial before state courts and a federal court in California resulted in jury verdicts in favor of the plaintiffs. Our post-trial motions subsequently filed with the trial courts only resulted in a reduction of the damages and punitive damages awards, respectively. We filed appeals in all three cases. In one of the appeals, the briefing is concluded and oral argument will likely be scheduled in March or April 2020. In the two other appeals, the briefing is still ongoing. We believe that the verdicts are not supported by the evidence at trial and the law and therefore intend to pursue the appeals vigorously. More than 800 scientific studies and regulatory authorities all over the world confirm that glyphosate is safe for use when used according to label instructions. Significantly, the largest and most recent epidemiology studies, which are the most relevant research for assessing exposure effects in the human population, each found that there was no association between glyphosate-based herbicides and NHL overall in real-world use when adjusted for the use of other pesticides. In addition, the U.S. Environmental Protection Agency’s 2017 risk assessment examined more than 100 studies and concluded that glyphosate is “not likely to be carcinogenic to humans.” Against this backdrop, the U.S. Department of Justice and the U.S. Environmental Protection Agency have filed an amicus brief in the appeal of the federal court case, supporting some of the key arguments which are at the center of Monsanto's appeal.

A number of trials that were originally scheduled to begin in 2019 and early 2020 have been continued. This continuance is intended to provide room for the parties to continue the court-ordered mediation process in good faith and explore whether a settlement can be reached on reasonable terms that includes a process to bring reasonable resolution to the overall litigation. The next trial is scheduled to begin in late March 2020 in Missouri state court. However, the trial schedule remains fluid and subject to change.

As of February 6, 2020, eleven Canadian lawsuits relating to Roundup™ seeking class action certification had been served upon Bayer.

Bayer believes it has meritorious defenses and intends to defend the safety of glyphosate and our glyphosate-based formulations vigorously.

Dicamba: As of February 6, 2020, lawsuits from approximately 170 plaintiffs have been served upon Bayer's subsidiary Monsanto and codefendant BASF in both state and federal court in the United States alleging that Monsanto's Xtendimax™ herbicide as well as other products containing dicamba caused crop damage from off-target movement. Plaintiffs claim, inter alia, that Monsanto and BASF knew or should have known that the application of dicamba would cause such damage and failed to prevent it. Additional lawsuits are anticipated. In 2018, 35 separate cases were coordinated in an MDL before a federal court in Missouri. Plaintiffs are seeking class action certification. In February 2020, the first trial in the MDL proceeding (Bader Farms) resulted in a US$ 265 million award to the plaintiff, consisting of compensatory damages of US$15 million and punitive damages of US$ 250 million. Monsanto and codefendant BASF are jointly and severally liable for the total US$ 265 million award. We disagree with the decision and plan to swiftly appeal. In the case of Bader Farms there was no competent evidence presented which showed that Monsanto's products were present on the farm and were responsible for the alleged losses. We believe that we have meritorious defenses and intend to defend ourselves vigorously in these matters.

Insurance against statutory product liability claims

In connection with the above-mentioned product-related litigations, Bayer is insured against statutory product liability claims to the extent customary in the respective industries and has, based on the information currently available, taken appropriate accounting measures for anticipated defense costs. However, the accounting measures relating to Essure™ and Roundup™ (glyphosate) claims exceed the available insurance coverage.

Patent disputes

Adempas™: In 2018, Bayer filed patent infringement lawsuits in a U.S. federal court against Alembic Pharmaceuticals Limited, Alembic Global Holding SA, Alembic Pharmaceuticals, Inc. and INC Research, LLC (together "Alembic"), against MSN Laboratories Private Limited and MSN Pharmaceuticals Inc. (together "MSN") and against Teva Pharmaceuticals USA, Inc. and Teva Pharmaceutical Industries Ltd. (together "Teva"). In 2017, Bayer had received notices of an Abbreviated New Drug Application with a paragraph IV certification ("ANDA IV") pursuant to which Alembic, MSN and Teva each seek approval of a generic version of Bayer's pulmonary hypertension drug Adempas™ in the United States. In 2018, the court decided, upon a joint request by Bayer and Teva, that Bayer's patent is valid and infringed by Teva. This terminated the patent dispute with Teva. In 2019, the lawsuit against Alembic was dismissed after the expiry of the only patent at issue in the dispute with Alembic. The patent upheld in the proceeding against Teva continues to be in force and at issue in the dispute with MSN.

Betaferon™ / Betaseron™: In 2010, Bayer filed a complaint against Biogen Idec MA Inc. in a U.S. federal court seeking a declaration by the court that a patent issued to Biogen in 2009 is invalid and not infringed by Bayer's production and distribution of Betaseron™, Bayer's drug product for the treatment of multiple sclerosis. Biogen is alleging patent infringement by Bayer through Bayer's production and distribution of Betaseron™ and Extavia™ and has sued Bayer accordingly. Bayer manufactures Betaseron™ and distributes the product in the United States. Extavia™ is also a drug product for the treatment of multiple sclerosis; it is manufactured by Bayer, but distributed in the United States by Novartis Pharmaceuticals Corporation, another defendant in the lawsuit. In 2016, the U.S. federal court decided a disputed issue regarding the scope of the patent in Biogen's favor. Bayer disagrees with the decision, which may be appealed at the conclusion of the proceedings in the U.S. federal court. In 2018, a jury decided that Biogen's patent is invalid at the end of a trial regarding Biogen's claims against EMD Serono, Inc. ("Serono") and Pfizer Inc. ("Pfizer") for infringement of the same patent. In the same year, the court overturned the jury decision and granted judgment in favor of Biogen. Serono and Pfizer appealed. The trial of Biogen's claim against Bayer has not yet been scheduled.

Jivi™ (BAY94-9027): In 2018, Nektar Therapeutics ("Nektar"), Baxalta Incorporated and Baxalta U.S., Inc. (together "Baxalta") filed another complaint in a U.S. federal court against Bayer alleging that BAY94-9027, approved as Jivi™ in the United States for the treatment of hemophilia, infringes five patents by Nektar. The five patents are part of a patent family registered in the name of Nektar and further comprising a European patent application with the title "Branched polymers and their conjugates." This patent family is different from the one at issue in the earlier patent disputes still pending in the United States and Germany. In 2018, Bayer filed a lawsuit in the administrative court of Munich, Germany, claiming rights to the European patent application based on a past collaboration between Bayer and Nektar in the field of hemophilia. In 2017, Baxalta and Nektar had already filed a complaint in the same U.S. federal court against Bayer alleging that BAY94-9027 infringes seven other patents by Nektar. The seven patents are part of a patent family registered in the name of Nektar and further comprising European patent applications with the title "Polymer-factor VIII moiety conjugates" which are at issue in a lawsuit Bayer had filed against Nektar in 2013 in the district court of Munich, Germany. In this proceeding, Bayer claims rights to the European patent applications based on a past collaboration between Bayer and Nektar in the field of hemophilia. However, Bayer believes that the patent families do not include any valid patent claim relevant for Jivi™. In parallel proceedings before the same U.S. district court over infringement of a Bayer patent by Baxalta's hemophilia treatment Adynovate™, the court ordered Baxalta in September 2019 to pay USD 181 million to Bayer following a jury trial in February 2019; the order is subject to an appeal filed by Baxalta.

Stivarga™: In 2016, Bayer filed a patent infringement lawsuit in a U.S. federal court against Apotex, Inc. and Apotex Corp. (together "Apotex"). Bayer had received a notice of an ANDA IV application pursuant to which Apotex seeks approval of a generic version of Bayer's cancer drug Stivarga™ in the United States.

Bollgard II RR Flex™ / Intacta™: In July 2019, the Cotton Producers Association of the State of Mato Grosso (AMPA) in Brazil filed a patent invalidity action in federal court seeking to invalidate four of Bayer's patents covering Bollgard II RR Flex™, a cotton technology owned by Bayer. In January 2020, the Brazilian patent office, in the court proceedings, acknowledged the validity of all four challenged patents. Two of the patents are also being challenged in administrative nullity proceedings before the Brazilian patent office. One of the patents, the promoter patent, is also at issue in a patent invalidation action filed in Brazilian federal court by the Soybean Growers Association from the State of Mato Grosso (Aprosoja/MT) in 2017 regarding the Intacta™ soybean technology. In addition to the patent invalidity claims, both lawsuits seek a refund of twice the amount of the paid royalties. Both lawsuits were filed as collective actions and are proceeding before the same federal judge. Bayer's Intacta™ soybean technology is further protected by two other patents one of which has been challenged in administrative nullity proceedings before the Brazilian patent office by the Soybean Growers Association from the State of Rio Grande do Sul (Aprosoja/RS).

Bayer believes it has meritorious defenses in the above ongoing patent disputes and intends to defend itself vigorously.

Further legal proceedings

Trasylol™ / Avelox™: A qui tam complaint relating to marketing practices for Trasylol™ (aprotinin) and Avelox™ (moxifloxacin) filed by a former Bayer employee is pending in the United States District Court in New Jersey. The case is proceeding with discovery. The U.S. government has declined to intervene at the present time.

Baycol™: A qui tam complaint (filed by the same relator as in the Trasylol™ / Avelox™ complaint) asserting Bayer fraudulently induced a contract with the Department of Defense is pending in the United States District Court in Minnesota. The case is proceeding with discovery.

BASF arbitration: In September 2019, Bayer was served with a request for arbitration by BASF SE. BASF alleges to have indemnification claims under the asset purchase agreements signed in 2017 and 2018 related to the divestment of certain CropScience businesses to BASF. BASF alleges that particular cost items, including certain personnel costs, had not been appropriately disclosed and allocated to some of the divested businesses. Bayer believes it has meritorious defenses and intends to defend itself vigorously.

Newark Bay environmental matters: In the United States, Bayer is one of numerous parties involved in a series of claims brought by federal and state environmental protection agencies. The claims arise from operations by entities which historically were conducted near Newark Bay or surrounding bodies of water, or which allegedly discharged hazardous waste into these waterways or onto nearby land. Bayer and the other potentially responsible parties are being asked to remediate and contribute to the payment of past and future remediation or restoration costs and damages. In 2016, Bayer learned that two major potentially responsible parties had filed for protection under Chapter 11 of the U.S. Bankruptcy Code. While Bayer remains unable to determine the extent of its liability for these matters, this development is likely to adversely affect the share of costs potentially allocated to Bayer.

In the Lower Passaic River matter, a group of more than 60 companies including Bayer is investigating contaminated sediments in the riverbed under the supervision of the United States Environmental Protection Agency (EPA) and other governmental authorities. Future remediation will involve some form of dredging, the nature and scope of which are not yet defined, and potentially other tasks. Occidental Chemical Company (“OCC”), one of the parties potentially liable for cleanup costs in the Lower Passaic River, is performing the remedial design under a consent order with EPA. Bayer will ultimately be asked to share in the cost of the investigation and the remediation work, which may be substantial if the final remedy involves extensive dredging and disposal of impacted sediments. In 2018, OCC filed a lawsuit in New Jersey federal court seeking contribution and cost recovery from dozens of other potentially responsible parties, including a Bayer subsidiary, for past and future response costs. Discovery is proceeding and Bayer is currently unable to determine the extent of its liability in this matter. In the Newark Bay matter, an unaffiliated party is currently conducting an investigation of sediments in Newark Bay under EPA supervision. The investigation is in a preliminary stage. Bayer has contributed to certain investigation costs in the past and may incur costs for future response activities in Newark Bay.

Bayer has also been notified by governmental authorities acting as natural resource trustees that it may have liability for natural resource damages arising from the contamination of the Lower Passaic River, Newark Bay and surrounding water bodies. Bayer is currently unable to determine the extent of its liability.

Asbestos: In many cases, plaintiffs allege that Bayer and co-defendants employed third parties on their sites in past decades without providing them with sufficient warnings or protection against the known dangers of asbestos. Additionally, a Bayer affiliate in the United States is the legal successor to companies that sold asbestos products until 1976. Union Carbide has agreed to indemnify Bayer for this liability. Similarly, Bayer's subsidiary Monsanto faces numerous claims based on exposure to asbestos at Monsanto premises without adequate warnings or protection and based on the manufacture and sale of asbestos-containing products. Bayer believes it has meritorious defenses and intends to defend itself vigorously.

PCB: Bayer's subsidiary Monsanto has been named in lawsuits brought by various governmental entities in the United States claiming that Monsanto, Pharmacia and Solutia, collectively as a manufacturer of PCBs, should be responsible for a variety of damages due to PCBs in bodies of water, regardless of how PCBs came to be located there. Monsanto also faces numerous lawsuits claiming personal injury and / or property damage due to use of and exposure to PCB products. PCBs are man-made chemicals that were widely used for various purposes until the manufacture of PCBs was prohibited by the Environmental Protection Agency (EPA) in the United States in 1979. We believe that we have meritorious defenses and intend to defend ourselves vigorously.

Tax proceedings

Stamp taxes in Greece: In 2014, 2016 and 2017, a Greek administrative court of first instance dismissed Bayer's lawsuits against the assessment of stamp taxes and contingent penalties in a total amount of approximately €130 million on certain intra-Group loans to a Greek subsidiary. Bayer is convinced that the decisions are wrong and either has appealed the relevant decisions. Bayer believes it has meritorious arguments to support its legal position and intends to defend itself vigorously.

Notes to the Statements of Cash Flows

The statement of cash flows shows how cash inflows and outflows during the fiscal year affected the cash and cash equivalents of the Bayer Group.

Of the cash and cash equivalents, an amount of €19 million (2018: €14 million) had limited availability due to foreign exchange restrictions. Past experience has shown such restrictions to be of short duration.

The cash flows reported by consolidated companies outside the eurozone are translated at average monthly exchange rates. Cash and cash equivalents are translated at closing rates. The "Change in cash and cash equivalents due to exchange rate movements" is reported in a separate line item.

31. Net cash provided by (used in) operating, investing and financing activities

The operating cash flow (total) rose by 3.7% in 2019, to €8,207 million. The operating cash flow from continuing operations was up 6.2% from the previous year. The improvement mainly resulted from the growth in operating income, though this was partly offset by a smaller decline in cash tied up in working capital. The first-time application of IFRS 16 had a positive effect on operating cash flow because lease expenses were no longer recognized in operating income.

Net cash used in investing activities in 2019 amounted to €671 million. Included here are €2,650 million (2018: €2,593 million) in cash outflows for additions to property, plant and equipment and intangible assets. Cash inflows from divestments, less divested cash, amounted to €2,546 million (2018: €7,563 million) and mainly arose from the sale of the interest in Currenta and the divestments at Consumer Health. Cash outflows for acquisitions, less acquired cash, amounted to €410 million (2018: €45,316 million) and partly related to the acquisition of the remaining shares in BlueRock Therapeutics L.P., Cambridge, Massachusetts, United States. In the previous year, this item primarily included cash outflows for the acquisition of the agriculture business. Net cash outflows for current and noncurrent financial assets totaled €575 million (2018: €5,717 million net inflows).

Net cash used in financing activities amounted to €8,389 million, including €4,296 million in net loan repayments (2018: €17,819 million in net borrowings). Net interest payments came to €1,478 million (2018: €919 million). Dividend payments totaled €2,615 million (2018: €2,407 million). The cash outflow increased as a result of the first-time application of IFRS 16 because the repayment component of lease payments and the interest expense were recognized in the financing cash flow.

The changes in financial liabilities in 2019 are presented in the following table:

B 31/1

Financial Liabilities

€ million	Dec. 31, 2018	Cash flows	Noncash changes: Acquisition Divestment	Currency effects	New contracts IFRS 16[2]	Fair value changes[1]	Dec. 31, 2019
Bonds and notes/ promissory notes	35,402	(2,518)	–	637	–	48	33,569
Liabilities to banks	4,865	(789)	(4)	(10)	–	–	4,062
Lease liabilities	399	(442)	(30)	10	1,309	5	1,251
Liabilities from derivatives	172	(70)	–	68	–	(47)	123
Other financial liabilities	556	(477)	–	5	–	5	89
Total	**41,394**	**(4,296)**	**(34)**	**710**	**1,309**	**11**	**39,094**

[1] Including effects of unwinding of discount
[2] Lease liabilities increased by €1.0 billion as of January 1, 2019 due to the first-time application of IFRS 16.

The changes in financial liabilities in 2018 were as follows:

B 31/2

Financial Liabilities

€ million	Dec. 31, 2017	Cash flows	Noncash changes: Acquisition	Currency effects	New contracts	Fair value changes[1]	Dec. 31, 2018
Bonds and notes/ promissory notes	12,436	16,803	5,596	648	–	(81)	35,402
Liabilities to banks	534	3,352	1,072	(93)	–	–	4,865
Liabilities under finance leases	238	(43)	133	9	62	–	399
Liabilities from derivatives	240	(1)	1	(1)	–	(67)	172
Other financial liabilities	970	(2,292)	1,855	14	–	9	556
Total	**14,418**	**17,819**	**8,657**	**577**	**62**	**(139)**	**41,394**

[1] Including effects of unwinding of discount

Other Information

32. Audit fees

Prof. Frank Beine signed the Independent Auditor’s Report for the first time for the year ended December 31, 2017, and Michael Mehren for the first time for the year ended December 31, 2019. Prof. Frank Beine is the responsible audit partner.

The following fees for the services of the worldwide network of Deloitte or Deloitte GmbH Wirtschaftsprüfungsgesellschaft (Deloitte GmbH WPG) were recognized as expenses:

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Audit Fees

	Deloitte		of which Deloitte GmbH WPG	
€ million	2018	2019	2018	2019
Financial statements auditing	15	14	6	5
Audit-related services and other audit work	3	8	3	7
Tax consultancy	3	4	–	–
Other services	4	3	2	–
Total	**25**	**29**	**11**	**12**

The fees for the financial statements audit services of Deloitte GmbH Wirtschaftsprüfungsgesellschaft primarily comprised those for the audits of the consolidated financial statements of the Bayer Group and of the financial statements of Bayer AG and its subsidiaries. The audit-related services and other audit work performed by Deloitte GmbH Wirtschaftsprüfungsgesellschaft in 2019 mainly concerned the sale of Animal Health and largely consisted of voluntary financial statements audits and audit reviews. In addition, other Deloitte companies performed financial statements audit services for subsidiaries of Bayer AG, compliance-related tax consultancy services that do not materially or directly impact the consolidated financial statements of the Bayer Group or the financial statements of Bayer AG, and other services in connection with the sale of Animal Health.

33. Related parties

Related parties as defined in IAS 24 are those legal entities and natural persons that are able to exert influence on Bayer AG and its subsidiaries or over which Bayer AG or its subsidiaries exercise control or joint control or have a significant influence. They include, in particular, nonconsolidated subsidiaries accounted for at fair value, joint ventures and associates accounted for at fair value or using the equity method, and post-employment benefit plans. Related parties also include the corporate officers of Bayer AG whose compensation is reported in Note [34] and in the Compensation Report, which forms part of the Combined Management Report.

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Related Parties

€ million	Sales of goods and services 2018	Sales of goods and services 2019	Purchase of goods and services 2018	Purchase of goods and services 2019	Receivables 2018	Receivables 2019	Liabilities 2018	Liabilities 2019
Nonconsolidated subsidiaries	8	3	5	3	8	14	26	33
Joint ventures	1	3	–	–	4	5	178	58
Associates	219	5	36	–	2	–	3	63
Post-employment benefit plans	–	–	–	–	837	871	215	156

Intercompany profits and losses for companies accounted for in the consolidated financial statements using the equity method were immaterial in 2019 and 2018.

Covestro ceased to be an associate in May 2018. The services provided to associates therefore declined significantly. Casebia Therapeutics ceased to be a joint venture in 2019, resulting in a decrease in liabilities to joint ventures.

Bayer AG has undertaken to provide jouissance right capital *(Genussrechtskapital)* in the form of an interest-bearing loan with a nominal volume of €150 million (2018: €150 million) for Bayer-Pensionskasse VVaG. The entire amount remained drawn as of December 31, 2019. The carrying amount was €154 million (2018: €152 million). The loan capital provided to Bayer-Pensionskasse VVaG for its effective initial fund had a nominal volume of €635 million as of December 31, 2019 (2018: €635 million). The carrying amount was €652 million (2018: €643 million). The outstanding receivables, comprised of different tranches, are each subject to a five-year interest-rate adjustment mechanism. Interest income of €12 million was recognized in 2019 (2018: €16 million) along with income of €22 million (2018: expenses of €8 million) due to fair value changes.

No material impairment losses on receivables from related parties were recognized in 2019 or 2018.

34. Total compensation of the Board of Management and the Supervisory Board, advances and loans

In 2019, the compensation of the Board of Management and the Supervisory Board totaled €39,035 thousand (2018: €24,449 thousand), with the compensation of the Supervisory Board amounting to €3,938 thousand (2018: €3,897 thousand) and that of the Board of Management to €35,097 thousand (2018: €20,552 thousand). The compensation of the Supervisory Board was comprised entirely of short-term components. The total compensation of the Board of Management comprised a short-term component of €15,211 thousand (2018: €15,149 thousand) and a long-term component of €11,172 thousand (2018: €5,403 thousand). The long-term component included stock-based compensation of €7,733 thousand (2018: €1,914 thousand). In addition, severance payments of €8,714 thousand (2018: €0 thousand) were granted in connection with the termination of a service contract.

Pension payments to former members of the Board of Management and their surviving dependents in 2019 amounted to €12,078 thousand (2018: €17,183 thousand). The defined benefit obligation for former members of the Board of Management and their surviving dependents amounted to €199,454 thousand (2018: €185,736 thousand). There were no advances or loans to members of the Board of Management or the Supervisory Board outstanding as of December 31, 2019, or at any time during 2019 or 2018.

Further details of the compensation of the Board of Management and Supervisory Board are given in the Compensation Report, which forms part of the Management Report.

35. Events after the end of the reporting period

On February 11, 2020, Bayer announced that it had entered into a definitive agreement to transfer a large part of its Berlin-based small molecule research unit to Nuvisan ICB GmbH, a subsidiary of Nuvisan GmbH. Based in Neu-Ulm, Germany, the Nuvisan group is an international service provider for clinical studies, laboratory services and contract manufacturing for the pharmaceuticals industry.

Leverkusen, February 18, 2020

Bayer Aktiengesellschaft

The Board of Management

Responsibility Statement

To the best of our knowledge, and in accordance with the applicable reporting principles for financial reporting, the consolidated financial statements give a true and fair view of the assets, liabilities, financial position and profit or loss of the Bayer Group, and the combined management report includes a fair review of the development and performance of the business and the position of the Bayer Group and Bayer AG, together with a description of the principal opportunities and risks associated with the expected development of the Bayer Group and Bayer AG.

Leverkusen, February 18, 2020
Bayer Aktiengesellschaft

The Board of Management

Werner Baumann

Liam Condon

Wolfgang Nickl

Stefan Oelrich

Heiko Schipper

Independent Auditor's Report

To: Bayer Aktiengesellschaft, Leverkusen

REPORT ON THE AUDIT OF THE CONSOLIDATED FINANCIAL STATEMENTS AND THE COMBINED MANAGEMENT REPORT

Audit opinions

We audited the consolidated financial statements of Bayer Aktiengesellschaft, Leverkusen, and its subsidiaries (the Group) – consisting of the consolidated balance sheet as of December 31, 2019, the consolidated income statement and consolidated statement of comprehensive income, the consolidated statement of cash flows and the consolidated statement of changes in equity for the fiscal year from January 1 through December 31, 2019 and also the Notes to the consolidated financial statements, together with a summary of significant accounting methods. Moreover we audited the management report of Bayer Aktiengesellschaft, Leverkusen, Germany, which is combined with the management report of the parent company, for the fiscal year from January 1 through December 31, 2019. In accordance with German statutory provisions, we did not audit the contents of the components of the combined management report named in the Appendix to our auditors' report.

In our opinion, based on the findings of our audit,

// the accompanying consolidated financial statements comply in all material respects with the International Financial Reporting Standards (IFRS) as adopted by the EU and the additional requirements of German law pursuant to § 315e (1) HGB and give a true and fair view of the net assets and financial position of the Group as of December 31, 2019 and of its results of operations for the fiscal year from January 1, 2019 through December 31, 2018; and

// the accompanying combined management report provides a suitable overall view of the Group's situation. In all material respects, this combined management report is consistent with the consolidated financial statements, complies with German legal requirements, and suitably presents the opportunities and risks of future development. Our audit opinion on the combined management report does not extend to the content of the components of the combined management report mentioned in the Appendix to the auditors' report.

In accordance with Section 322 (3.1) HGB, we state that our audit has not led to any objections to the correctness of the consolidated financial statements and the combined management report.

Basis for the audit opinions

We conducted our audit of the consolidated financial statements and the combined management report in accordance with Section 317 HGB and the EU Auditors' Regulation (No. 537/2014; hereafter referred to as "EU Audit Regulation") in compliance with the generally accepted German standards for the audit of financial statements promulgated by the Institut der Wirtschaftsprüfer (IDW). We conducted our audit of the consolidated financial statements with additional regard for the International Standards on Auditing (ISA). Our responsibility pursuant to these regulations, principles, and standards is described in more detail in the section "Auditor's responsibility for the audit of the consolidated financial statements and the combined management report" of our Audit Report. We are independent of the Group companies in accordance with European and German commercial and professional regulations and have fulfilled our other German professional obligations in accordance with these requirements. Furthermore we state, in accordance with Article 10 (2f) EU Audit Regulation, that we have rendered no inadmissible non-audit services within the meaning of Article 5 (1) EU Audit Regulation. We believe that the audit evidence we obtained is sufficient and appropriate to provide a basis for our audit opinions on the consolidated financial statements and combined management report.

Key Audit Matters in the audit of the consolidated financial statements

Key Audit Matters are those issues that we considered – at our due discretion – to be the most significant in our audit of the consolidated financial statements for the fiscal year from January 1 through December 31, 2019. These issues have been taken into account in connection with our audit of the consolidated financial statements as a whole and in forming our opinion thereon; we do not express a separate opinion on these issues.

We present below what we consider to be the Key Audit Matters:

1. Depiction of restructuring matters
2. Intrinsic value (recoverability) of goodwill and other intangible assets
3. Depiction of risks arising from product-related legal disputes and arbitration proceedings
4. Adjustments to EBITDA and EBIT for special items

We structured our presentation of these Key Audit Matters as follows:

a) Description of the matter (including reference to associated disclosures in the consolidated financial statements)
b) Audit approach

1. Depiction of restructuring matters

a) At the end of 2018, the Management of Bayer Aktiengesellschaft announced a comprehensive restructuring program for the entire Bayer Group. The program essentially involves the cutback of up to 12,000 jobs in the next three fiscal years. A provision in the amount of EUR 1,267m was recognized for the severance payment obligations specified by the end of the financial year. A not inconsiderable part of the job cuts is attributable to Germany, where redundancies for operational reasons are excluded until 2025 owing to works agreements. Following initial discussions with the employee committees and, in individual cases, with the employees of the divisions concerned as early as 2018, all employees of the divisions concerned were finally informed in the year under review and in some cases appropriate termination agreements have already been signed with them. In our opinion, this matter was of particular importance for our audit, as the recognition and measurement of the provision are to a large extent based on estimates and assumptions made by Management.

   The information provided by management on the restructuring provision is contained in Section 23 of the notes to the consolidated financial statements.

b) We investigated whether a restructuring provision that is in accordance with the definition in IAS 37.10 has been recognized. To this end, we verified compliance with the general recognition and measurement requirements for provisions, including the criteria of IAS 37.70 et seq. that further specify these requirements and – insofar as provisions for employee benefits in connection with the termination of employment are involved – with the relevant provisions of IAS 19. For this purpose, we received and verified the corresponding evidence and calculation documents from Management. We critically assessed and verified the plausibility of Management's estimates and assumptions on which the evidence and calculation principles are based as to the extent to which the recognition and amount of the provisions are appropriate. In particular, we evaluated information documents (resolutions, minutes, presentations) supplied to employee representatives in Germany as to whether the employees were sufficiently informed thereby in concrete terms about the restructuring programs and individual components of the planned restructuring measures in the 2019 fiscal year. For the termination agreements already concluded with employees, we examined whether the provisions formed for this purpose result from the underlying contractual agreements. Where individual termination agreements have not yet been concluded, in order to check the plausibility of the amount of the provisions, we have, among other things, analyzed the restructuring programs developed in the personnel departments for job cuts with regard to the assumptions made regarding the scope and amount of the severance offers to employees and the expected acceptance rates – also on the basis of experience to date – and discussed them with the persons responsible in the personnel departments. We also examined the disclosures in the Notes to the consolidated financial statements relating to the restructuring measures in the light of the relevant requirements of IAS 37.

2. Intrinsic value (recoverability) of goodwill and other intangible assets

a) In the consolidated financial statements, an amount of EUR 39,126m (31 % of total Group assets) is reported under the balance sheet item “Goodwill”. “Other intangible assets” also include patents and technologies of EUR 18,101m (14% of consolidated total assets), trademark rights of EUR 8,102m (6% of Group total assets) and research and development projects of EUR 5,491m (4% of Group total assets). The Company allocates goodwill to the strategic business units or groups of strategic business units within the Bayer Group. Regular impairment tests for goodwill and research and development projects as well as impairment tests for other intangible assets are generally carried out comparing the respective carrying amounts with their respective recoverable amounts. Fundamentally, the recoverable amount is determined on the basis of the fair value less costs to sell. The present value of future cash flows is used as a basis, since as a rule no market values are available for the individual strategic business units. The present value is calculated using discounted cash flow models based on the Bayer Group’s three-year operating plan prepared by Management and approved by the Supervisory Board or, in the case of Crop Science, the Bayer Group’s four-year plan, and extrapolated using assumptions for long-term growth rates. Discounting is based on the weighted average cost of capital of the reporting segments concerned. The result of this valuation depends to a large extent on the estimates by the Management of the future cash flows of the strategic business unit concerned and the discount rate used and is therefore fraught with considerable uncertainty. In the light of this, and owing to the underlying complexity of the valuation models, this issue was of particular importance within the framework of our audit.

The disclosures provided by the Management on goodwill and other intangible assets are contained in Sections 3 and 14 of the Notes to the consolidated financial statements.

b) In our audit, among other things we reconstructed the methodology used to perform the impairment tests and assessed the calculation of the weighted cost of capital. We convinced ourselves of the appropriateness of the future cash inflows used in the valuation, among other things by recording and critically assessing the underlying planning process. We also compared this information with the current budgets from the three-year plan prepared by Management and approved by the Supervisory Board or, in the case of Crop Science, the four-year plan, as well as with general and industry-specific market expectations. For this, we also convinced ourselves that the costs of the Group functions included in the Corporate Functions and Consolidation segment of segment reporting were appropriately taken into account in the impairment test of the strategic business unit concerned. We studied intensively the parameters used to determine the discount rate applied and assessed the completeness and correctness of the calculation scheme. Owing to the material significance of goodwill, we further performed additional sensitivity analyses of our own for the strategic business units (carrying amount in comparison to the recoverable amount).

3. Depiction of risks arising from product-related legal disputes and arbitration proceedings

a) Bayer Group companies are involved in legal and out-of-court proceedings with public authorities, competitors, and other parties. These give rise to legal risks, in particular in the areas of product liability, competition and anti-trust law, patent law, tax law, and environmental protection.

As of February 6, 2020, Monsanto Company, St. Louis, U.S.A., a subsidiary of Bayer Aktiengesellschaft, has been served with actions in the United States seeking compensatory and punitive damages from approximately 48,600 plaintiffs who allege that their exposure to products containing glyphosate manufactured by Monsanto resulted in adverse health effects. In addition, up to February 6, 2020, the Bayer Group has been served in the United States with actions for compensatory and punitive damages by approximately 27,200 users of the product Xarelto™. Up to February 6, 2020, the Bayer Group had been served with lawsuits in the United States by approximately 33,100 female users of Essure™, each claiming damages and punitive damages. In September 2019, Bayer was served with an arbitration claim in which BASF SE seeks damages under the purchase agreements signed in 2017 and 2018 under which BASF acquired certain businesses of the Crop Science Division.

Whether a pending legal dispute makes the recognition of a provision to cover the risk necessary and, if so, to what extent, is determined to a large extent by estimates and assumptions by Management. Against this background and due to the amount of the claims asserted, the above-mentioned product-related disputes of the Bayer Group were, in our opinion, of particular significance for the audit.

The information and explanations provided by the management on the legal disputes mentioned are contained in Section 30 of the notes to the consolidated financial statements.

b) Within the scope of our audit, we assessed, among other things, the process established by the Company to recognize and assess the outcome of the judicial and extrajudicial proceedings and the presentation of a legal dispute in the balance sheet. In addition, we held regular discussions throughout the year with the Company's internal legal department in order to have the current developments and reasons that led to the corresponding assessments regarding the expected outcome of the proceedings explained to us. This was particularly true of the mediation process in connection with the legal cases involving products containing glyphosate. The evolution of material legal disputes, including the estimates by the Management with regard to the possible outcome of proceedings, was made available to us in writing by Bayer Aktiengesellschaft's internal legal department. As of the balance sheet date, we also obtained external attorney confirmations, which we compared with the risk assessment made by the Management regarding the product-related disputes and arbitration proceedings listed under "Description of the facts". Taking these estimates into account, we also critically assessed the assumptions underlying the provisions for expected defense costs and checked the amount of the provisions for plausibility on the basis of experience from similar proceedings in the past and on other evidence.

4. Adjustments to EBITDA and EBIT for special items

a) For management and analysis purposes, the Bayer Group adduces EBITDA (Earnings Before Interest, Taxes, Depreciation, and Amortization, and also impairment losses and reinstatements), adjusted for special items (by their nature or amount special effects). The segment reporting in the consolidated financial statements of Bayer AG shows adjustments to EBIT of EUR -2,818m and to EBITDA of EUR -1,951m. EBIT adjusted for special items are used for the calculation of adjusted net income from continuing operations, which is needed to calculate adjusted earnings per share from continuing operations (core EPS). EBITDA before special items and core EPS are used by Bayer as key financial performance indicators in its capital market communications. These two key indicators are furthermore adduced as the degree of target achievement for the annual performance-based compensation of Bayer Group employees. The adjustments to EBIT and EBITDA were of particular significance within the framework of our audit, as they are made on the basis of the Bayer Group's internal accounting guideline and there is a risk that Management might exercise their discretionary powers one-sidedly.

The information provided by the management on the adjustments of EBIT and EBITDA and their derivation is presented in Section 4 of the Notes to the consolidated financial statements.

b) We reconstructed the calculation of EBIT and EBITDA adjusted for special items and critically examined the identification of the Group companies' special items taken into account by Management. We analyzed the composition of the adjustments to determine the extent to which the individual components comply with the relevant internal guidelines for special items and have been appropriately eliminated from EBIT and EBITDA. In this context, we have examined, on the basis of the findings of our audit and the information provided to us by Management, whether the adjustments made were in accordance with the Notes to the combined management report and segment reporting.

Other information

Management is responsible for the other information. This other information includes:

- // the components of the combined management report named in the Appendix to the Auditors' Report that were not audited as to their contents,
- // the declaration by Management regarding the consolidated financial statements and the combined management report pursuant to § 297 (2.4) HGB and § 315 (1.5) HGB, and
- // the remaining components of the annual report, with the exception of the audited consolidated financial statements and the combined management report and our Auditors' Report.

Our audit opinions on the consolidated financial statements and on the combined management report do not extend to this other information and, accordingly, we express neither an opinion nor any other form of audit conclusion on them.

In connection with our audit of the consolidated financial statements, it is our responsibility to read the other information and to assess whether the other information

- // displays significant discrepancies with the consolidated financial statements, the combined management report or with our knowledge gained during the audit, or
- // otherwise appears to be substantially incorrectly presented.

Should we, on the basis of our work, conclude that there is a material misrepresentation in this other information, we are required to report on this fact. We have nothing to report in this connection.

Responsibility of the Management and the Supervisory Board for the consolidated financial statements and the combined management report

Management is responsible for the preparation of consolidated financial statements which comply in all material respects with the IFRSs as adopted by the EU, and with the additional requirements of German law pursuant to Section 315e (1) HGB, and for ensuring that the consolidated financial statements give a true and fair view of the net assets, financial position, and results of operations of the Group while observing these requirements. Management is furthermore responsible for the internal controls which they have determined are necessary to enable the preparation of consolidated financial statements that are free from material misstatements, whether intentional or unintentional.

In preparing the consolidated financial statements, Management is responsible for assessing the Group's ability to continue its business activities. Furthermore, they are responsible for disclosing matters relating to the continuation of business activities, if relevant. They are moreover responsible for accounting on the basis of the accounting policy of continuing operations, unless there is an intention to liquidate the Group or discontinue operations, or there is no realistic alternative.

Management is also responsible for preparing the combined management report, which as a whole provides a suitable view of the Group's situation and is consistent in all material respects with the consolidated financial statements, complies with German legal requirements and suitably presents the opportunities and risks of future development. Management is further responsible for the arrangements and measures (systems) that they deem necessary to enable the preparation of a combined management report in accordance with the applicable German legal provisions and to provide sufficient suitable evidence for the assertions in the combined management report.

The Supervisory Board is responsible for monitoring the Group's accounting process for preparing the consolidated financial statements and the combined management report.

Auditors' responsibility for the audit of the consolidated financial statements and the combined management report

Our objective is to obtain reasonable assurance as to whether the consolidated financial statements as a whole are free from material – intentional or unintentional – misstatements, and whether the combined management report as a whole provides a suitable view of the Group's situation and is in all material respects consistent with the financial statements and with the findings of the audit, complies with German legal requirements, and suitably presents the opportunities and risks of future development, and to issue an auditors' report containing our audit opinions on the consolidated financial statements and the combined management report.

Reasonable assurance is a high degree of certainty, but there is no guarantee that an audit conducted in accordance with Section 317 HGB and the EU Audit Regulation, observing generally accepted auditing principles for the audit of financial statements promulgated by the Institute of Public Auditors in Germany (IDW), and in supplementary observance of the ISAs will always reveal a material misrepresentation. Misstatements may result from violations or inaccuracies and are considered material if it is reasonable to expect that they will affect, individually or collectively, the economic decisions of addressees made on the basis of these consolidated financial statements and the combined management report.

During the audit, we exercise due discretion and maintain a critical attitude. In addition to this

- // we identify and assess the risks of material misstatements – whether intentional or unintentional – in the consolidated financial statements and the combined management report, plan and perform audit procedures in response to these risks, and obtain audit evidence that is sufficient and adequate to serve as a basis for our audit opinions. The risk that material misrepresentations are not detected is higher for violations than for inaccuracies, as violations may involve fraudulent collaboration, forgeries, intentional incompleteness, misleading representations, or the overriding of internal controls.
- // we gain an understanding of the internal control system relevant to the audit of the consolidated financial statements and the arrangements and measures relevant to the audit of the combined management report to plan audit procedures that are appropriate in the circumstances, but not with the objective of expressing an audit opinion on the effectiveness of these of the Company's systems.
- // we assess the appropriateness of the financial reporting methods applied by Management and the tenability of the estimates and related disclosures made by Management.
- // we draw conclusions on the appropriateness of the application of the going-concern accounting principle applied by Management and, on the basis of the audit evidence obtained, whether there is essential uncertainty in connection with events or circumstances that might give rise to significant doubts about the Group's ability to continue operations. If we come to the conclusion that there is essential uncertainty, we are obliged to draw attention to the related disclosures in the consolidated financial statements and the combined management report or, if these disclosures are inappropriate, to modify our relevant audit opinion. We draw our conclusions based on the audit evidence obtained up to the date of our audit opinion. However, future events or circumstances may result in the Group no longer being able to continue its business activities.
- // we assess the overall presentation, the structure and content of the consolidated financial statements, including the disclosures, and whether the consolidated financial statements present the underlying transactions and events in such a way that the consolidated financial statements give a true and fair view of the net assets, financial position, and results of operations of the Group in accordance with IFRSs as adopted by the EU and the additional requirements of German law pursuant to Section 315e (1) HGB.
- // we obtain sufficient suitable audit evidence for the accounting information of the companies or business activities within the Group in order to give our opinion on the consolidated financial statements and the combined management report. We are responsible for the guidance, supervision, and conduct of the audit of the consolidated financial statements. We bear sole responsibility for our audit opinions.
- // we assess the conformity of the combined management report with the consolidated financial statements, its legal compliance, and the view it provides of the Group's situation.

// we perform audit procedures on the forward-looking statements presented by Management in the combined management report. On the basis of adequate and suitable audit evidence, we trace in particular the significant assumptions on which Management's forward-looking statements are based and assess the proper derivation of the forward-looking statements from these assumptions. We do not express a separate audit opinion on the forward-looking statements or on the underlying assumptions. There is a significant, unavoidable risk that future events will differ materially from the forward-looking statements.

We discuss, with those responsible for monitoring, among other things the planned scope and timing of the audit and also significant audit findings, including any deficiencies in the internal control system that we identify during our audit.

We address a declaration that we have complied with the relevant independence requirements to those responsible for monitoring and discuss with them all relationships and other issues reasonably likely to affect our independence, and the safeguards we have put in place.

On the basis of the issues which we discussed with those responsible for monitoring, we determine the issues that were most significant for the audit of the consolidated financial statements in the current reporting period and are therefore the Key Audit Matters. We describe these issues in the auditor's report, unless laws or other legal provisions preclude the disclosure of such issues.

OTHER STATUTORY AND LEGAL REQUIREMENTS

Other disclosures pursuant to Article 10 EU Audit Regulation

We were elected as auditors of the consolidated financial statements by the Annual General Meeting on April 26, 2019. We were engaged by the Supervisory Board on May 15, 2019. We have been working uninterruptedly as statutory auditors of the consolidated financial statements of Bayer Aktiengesellschaft, Leverkusen, since the 2017 fiscal year.

We declare that the audit opinions contained in this Auditor's Report are consistent with the additional report to the Audit Committee pursuant to Article 11 EU Audit Regulation (Audit Report).

RESPONSIBLE AUDITOR

The public auditor responsible for the audit is Prof. Dr. Frank Beine.

Munich, February 19, 2020

Deloitte GmbH
Wirtschaftsprüfungsgesellschaft

Prof. Dr. Beine
German Public Auditor

Mehren
German Public Auditor

Appendix to the Auditors’ Report: components of the combined management report that were not audited as to their contents

We did not audit the following components of the combined management report as to their contents:

- the corporate governance statement pursuant to Section 289f and Section 315d HGB contained in Chapter 4.1 of the combined management report.

Furthermore, we did not audit the content of the following disclosures that are not normally part of the management report. Disclosures that are not normally part of the management report in the combined management report are disclosures that are neither required by Sections 289 to 289f, 315 to 315d of the German Commercial Code (HGB) nor by DRS 20.

The information contained in section 2.2.2 of the combined management report on pro forma revenues from strategic business units in the Crop Science Division.

C Further Information

Governance Bodies

Supervisory Board

Members of the Supervisory Board held offices as members of the supervisory board or a comparable supervising body of the corporations listed (as at December 31, 2019, or the date on which they ceased to be members of the Supervisory Board of Bayer AG) and as shown attended the meetings of the Supervisory Board and committees to which he or she belonged.

Werner Wenning
Leverkusen, Germany
(born October 21, 1946)

Chairman of the Supervisory Board effective October 2012

Chairman of the Supervisory Board of Bayer AG

Memberships on other supervisory boards:

- Henkel Management AG
- Siemens AG (Vice Chairman)

Memberships in comparable supervising bodies of German or foreign corporations:

- Henkel AG & Co. KGaA (Shareholders' Committee)

Attendance at Supervisory Board and committee meetings: 25 of 25

Oliver Zühlke
Solingen, Germany
(born December 11, 1968)

Vice Chairman of the Supervisory Board effective July 2015

Member of the Supervisory Board effective April 2007

Chairman of the Bayer Central Works Council

Attendance at Supervisory Board and committee meetings: 13 of 21

Dr. Paul Achleitner
Munich, Germany
(born September 28, 1956)

Member of the Supervisory Board effective April 2002

Chairman of the Supervisory Board of Deutsche Bank AG

Memberships on other supervisory boards:

- Daimler AG
- Deutsche Bank AG (Chairman)

Memberships in comparable supervising bodies of German or foreign corporations:

- Henkel AG & Co. KGaA (Shareholders' Committee)

Attendance at Supervisory Board and committee meetings: 18 of 19

Dr. rer. nat. Simone Bagel-Trah
Düsseldorf, Germany
(born January 10, 1969)

Member of the Supervisory Board effective April 2014

Chairwoman of the Supervisory Board of Henkel AG & Co. KGaA and Henkel Management AG and of the Shareholders' Committee of Henkel AG & Co. KGaA

Memberships on other supervisory boards:

- Henkel AG & Co. KGaA (Chairwoman)
- Henkel Management AG (Chairwoman)
- Heraeus Holding GmbH

Memberships in comparable supervising bodies of German or foreign corporations:

- Henkel AG & Co. KGaA (Shareholders' Committee, Chairwoman)

Attendance at Supervisory Board meetings: 11 of 11

Dr. Norbert W. Bischofberger
Hillsborough, U.S.A.
(born January 10, 1956)

Member of the Supervisory Board effective April 2017

President and Chief Executive Officer of Kronos Bio, Inc.

Memberships in comparable supervising bodies of German or foreign corporations:

- InCarda Therapeutics, Inc. (Board of Directors)
- Kronos Bio, Inc. (Board of Directors)
- Morphic Therapeutic, Inc. (Board of Directors) (effective June 2019)

Attendance at Supervisory Board and committee meetings: 11 of 13

André van Broich
Dormagen, Germany
(born June 19, 1970)

Member of the Supervisory Board effective April 2012

Chairman of the Bayer Group Works Council

Chairman of the Works Council of the Dormagen site

Attendance at Supervisory Board and committee meetings: 19 of 19

Ertharin Cousin
Chicago, U.S.A.
(born May 12, 1957)

Member of the Supervisory Board effective October 2019

Independent consultant

Attendance at Supervisory Board and committee meetings: 2 of 2

Thomas Ebeling
Muri bei Bern, Switzerland
(born February 9, 1959)

Member of the Supervisory Board until September 2019

Independent consultant

Memberships on other supervisory boards:

- Apleona GmbH (Chairman)
- GfK SE
- ClearVat AG

Memberships in comparable supervising bodies of German or foreign corporations:

- Cullinan Oncology, LLC (Board of Directors)
- Heilpflanzenwohl AG (Board of Directors)
- Ocean Outdoor Ltd. (Board of Directors)

Attendance at Supervisory Board meetings: 8 of 9

Dr. Thomas Elsner
Düsseldorf, Germany
(born April 24, 1958)

Member of the Supervisory Board effective April 2017

Chairman of the Bayer Group Managerial Employees' Committee

Chairman of the Managerial Employees' Committee of Bayer AG Leverkusen

Attendance at Supervisory Board and committee meetings: 18 of 18

Johanna W. (Hanneke) Faber
Amstelveen, Netherlands
(born April 19, 1969)

Member of the Supervisory Board effective April 2016

President Europe at Unilever N.V./plc (until April 2019)

President Global Foods & Refreshments at Unilever N.V./plc (effective May 2019)

Attendance at Supervisory Board meetings: 9 of 11

Colleen A. Goggins
Princeton, U.S.A.
(born September 9, 1954)

Member of the Supervisory Board effective April 2017

Independent consultant

Memberships in comparable supervising bodies of German or foreign corporations:

- The Toronto-Dominion Bank (Board of Directors)
- IQVIA Holdings Inc. (Board of Directors)
- SIG Combibloc Services AG (Board of Directors)

Attendance at Supervisory Board and committee meetings: 13 of 14

Robert Gundlach
Velten, Germany
(born November 23, 1957)

Member of the Supervisory Board effective December 2019

Chairman of the Works Council of the Berlin site

Attendance at Supervisory Board and committee meetings: 0 of 0

Heike Hausfeld
Leverkusen, Germany
(born September 19, 1965)

Member of the Supervisory Board effective April 2017

Chairwoman of the Works Council of the Leverkusen site

Memberships on other supervisory boards:

- Bayer Business Services GmbH (Vice Chairwoman)

Attendance at Supervisory Board and committee meetings: 14 of 14

Reiner Hoffmann
Wuppertal, Germany
(born May 30, 1955)

Member of the Supervisory Board effective October 2006

Chairman of the German Trade Union Confederation

Attendance at Supervisory Board meetings: 8 of 11

Frank Löllgen
Cologne, Germany
(born June 14, 1961)

Member of the Supervisory Board effective November 2015

North Rhine District Secretary of the German Mining, Chemical and Energy Industrial Union

Memberships on other supervisory boards:

- Evonik Industries AG
- IRR-Innovationsregion Rheinisches Revier GmbH

Attendance at Supervisory Board and committee meetings: 15 of 15

Prof. Dr. Wolfgang Plischke
Aschau im Chiemgau, Germany
(born September 15, 1951)

Member of the Supervisory Board effective April 2016

Independent consultant

Memberships on other supervisory boards:

- Evotec AG (Chairman)

Attendance at Supervisory Board and committee meetings: 17 of 17

Petra Reinbold-Knape
Gladbeck, Germany
(born April 16, 1959)

Member of the Supervisory Board effective April 2012

Member of the Executive Committee of the German Mining, Chemical and Energy Industrial Union

Memberships on other supervisory boards:

- Lausitz Energie Bergbau AG (Vice Chairwoman)
- Lausitz Energie Kraftwerk AG (Vice Chairwoman)

Memberships in comparable supervising bodies of German or foreign corporations:

- DGB Rechtsschutz GmbH (until July 2019)

Attendance at Supervisory Board and committee meetings: 16 of 17

Detlef Rennings
Krefeld, Germany
(born April 29, 1965)

Member of the Supervisory Board until November 2019

Chairman of the Central Works Council of CURRENTA

Chairman of the Works Council of CURRENTA of the Uerdingen site

Memberships on other supervisory boards:

- Currenta Geschäftsführungs-GmbH

Attendance at Supervisory Board meetings: 9 of 10

Sabine Schaab
Mettmann, Germany
(born June 25, 1966)

Member of the Supervisory Board effective October 2017

Vice Chairwoman of the Works Council of the Elberfeld site

Attendance at Supervisory Board and committee meetings: 13 of 13

Michael Schmidt-Kießling
Schwelm, Germany
(born March 24, 1959)

Member of the Supervisory Board effective April 2012

Chairman of the Works Council of the Elberfeld site

Attendance at Supervisory Board meetings: 10 of 11

Prof. Dr. med. Dr. h.c. mult. Otmar D. Wiestler
Berlin, Germany
(born November 6, 1956)

Member of the Supervisory Board effective October 2014

President of the Hermann von Helmholtz Association of German Research Centres e.V.

Attendance at Supervisory Board and committee meetings: 11 of 13

Prof. Dr. Norbert Winkeljohann*
Osnabrück, Germany
(born November 5, 1957)

Member of the Supervisory Board effective May 2018

Independent management consultant

Memberships on other supervisory boards:

- Deutsche Bank AG
- Georgsmarienhütte Holding GmbH
- heristo aktiengesellschaft (Chairman)
- Sievert AG (Chairman)

Attendance at Supervisory Board and committee meetings: 18 of 18

* Expert member pursuant to Section 100, Paragraph 5 of the German Stock Corporation Act (AktG)

Standing committees of the Supervisory Board of Bayer AG (as at December 31, 2019)

Presidial Committee / Mediation Committee
Wenning (Chairman), Achleitner, Reinbold-Knape, Zühlke

Audit Committee
Winkeljohann* (Chairman), Elsner, Löllgen, Plischke, Wenning, Zühlke

Human Resources Committee
Wenning (Chairman), Achleitner, van Broich, Hausfeld

Nominations Committee
Wenning (Chairman), Achleitner

Innovation Committee
Plischke (Chairman), Bischofberger, van Broich, Reinbold-Knape, Schaab, Wenning, Wiestler, Zühlke

Glyphosate Litigation Committee
Wenning (Chairman), Achleitner, van Broich, Elsner, Goggins, Reinbold-Knape, Winkeljohann*, Zühlke

Board of Management

Members of the Board of Management held offices as members of the supervisory board or a comparable supervising body of the corporations listed (as at December 31, 2019, or the date on which they ceased to be members of the Board of Management of Bayer AG):

Werner Baumann
(born October 6, 1962)

Chairman

Member of the Board of Management effective January 1, 2010, appointed until April 30, 2021

Liam Condon
(born February 27, 1968)

Member of the Board of Management effective January 1, 2016, appointed until December 31, 2023

Wolfgang Nickl
(born May 9, 1969)

Member of the Board of Management effective April 26, 2018, appointed until April 25, 2021

- Bayer Business Services GmbH (Chairman)

Stefan Oelrich
(born June 1, 1968)

Member of the Board of Management effective November 1, 2018, appointed until October 31, 2021

- InforMed Data Systems Inc. (Board of Directors) (effective October 2019)

Heiko Schipper
(born August 21, 1969)

Member of the Board of Management effective March 1, 2018, appointed until February 28, 2021

- Royal FrieslandCampina N.V. (effective December 2019)

Members of the Board of Management until December 31, 2019

Dr. Hartmut Klusik
(born July 30, 1956)

Labor Director

- Currenta Geschäftsführungs-GmbH (Chairman) (until November 2019)

Kemal Malik
(born September 29, 1962)

Financial Calendar

Q1 2020 Quarterly Statement	*April 27, 2020*
Annual Stockholders' Meeting 2020	*April 28, 2020*
Planned dividend payment day	*May 4, 2020*
2020 Half-Year Report	*August 4, 2020*
Q3 2020 Quarterly Statement	*November 3, 2020*
2020 Annual Report	*February 25, 2021*
Annual Stockholders' Meeting 2021	*April 27, 2021*
Q1 2021 Quarterly Statement	*May 12, 2021*

Masthead

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