A Combined Management Report

of the Bayer Group and Bayer AG as of December 31, 2020

1. Fundamental Information About the Group

1.1 Corporate Profile and Structure

Our goal: Promote health and safeguard the food supply

Economic growth and sustainability go hand in hand

1.1.1 Corporate Profile

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. “Health for all, hunger for none” – putting an end to hunger and helping everyone lead a healthy life, while at the same time protecting ecosystems. That is what we aspire to achieve, guided by our purpose “Science for a better life.”

We aim to continuously 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. These values shape our culture and ensure a common identity throughout the Bayer Group. Building on this, our Bayer Societal Engagement (BASE) principles provide clear direction for the way we interact with social interest groups.

1.1.2 Corporate Structure

Corporate structure as of December 31, 2020

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 enabling functions support the operational business.

The following structural changes occurred within our organization in 2020:

The Animal Health business unit was sold to Elanco Animal Health Incorporated, United States, in August and is no longer part of the Bayer Group. The business activities were already reported retroactively as a discontinued operation in the previous year, after we had concluded the divestment agreement in August 2019.

In 2020, we also continued to pursue the goal of creating an organization and infrastructure that provide optimum support for the business, and therefore made further adjustments to the structure of our enabling functions. For example, we merged the Internal Audit & Risk Management functions to form the enabling function Internal Audit & Risk Management. In addition, we realigned the IT department to accelerate our digital transformation, with leading IT service providers now providing a range of services and operating our global IT infrastructure. Internally, the IT function is now focusing more on innovative digital solutions along the entire value chain.

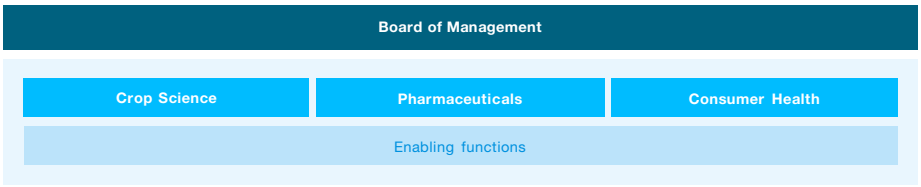
The size of the Board of Management was reduced to five members at the start of the year, after the Supervisory Board had passed a resolution to this effect in September 2019. Responsibilities were reassigned as part of the move, with the role of Labor Director, for instance, being transferred to the Chairman of the Board of Management.

In January 2021, the Supervisory Board of Bayer AG announced the appointment of Sarena Lin as a member of the Board of Management. Effective February 1, she became Chief Transformation and Talent Officer, assuming responsibility for Human Resources, Strategy and Business Consulting. Lin also began her role as Labor Director on the same date.

At the start of 2020, we simplified the value flows and aligned them with our structural changes and our steering logic, necessitating the restatement of prior-period data. The costs of the enabling functions are now mainly allocated to the income statements of the divisions directly or using a reduced number of allocation keys that are standardized across the Group. Further information on these adjustments and their impact on our key financial data is given in B Consolidated Financial Statements.

A 1.1.2/1

Bayer Group Structure in 2020



Our divisions are active in the following areas:

Crop Science is the world's leading agriculture enterprise, with businesses in crop protection, seeds and digital farming. 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 respond quickly to the needs of local markets. The breeding, propagation, production and / or processing of seeds, including seed dressing, take 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, ophthalmology and, in the medium term, cell and gene therapy. We have established an independent strategic unit for cell and gene therapy that reports directly to the head of Pharmaceuticals. 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 & cold. The products are generally sold by pharmacies and pharmacy chains, supermarkets, online retailers and other large and small retailers.

The **enabling functions**, such as Group Finance, Information Technology and Human Resources, serve as Group-wide competence centers and bundle business support processes and 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™, XtendiMax™
Corn Seed & Traits	Seeds and traits for corn	Dekalb™, SmartStax™ RIB Complete, VT Double™ PRO, VT Triple™ PRO, Vitala
Soybean Seed & Traits	Seeds and traits for soybeans	Asgrow™, Intacta RR2PRO™ Roundup Ready 2 Xtend™, Roundup Ready 2 Yield™, XtendFlex™
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, products for consumer lawn and garden use	Ficam™, Maxforce™, Esplanade™, K-Othrine™, Fludora™ Fusion
Vegetable Seeds	Vegetable seeds	Seminis™, DeRuiter™
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™, Cotton, Deltapine™
Pharmaceuticals		
Cardiology	Hypertension, pulmonary hypertension, heart attack and stroke, thrombosis, coronary artery disease (CAD), peripheral artery disease (PAD), symptomatic chronic heart failure	Xarelto™, Adalat™, Aspirin™ Cardio, Adempas™, Verquvo™
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 and cardiovascular risk prevention	Aspirin™, Aleve™
Digestive Health	Digestive health complaints	Alka-Seltzer™, MiraLAX™, Rennie™, Iberogast™
Allergy, Cough & Cold	Allergies, cough and cold	Claritin™, Aspirin™, Alka-Seltzer™, Afrin™

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

We operate sites around the world, and some are used by multiple divisions. As of December 31, 2020, the Bayer Group comprised 385 consolidated companies in 83 countries.

A 1.1.2/3

Bayer Worldwide 2020

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

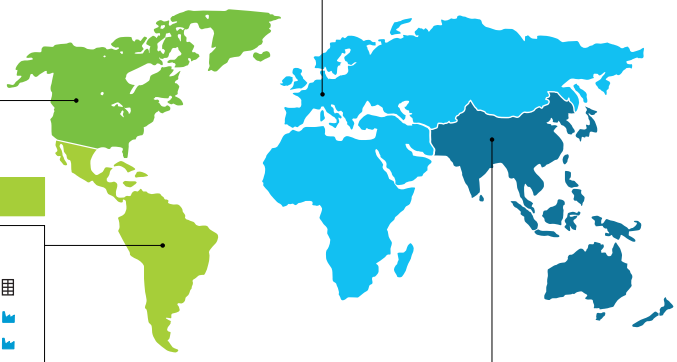
Norway
- Oslo — PH

Switzerland
- Basel — PH | CH
- Muttenz — CS

Spain
- Alcalá — CH

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



Latin America

Argentina
- Buenos Aires
- 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

Innovative solutions support “Health for all, hunger for none” vision

Ambitious sustainability targets for the entire Group

Accelerated global trends demand faster corporate transformation

COVID-19 pandemic highlights systemic importance of our business activities

1.2.1 Strategy and Targets

Group strategy

A growing and aging world population and 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 agriculture. We contribute to a world in which diseases are not only treated but effectively prevented or cured, in which people can take better care of their own health needs, and in which enough agriculture products are produced 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 make our vision “Health for all, hunger for none” a reality.

Our strategy as a diversified life science company remains unchanged, especially in the current situation, with the systemic relevance and resilience of our businesses becoming particularly evident in the face of the global COVID-19 pandemic. At the same time, the pandemic has accelerated a number of trends, meaning that we need to execute our strategy and implement the transformation of our company at a faster pace.

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

// We develop **innovative products and solutions** and leverage cutting-edge research to address unmet societal challenges. As part of these endeavors, we are improving our access to innovation by collaborating with third parties. In addition, we are working on disruptive technologies, for example through our Leaps by Bayer activities, while also continuing to drive the digitalization of our entire value chain.

// We drive the **operational performance** of our business by optimizing our resource allocation. Alongside our ongoing efficiency and structural measures, we have also launched a program to accelerate our transformation.

// **Sustainability** is an integral part of our business strategy, operations and compensation system. We make a positive contribution to society and the environment. Our ambitious targets for 2030 are fully in step with the United Nations’ Sustainable Development Goals and the climate targets of the Paris Agreement.

// 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 have the objective to grow ahead of the competition.

These four strategic levers underpin the strategies of our divisions.

Strategies of the divisions

Crop Science

Global agriculture and food systems are confronted with major challenges, such as climate change, water scarcity and population growth. At the same time, megatrends in e-commerce, digital ecosystems, food security and alternative energy are driving a structural transformation of agricultural markets. The sector has to meet the needs of a growing population while at the same time promoting sustainability and protecting our ecosystems.

By leveraging our R&D expertise and leading positions in seeds, traits, crop protection and digital farming, we are actively addressing the challenges our industry is facing.

Our near- to medium-term growth will primarily be driven by product innovations in crop protection, seeds and traits. To fuel long-term growth, we are also tapping into new business areas such as digital farming. Our leading position in this field allows us to tailor the solutions we offer our customers, automate processes and increase the productivity of our R&D pipeline. We are digitally connecting farms, creating an industry-wide ecosystem aimed at bringing new pools of value to our customers. In the longer term, our data-based models and digitally enabled services will supplement or in some cases replace what is currently our core business.

See also A 1.3

We see this optimized form of agriculture in the future as part of the solution to the growing loss of biodiversity and increasing climate change. At the same time, it also needs to produce enough healthy food at affordable prices.

To increase food security, we aim to empower 100 million smallholder farmers in low- and middle-income countries by improving access to agronomic knowledge, products, services and partnerships. We will do this by expanding our product and service portfolio, including with tailored digital solutions. As part of this endeavor, we are also partnering with research institutes, nongovernmental organizations, companies and social start-ups.

We also aim to reduce the environmental impact of crop protection by 30% in key cropping systems and decrease field greenhouse gas emissions by 30% in the most emitting cropping systems that we serve by 2030. In late July, we launched our Bayer Carbon Initiative which rewards farmers in Brazil and the United States for adopting climate-smart practices such as no- or low-till farming and the use of cover crops. This program is enabled by our digital platform and serves as a tangible step toward delivering on our goals.

Pharmaceuticals

Throughout the world, an aging population is leading to a growing number of chronic diseases and the increased occurrence of multiple conditions. The convergence of biology and data science will be a key element for innovation in Pharmaceuticals. Digital technologies can transform the way health care is delivered, while cell and gene therapy has the potential to cure severe diseases. Furthermore, the pandemic has accelerated the digital transformation of health care provision.

See also A 1.3

We are helping to drive medical progress through our focus on researching, developing and marketing innovative medicines. Our near- to medium-term growth is driven by key products, such as Xarelto™ and Eylea™, and will be further fueled by several promising late-stage R&D pipeline candidates, such as finerenone, and recently launched products, such as Verquvo™ and Nubeqa™. To safeguard long-term growth, we continue to invest in R&D in therapeutic areas with a substantial need for innovation. Moreover, we are expanding our efforts to access external innovation through research collaborations and in-licensing, capturing continued growth opportunities in biologics and novel technologies.

Building on the acquisition of BlueRock Therapeutics LP, United States, and strengthened internal capabilities in cell and gene therapy, we have established an independent strategic unit for cell and gene therapy. We significantly strengthened this unit with the acquisition of Asklepios BioPharmaceutical, Inc. (AskBio), United States, a biopharma company specialized in the R&D and manufacturing of gene therapies across different therapeutic areas, which adds an industry-leading, adeno-associated virus (AAV)-based gene therapy platform with demonstrated applicability and a number of preclinical and clinical-stage candidates. We aim to further accelerate the implementation of our long-term innovation strategy.

Our sustainability agenda includes improving access to medicines. We are therefore applying tiered pricing principles globally, in order to set price levels according to a country's ability to pay. Another key focus is on improving women's health and strengthening their role in society by helping to promote gender equality and women's economic participation. As part of this endeavor, we are leveraging our leading position in women's health and are aiming to provide 100 million women in low- and middle-income countries with access to modern contraception by 2030. This includes partnerships such as The Challenge Initiative through Johns Hopkins University, together with the Bill & Melinda Gates Foundation, that supports family planning in poor urban settlements. In addition, we remain committed to combating neglected tropical diseases and noncommunicable diseases (such as through the Ghana Heart Initiative).

Consumer Health

Rising health care costs, changing demographics and evolving health awareness of consumers continue to make self-care more relevant, and are expected to fuel solid long-term growth in the consumer health care market. The COVID-19 pandemic has further raised awareness about the importance of self-care and accelerated the move toward digitalization, as well as driving growth in categories like nutritional supplements.

We provide consumers with products, services and information that empower them to transform their everyday health. Our strategy focuses on our core categories, as well as the transition of prescription medicines to nonprescription status. We drive profitable growth through excellence in the development of innovative solutions and through execution excellence in marketing, sales and product supply.

See also A 1.1.2

The digital transformation and our sustainability agenda are the accelerators driving forward the implementation of our strategy at Consumer Health.

See also A 1.3

We are digitalizing all areas of our operations, including marketing, sales, supply chain and R&D to engage better with consumers, customers, and healthcare professionals while driving efficiency and flexibility. In addition, we are pursuing an agile innovation model with external partners to discover new sources of growth. By acquiring a majority stake in Care/of, a personalized nutrition company, we have gained access to a new business model that enables us to provide consumers with individual, tailored solutions.

Moreover, our sustainability ambition has two focus areas. Firstly, it focuses on expanding access to everyday health for 100 million people in underserved communities. Secondly, it focuses on investing in sustainable solutions to support a healthier planet by 2030. We have embedded the sustainability strategy into our operating model across the entire value chain.

Sustainability

As a leading company in health and nutrition, we will contribute significantly toward meeting the Sustainable Development Goals (SDGs) of the United Nations through our innovations, products and services, addressing some of the most fundamental challenges of our time.

We are making significant progress in this regard. We have started a far-reaching decarbonization program across the company, contributing in this way to meeting the target to limit global warming to 1.5°C as confirmed by the Science Based Target initiative. To reduce emissions by more than 42% by the end of 2029, we are implementing energy efficiency measures at our sites, and will purchase 100% electricity from renewable sources. We have committed to becoming climate-neutral in our own operations by 2030 by offsetting all remaining emissions through the purchase of certificates from certified climate protection projects that satisfy externally recognized quality standards. We are also cooperating with our suppliers and customers to reduce our greenhouse gas emissions along the upstream and downstream value chain by at least 12.3% by 2029. The above-described in-field decarbonization efforts of our Crop Science Division supplement these commitments and should make significant contributions in the value chains of the agricultural industry.

We will continue forging ahead with decarbonization also after 2030. As a signatory to the Business Ambition for 1.5°C, we have committed to reaching net zero emissions in our entire value chain by 2050.

Our Group-wide sustainability targets have been included in the compensation system of our Board of Management and other employees eligible to participate. From 2021 onward, quantitative sustainability targets will account for 20% of the target attainment within the long-term incentive.

Sustainable behavior is an integral part of our LIFE values and our Bayer Societal Engagement (BASE) principles. These values and principles form our code of conduct and guide our relationships with all societal stakeholders, from employees and suppliers to customers, investors and scientists.

The recently established external Sustainability Council supports us with a critical-constructive perspective on all sustainability matters. It is composed of renowned, independent experts who advise the Board of Management and provide input within our business on all matters related to sustainability. The contributions of the Sustainability Council inform our strategic planning going forward.

Targets and key performance indicators

Our strategy is aimed at achieving long-term profitable growth balanced with our responsibility for the environment and society. To advance and measure the implementation of our strategy, we have set ambitious Group targets.

A 1.2.1/1

Financial Group Targets

Target	Target attainment in 2020	Target for 2021 at Dec. 31, 2020, closing rates	Target for 2021 (currency-adjusted)
Group sales (Fx & p adj. change); Revised 2020 outlook issued in August: increase by 0 to 1% (Fx & p adj.) to €43 billion to €44 billion	€43.3 billion +0.6%	approx. €41 billion Fx & p adj.: approx. +3%	approx.€42 to €43 billion Fx & p adj.: approx +3%
EBITDA margin before special items; Revised 2020 outlook issued in August: approx. 28% (Fx adj.)	28.1%	approx. 26%	approx. 27%
Core earnings per share; Revised 2020 outlook issued in August: €6.70 to €6.90 (Fx adj.)	€6.92	€5.60 to €5.80	€6.10 to €6.30
Free cash flow Revised 2020 outlook issued in August: minus €0.5 billion to €0 billion	€1.3 billion	approx. minus €3 to minus €4 billion	approx. minus €3 to minus €4 billion

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

See A 2.1.1 Economic Position and Target Attainment for further information on the attainment of our Group financial targets, and A 3.1.2 Corporate Outlook for our financial targets for 2021.

A 1.2.1/2

Nonfinancial Group Targets Through 2030

Target[1]	Base year 2019	2020	Target for 2030
Number of smallholder farmers in LMICs[2] who have received support	42 million	45 million	100 million
Number of women in LMICs[2] who have gained access to modern contraception	38 million	40 million	100 million
Number of people in underserved[3] communities whose self-care needs have been supported by Bayer interventions	41 million	43 million	100 million
Scope 1 & 2[4] greenhouse gas emissions	3.76 million metric tons	3.58 million metric tons	42% decrease[5,7]
Scope 3 greenhouse gas emissions from relevant[8] categories	8.87 million metric tons	7.88 million metric tons	12.3% decrease[6,7]
Off-setting of remaining Scope 1 & 2 greenhouse gas emissions in 2030	0 million metric tons	0.20 million metric tons	100%

[1] A more detailed description of the calculation methodologies is published on our website www.bayer.com/en/sustainability.
[2] Low- and middle-income countries
[3] From a financial or medical perspective
[4] Covering Scope 1 & 2 emissions (market-based) of sites that have an energy consumption in excess of 1.5 terajoules; 2019 figures restated owing to a recalculation of fleet emissions; Scope 1 & 2 emissions audited to obtain reasonable assurance
[5] Corresponding to the sustainability target of limiting global temperature rise to 1.5°C above pre-industrial level
[6] Corresponding to the sustainability target of limiting global temperature rise to below 2°C above pre-industrial level
[7] By the end of 2029
[8] In accordance with the criteria set out by the Science-Based Targets initiative, the Scope 3 categories relevant for our goal include emissions in the following categories: (1) purchased goods and services, (2) capital goods, (3) fuel- and energy-related activities, (4) upstream transportation and distribution, and (6) business travel

In our Crop Science Division, we helped smallholder farmers to increase productivity in 2020 by supplying high-quality seeds and crop protection products, while also delivering insecticides that provide protection against malaria. Through these efforts, we have already supported 45 million smallholder farmers in the respective countries. Compared to the 2019 baseline, this represents an improvement of around three million smallholder farmers. Moving forward, we will also increasingly support smallholder farmers with the help of partnerships and digital services.

In our Pharmaceuticals Division, our local sales activities for modern contraception are primarily supplemented by global aid programs (such as the United Nations' Population Fund, UNFPA) for which we offer our products on favorable terms. The number of women supported in this way increased from 38 million in the 2019 base year to 40 million in 2020. From 2021, this figure will also take into account support provided through partnerships that we have recently entered into, such as with the Bill & Melinda Gates Institute at Johns Hopkins University as part of "The Challenge Initiative."

In our Consumer Health Division, we are making our products available to low-income consumers locally at affordable conditions (by adjusting sizes and pricing), while at the same time enhancing our product portfolio in a targeted manner. As part of this endeavor, we aim to provide products that address unmet medical need. We supplement our local business activities by collaborating with strategic partners, sharing health-related knowledge and engaging in appropriate lobbying work as we look to empower people in underserved communities to take charge of their everyday health. Through our efforts, we were already able to reach 43 million people in 2020 (41 million in 2019), with the increase in demand for our products partly attributable to the greater focus on health and prevention in connection with the COVID-19 pandemic. By launching a strategic partnership initiative in 2021, we aim to improve access to micronutrients for up to four million underserved pregnant women and their babies in over 50 countries.

As part of our climate strategy, we reduced Scope 1 and 2 greenhouse gas emissions by 0.18 million metric tons of CO_2 equivalents in 2020. In the categories that are relevant for our attainment of the Scope 3 Science Based Target, we reduced emissions by 0.99 million metric tons of CO_2 equivalents.

See A 1.7 Environmental Protection and Safety

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, Science and Sustainability enabling function, which develops nonfinancial targets and key performance indicators as well as management systems and corporate policies. To enable operational implementation throughout the value chain, we have established a sustainability organization in each of our divisions and integrated sustainability aspects into the processes of our enabling functions.

See the Sustainability Report for more detailed information: www.bayer.com/sustainability-report

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.

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 of this 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 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 respects 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. In 2020, we began developing a human rights strategy for the Group, which we will complete in the first half of 2021, and are also updating Bayer's Human Rights Policy as part of this process.

www.bayer.com/en/sustainability/human-rights

We began devising a specific human rights training program in 2020 to help our employees better understand our Human Rights Policy and the associated challenges. To support our updated policy, this program is scheduled for roll-out in 2021. In addition, we have offered corresponding training programs for many years to enhance employees' awareness of the importance of human rights in their day-to-day activities. In 2020, around 80% of our employees received training in aspects of our current Human Rights Policy. We also demand that our business partners, particularly our suppliers, fully observe human rights.

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 to 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 2020, we did not establish any adverse potential consequences to be reported in accordance with the CSR Directive Implementation Act (CSR-RUG).

See A 3.2 for further information on the risk management process

Foundation and charity activities

Bayer continues to be socially engaged worldwide in keeping with our purpose "Science for a better life." In 2020, Bayer and the Bayer Fund made financial aid of around €57 million (2019: €61 million) available worldwide 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. In addition, we provided our own products and material aid worth more than €100 million. 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.

A Board of Trustees comprising members from inside and outside the company coordinates the yearly alignment of all programs. A Science Council comprising five internationally recognized scientists was newly established in 2020 to decide on the awarding of research prizes and scholarships from the foundations.

Money from the €20 million Social Innovation Ecosystem Fund of the Bayer Cares Foundation was used in 2020 to promote innovative technological and social entrepreneurial solutions in the fields of health care and agriculture. The main objective of the fund is to enable smallholder farmers in Sub-Saharan Africa to lift themselves and their families out of poverty through their own agricultural smallholdings and improved access to medical care. Five pioneering social enterprises were supported by this fund in 2020.

Since the outbreak of the COVID-19 pandemic, we have provided donations of products, equipment and money worth €29 million in over 60 countries to fight the pandemic. In Germany, for example, we have turned research laboratories at our Berlin site into test laboratories at short notice and granted leave of absence to more than 140 employees to perform the tests. In Mali,

Senegal, Uganda and Kenya, the Bayer Cares Foundation provided charitable health care organizations with immediate financial assistance to promote innovative projects to stem the pandemic. As part of our commitment we also provided our employees worldwide with protective masks for everyday use.

1.2.3 Management Systems

Planning and steering

Economic planning and steering are conducted in line with the frameworks that are set for the 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 financial 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. 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. 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.

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. In addition, it forms part of our long-term stock-based cash compensation (LTI).

See also A 2.2.3 and A 2.3

Total shareholder return

We aim to create shareholder value and thus maximize the returns we deliver for our 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, also forms part of the LTI.

Integrated management system

We maintain a Group-wide integrated management system (IMS), which is detailed in a corporate policy. The IMS provides a framework for all management systems at Bayer, ensuring compliance with the law and with internal and external requirements while also ensuring efficient ways of working. This is achieved through internal regulations and applicable processes involving clear roles and responsibilities. It also encompasses effective risk management and as such helps to safeguard our company's license to operate.

1.3 Focus on Innovation

Final key authorization for XtendFlex™ soybeans received in the European Union; full launch in the United States and Canada in 2021 is now possible

Regulatory approval in the United States for Verquvo™ (vericiguat) to treat chronic heart failure strengthens cardiovascular portfolio

Acquisition of AskBio builds on newly established cell and gene therapy platform to transform groundbreaking technologies into treatment options for therapeutic areas with a high medical need

Access to a new business model through the acquisition of Care/of, a provider of personalized nutritional supplements

Bayer joins international AMR Action Fund to develop urgently needed novel antibiotics

Innovation is one of the Bayer Group's strategic levers. Our new solutions 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 process, service and business model innovations. We also focus on social innovation to improve the living conditions for people in developing countries and disadvantaged individuals in our society.

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. In addition, our internal "WeSolve" online platform enables all employees to engage in innovation trends and current projects.

Partnerships are integral to our innovation strategy, ensuring access to 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 division sections of this chapter for further details on collaborations

We maintain a global network of R&D locations, which employ roughly 15,100 Bayer employees. In 2020, our research and development spend before special items amounted to €4,884 million (2019: €5,282 million).

We have worked hard on protection concepts to ensure that our research and development activities can continue largely without interruption during the COVID-19 pandemic. In addition, employees from our R&D organizations joined international research consortiums to make an active contribution to solutions aimed at controlling the COVID-19 virus.

Excellence in research and development

The activities we pursue are aligned with the innovation strategies of our divisions and are aimed at improving human and plant health and safeguarding stable harvests in agriculture. As part of these efforts, we are increasingly employing data science methods. At our subsidiary The Climate Corporation, for example, we use artificial intelligence and machine learning to help farmers achieve better yields through optimized seed selection and harvest analysis, as well as weather and pest infestation forecasts.

See the following subsections for further details

A cross-divisional R&D platform for data sciences is used to generate new solutions. This platform facilitates dialogue and enables the efficient processing of large volumes of data from R&D, for

example by networking our bioinformatics experts across divisional and site boundaries. Furthermore, the inaugural Data Science Summit was held in February as a platform for experts from inside and outside the company to share data science insights.

In 2020, the Bayer R&D Executive Committee developed the new Bayer Science Fellows Program 2.0, creating a global community of active and engaged Bayer scientists from across our divisions. The focus here is on scientific excellence, the willingness to engage in multidisciplinary cooperation and advise Bayer management in science strategy, and the transfer of expertise to colleagues. Bayer Science Fellows represent Bayer R&D in national and international scientific communities, the media and civil society, thus actively contributing to our mission “Science for a better life.”

Leaps by Bayer

Through Leaps by Bayer, we invest in disruptive innovations in the areas of health and nutrition. The research activities of Leaps by Bayer are focused on applying and further developing new technologies with the potential to solve some of humankind’s most pressing problems (the ten “leaps”) and thus make an important contribution to the Sustainable Development Goals of the United Nations. The Leaps by Bayer portfolio comprised investments in more than 35 biotech start-ups in 2020. Last year we concluded the following agreements:

www.leaps.bayer.com/approach#10leaps

In the **agriculture sector**, we partnered with the Singapore sovereign wealth fund Temasek to establish the start-up Unfold Bio Inc., California, United States, with the aim of developing innovative vegetable seed that can be efficiently and sustainably cultivated in vertical farming. Unfold is the world's first company to focus not on the technical infrastructure, but rather on the biology and genetic potential of vegetable crops.

Leaps by Bayer also invested in Apollo Agriculture Ltd., Kenya, a start-up that uses digital, chemical and financial tools to help African smallholder farmers grow crops under suboptimal climatic conditions. By investing in the U.S. start-up company Rantizo Inc., we became involved for the first time in agricultural drones that offer the potential to deploy chemical and biological crop protection agents in a targeted and thus conservative way.

Ukko Inc., a biotech company headquartered in Israel, also joined the Leaps by Bayer portfolio. Ukko has set itself the goal of eliminating food allergies by using artificial intelligence to modify proteins and in this way develop therapeutic approaches to treat gluten intolerances or peanut allergies, for example. The applications for these innovations also have relevance in the agricultural and pharmaceutical fields.

Leaps by Bayer’s activities in **health care** are diverse and include, for example, an investment in Metagenomi Technologies LLC, United States, which aims to find ways to cure genetic diseases through novel gene editing technologies. We also invested in Vesigen Therapeutics Inc., United States, with the goal of focusing modern cell and gene therapies on specific cells in the body, which is considered an especially critical supporting technology. Furthermore, we have joined a financing round for Senti Biosciences, Inc., a U.S. biotech company which is a leader in the use of synthetic biology to engineer gene circuits to improve cell and gene therapy products.

The strategic partnership into which we have entered with Recursion Pharmaceuticals, Inc., United States, comprises not only an investment via Leaps by Bayer but also close cooperation with the R&D areas of our Pharmaceuticals Division right from the early stages. The objective is to merge Recursion’s AI platform with our molecule library in order to discover new active substances and develop innovative therapies to treat fibrotic diseases of the lung, kidney, heart and other organs.

In the area of immuno-oncology, we invested in Triumvira Immunologics Inc., Texas, United States, a leading company in the field of T-cell therapy.

In microbiome research, furthermore, we invested in Azitra Inc., United States, with the aim of assembling a joint platform to develop novel antimicrobial dermatological products.

Leaps by Bayer has also invested in the foundation and incubation of early-stage biotech companies as part of the Israeli company FutuRx Ltd.

We also continued to strengthen our existing portfolio, injecting additional capital into companies including InforMed Data Systems Inc. (OneDrop), Dewpoint Therapeutics Inc., NewLeaf Symbiotics, Inc. and Immunitas Therapeutics.

We also launched the AMR Action Fund together with more than 20 leading biopharmaceutical companies. The AMR Action Fund is a groundbreaking partnership that also includes philanthropies, development banks and multilateral organizations and is focused on making two to four new antibiotics available by 2030. These treatments are urgently needed to address the rapid rise of infections that do not respond to treatment with existing antibiotics due to antimicrobial resistance (AMR).

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 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

Working with digital applications and teams of experts, we develop a broad spectrum of tailored solutions that give farmers greater choice and enable them to achieve higher productivity in a sustainable manner. Our R&D organization comprises approximately 7,100 employees (2019: 7,800)[1] operating in more than 50 countries around the world. We also enter into collaborations with a large number of external partners under our Open Innovation model to strengthen our innovation power.

Bayer worldwide:
see also A 1.1.2/3

Research and development capacities

Our R&D is focused on developing products for farmers and customers across multiple indications, through multiple technology platforms, in order to increase agricultural productivity while better protecting natural resources and at the same time making contributions to sustainability. Using a targeted approach, we focus on bringing together our expertise across the following disciplines to deliver more innovation faster:

[1] Including permanent and temporary employees

Our **breeding** innovations are aimed at improving crop yields, boosting resiliency against pests, disease and a changing climate, and raising quality. We combine genomic, phenotypic and environmental data with the use of advanced breeding methods and artificial intelligence (AI) to develop new, innovative seed products. In 2020, we opened our automated greenhouse in Marana, Arizona, United States, to serve as our new global product design center for corn. This greenhouse's operations are designed for the sustainable use of inputs and, by consolidating the end-to-end breeding process, more advanced corn products can be developed faster.

Biotechnology – using genome editing and other molecular approaches – helps us to develop solutions that strengthen plants' resistance to insect pests, disease, weeds and other environmental stresses, such as drought or high winds in a targeted manner. Biotechnology makes possible sustainable farming with reduced pesticide use and conservative tillage practices that are designed to preserve topsoil and decrease CO_2 emissions.

In **chemical crop protection**, we discover, optimize and develop innovative, safe and sustainable products with herbicidal, insecticidal and fungicidal activity. Our tailored solutions help farmers achieve better harvests by managing threats in a more targeted manner. We are constantly working on improving our current offerings and developing new molecules. Discovering new modes of action (MOAs) is one of our main priorities. In 2020, we were able to announce the discovery of a new herbicide molecule. The use of different MOAs for weed control is important for managing herbicide resistance and enabling practices like no-till farming that help to sequester greenhouse gases.

Our approach in **biologicals** encompasses a focus on microbial organisms and materials derived from them. We are realigning our activities by partnering with innovation leaders. In addition to microbes, we are also developing a broad range of biological solutions, including plant extracts. Biologicals often enable us to reduce the use of synthetic chemicals, decreasing residue levels and supporting resistance management strategies. By introducing microbials or other biological product types into programs with traditional chemistry, we are building a more holistic application system.

Digital solutions and data science, and in particular artificial intelligence, are transforming the world of agriculture. The performance of seed and crop protection products depends heavily on the environmental conditions and management practices under which they are used. With FieldView™, our industry-leading digital farming platform, we have unparalleled insight into field-specific information that enables us to use advanced modeling to make custom product recommendations tailored to each individual acre. With these insights we are able to maximize the value of our seed and chemistry portfolio for our farmer customers, as well as lead Bayer toward digitally enabled business models and new opportunities for growth.

Research and development pipeline

Our product pipeline contains numerous new small molecule products, seed varieties, digital products and biologicals that promote sustainable agriculture and help improve farmer productivity. The following table shows new products in late development phases[2], sorted according to key crops, that are planned to be launched by 2023.

[2] 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.

A 1.3/1

Product Innovation Pipeline[1]

Crop / digital application	First launch	Product group	Indication	Product / trait / number of hybrids or varieties
Corn	2022	Biotechnology trait	Pest management	SmartStax PRO / VTPro4
	2023	Biological	Crop efficiency	BioRise third-generation seed treatment
	2023	Breeding / native trait	Crop efficiency / yield	Short Stature Corn
	Annual	Breeding / native trait	Crop efficiency	> 150 new corn seed hybrids
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 varieties
Cotton	2021	Biotechnology trait	Pest management	ThryvOn Technology
	Annual	Breeding / native trait	Crop efficiency	> 10 new cotton seed varieties
Horticulture	2021	Biological	Disease management	High-concentration biological for seed and soil application (Minuet in U.S.A.)
Vegetables	Annual	Breeding / native trait	Crop efficiency, disease management	~ 130 new seed varieties launched with highlights in pepper, tomato and melon seed
All major crops	Annual	Biological / small molecule LCM	Crop efficiency, disease, pest and weed management	~ 8 new formulations of crop protection products between 2021–2023
Digital applications	2021	Digital / climate	Crop efficiency	Advanced seed prescription service for corn in Argentina, Brazil and the EU
	2022	Digital / climate	Crop efficiency	Seed Advisor tool within FieldView™ enabling seed placement and density recommendations for North American corn growers

As of December 2020

[1] Planned market launch of selected new products, subject to regulatory approval

[2] Co-development with Sumitomo

In 2020, we launched confirmatory technical proof-of-concept field studies for three new small molecule or biological active ingredients and plant traits[3]. For 2021, we aim to launch confirmatory technical proof-of-concept field studies for two to three new small molecule or biological active ingredients and plant traits.

New products and registrations in 2020

Since the beginning of 2020, our latest fungicide innovation iblon™ technology has been available to growers in New Zealand. iblon™ technology is based on the active ingredient isoflucypram, a member of a new subclass in the family of succinate dehydrogenase inhibitors, or SDHIs. It provides excellent disease control, resulting in healthy-looking crops that deliver higher yields compared to currently available market standards. Further product launches for iblon™ technology fungicides are expected in other important cereal-producing countries once regulatory approval has been completed.

In the 2020 winter canola season, we launched BUTEO™ start, an insecticidal seed treatment for canola that offers very good protection against the cabbage stem flea beetle and crucifer flea beetle, in selected Eastern European countries. From the next planting season in 2021 onward, BUTEO™ start will also be available to growers in Canada.

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

In May, our Bollgard™ 3 ThryvOn™ cotton was approved by the U.S. Environmental Protection Agency (EPA). This first-of-its-kind trait technology provides season-long protection against tarnished plant bugs and thrips species, and may help reduce the need for some insecticide applications.

In June, we obtained certification in China for the second generation of our trait-based insect protection in soy. This approval marks a key milestone to support the launch of Intacta 2 Xtend™, targeted for 2021.

In September, we announced that the European Commission had authorized XtendFlex™ soybean technology for food, feed, import, and processing in the European Union. This milestone represents the final key authorization for XtendFlex™ soybeans. With this approval in hand, a full launch in the United States and Canada in 2021 is now possible.

In September, we also began the commercial beta introduction of a new short stature corn product in Mexico called VITALA™. The VITALA™ system is based on a new hybrid variety and best practices in agronomy to help farmers grow more using fewer resources.

In October, we received a new five-year registration for our XtendiMax™ herbicide from the U.S. EPA. Based on the active ingredient dicamba, this product is an important weed-control tool for many U.S. growers. Following the recent launch announcement for XtendFlex™ soybeans, growers in the United States can now take full advantage of the benefits of the Roundup Ready™ Xtend Crop System.

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[4] 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.[5] 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 Intacta RR2 PRO™ soybean also has patent coverage until at least the mid-2020s. Patents on our herbicide trait that confers dicamba tolerance run until at least the mid-2020s. In corn seed and traits, patent coverage for our first-generation YieldGard™ trait in corn 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 2020, we entered into many new research partnerships, including those detailed below.

[4] The last supplementary protection certificates for prothioconazole in some CIS countries expired in 2020.
[5] Patent protection does not take into account patent term extensions or supplementary protection certificates.

In February, we announced an agreement with Meiogenix, France, to accelerate the development of Meiogenix's proprietary technologies related to plant breeding and genome editing applications. These technologies are used to induce the exchange of genomic regions between chromosomes of plant cells during meiosis. Technologies based on meiotic recombination provide commercial crops with access to a broader genetic diversity, including complex traits for improved food quality, plants' resistance to diseases and pests, and higher yield potential.

Also in February, we signed a memorandum of understanding with XAG Co., Ltd., China, to formalize a strategic partnership that will develop and commercialize digital farming technologies in Southeast Asia and Pakistan (SEAP). The collaboration will enable smallholder farmers in SEAP to access digital farm management know-how and technology, and will help them overcome farming challenges such as labor shortages, water availability, product stewardship and safe use and – most importantly – allow them to grow more with less.

In July, we announced a strategic collaboration with Prospera Technologies Inc., Israel, a leading AI data analytics company specializing in machine learning, to jointly create integrated digital solutions for vegetable greenhouse growers. The all-in-one, cloud-based service will enable vegetable greenhouse growers to make more timely and insightful decisions that help optimize both the profitability and sustainability of their crops and operations. The initial roll-out and in-field exploration of the offering began in July in Mexico.

The FieldView™ platform is a central hub or "ecosystem" for agricultural innovations, collaborating with over 70 third-party partners to ensure farmers can easily access a broad and interconnected set of tools, data, and services to optimize all their decisions on the farm. Key partnerships include Sentera, FarmBox and CLAAS.

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

A 1.3/2

Crop Science: Important Collaborations

Partner	Collaboration objective
AbacusBio Limited	Accelerate Bayer's Global Crop Breeding program by utilizing AbacusBio's expertise in trait prioritization and valuation to advance products that anticipate grower and market needs
Arvinas Inc.	Oerth Bio (joint venture of Bayer & Arvinas, Inc.) to utilize Arvinas' targeted protein degradation technology PROTAC™ to develop innovative new agricultural products to improve crop yields
Atomwise Inc.	Partnership using artificial intelligence (AI) to discover small molecules for crop protection applications
BASF SE	Co-funded 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
CLAAS KGaA mbH	Enables real-time data connectivity between wireless technology in the cab and farmers' FieldView™ accounts and expands Drive compatibility across all lines of CLAAS equipment in Europe
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
FarmBox	Leverages FieldView™ data to enable dealers to write prescriptions specific to a farmer's operation. The partnership also provides multiple solutions for retail, growers and dealers, including scouting
Forschungszentrum Jülich GmbH	Research collaboration focused on phenotyping of biologicals in plants

A 1.3/2 (continued)

Crop Science: Important Collaborations

Partner	Collaboration objective
Grains Research and Development Corporation (GRDC)	Partnership for the discovery and development of innovative weed management solutions (herbicides)
Ginkgo Bioworks Inc.	The Joyn Bio joint venture investigates technologies to enhance plant-associated microorganisms
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
Meiogenix	Further development of technologies in the fields of plant breeding and genome editing
Novozymes A/S (BioAg Alliance)	Joint development of new sustainable microbial solutions for crop agriculture
Oxitec Ltd.	Development of a Friendly™ fall armyworm exploring a new approach to support integrated pest management in a sustainable way with initial focus on Brazil
Pairwise Plants	Research alliance to develop genome editing tools and products in corn, soybeans, cotton, oilseed rape / canola, and wheat
Pivot Bio Inc.	Research collaboration focused on Bradyrhizobium for improved nitrogen utilization in soybeans
Prospera Technologies Inc.	Joint development of digital solutions for vegetable greenhouse growers
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
Sentera Inc.	Enables farmers to visualize and order imagery through FieldView™
Targenomix GmbH	Development and application of systems biology approaches to achieve a better understanding of metabolic processes in plants
Temasek	Unfold (joint venture between Bayer and Temasek) will focus on innovation in vegetable seed with the goal of raising vertical farming to the next level in terms of quality, efficiency and sustainability
XAG Co. Ltd.	Strategic partnership to develop and market digital agricultural technologies

Pharmaceuticals

In our Pharmaceuticals Division, we focus on indications with high medical need in the areas of cardiovascular disease, oncology, women's healthcare, hematology and ophthalmology. Our work in radiology focuses on the development of digital solutions, contrast agents and injection systems. Approximately 7,400 (2019: 7,500) employees work in our research and development (R&D) departments 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

Our R&D innovation model is centered around a deeper understanding of diseases, expanding our activities to include new modalities, groundbreaking technologies and external innovation.

We achieved further significant progress in this area in 2020, such as the establishment of a strategic organizational unit for cell and gene therapies (CGT). The CGT organization will be responsible, from research to market maturity, for developing cell and gene therapies and making them available to patients. The unit will combine external strategic collaborations, acquisitions of technologies and license activities to establish a pipeline in cell and gene therapies. The acquisition of Asklepios BioPharmaceutical, Inc. (AskBio), United States will supplement the cell therapy activities at BlueRock Therapeutics, United States, which we purchased in 2019, and thus further consolidate our leading position in gene and cell therapies. Another fundamental element of our new cell and gene therapy strategy is the partnership we have established with Atara Biotherapeutics, Inc., United States, which will strengthen our cell therapy pipeline.

We are also continuously advancing the digital transformation in R&D. In this context, we entered into various partnerships over the course of 2020, such as the alliance with the artificial intelligence specialist Exscientia Ltd, United Kingdom, in which we aim to identify and optimize novel lead structures for potential drug candidates to treat cardiovascular and oncological diseases. Other partnerships in this field were formed with the U.S.-based companies Recursion Pharmaceuticals Inc. and Schrödinger, Inc.

We are also investing in external growth to supplement our development portfolio. This includes the acquisition of British biotech company KaNDy Therapeutics Ltd., which further expands our development portfolio in women's healthcare. KaNDy Therapeutics Ltd. recently completed Phase IIb for an innovative non-hormonal oral compound, publishing positive data for the treatment of frequent symptoms of the menopause. We also purchased an exclusive license from Systems Oncology LLC, United States, for the global development and commercialization of the preclinical oral drug candidate ERSO™, thereby supplementing our development portfolio with an innovative treatment approach for women with metastatic estrogen receptor-positive breast cancer.

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.

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 our clinical trials comply with strict international guidelines and quality standards, as well as the respective applicable national laws and standards.

We also publish 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 our homepage.

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

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]

Project	Indication
BAY 1097761 (PEG-ADM Inhale)	Acute respiratory syndrome
BAY 1747846 (High Relaxivity Contrast Agent)	Magnetic resonance imaging
BAY 2433334 (FXIa inhibitor)	Prevention of stroke in atrial fibrillation patients
BAY 2433334 (FXIa inhibitor)	Secondary prevention of stroke
BAY 2433334 (FXIa inhibitor)	Prevention of major adverse cardiac events (MACE)
BAY 2586116 (task channel blocker)	Obstructive sleep apnea
Eliapixant (BAY 1817080, P2X3 Antagonist)	Chronic cough
Eliapixant (BAY 1817080, P2X3 Antagonist)	Overactive bladder
Eliapixant (BAY 1817080, P2X3 Antagonist)	Endometriosis
Eliapixant (BAY 1817080, P2X3 Antagonist)	Neuropathic pain
Elinzanetant (Neurokinin-1,3 Rezeptor Antagonist)	Vasomotor symptoms
Fulacimstat (chymase inhibitor)	Chronic kidney disease
Osocimab (anti-FXIa antibody)	Prevention of thrombosis in end-stage renal disease (ESRD)
BAY-2976217 (FXI LICA, IONIS-FXI-L_{RX})[2]	Prevention of thrombosis in end-stage renal disease (ESRD)
Pecavaptan (dual vasopressin receptor antagonist)	Congestive heart failure
Levonorgestrel (progestin) + indomethacin (NSAID) combi IUS	Contraception
Regorafenib + nivolumab combination[3]	Metastatic colorectal cancer
Regorafenib + nivolumab combination[3]	Recurrent or metastatic solid tumors
Regorafenib + pembrolizumab combination	Second-line therapy of unresectable hepatocellular carcinoma
Rogaratinib (pan-FGFR inhibitor)	Urothelial cancer
Runcaciguat (sGC Activator)	Chronic kidney disease

[1] As of February 4, 2021
[2] Sponsored by Ionis Pharmaceuticals, Inc., United States
[3] In collaboration with Bristol-Myers Squibb Company Co., 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 2020 compared with 2019:

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

In February, we discontinued the development of BAY 1902607, one of two P2X3 antagonists. The project was terminated on the basis of the results of a Phase IIa trial that examined the efficacy and safety of BAY 1902607 in patients with refractory chronic cough. We are continuing to advance the development of our second P2X3 antagonist, BAY 1817080.

In June, we presented the results of the Phase IIb VITALITY-HFpEF study investigating our sGC stimulator vericiguat in patients with chronic heart failure and preserved ejection fraction as part of the Heart Failure Association (HFA) Discoveries program. The primary endpoint was not met.

We have switched our development focus from investigating the unconjugated FXI antisense oligonucleotide (IONIS-FXI Rx) to the more potent ligand-conjugated IONIS-FXI-L_{RX}, as this can enable lower and less frequent doses to be used in patients.

In November, we also decided to discontinue development of vilaprisan. A comprehensive assessment of the generated preclinical and clinical data is currently being conducted.

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]

Project	Indication
Aflibercept (VEGF inhibitor)[2]	Retinopathy of prematurity
High-dose aflibercept (VEGF inhibitor)[2]	Diabetic macular edema (DME)
High-dose aflibercept (VEGF inhibitor)[2]	Neovascular age-related macular degeneration (nAMD)
Copanlisib (PI3K inhibitor)	Various forms of non-Hodgkin lymphoma (NHL)
Regorafenib (multikinase inhibitor)	Newly diagnosed or recurrent glioblastoma
Darolutamide (ODM-201, AR antagonist)	Hormone-sensitive metastatic prostate cancer
Darolutamide (ODM-201, AR antagonist)	Adjuvant treatment for localized prostate cancer with very high risk of recurrence
Finerenone (MR antagonist)	Heart failure with mid-range or preserved ejection fraction

[1] As of February 4, 2021
[2] In collaboration with Regeneron Pharmaceuticals, Inc., United States
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 2020 compared with 2019:

In March, we presented data from the Phase III VICTORIA study investigating the efficacy and safety of vericiguat in patients with symptomatic chronic heart failure and reduced ejection fraction of less than 45% who have had a previous worsening heart failure event at the virtual Annual Scientific Session & Expo of the American College of Cardiology (ACC). The data confirmed that the oral, once-daily active ingredient significantly reduced the risk of the composite primary efficacy endpoint of cardiovascular death or heart failure hospitalization and was also well tolerated, while the incidence rate of adverse events was comparable to that of placebo. The data from the presentation at the event was published in The New England Journal of Medicine.

At the ACC congress, we also presented data from the Phase III VOYAGER PAD study that was published at the same time in The New England Journal of Medicine. This data demonstrated that the Factor Xa inhibitor rivaroxaban (Xarelto™) in the vascular dose plus ASA 100 mg significantly lowered the combined risk of acute limb ischemia, major amputation of vascular etiology, myocardial infarction, ischemic stroke, and cardiovascular death in patients with symptomatic peripheral artery disease following revascularization. The study for rivaroxaban also demonstrated that the incidence rate of major bleeding was not elevated according to the TIMI definition, the main criteria for safety assessment in this trial.

Also at the ACC scientific meeting, we presented results from the clinical Phase IIIb PRONOMOS trial that were concomitantly published in The New England Journal of Medicine. This trial investigated rivaroxaban in comparison to enoxaparin in adult patients during a period of immobilization after nonmajor, moderate-risk lower limb orthopedic surgery. Rivaroxaban reduced the risk of major venous thromboembolism compared to enoxaparin. Bleeding rates were low and not statistically different between the two treatment groups.

April saw the start of a Phase III trial investigating darolutamide in adjuvant prostate cancer, sponsored by the Australian and New Zealand Urogenital and Prostate Cancer Trials Group (ANZUP) and supported by Bayer. The purpose of this study is to determine the efficacy of darolutamide in combination with a luteinizing hormone-releasing hormone analogue (LHRHA) in men undergoing radiation therapy for localized prostate cancer who are at very high risk of recurrence. The study will include around 1,100 participants from Australia, New Zealand, Europe and North America.

In May, we presented the final data from the Phase III ARAMIS trial at the virtual ASCO Annual Meeting showing that darolutamide, a nonsteroidal androgen receptor antagonist, in combination with androgen deprivation therapy (ADT) significantly improves overall survival in men with nonmetastatic castration-resistant prostate cancer (nmCRPC) compared to placebo plus ADT. This data was published in September in The New England Journal of Medicine.

In June, we launched the Phase III PHOTON trial together with Regeneron Pharmaceuticals, Inc., evaluating extended treatment intervals with a new aflibercept 8 mg formulation for intravitreal injection in adults with visual impairment due to diabetic macular edema (DME). The Phase III PULSAR trial to investigate extended dosing intervals with a new 8 mg aflibercept formulation in adults with neovascular age-related macular degeneration (nAMD) began in August. Aflibercept 2 mg is already approved under the brand name Eylea™ for five indications in more than 100 countries.

In June, we initiated the FINEARTS-HF study, which is investigating the efficacy and safety of finerenone with regard to morbidity and mortality in symptomatic heart failure patients with a left ventricular ejection fraction of 40% or more. The study started in September. The primary objective of the study is to demonstrate superiority of finerenone over placebo in reducing the rate of the composite endpoint of cardiovascular death and total (first and recurrent) heart failure (HF) events (defined as hospitalizations or emergency treatment for HF).

In July, we announced that our Phase III FIDELIO-DKD study evaluating the efficacy and safety of the investigational drug finerenone versus placebo had met its primary endpoint. The results showed that finerenone delayed the progression of chronic kidney disease by significantly reducing the combined risk of time to first occurrence of kidney failure, a sustained decrease of estimated glomerular filtration rate greater than or equal to 40% from baseline over a period of at least four weeks, or renal death. Finerenone also significantly reduced the risk of the key secondary endpoint, a composite of time to first occurrence of cardiovascular death or nonfatal cardiovascular events (nonfatal myocardial infarction, nonfatal stroke, or heart failure hospitalization). The results of the FIDELIO-DKD study, which is part of the biggest Phase III clinical trial program to date for chronic kidney disease and type 2 diabetes, were presented in October at Kidney Week 2020 of the American Society of Nephrology (ASN) and published at the same time in The New England Journal of Medicine.

At the ESMO congress in September we also presented updated data on larotrectinib (Vitrakvi™) that demonstrates high efficacy and good tolerability of this precision oncology medication in adult and pediatric patients with TRK fusion cancer.

In October we announced that the Phase III CHRONOS-3 study evaluating copanlisib in combination with rituximab in patients with relapsed indolent non-Hodgkin lymphoma (iNHL) had met its primary endpoint of significantly prolonging progression-free survival (PFS). The safety and tolerability observed in the trial were generally consistent with previously published data on the individual components of the combination, and no new safety signals were identified. We intend to present the results from CHRONOS-3 at a scientific congress and discuss the data with health authorities worldwide.

Furthermore, as mentioned above, we decided in November to discontinue development of vilaprisan. A comprehensive assessment of the generated preclinical and clinical data is currently being conducted.

We further announced in February 2021 that Nubeqa™ (darolutamide) is planned to be investigated in the Phase III trial ARANOTE evaluating the efficacy and safety of darolutamide plus androgen deprivation therapy (ADT) in comparison to placebo plus ADT in men with metastatic hormone-sensitive prostate cancer. The primary endpoint of this study is radiological progression-free survival (rPFS). We anticipate that the first patients will be enrolled to the study in the first quarter of 2021.

Filings and approvals

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]

Project	Indication
Finerenone (MR antagonist)	EU, U.S.A., Japan, China[2]: Heart failure with mid-range or preserved ejection fraction
Larotrectinib (LOXO-101, TRK fusion inhibitor)	Japan: Solid tumors with NTRK gene fusions
Rivaroxaban (FXa inhibitor)	China: VTE treatment in children
Rivaroxaban (FXa inhibitor)	EU, U.S.A., China: Peripheral artery disease (PAD)
Vericiguat (sGC stimulator)[3]	EU, Japan, China: Chronic heart failure with reduced ejection fraction (HFrEF)

[1] As of February 3, 2021
[2] Filings in China are included in this table starting in the second quarter of 2020. The projects were already submitted in prior quarters for approval in the respective indications.
[3] Co-development with Merck & Co., Inc., United States

In January, darolutamide was approved in Japan under the brand name Nubeqa™ for the treatment of patients with nonmetastatic castration-resistant prostate cancer (nmCRPC). The approval is based on the Phase III ARAMIS trial evaluating the efficacy and safety of darolutamide plus androgen deprivation therapy (ADT) compared to placebo plus ADT. In March, we received marketing authorization in the European Union for Nubeqa™ to treat patients with nonmetastatic castration-resistant prostate cancer who are at high risk of developing metastatic disease. In February 2021, the Chinese National Medical Products Administration (NMPA) also approved Nubeqa™ for the treatment of patients with nonmetastatic castration-resistant prostate cancer who are at high risk of developing metastatic disease. Darolutamide is a nonsteroidal androgen receptor inhibitor that we developed together with Finnish pharmaceutical company Orion Corporation.

In April, the European Medicines Agency (EMA) approved Eylea™ (aflibercept) injection solution in a prefilled syringe form for all registered indications. The prefilled syringe was also launched on the Japanese market in June.

In May, we applied for registration in Japan for the precision oncology treatment larotrectinib, an oral TRK inhibitor that has been developed specifically to treat adults and children with locally advanced or metastatic solid tumors that have a rare genomic alteration called neurotrophic tyrosine receptor kinase (NTRK) gene fusion. The product is already approved under the brand name Vitrakvi™ in several countries, including the United States, Brazil, Canada and countries of the European Union.

In June, we applied for marketing authorization in the European Union and Japan for vericiguat to treat patients with chronic heart failure. In July, we announced that the United States Food and Drug Administration (FDA) had accepted the New Drug Application for priority review. In August, we submitted the regulatory application seeking the approval of vericiguat in China. In January 2021, the FDA granted regulatory approval for vericiguat for the treatment of patients with symptomatic chronic heart failure and reduced ejection fraction of less than 45% who have had a previous worsening heart failure event in combination with available heart failure therapies, under the brand name Verquvo™. Vericiguat is being developed by Bayer in collaboration with MSD (a trade name of Merck & Co., Inc., United States).

In August, the Chinese National Medical Products Administration (NMPA) approved Xofigo™ (radium-223 dichloride) for the treatment of patients with castration-resistant prostate cancer (CRPC), symptomatic bone metastases and no known visceral metastases. The drug is already approved in more than 50 countries worldwide, including the United States, the countries of the European Union and Japan. The approval of Xofigo™ in China is based on the data from the ALSYMPCA trial as well as the Phase III 15397 trial conducted in Asia.

In November, we submitted marketing authorization applications for finerenone in the United States, the European Union and Japan for patients with chronic kidney disease and type 2 diabetes. The submissions are based on the positive results of the Phase III FIDELIO-DKD trial investigating the efficacy and safety of this investigational drug. In January 2021, the U.S. Food and Drug Administration (FDA) accepted the applications and granted a priority review.

Also in November, the EMA's Committee for Medicinal Products for Human Use recommended the expanded approval of Xarelto™, on the basis of which the European Commission then granted this extension in January 2021. Rivaroxaban is now licensed for use in children aged between 0 and 17. The expansion extends to treatment of acute venous thromboembolism (VTE) and prevention of recurring VTE following initial diagnosis, including cerebral venous sinus thrombosis. It is now possible to apply for prolongation of the patent by six months to April 2024.

In January 2021, the Japanese Ministry of Health, Labour and Welfare (MHLW) granted regulatory approval for the oral Factor Xa inhibitor rivaroxaban (Xarelto™) in the treatment of venous thromboembolism (VTE) including catheter-related thrombosis and cerebral venous sinus thrombosis and for the prevention of recurrent VTE in pediatric patients. The suspension for oral administration was likewise approved. This means that rivaroxaban, which is already routinely used in adult patients with VTE, is now the first oral Factor Xa inhibitor to be licensed for the treatment and prevention of recurrent VTE in children.

Likewise in January 2021, the Japanese health authorities granted us regulatory approval for molidustat, a new therapeutic option for renal anemia. Molidustat stimulates the production of erythrocytes by mimicking the physiological reaction that occurs when the human body adapts to hypoxic conditions such as those prevailing at high altitudes. The marketing authorization application was based on data from clinical trials including the Japanese clinical Phase III MIYABI trial program in nondialysis patients with chronic kidney disease and dialysis patients.

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**	**Switzer-land**	**Spain**	**U.K.**	**China**	**Japan**	**Brazil**	**Canada**	**U.S.A.**
Adempas™											
Active ingredient	2028	2028	2028	2028	2028	2028	2023	2027-2028[d]	2028	2023	2026
Eylea™											
Active ingredient	2025	2025	2025	2025	2025	2025	2020	2021-2023[d]	2028	2020	–
Jivi™											
Active ingredient	2025[a]	2025[a]	2025[a]	2025[a]	2025[a]	2025[a]	2025	2027[e]	2030[c]	2027[e]	2025[a]
Nexavar™											
Active ingredient	2021	2021	2021	2021	2021	2021	2020	2021-2025[d]	2025	2020	2020
Nubeqa™											
Active ingredient	2030[a]	2030[a]	2035[e]	2030[a]	2030[a]	2030[a]	2030	2035[e]	2030	2032	2030[a]
Stivarga™											
Active ingredient	2028	2028	2028	2028	2028	2028	2024	2026[d]	2028	2024	2031
Verquvo™											
Active ingredient	2031[f]	2031[f]	2031[f]	2031[f]	2031[f]	2031[f]	2031	2031[f]	2031[b]	2031[f]	2031[f]
Vitrakvi™											
Active ingredient	2029[a]	2029[a]	2034	2029[a]	2034[e]	2029[a]	2029	2029	2030	2031	2029[a]
Xarelto™											
Active ingredient	2023	2023	2023	2023	2023	2023	2020	2022-2025[d]	2022	2020	2024
Xofigo™											
Use	2024	2024	2024	2024	2024	2024	–	2022[a]	–	–	2022

[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
[f] Current expiration date; patent term extension will be applied for punctually

Collaborations

In addition to the collaborations entered into in January with Evotec SE, Germany, Exscientia Ltd., United Kingdom, and Daré Bioscience, Inc., United States, which we already reported in the 2019 Annual Report, the following collaborations were initiated in 2020:

In March, we signed a research collaboration and licensing agreement with the Indian drug discovery company Curadev Pvt. Ltd. for Curadev's Stimulator of Interferon Genes (STING) antagonist program. The collaboration aims to discover and develop new drug candidates for the treatment of lung, cardiovascular and other inflammatory diseases.

In May, we announced a collaboration with the U.S. diagnostics company ArcherDX, Inc., which will focus on the global development and commercialization of therapy-accompanying diagnostic tests – also known as companion diagnostics (CDx) – for Vitrakvi™ (larotrectinib), based on next-generation sequencing.

In August, we entered into an agreement with U.S.-based digital health company Informed Data Systems Inc. (One Drop) to jointly develop digital health products for multiple therapeutic areas. In the year before, we had invested in the company and signed a licensing agreement with them as part of our Leaps by Bayer initiative. The aim of the collaboration at present is to provide integrated services empowering patients to manage certain conditions.

In September, we formed a strategic partnership with U.S.-based biotech company Recursion Pharmaceuticals, Inc., as described above.

Also in September, we entered into an exclusive global license agreement with the U.S. company Systems Oncology, LLC, for ERSO™, an oral compound in pre-clinical development for the treatment of metastatic estrogen receptor-positive (ER+) breast cancer. Under the terms of the agreement, we will be responsible for developing and commercializing ERSO globally.

In October, our partner Foundation Medicine Inc., United States, announced that it had applied for an extension to the regulatory approval for its companion diagnostic test FoundationOne™CDx in Japan. In the same month, the U.S. Food and Drug Administration (FDA) approved FoundationOne™CDx for use as the first companion diagnostic for Vitrakvi™ in the United States.

In November, we signed a development and license agreement with Blackford Analysis Ltd., United Kingdom, to establish a digital AI platform for radiology. The platform will provide access to a curated marketplace through which radiologists and their teams can centrally manage workflows, thus supporting their diagnostic decision-making and enabling earlier interventions for patients.

We also entered into a strategic partnership with Atara Biotherapeutics, Inc., United States, in December, comprising an exclusive worldwide license agreement for mesothelin-directed CAR-T cell therapies for the treatment of solid tumors. Under the terms of the agreement, Atara will lead IND (Investigational New Drug)-enabling studies and process development for ATA3271 while Bayer will be responsible for submitting the IND and subsequent clinical development and commercialization.

In connection with our work to stem the spread of the COVID-19 pandemic, in January 2021 we announced that we had signed a collaboration and service agreement with the bio pharmaceutical company CureVac N.V., Germany, in order to work together on the COVID-19 vaccine candidate CvnCoV. CureVac is developing in clinical trials a new class of transformative medicines based on messenger ribonucleic acid (mRNA). Under the terms of the agreement, we will support the further development and supply of the vaccine candidates and provide support for local activities in selected countries. We will also deploy our manufacturing network to contribute to vaccine production.

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

A 1.3/7

Main Collaborations

Partner	Collaboration objective
ArcherDX, Inc.	Collaboration for global development and marketing of companion diagnostics (CDx) tests for Vitrakvi™ (larotrectinib) on the basis of next-generation sequencing
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
Atara Biotherapeutics, Inc.	Strategic partnership for next-generation, mesothelin-directed CAR-T cell therapies for the treatment of solid tumors
Blackford Analysis Ltd.	Development and licensing agreement aimed at establishing a digital AI platform for radiology
Brigham and Women's Hospital and Massachusetts Hospital	Joint laboratory for research into new drug candidates to treat chronic lung diseases
Bristol-Myers Squibb Co. and Ono Pharmaceutical Co., Ltd.	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
Curadev Pvt. Ltd.	Research collaboration to identify and develop new drug candidates for the treatment of lung, cardiovascular and other inflammatory diseases, and a licensing agreement for Curadev's STING (Stimulator of Interferon Genes) antagonist program
CureVac N.V.	Collaboration and service agreement to support the further development and supply of the COVID-19 vaccine candidate CvnCoV and to provide support for local activities in selected countries
Daré Bioscience Inc.	License agreement for U.S. commercial rights to hormone-free contraceptive Ovaprene™ in the future
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

A 1.3/7 (continued)

Main Collaborations

Partner	Collaboration objective
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 global commercialization of therapy-accompanying diagnostic tests, also known as companion diagnostics (CDx), based on next-generation sequencing for new cancer drugs developed by Bayer
Haplogen GmbH	Research collaboration in the field of pulmonary diseases such as chronic obstructive pulmonary disease (COPD)
Informed Data Systems Inc. (One Drop)	Collaboration for co-development of digital health care products in a variety of therapeutic areas
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
Recursion Pharmaceuticals Inc.	Strategic partnership to conduct research into new treatments for fibrotic diseases of the lungs, kidneys, heart and other organs
Systems Oncology, LLC	Development and marketing of ERSO™ for the treatment of patients with breast cancer
Tsinghua University	Research collaboration and establishment of a research center for joint projects
Ultragenyx Pharmaceuticals Inc.	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

Consumer Health

At Consumer Health, we concentrate on developing new nonprescription (OTC) products and solutions that improve consumer health and well-being. We maintain a global network of research and development facilities, with sites in the United States, France, Spain, Germany and China at which approximately 600 employees (2019: 600 employees) work. We are active in the areas of pain, cardiovascular risk prevention, dermatology, nutritional supplements, digestive health, allergy and cough & cold. In 2020, we established a new Consumer Health function, Regulatory, Medical, Safety & Compliance (RMSC), which is separate from Pharmaceuticals. It will further strengthen our commitment to science to address medical needs and compliance across innovations and existing portfolio of products on the market as leaders in selfcare.

Bayer worldwide;
see also A 1.1.2/3

The focus lies on product developments that are insight-driven and aligned to the unmet needs of consumers. Our innovations range from new product formulations, devices and packaging to new consumer and healthcare professional claims and communications. In addition, we developed around 53 new consumer-validated product innovations in 2020, thus exceeding our target. We are strengthening Consumer Health's innovation pipeline with more than 110 active projects that 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.[6] 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).

In the United States, China, Germany and other core markets, we continue to make progress in e-commerce by increasing sales and market share on key e-commerce platforms. In addition, we are pursuing an agile innovation model with external partners to discover new sources of growth. For example, we have strengthened our ability to provide individual tailored solutions through a new business model by acquiring a majority stake in Care/of, a personalized nutrition company.

We also introduced a number of new product line extensions for existing brands in various countries in 2020, for example:

In North America, we expanded our product portfolio with the launch of four product-line extensions for our One A Day™ vitamins in the United States. In the Allergy & Cold category, our Claritin™ antihistamine is now also available in a new presentation thanks to the introduction of Claritin™ Cool Mint Chewables.

In the Europe / Middle East / Africa region, we launched Iberogast™'s first ever line extension. Iberogast™ Advance is a new formulation of proven ingredients intended for the relief of ongoing gastrointestinal symptoms. We also extended our wound-healing and skincare range by launching Bepanthen™ Tattoo in a number of large European markets, including Italy, the United Kingdom and Spain.

In the Asia / Pacific region, we expanded our range of Elevit™ prenatal vitamins in the Nutritionals category with the launch of Elevit™ DHA and Elevit™ Probiotics supplements.

1.4 Commitment to Employees

Defining our corporate culture through values, dialogue and inclusion

Focus on supporting work-life integration for our employees during the COVID-19 pandemic

Bayer's business success is essentially built on the knowledge and commitment of our workforce. As an employer, we offer our employees attractive conditions and wide-ranging individual development opportunities. Alongside professional training, we focus on promoting 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 lies with the Board of Management, supported by Bayer's Human Resources enabling function. The strategy is globally implemented within the scope of binding policies.

[6] Core innovation means optimizing existing products for existing customers. Adjacent innovation refers to the extension of existing brands to new market segments. Transformational innovation refers to achieving breakthroughs and creating new markets that do not yet exist.

For 10 years, Bayer's LIFE values (Leadership, Integrity, Flexibility and Efficiency) have guided us in our activities. These stand for our values and leadership principles. To align the behaviors of the LIFE values with Bayer's new vision "Health for all, hunger for none," the attributes for each value were updated in 2020. The attributes define each value's practical meaning and behaviors. In this way, we have further developed our holistic mindset framework, which serves as the sole reference for how employees work at Bayer.

The updated attributes for each value can be found at www.bayer.com/en/commitments/our-values

Employees at all Bayer sites around the world have the right to elect their own representatives. In 2020, the working conditions for around 55% (2019: 55%) of our employees worldwide were governed by collective or company agreements.

Employee data

On December 31, 2020, we employed 99,538 people (2019: 103,824) worldwide. In Germany we had 23,398 employees (2019: 24,953), representing 23.5% of the total Group workforce (2019: 24.0%).

Bayer AG key data: see also A 5.4

The absolute decline in employee numbers as a result of the restructuring and portfolio measures was reflected above all in the development in Europe / Middle East / Africa and North America.

As part of the restructuring, employees from the Information Technology enabling function transferred to external service providers. In addition, the number of employees working in research and development fell, in part due to the transfer of certain activities in pharmaceutical research to Nuvisan ICB GmbH, Germany, at the Berlin site. In relative terms, headcount declined most strongly in North America and Asia / Pacific.

In 2020, the Bayer Group hired 9,615 new employees (accounting for 9.5% of our workforce). On the reporting date, our employees had worked for the Bayer Group for an average of 11.3 years (2019: 10.2). Our workforce includes only a small number of employees on temporary contracts (3.6%).

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 following local laws and regulations, meaning that there may 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 reductions are necessary. The General Works Agreement "Safeguarding Bayer's Future 2025" fundamentally rules out dismissals for operational reasons for the intercompany personnel network of Bayer AG in Germany until the end of 2025.

We made further progress with the planned Group-wide measures in 2020. To date, around 10,700 jobs have been reduced as part of these measures. Flexible models with attractive conditions have been offered to employees of various age groups since February 2019. More than 2,200 employees in Germany have accepted such a voluntary severance agreement since it was introduced.

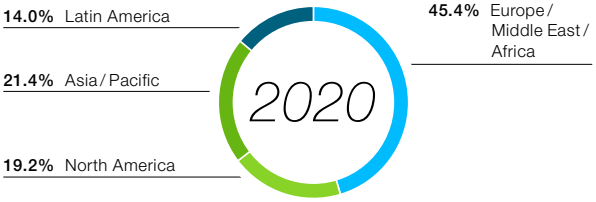
Further measures with regard to the acceleration of our transformation announced in September are currently being developed and discussed in detail.

A 1.4/1

Employee Data

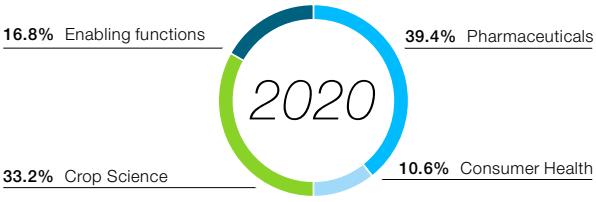
	2019	2020	Change %
Total	**103,824**	**99,538**	**–4.1%**

by Region



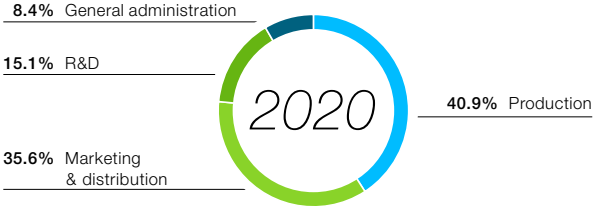
	2019	2020	Change %
Europe/Middle East/Africa	46,933	45,146	–3.8%
North America	20,735	19,111	–7.8%
Asia/Pacific	22,341	21,310	–4.6%
Latin America	13,815	13,971	+1.1%

by Division



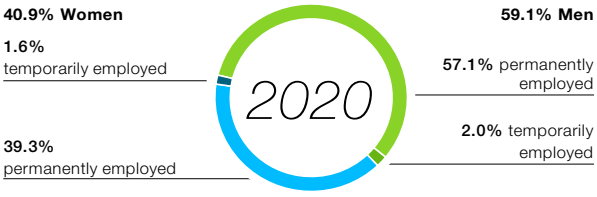
	2019	2020	Change %
Crop Science	33,866	33,064	–2.4%
Pharmaceuticals	38,553	39,206	+1.7%
Consumer Health	10,400	10,570	+1.6%
Enabling functions	21,005	16,698	–20.5%

by Function



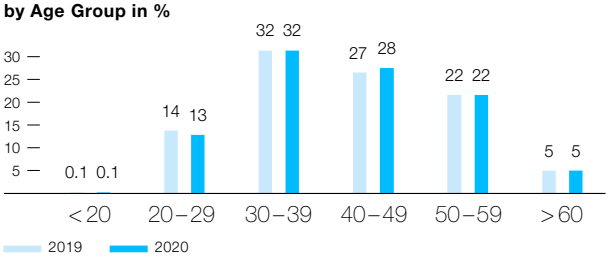
	2019	2020	Change %
Production	40,814	40,696	–0.3%
Marketing & distribution	37,665	35,424	–5.9%
R&D	16,006	15,065	–5.9%
General administration	9,339	8,353	–10.5%

by Gender



	Women		Men	
	2019	2020	2019	2020
Europe/Middle East/Africa	20,609	19,971	26,324	25,174
North America	7,799	7,232	12,936	11,879
Asia/Pacific	8,542	8,174	13,799	13,136
Latin America	5,089	5,325	8,726	8,647
Total	42,093	40,702	61,785	58,836

by Age Group in %



Fluctuation in %

	Voluntary		Total	
%	2019	2020	2019	2020
Women	7.2	5.1	15.3	12.3
Men	6.2	4.7	14.7	12.2
Total	6.6	4.9	15.0	12.3

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. Members of upper management 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.

Besides 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 71% (2019: 78%) of Bayer employees worldwide to complement national pension systems.

From 2021 onward, we will adjust the calculation logic of the short-term and long-term variable incentive programs for eligible employees to include the Group's sustainability, return on investment and free cashflow targets. These additional parameters will align with those that are already relevant for the compensation of the Board of Management, thereby standardizing the performance parameters for variable compensation throughout the Group.

See also A 4.4

A 1.4/2

Personnel Expenses and Pension Obligations

€ million	2019	2020
Personnel expenses	11,788	9,769
of which pension expenses	968	976
Pension obligations[1]	25,879	26,595
Pension benefits paid[2]	1,198	1,139

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

The decline in personnel expenses is due, among other reasons, to the reduction in headcount. In addition, lower restructuring expenses led to a decrease in expenses compared to 2019. As a result of the business performance in 2020, the additions to provisions for variable compensation were lower than in 2019. Provisions of around €500 million (2019: €890 million) were established in 2020 for variable one-time payments to employees under the Group-wide short-term incentive (STI) program and similar programs. Furthermore, a budget of approximately €72 million (2019: €70 million) was made available in 2020 for individual Top Performance Awards.

Our compensation principles comprise providing fair compensation to all and informing all of 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 (BSR), 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.

Vocational and ongoing training

To meet the need for skilled employees, we hire apprentices in Germany in more than 26 different occupations. In total, we have around 1,300 apprentices. We also offer trainee programs in various areas for those embarking on a career, and internships for students around the world.

www.bayer.com/en/working-at-bayer

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 28 hours of ongoing training in 2020.

Digitalization

We have included "Go Digital" as an attribute in our updated LIFE mindset framework for the value "Flexibility" and are enabling our employees through our Create Digital Mindset and Skills program. Over 10,000 employees have already participated in this program to learn new digital

skills in areas such as artificial intelligence, data science, design thinking, agile methodology and innovation. To drive our digital transformation, 78% of our Group Executives have completed a digital training program, which was co-created with a leading digital business school.

Work-life integration

We support employees in balancing their work and private lives. We provide various programs to support employees, including flexible working arrangements (how, when and where employees work) and support for childcare and care of close relatives within the scope of local social and legal guidelines. In many countries, our commitment in this area goes beyond the statutory requirements.

www.bayer.com/career

In 2020, part-time employees accounted for around 6.1% of our workforce (of which 55.6% were women and 44.4% men), primarily in Europe.

In response to the COVID-19 pandemic, we are developing an approach for when, where and how employees will work in the next normal. More flexible ways of working is a core theme throughout this ambition, embracing empowerment at all levels of the organization to define and shape a next normal that strengthens our business, best meets the needs of our customers and employees, respects cultural differences and complies with all labor law and tax law requirements. Ensuring employee safety and driving work-life integration remain important enablers of our people.

Health promotion

Almost 97% (2019: 98%) of our employees worldwide either have statutory health insurance or can obtain health insurance through the company.

We maintain a global framework concept to promote employee health and quality of life called BeWell@Bayer. BeWell@Bayer expands the core aspect of health into a comprehensive approach, targets further health improvements in the daily work environment and is intended in particular to help employees balance their professional and private lives. Health check-ups are an integral part of our global health promotion initiatives.

Inclusion and diversity

Mutual understanding and a company culture that leverages talented employees of various backgrounds and perspectives is an important success factor for the Bayer Group. We create an inclusive workplace where all employees feel welcome and contribute at their best. We will continue to seek out and promote the best talent and drive for a workforce that both reflects the highest quality of skills and qualifications, and our strong focus on inclusion and diversity. We employ people from around 149 nations.

Our Inclusion & Diversity strategy focuses on the integrative behavior and decision-making of all employees within the Group. Each of our Business Resource Groups (BRGs) has a sponsor at Board of Management level and is intensively supported in promoting an inclusive workspace. In addition, we are integrating inclusion and diversity into core people processes such as talent attraction and talent management.

The proportion of women in the workforce remained almost constant at 40.9% (2019: 40.5%). We are specifically targeting a greater gender balance in management. Based on 40,268 employees in management, the proportion of women in 2020 was 41.0% (2019: 40.5%), and among skilled workers 40.8% (2019: 40.4%). The proportion of women in the Group Leadership Circle and Group Executive Circle, the highest management levels below the Board of Management, increased again compared to previous years. At the end of 2020, they were made up of 23.0% women (2010: 6.5%[7]) and 77.0% men (2010: 93.5%).

[7] Figure as last reported

The Group Leadership Circle currently comprises 35 nationalities (2019: 29), with around 64.8% (2019: 65.8%) 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 (2019: 42). There were no significant changes to the age structure in 2020 compared to 2019.

People with disabilities are an integral part of our workforce. Based on voluntary statements by employees, we employ some 2,150 people with disabilities, 46% of whom are women and 54% men. That represents around 2.1% of our total workforce.

In 2020, we further developed a more integrated talent management approach that uses an inclusive lens in our people practices and personnel decisions with a strong focus on diversity. We aim to increase female representation to 33% across our entire top management by 2025, and to 50% across all other management levels (including upper and lower management) by the same year. We then aim to increase the share of women in top management to 50% as well by 2030. We have also defined aspirations for other diversity elements, including generation, nationality, experience, LGBTQ+, and people with disabilities for 2025 and 2030. Regionally tracked elements such as ethnic origin are integrated into targets in our country organizations.

1.5 Procurement and Supplier Management

Sustainability risk classification reviewed and expanded

First activities for reducing CO_2 emissions in the supply chain initiated

We influence 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 updated Procurement Policy, which is binding for all employees worldwide.

As a cross-divisional enabling function, Procurement leverages synergies by bundling know-how and procurement spend. In 2020, we had a total of 97,362 (2019: 86,400) suppliers. Our procurement spend was €17.7 billion (2019: €17.6 billion).[8]

Our main direct procurement materials include active ingredients, raw materials, intermediates, finished products and seeds. Technical goods and services, marketing services and information technologies 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 key 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.

[8] In addition, internal services to the value of €0.3 billion were procured from the Currenta Group at the time of Currenta's deconsolidation in 2019.

During the continuing COVID-19 pandemic, our supply chain has proven to be stable and resilient due partly to our involvement in the Together for Sustainability (TfS) initiative and the Pharmaceutical Supply Chain Initiative (PSCI). We have worked together for many years with our suppliers to jointly develop sustainable solutions to avoid risks.

To meet our climate protection targets, Procurement takes measures connected with reducing the carbon footprint in our supply chain. We launched our activities in 2020 and were already able to make initial progress in preparing the future implementation of Scope 3 reductions among suppliers.

See also A 1.2.1 Strategy and Targets

Sustainability in the supply chain

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-step management process that comprises the following elements: raising awareness, supplier selection, supplier evaluation and supplier development. In 2020, together with an external services provider, we updated our sustainability risk classification according to procurement categories and countries. We select suppliers to be evaluated based on this classification and the associated supply chain risks. This allows for a more targeted analysis according to individual risk criteria (e.g., human rights violations) and enables us to increase transparency in our supply chain.

Our sustainability requirements are established in the Supplier Code of Conduct, 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 throughout the Bayer Group. Furthermore, our standard supply contracts (with the exception of ongoing contracts of the acquired agricultural business) contain a clause that authorizes us to verify suppliers' compliance with our sustainability requirements. In the course of the acquired agricultural business's supplier relationships, this clause will be successively integrated into all supply contracts that need to be revised from 2021 onward.

We verify suppliers' observance of the code requirements through online assessments[9] or on-site audits[10]. We evaluate our strategically important suppliers – together comprising almost 25% of our total procurement spend – and suppliers with a high sustainability risk, which factors in both country and category risks. Our assessment process also includes supplier evaluations performed within the scope of industry initiatives. In total, our service provider EcoVadis assessed 670 (2019: 650) suppliers on our behalf in 2020. In 2020, we arranged for 26 (2019: 62) of our suppliers to be audited on site by external, independent auditors. In addition, five suppliers were audited virtually due to the COVID-19 pandemic. In 2020, 83 (2019: 103) suppliers 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 2020, critical results were determined for 13 suppliers (2% of all assessed and audited suppliers; 2019: 2% [11 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 2020, we did not have to end any supplier relationship due solely to sustainability performance. In 2020, 357 (2019: 332) of the 701 (2019: 712) suppliers assessed and audited improved their sustainability performance.

[9] The online assessments of suppliers that belong to a company group generally take place at parent company level.
[10] The number of evaluations for 2019 comprises suppliers of continuing and discontinued operations.

1.6 Product Stewardship

For us, product stewardship means that our products satisfy the highest quality standards and are safe for people 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 (HSE) 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 international sector-specific standards. By implementing a binding company-wide quality assurance system, 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 and other problems. For all chemical substances, we compile safety data sheets targeting professional users. End consumer products contain appropriate information in their packaging, with one 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 development phase in internationally standardized tests stipulated by law and regulations. These examinations cover the products' mode of action, their (eco)toxicological properties and the extent and distribution of potential residues in and on plants and in the environment. 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 its customers' and stakeholders' confidence in its products through transparency, and Crop Science is the first business in its industry to make safety-relevant data on crop protection products and genetically modified crops publicly accessible. Summaries of scientific studies for 29 of our active ingredients submitted to the European Food Safety Authority (EFSA) in the context of registration procedures in the European Union are available on our website. These reports include information on toxicological and ecotoxicological studies and investigations into the degradability of crop protection products. Also available are summaries of scientific studies on 16 traits of our genetically modified crops that were evaluated by U.S. regulatory authorities. Comprehensive study reports on our registration studies for the approval of our crop protection products are available on specific request.

www.cropscience.bayer.com/transparency-crop-science

Through extensive programs, we train farmers, seed treatment professionals, dealers and other users in the safe handling and use of our products. In 2020, we managed to increase the number of our training contacts worldwide. With regard to the sale of and the application instructions for 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.

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 already 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 EU 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 only with legal requirements, but also with Bayer's principles on animal welfare and animal studies. The latter also apply both to the research institutes we commission and our suppliers, whose compliance with our animal welfare requirements we regularly monitor. A corporate policy outlining these principles was published in 2020. We aim to minimize the use of study animals and to employ alternative methods whenever possible.

Environmental impact

As part of our business activities, we aim to minimize the impact of our products on the environment.

Biodiversity

We endeavor to promote a responsible use of natural resources, complying with international and national legislation and respecting biodiversity. Our principles on biodiversity are set forth in both the Bayer Human Rights Policy and our own position paper on this issue, which was updated in 2020. 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 that is designed to ensure compliance with international and national legislation on access to genetic resources and a fair utilization of the resulting benefits. Through monetary and nonmonetary contributions such as donations, gifts in kind for the establishment of new collections that serve to preserve the genetic diversity of crops, participation in a variety of projects, the buildup of capacities and other global efforts, we help to facilitate the conservation and sustainable use of plant genetic resources, as well as food security and ecological sustainability. Through these activities we are reinforcing our commitment to the Sustainable Development Goals of the United Nations.

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

Agriculture in particular benefits significantly from biodiversity, but it can also contribute to its loss. We are therefore investigating and developing cultivation systems that help to achieve a better balance between productivity and the conservation of biodiversity and habitats. In cooperation projects involving our Forward Farms and nature conservation experts, we research what this balance could look like in various countries and regions. We continually deploy plant breeding innovations that help improve the genetic diversity of crops essential for a secure food supply and for the development of sustainable cultivation systems.

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

Bee safety of crop protection products

We are actively involved in numerous projects and research activities to protect bees and other pollinators.

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, along with training programs for farmers who use our products. In addition, we develop bee-friendly crop protection products and application processes.

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 (EPA) 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 provides benefits for farmers and the environment by simplifying weed management, 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.

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, PMRA and other regulatory authorities have concluded that approved uses of glyphosate-based herbicides are unlikely to cause adverse effects on the environment. In the United States, EPA scientists reached the same conclusion following their primary environmental review and have initiated a final step in the reregistration process to ensure current uses account for potential effects on endangered species. This is a standard review for all pesticides in the United States and can take several years to complete. Bayer scientists are reviewing the draft report on endangered species and look forward to engaging in dialogue as part of the public comment period.

Our 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.

Biotechnology

We apply biotechnological processes both in the area of seeds and in pharmaceutical product development and production (e.g., Kogenate™, Kovaltry™, Jivi™, Bollgard II™, XtendFlex™ Cotton and Intacta RR2 Pro™). Further biotechnologically manufactured active ingredients are undergoing clinical development. In plant cultivation, we use both conventional breeding methods and genetic engineering.

For us, the safety of 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 our strict, globally applicable safety measures in handling biological substances in corresponding corporate policies.

The development and commercialization of genetically improved seeds are 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 2020, Crop Science maintained its membership in the Excellence Through Stewardship (ETS) organization.

Active ingredient residues in the environment

We are actively committed to preventing emissions of product residues (e.g., active ingredients and their degradation products) into the environment or, where they are unavoidable, to minimize the risk they harbor. We focus on all stages of the product cycle from manufacturing to safe use and disposal.

At our production sites worldwide, regulatory authorities and external assessors therefore monitor compliance with wastewater thresholds. Internal experts also perform corresponding audits of the production sites at regular intervals. We take additional action in our production facilities to avoid or reduce emissions from production such as the release of active ingredients into the environment. We are also working in various research projects to develop further effective risk minimization measures.

With regard to the application of crop protection products, potential environmental impact is investigated in ecotoxicological studies prior to the official product approval process. The responsible authorities receive an extensive environmental risk assessment and can specify risk minimization measures as appropriate.

Environmental risk assessments are also conducted in Europe and the United States for the official approval of human pharmaceuticals.

1.7 Environmental Protection and Safety

We are working on ways to further reduce the environmental impact of our business activities and to develop solutions that relieve the burden on the environment. Responsibility for this lies with the Corporate Health, Safety & Environment (HSE) enabling function, which defines 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 2019, Bayer's total energy consumption fell to 35.9 petajoules in 2020 (2019[11]: 39.2 petajoules). This includes both primary energy consumption, which mainly relates to fossil fuels, and secondary energy consumption. This decline is primarily due to reduced production activities, including in connection with the COVID-19 pandemic. In addition, at the Rock Springs

[11] 2019 values restated

site in the United States, the reallocation of coal from use as an energy source to use in a chemical process also contributed to this reduction.

Energy efficiency reported as the ratio of energy consumed to external sales improved from 250 kWh/€ thousand in 2019 to 241 kWh/€ thousand[12] in 2020.

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

The following table provides an overview of the development in 2020:

A 1.7/1

Greenhouse Gas Emissions

Million metric tons of CO_2 equivalents	2019	2020
Scope 1: Direct emissions[1,2]	2.08	2.01
Scope 2: Indirect emissions[3] according to the market-based method	1.68	1.57
Total greenhouse gas emissions according to the market-based method[1]	**3.76**	**3.58**
Scope 3: Indirect emissions from our upstream and downstream value chains (by materiality)[4,5]	10.05	8.86
of which indirect emissions from our upstream value chain to attain the SBT[4,6,7]	8.87	7.88

[1] 2019 values restated owing to a recalculation of fleet emissions

[2] 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 2020, 97.7% of direct greenhouse gas emissions were carbon dioxide emissions. Other greenhouse gases such as nitrous oxide, partially fluorinated hydrocarbons and methane made a negligible contribution to direct greenhouse gas emissions.

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

[4] Scope 3 emissions were subjected to a limited assurance check.

[5] Emissions from eight Scope 3 categories are of material importance to Bayer and together represent our total Scope 3 emissions: (1) purchased goods and services, (2) capital goods, (3) fuel- and energy-related activities, (4) upstream transportation and distribution, (5) waste, (6) business travel, (7) employee commuting and (12) end-of-life treatment of sold products.

[6] Science Based Target

[7] For the calculation of our reduction target for Scope 3 emissions in line with SBTi, 88% of total materially important Scope 3 emissions are considered. The following Scope 3 categories are covered: (1) purchased goods and services, (2) capital goods, (3) fuel- and energy-related activities, (4) upstream transportation and distribution and (6) business travel.

In 2020, we cut Scope 1 and 2 greenhouse gas emissions by 0.18 million metric tons of CO_2 equivalents. This represents a reduction of 4.8%. The main reason for this decline is the increased share of electricity purchased from renewable sources (Scope 2: from 1.7% in 2019 to 6.1% in 2020). In the categories relevant to our achievement of the Scope 3 Science Based Target, we cut our emissions by 0.99 million metric tons of CO_2 equivalents, corresponding to a reduction of 11.2%. The significant decline in business travel in 2020 also contributed to this. In addition, by purchasing climate protection certificates in, for example, Uruguay, Brazil and China, we financed reforestation and forest conservation projects in 2020, thereby offsetting 0.2 million metric tons of greenhouse gas emissions.

[12] 2019 values restated

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. In 2020, we achieved our goal of ensuring that 100% of these sites have a water management system.

Total water use in 2020 amounted to 57 million cubic meters (2019: 59 million cubic meters). This year-on-year decrease in use is due to the improved infrastructure at the Luling site in the United States and the impact of the COVID-19 pandemic at some sites. Around 37.8% of all water used by Bayer is cooling water that is only heated in the 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 fell in 2020 to 25 million cubic meters (2019: 26 million cubic meters). This decline in wastewater volume is due to the impact of the COVID-19 pandemic and reduced water consumption at the Luling site in the United States. All wastewater is subject to thorough checks before it is discharged into the various disposal channels. In 2020, 78.8% 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, reduce and recycle waste and to dispose of it safely and in line with good environmental practices.

The total quantity of waste generated rose to 937,000 metric tons in 2020 (2019: 879,000 metric tons). This was mainly due to the fact that at the seed production site in Maria Eugenia Rojas in Argentina we disposed of large volumes of vegetable by-products as nonhazardous waste for agricultural use and composting.

The volume of hazardous waste fell to 305,000 metric tons (2019: 316,000 metric tons) owing to the completion of building and renovation work at the Vapi site in India. The volume of hazardous waste from production, including hazardous waste from wastewater treatment plants, remained consistent with the 2019 level, at 301,000 metric tons.

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 and the expertise of employees. Principles of process and plant safety are laid out in our globally applicable corporate policy. Compliance with internal and external safety regulations is verified in internal audits.

www.bayer.com/en/safety.aspx

To prevent substance and energy releases, the causes of process safety incidents (PSIs) are analyzed and relevant findings communicated throughout the Bayer Group. A globally standardized key performance indicator (KPI) – the Process Safety Incident Rate (PSI-R) – is used at Bayer as an early indicator and is integrated into Group-wide safety reporting. The PSI-R indicates the number of PSI incidents per 200,000 hours worked. In 2020, the PSI-R was 0.08 (2019: 0.10).

The integration project that was launched in 2019 to align the process safety approaches of Bayer and the acquired agricultural business were completed in the first quarter of 2020. This showed that the approaches were similar. The results will be implemented on a step-by-step basis.

Transportation safety

Transportation and warehouse safety is part of the HSE management and is implemented by a network of supply chain experts. In addition to complying with legal regulations, we have implemented supplementary standards and requirements that are defined in corporate policies. We thereby ensure that our materials are handled and transported in accordance with their respective potential hazards and applicable regulations.

There were 13 transport incidents in 2020[13] (2019: 28), primarily involving road transport accidents.

Safe working conditions

Our fundamental conviction is that nothing is important enough to justify an accident or any risk to the safety of employees. We consider safeguarding the occupational health of our employees – and of the employees of contractors on our company premises – to be a top priority.

In 2020, occupational safety and health protection were primarily shaped by the development of the COVID-19 pandemic. With protecting the health and safety of our employees being our top priority, we implemented existing pandemic plans early on, thus minimizing risks to employees at work as far as possible. The protection concepts and measures that we implemented on a global scale took the different tasks at the individual sites into consideration.

In 2020, the Recordable Incident Rate (RIR)[14] declined from 0.46 to 0.32 cases per 200,000 hours worked, corresponding to 383 occupational injuries worldwide. The significant reduction in the RIR is due to the long-term impact of effective occupational safety measures and programs and short- and medium-term effects in connection with the COVID-19 pandemic resulting from a reduction in the radius of movement, for example between home and the workplace, and from increased individual attention being paid to health and safety issues.

Regrettably, two Bayer employees lost their lives in work-related accidents in 2020. 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 to further strengthen safety initiatives that are already successful. All safety programs and initiatives take account of globally recognized safety principles that further elaborate the safety-oriented conduct of our employees. Involvement in the Behavioral Safety initiative continues to increase and is sustainably supported by the publication of a global corporate policy. Behavioral improvements were achieved in areas in which the program has already been implemented, and the Recordable Incident Rate is therefore expected to decline further across the Bayer Group in the medium term.

[13] Transport incidents comprise accidents that cause personal injury or significant damage to property, environmental impact resulting from the release of substances, or leakage of hazardous goods.
[14] The RIR covers all injuries to employees and directly supervised contractors 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 operational business was stable in 2020 – despite significant unforeseen developments. Sales were level with the previous year, edging up by 0.6% on a currency- and portfolio-adjusted basis (Fx & portfolio adj.), and were held back by negative currency effects of €1.9 billion. EBITDA before special items came in at the prior-year level (–0.1%) despite sharply negative currency effects, thanks to stringent cost management. Crop Science reported an increase in sales (Fx & portfolio adj.) but saw EBITDA before special items heavily impacted by the development of the Brazilian currency in particular. Pharmaceuticals posted a slight decrease in sales, partly due to negative factors in connection with the COVID-19 pandemic, but succeeded in raising earnings. Consumer Health increased business substantially (Fx & portfolio adj.), although EBITDA before special items fell due to currency and portfolio effects. Earnings per share (total) declined significantly, mainly due to impairment charges in the Crop Science Division and allocations to provisions for litigations. The gain from the sale of the Animal Health business unit had a positive impact. Core earnings per share came in at the prior-year level.

In the Group outlook published in February 2020 in the 2019 Annual Report, which did not yet take into account the impact of the COVID-19 pandemic, we anticipated currency-adjusted sales of around €44 billion to €45 billion, corresponding to an increase of 3% to 4% on a currency- and portfolio-adjusted basis. We expected an EBITDA margin before special items of around 28% on a currency-adjusted basis, which, based on the sales forecast, would have corresponded to EBITDA before special items of €12.3 billion to €12.6 billion on a currency-adjusted basis. We also forecast core earnings per share of between €7.00 and €7.20 on a currency-adjusted basis, and free cash flow of approximately €5 billion.

We revised our outlook in August based on the business development in the first half of the year and assumptions for the rest of the year that involved uncertainties. We reduced our sales forecast to €43 billion to €44 billion, corresponding to an increase of 0 to 1% on a currency- and portfolio-adjusted basis. Our target for the EBITDA margin before special items was left unchanged at around 28% on a currency-adjusted basis. Based on the sales target above, this would have corresponded to EBITDA before special items of around €12.1 billion on a currency-adjusted basis. In the revised outlook, we anticipated core earnings per share of between €6.70 and €6.90 on a currency-adjusted basis. We lowered our free cash flow forecast to between minus €0.5 billion and €0 billion in view of the expected payments in connection with litigations.

We met this revised full-year forecast in terms of our operational management indicators:

A 2.1.1/1

Target Attainment in 2020

	Forecast for 2020 currency-adjusted	Revised forecast for 2020[1] currency-adjusted	Target attainment in 2020 currency-adjusted	2020 results reported
Group sales	€44 - 45 billion	€43 - 44 billion	€43.3 billion	€41.4 billion
	+ 3 - 4% (Fx & p adj.)	+ 0 - 1% (Fx & p adj.)	+ 0.6% (Fx & p adj.)	– 4.9%
EBITDA before special items	€12.3 - 12.6 billion based on a margin of approx. 28%	€12.1 billion based on a margin of approx. 28%	€12.2 billion and a margin of 28.1%	€11.5 billion and a margin of 27.7%
Core earnings per share	€7.00 - 7.20	€6.70 - 6.90	€6.92	€6.39
Free cash flow	Approx. €5 billion (reported)	Minus €0.5 - 0 billion (reported)	€1.3 billion	€1.3 billion

Fx & p adj. = currency- and portfolio-adjusted
[1] Issued in August 2020

2.1.2 Key Events

Business activities impacted by COVID-19

Fiscal 2020 was greatly affected by the COVID-19 pandemic. Our top priority was – and remains – ensuring the health and safety of our employees and the supply of our products and life-saving medicines to patients, farmers and consumers.

The protective measures adopted worldwide and the uncertainty associated with the pandemic affected our business activities in a variety of ways. In our Crop Science Division, they led to weaker demand in some parts of our business. Among other factors, lower demand for biofuel in the first half of the year depressed prices for agricultural commodities, particularly in North America. This had negative repercussions for our business with corn seed and traits, for example. In addition, the uncertainties in certain regions and product areas resulted in shifts in demand between quarters. In the Pharmaceuticals Division, the worldwide protective measures and contact restrictions led to the cancellation or postponement of visits to the doctor, especially in the first half of the year, which resulted in nonurgent treatments in particular not being performed. However, the situation normalized to some extent in the third and fourth quarters. The increased focus on health and prevention had a positive impact on our Consumer Health Division, mainly through a sharp rise in demand for products in the Nutritionals category. At the same time, increased protection and hygiene measures led to a drop in sales of cough and cold products.

Further details on the effects of the pandemic on our business operations and the measures we adopted in response are provided in the respective chapters.

With regard to efforts to contain the COVID-19 pandemic, we announced in January 2021 that we had signed a collaboration and services agreement with the biopharmaceutical company CureVac N.V., Germany, to work together to enhance the availability of the COVID-19 vaccine candidate CVnCoV. CureVac is developing a new class of transformative medicines based on messenger ribonucleic acid (mRNA), which have reached clinical trials. Under the terms of the agreement, we will assist with the further development and supply of the vaccine candidate and support local activities in selected countries. In addition, we will use our production network to help

manufacture vaccines. We plan to supply 160 million doses of the vaccine in 2022. The first doses from our production could potentially be available by the end of 2021.

Accelerating the company's transformation

To counter the effects of reduced growth prospects and move the company forward in a persistently challenging market environment, we announced in September that we will accelerate our transformation. We aim to further enhance our innovation capabilities and lay the foundation for future growth, an example of which being our new strategic unit for cell and gene therapy. We are also planning to introduce additional operational savings, which could also lead to job reductions. The details are currently being worked out.

Impairment charges at Crop Science

The currently challenging market environment and extremely negative currency effects are leading to reduced growth expectations in the agricultural industry, especially in North and Latin America, with the cost of capital increasing at the same time. In this connection, we had to take noncash impairment charges of €9.1 billion on various intangible assets, including goodwill, in our agricultural business over the course of the year.

See A 2.2.1 and Note [14] in B Consolidated Financial Statements for more information

Portfolio changes

In February, we entered into an agreement with Nuvisan ICB GmbH, Germany, which acquired a large part of our Berlin-based small molecule research unit in mid-2020. The Nuvisan group is an international service provider for clinical studies, laboratory services and contract manufacturing for the pharmaceuticals industry. We will work closely with Nuvisan at the Berlin site in the future, with the move giving us greater flexibility in research and development in line with our strategy.

In early August, we completed the sale of our Animal Health business unit to Elanco Animal Health Incorporated, United States. The divestment resulted in approximately 4,400 employees transferring to Elanco. The provisional sale price amounted to US$6.8 billion, comprising a cash component and an equity component. The equity component consisted of approximately 72.9 million shares of Elanco common stock, corresponding to 15.5% of the company's outstanding shares. The provisional divestment gain amounted to about €5.2 billion.

In November we sold approximately 54.5 million of these Elanco shares for US$30.25 per share. In December we sold a further 8.175 million Elanco shares on the same terms. The gross proceeds of the two transactions totaled approximately US$1.9 billion.

In September, we completed the acquisition of British biotech company KaNDy Therapeutics Ltd. to expand our drug development pipeline in women's health care. Under the terms of the agreement, we paid an upfront consideration of US$425 million and will make potential milestone payments of up to US$450 million until launch, followed by potential additional sales milestone payments in the triple-digit millions.

In mid-November, we increased our investment in Noho Health, Inc. (Care/of), United States, giving us a majority stake. Care/of offers consumers a personalized regimen of nutritional supplements that is based on an individual health questionnaire and a special algorithm. The purchase price amounted to US$135 million. Additional success-based milestone payments totaling US$10 million have also been agreed. In addition, we secured the option to buy the remaining shares in the company.

In December, we completed the acquisition of Asklepios BioPharmaceutical, Inc. (AskBio), a U.S.-headquartered company specialized in the research, development and manufacturing of gene therapies across different therapeutic areas. Under the terms of the agreement, we paid an upfront consideration of US$2 billion and will make potential success-based milestone payments of up to US$2 billion. AskBio and BlueRock Therapeutics LP, which was acquired in 2019, are the first partners we are integrating into our newly established cell and gene therapy platform. As part of our Pharmaceuticals Division, this platform will combine multiple backbone functions, providing support across the entire value chain for the research and development of cell and gene therapies.

In December, we also announced the sale of a facility at the Wuppertal site of the Pharmaceuticals Division, originally intended for the production of biologics substances, to a German subsidiary of WuXi Biologics. The volume of the transaction under the respective agreement, which also includes a long-term sublease agreement and a transitional service contract, amounts to approximately €150 million. We expect the transaction to close in the first half of 2021.

Litigations

Further details on the litigations above and other legal risks are given in the "Legal Risks" in Note [30] to B Consolidated Financial Statements.

Glyphosate

In June, Monsanto reached an agreement in principle with plaintiffs, without admission of liability, to settle most of the current Roundup™ litigation, involving most of the total approximately 125,000 then known filed and unfiled claims, and to put in place a mechanism to resolve potential future claims.

The total costs of the executed and additional inventory settlements for all outstanding claims are currently expected to be up to US$9.6 billion. Monsanto continues in its efforts to reach settlement in a substantial number of the outstanding claims in the coming months.

Monsanto may withdraw from the various settlement agreements if certain eligibility and participation rates are not satisfied. Plaintiffs who opt out of a settlement have the right to pursue their claims separately against the company.

As regards potential future litigation, the company intends to make an additional payment to support a separate class agreement between Monsanto and plaintiffs' counsel. In July, Judge Chhabria of the U.S. District Court for the Northern District of California issued a pre-trial order raising concerns about certain aspects of the class settlement agreement and stating that he was tentatively inclined to deny the motion. The parties subsequently withdrew their motion, worked to comprehensively address the court's questions, and on February 3, 2021, filed with the court a revised class agreement and accompanying motion for preliminary approval of that settlement.

Bayer remains strongly committed to a resolution that simultaneously addresses the current litigation on reasonable terms and provides a viable solution to manage and resolve future litigation.

The three cases that have so far gone to trial – Johnson, Hardeman and Pilliod – will continue through the appeals process and are not covered by the settlement.

For information on the current status of these cases see Note [30] to B Consolidated Financial Statements

PCBs

In the litigation concerning the effects of PCBs in bodies of water, we reached an agreement in the second quarter for a nation-wide class settlement to settle claims of approximately 2,500 municipal government entities across the United States for a total payment, including class benefits and attorney fees, of approximately US$650 million. In November 2020, the court denied, without prejudice, the motion for preliminary approval and identified certain discreet areas of concern. In December 2020, the parties filed a revised class agreement. This agreement will require court approval before it becomes effective.

At the same time, we have entered into separate agreements with the attorneys general of New Mexico, Washington and the District of Columbia to resolve similar PCB claims. For these agreements, we will make payments that together total approximately US$170 million. Individual suits by Attorneys General of the States of Ohio, Pennsylvania, New Hampshire and Oregon remain pending. Bayer will continue its vigorous defense of any case that remains pending.

Dicamba

In June, we announced the conclusion of an agreement to settle the previously disclosed product liability litigation involving alleged damage to crops from drifting of dicamba. We will pay up to a total of US$400 million to resolve the multi-district litigation pending before a federal court in Missouri and claims for the 2015–2020 crop years.

The only dicamba drift case to go to trial – Bader Farms – is not included in this resolution.

Essure

In August, we announced that we had reached a settlement agreement to resolve Essure™ claims in the United States. By February 3, 2021, we had reached agreements in principle with plaintiff law firms to resolve approximately 99% of the nearly 40,000 total filed and unfiled U.S. Essure™ claims involving women who allege device-related injuries. The company will pay approximately US$1.6 billion to resolve these claims, including an allowance for outstanding claims, and is in resolution discussions with counsel for the remaining plaintiffs. At the same time, we continue to support the safety and efficacy of the Essure™ device and are prepared to vigorously defend it in litigation where no amicable resolution can be achieved.

See Note [30] to B Consolidated Financial Statements for the current status of this case

Financing activities

In early July, we issued €6 billion in bonds to ensure the financial flexibility necessary to make payments in connection with the glyphosate litigations and address upcoming bond maturities. The issuance comprised four €1.5 billion tranches with maturities of 4 years, 6.5 years, 9.5 years and 12 years, and exclusively targeted institutional investors.

In January 2021, we issued €4 billion in bonds consisting of four tranches. The proceeds are to be used for general corporate purposes, including the refinancing of existing liabilities. The four tranches have maturities of 4 years, 8 years, 10.5 years and 15 years.

Supervisory Board and the Board of Management

In late February 2020, the Supervisory Board of Bayer AG resolved to appoint Prof. Dr. Norbert Winkeljohann as its new Chairman with effect from the end of the 2020 Annual Stockholders' Meeting. He succeeded Werner Wenning, who then stepped down from the Supervisory Board.

The shareholder representative seat on the Supervisory Board that would have become vacant was taken by Horst Baier following his election by the Annual Stockholders' Meeting in April. He also succeeded Prof. Dr. Norbert Winkeljohann as Chairman of the Audit Committee.

In September, the Supervisory Board of Bayer AG unanimously decided to extend the contract of Werner Baumann, Chairman of the Board of Management, until April 30, 2024. Before the extension, Baumann's contract would have expired at the 2021 Annual Stockholders' Meeting.

In January 2021, the Supervisory Board of Bayer AG announced the appointment of Sarena Lin to the Board of Management as Chief Transformation and Talent Officer, effective February 1, 2021.

2.1.3 Economic Environment

World economy contracts due to coronavirus pandemic

Global economic development in 2020 was impacted by the COVID-19 pandemic. Trade and consumption slumped, especially in the second quarter, and unemployment rose considerably. Many countries saw their economies stabilize to a certain extent as the year went on, driven in part by the massive support from monetary and fiscal policy. Overall, however, economic output declined in all regions, especially in Europe, but also in the United States and most emerging markets. China was one of the few countries to register modest growth for the year.

See also A 2.2.2

A 2.1.3/1

Economic Environment

	Growth[1] 2019	Growth[1] 2020
World	+2.6%	–3.9%
European Union[2]	+1.6%	–6.7%
of which Germany	+0.6%	–5.3%
United States	+2.2%	–3.6%
Emerging Markets[3]	+4.1%	–2.1%

2019 figures restated
[1] Real GDP growth, source: IHS Markit (as of January 2021)
[2] EU excluding United Kingdom, 2019 figures restated
[3] Including about 50 countries defined by IHS Markit as Emerging Markets in line with the World Bank

Currency development

In 2020, Group sales were impacted by negative currency effects of €1,941 million, while EBITDA before special items was diminished by negative currency effects of €741 million. 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		
	2019	2020	Fx effect on sales	Fx effect on clean EBITDA	Of which result of Fx hedging[1]
AUD	1.61	1.65	(22)	(10)	2
BRL	4.41	5.80	(1,027)	(512)	124
CAD	1.49	1.53	(33)	4	20
CNY	7.74	7.87	(48)	(24)	11
JPY	122.01	121.71	13	40	28
MXN	21.55	24.35	(116)	(28)	19
RUB	72.44	81.86	(121)	(78)	26
TRY	6.35	7.90	(86)	(58)	0
USD	1.12	1.14	(121)	85	24
Other currency areas			(380)	(160)	21
All currencies			**(1,941)**	**(741)**	**275**

[1] Result of Fx hedging for all currencies in 2020 (€84 million) and 2019 (minus €191 million)

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

Key Data Bayer Group

			Change %[1]				Change %[1]	
€ million	Q4 2019	Q4 2020	Reported	Fx. & p. adj.	2019	2020	Reported	Fx. & p. adj.
Sales	**10,750**	**9,995**	**–7.0**	**+2.6**	**43,545**	**41,400**	**–4.9**	**+0.6**
Change in sales[1]								
Volume	+2.3%	+5.4%			+2.6%	+3.0%		
Price	+1.1%	–2.8%			+0.9%	–2.4%		
Currency	+1.3%	–9.4%			+1.5%	–4.4%		
Portfolio	–0.9%	–0.2%			+13.5%	–1.1%		
Sales by region								
Europe / Middle East / Africa	2,971	2,996	+0.8	+5.6	13,185	12,881	–2.3	+0.7
North America	3,392	3,027	–10.8	–3.7	15,087	14,352	–4.9	–2.0
Asia / Pacific	2,151	2,041	–5.1	–2.2	8,610	8,267	–4.0	–1.9
Latin America	2,236	1,931	–13.6	+12.7	6,663	5,900	–11.5	+9.3
EBITDA[1]	**1,994**	**2,024**	**+1.5**		**9,529**	**(2,910)**	**.**	
Special items[1]	(482)	(368)			(1,945)	(14,371)		
EBITDA before special items[1]	**2,476**	**2,392**	**–3.4**		**11,474**	**11,461**	**–0.1**	
EBITDA margin before special items[1]	23.0%	23.9%			26.3%	27.7%		
EBIT[1]	**389**	**1,515**	**.**		**4,162**	**(16,169)**	**.**	
Special items[1]	(922)	67			(2,813)	(23,264)		
EBIT before special items[1]	**1,311**	**1,448**	**+10.5**		**6,975**	**7,095**	**+1.7**	
Financial result	**(378)**	**(142)**	**–62.4**		**(1,309)**	**(1,081)**	**–17.4**	
Net income (from continuing and discontinued operations)	**1,414**	**308**	**–78.2**		**4,091**	**(10,495)**	**.**	
Earnings per share[1] from continuing and discontinued operations (€)	**1.44**	**0.32**	**–77.8**		**4.17**	**(10.68)**	**.**	
Core earnings per share[1] from continuing operations (€)	**1.29**	**1.32**	**+2.3**		**6.38**	**6.39**	**+0.2**	
Net cash provided by operating activities (from continuing and discontinued operations)	**3,246**	**751**	**–76.9**		**8,207**	**4,903**	**–40.3**	
Free cash flow (from continuing and discontinued operations)	**1,692**	**(503)**	**.**		**4,214**	**1,343**	**–68.1**	

2019 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 level year on year after adjusting for currency and portfolio effects

Sales of the Bayer Group came in level with the previous year in 2020, at €41,400 million (Fx & portfolio adj. +0.6%; reported –4.9%). Germany accounted for €2,361 million of this figure.

Sales at Crop Science advanced by 1.3% (Fx & portfolio adj.) to €18,840 million. Our businesses in Latin America and Asia / Pacific contributed to the increase, while sales receded in North America. Sales at Pharmaceuticals declined by 1.5% (Fx & portfolio adj.) to €17,243 million. This was due to the negative impact of the COVID-19 pandemic and sales declines resulting from new tender procedures in China. Sales at Consumer Health advanced by a substantial 5.2% (Fx & portfolio adj.) to €5,054 million, mainly in light of significant growth in the Nutritionals category. In the Reconciliation, sales fell by 8.3% to €263 million.

Earnings

EBITDA before special items of the Bayer Group came in level with the prior year at €11,461 million (2019: €11,474 million; –0.1%). Negative currency effects diminished earnings by €741 million. EBITDA before special items at Crop Science moved back by 3.8% to €4,536 million (2019: €4,714 million), primarily due to very negative currency effects. At Pharmaceuticals, EBITDA before special items improved by 2.6% to €6,016 million (2019: 5,861 million), with strict cost management more than offsetting the slight decline in sales. EBITDA before special items at Consumer Health receded by 2.5% to €1,114 million (2019: €1,142 million), mainly due to the absence of earnings contributions from the divested businesses and to negative currency effects. These factors were partly offset by the positive effects of the sales development on earnings and contributions from the efficiency program initiated at the end of 2018. In the Reconciliation, EBITDA before special items fell by 15.6% to minus €205 million.

See also A 2.3

EBITDA in 2020 came in at minus €2,910 million (2019: €9,529 million). Depreciation, amortization and impairment losses – less impairment loss reversals – led to net expenses of €13,259 million (2019: €5,367 million), with intangible assets accounting for €11,570 million (2019: €2,887 million) and property, plant and equipment for €1,689 million (2019: €2,480 million). Impairment losses – less impairment loss reversals – led to net expenses of €8,976 million (2019: €928 million). These included €8,948 million (2019: €247 million) in impairments on intangible assets, of which €2,238 million related to goodwill.

See also A 2.3

The impairment losses were mainly recognized in the Crop Science Division and pertained to the Corn Seed & Traits, Soybean Seed & Traits, Herbicides and Vegetable Seeds business units as well as to the cotton seed and canola businesses (reported under “Other”). These impairments were driven by reduced growth expectations in the agricultural industry, especially in North and Latin America. Extremely negative currency effects and an increase in the weighted average cost of capital also had a negative impact. In the Consumer Health Division, we recognized impairment loss reversals for Claritin™ and Afrin™ totaling €253 million in 2020. We also recognized an impairment loss reversal on property, plant and equipment in the Pharmaceuticals Division in connection with the agreed sale of a production facility at the Wuppertal site.

Impairment losses of €8,898 million (2019: €866 million), net of impairment loss reversals, and accelerated depreciation of €1 million (2019: €2 million) were included in special items.

EBIT in 2020 fell to minus €16,169 million (2019: €4,162 million) after net special charges of €23,264 million (2019: €2,813 million). The special charges mainly comprised provisions for the agreements reached in the litigations concerning glyphosate and dicamba (both in the Crop Science Division), PCBs (in the Reconciliation) and Essure™ (in the Pharmaceuticals Division). In addition, the aforementioned impairment charges on Crop Science assets and impairment loss reversals at Consumer Health constituted special items. Additional special charges resulted from the restructuring program announced at the end of 2018. **EBIT before special items** rose by 1.7% to €7,095 million (2019: €6,975 million).

In 2020, 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 2019	EBIT Q4 2020	EBIT 2019	EBIT 2020	EBITDA Q4 2019	EBITDA Q4 2020	EBITDA 2019	EBITDA 2020
Total special items	**(922)**	**67**	**(2,813)**	**(23,264)**	**(482)**	**(368)**	**(1,945)**	**(14,371)**
Crop Science	**(596)**	**54**	**(1,418)**	**(20,420)**	**(75)**	**(56)**	**(896)**	**(11,136)**
Pharmaceuticals	**(72)**	**9**	**(137)**	**(1,565)**	**41**	**(117)**	**(24)**	**(1,705)**
Consumer Health	**162**	**174**	**(16)**	**199**	**(33)**	**(25)**	**215**	**(54)**
Reconciliation	**(416)**	**(170)**	**(1,242)**	**(1,478)**	**(415)**	**(170)**	**(1,240)**	**(1,476)**
Special items by category								
Restructuring	(499)	(56)	(1,355)	(556)	(385)	(181)	(1,239)	(694)
of which in the Reconciliation	(320)	(132)	(1,090)	(573)	(319)	(131)	(1,088)	(571)
Acquisition / integration	(66)	(71)	(707)	(282)	(67)	(73)	(707)	(271)
of which in the Reconciliation	(3)	–	(19)	(2)	(3)	(1)	(19)	(2)
Divestments	39	(10)	304	(52)	39	(10)	305	(52)
of which in the Reconciliation	–	(11)	–	(45)	–	(11)	–	(45)
Litigations / legal risks	(13)	(27)	(245)	(13,163)	(13)	(27)	(245)	(13,163)
of which in the Reconciliation	(37)	(27)	(77)	(858)	(37)	(27)	(77)	(858)
Impairment losses / loss reversals[2]	(327)	284	(754)	(9,158)	–	(24)	(3)	(138)
Other	(56)	(53)	(56)	(53)	(56)	(53)	(56)	(53)
of which in the Reconciliation	(56)	–	(56)	–	(56)	–	–	–

2019 figures restated
[1] For definition see A 2.3 "Alternative Performance Measures Used by the Bayer Group."
[2] Where not already included in the other special items categories

Core earnings per share

Core earnings per share were level year on year at €6.39 (2019: €6.38; +0.2%), as the positive earnings development at Pharmaceuticals was offset by lower earnings at Crop Science.

Earnings per share (total) in 2020 fell to minus €10.68 (2019: €4.17), weighed down by litigation expenses in connection with the reported settlement agreements and the aforementioned impairments in the Crop Science Division. The proceeds from the divestment of the Animal Health business unit had a positive effect.

A 2.2.1/3

Core Earnings per Share[1]

€ million	Q4 2019	Q4 2020	2019	2020
EBIT (as per income statements)	**389**	**1,515**	**4,162**	**(16,169)**
Amortization and impairment losses / loss reversals on goodwill and other intangible assets	484	254	2,887	11,570
Impairment losses / loss reversals on property, plant and equipment, and accelerated depreciation included in special items	674	(110)	682	29
Special items (other than amortization, accelerated depreciation and impairment losses / loss reversals)	482	368	1,945	14,371
Core EBIT	**2,029**	**2,027**	**9,676**	**9,801**
Financial result (as per income statements)	(378)	(142)	(1,309)	(1,081)
Special items in the financial result[2]	11	(197)	(268)	(469)
Income taxes (as per income statements)	(43)	(987)	(443)	1,689
Special items in income taxes	67	–	67	–
Tax effects related to amortization, impairment losses / loss reversals and special items	(411)	600	(1,441)	(3,640)
Income after income taxes attributable to noncontrolling interest (as per income statements)	(11)	(3)	(19)	(8)
Above-mentioned adjustments attributable to noncontrolling interest	(1)	–	(4)	(12)
Core net income from continuing operations	**1,263**	**1,298**	**6,259**	**6,280**
Shares (million)				
Weighted average number of shares[3]	982.43	982.42	981.69	982.42
€				
Core earnings per share from continuing operations	**1.29**	**1.32**	**6.38**	**6.39**

2019 figures restated

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

[2] Primarily comprising changes in the fair value of our interests in Elanco (€392 million) and Covestro (€94 million)

[3] 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.

Bayer Group – Other Earnings Parameters

A 2.2.1/4

Bayer Group Summary Income Statements

€ million	Q4 2019	Q4 2020	Change %	2019	2020	Change %
Net sales	10,750	9,995	–7.0	43,545	41,400	–4.9
Cost of goods sold	(4,920)	(3,669)	–25.4	(17,613)	(19,138)	+8.7
Selling expenses	(3,058)	(2,827)	–7.6	(12,489)	(13,053)	+4.5
Research and development expenses	(1,399)	(1,291)	–7.7	(5,301)	(7,126)	+34.4
General administration expenses	(969)	(664)	–31.5	(3,606)	(2,879)	–20.2
Other operating income / expenses	(15)	(29)	+93.3	(374)	(15,373)	.
EBIT[1]	**389**	**1,515**	**.**	**4,162**	**(16,169)**	**.**
Financial result	**(378)**	**(142)**	**–62.4**	**(1,309)**	**(1,081)**	**–17.4**
Income before income taxes	**11**	**1,373**	**.**	**2,853**	**(17,250)**	**.**
Income taxes	(43)	(987)	.	(443)	1,689	.
Income from continuing operations after taxes	(32)	386	.	2,410	(15,561)	.
Income from discontinued operations after taxes	1,457	(75)	.	1,700	5,074	+198.5
Income after income taxes (total)	**1,425**	**311**	**–78.2**	**4,110**	**(10,487)**	**.**
of which attributable to non-controlling interest	11	3	–72.7	19	8	–57.9
of which attributable to Bayer AG stockholders (net income)	**1,414**	**308**	**–78.2**	**4,091**	**(10,495)**	**.**

2019 figures restated

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

Functional costs

The cost of goods sold rose by 8.7% to €19,138 million in 2020. This significant increase was attributable to special charges resulting from the impairments recognized in the Crop Science Division. The ratio of the cost of goods sold to total sales also increased significantly year on year to 46.2% (2019: 40.4%).

Selling expenses advanced by 4.5% to €13,053 million. The considerable increase at Crop Science due to special charges for the impairments was partly offset by lower selling expenses at Pharmaceuticals. In the Consumer Health Division, special gains from the impairment loss reversals for Claritin™ and Afrin™ led to lower selling expenses. Selling expenses accounted for 31.5% (2019: 28.7%) of sales.

Research and development (R&D) expenses rose by 34.4% to €7,126 million. The ratio of R&D expenses to sales was 17.2% (2019: 12.2%). The increase in this ratio was due to special charges of €2,242 million, mainly in connection with the aforementioned impairments at Crop Science.

General administration expenses fell by a substantial 20.2% to €2,879 million, mainly on account of lower one-time expenses for the ongoing restructuring program. The ratio of general administration expenses to total sales therefore decreased to 7.0% (2019: 8.3%).

The balance of other operating expenses and other operating income amounted to minus €15,373 million (2019: minus €374 million). This figure reflected in particular the allocations to provisions in connection with the glyphosate, dicamba, PCB and Essure™ litigations as well as the impairment loss on goodwill in the Crop Science Division.

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 2.2.1/5

Special Items by Functional Cost[1]

€ million	EBIT Q4 2019	EBIT Q4 2020	EBIT 2019	EBIT 2020	EBITDA Q4 2019	EBITDA Q4 2020	EBITDA 2019	EBITDA 2020
Total special items	**(922)**	**67**	**(2,813)**	**(23,264)**	**(482)**	**(368)**	**(1,945)**	**(14,371)**
Cost of goods sold	(682)	90	(1,190)	(3,411)	(24)	(38)	(531)	(233)
Selling expenses	174	202	(153)	(1,433)	(37)	(37)	(146)	(100)
Research and development expenses	(22)	(8)	(19)	(2,242)	(22)	(76)	(19)	(110)
General administration expenses	(413)	(175)	(1,300)	(709)	(412)	(175)	(1,298)	(708)
Other operating income / expenses	21	(42)	(151)	(15,469)	13	(42)	49	(13,220)

2019 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 €1,081 million (2019: minus €1,309 million), income before income taxes was minus €17,250 million (2019: €2,853 million). The financial result comprised income from investments in affiliated companies of €406 million (2019: €190 million), net interest expense of €1,292 million (2019: €1,281 million), a net exchange loss of €216 million (2019: net exchange gain of €58 million), interest cost of €102 million (2019: €273 million) for pension and other provisions, and net other financial income of €122 million (2019: net expenses of €3 million). The financial result included net special gains of €469 million (2019: €268 million), mainly resulting from changes in the fair value of our interests in Elanco and Covestro.

Income taxes

Income of €1,689 million from income taxes was recorded in 2020 (2019: income tax expense of €443 million). This tax income largely arose from the tax-reducing effect of the expenses in connection with the settlement agreements in the United States.

Income from discontinued operations after income taxes

Income from discontinued operations after income taxes was €5,074 million (2019: €1,700 million) and included the €5,171 million proceeds from the divestment of the Animal Health business unit.

Net income

After income from income taxes, income from discontinued operations after income taxes, and income attributable to noncontrolling interest, a net loss of €10,495 million was recorded for 2020 (2019: net income of €4,091 million).

2.2.2 Business Development by Division

Crop Science

Challenging market environment

The global seed and crop protection market grew moderately in 2020 (Fx adj. +2%, 2019: 0%). The Latin America region saw an expansion of soybean and corn acreages, while the U.S. soybean market recovered from the 2019 flooding impact. Overall growth was limited by the decrease in cotton, fruit and vegetables demand caused by the COVID-19 pandemic, as well as dry weather conditions in Europe during the spring.

A 2.2.2/1

Key Data – Crop Science

			Change %[1]				Change %[1]	
€ million	Q4 2019	Q4 2020	Reported	Fx & p adj.	2019	2020	Reported	Fx & p adj.
Sales	**4,652**	**4,176**	**–10.2**	**+4.3**	**19,832**	**18,840**	**–5.0**	**+1.3**
Change in sales[1]								
Volume	–1.7%	+4.1%			–0.3%	+1.5%		
Price	+0.8%	+0.2%			+1.7%	–0.2%		
Currency	+0.7%	–14.5%			+1.3%	–6.3%		
Portfolio	0.0%	0.0%			+36.3%	0.0%		
Sales by region								
Europe/Middle East/Africa	581	545	–6.2	–0.8	4,170	4,053	–2.8	–0.1
North America	1,761	1,555	–11.7	–4.6	8,743	8,367	–4.3	–4.3
Asia/Pacific	490	499	+1.8	+6.9	1,829	1,917	+4.8	+8.9
Latin America	1,820	1,577	–13.4	+13.7	5,090	4,503	–11.5	+9.4
EBITDA[1]	**774**	**538**	**–30.5**		**3,818**	**(6,600)**	**.**	
Special items[1]	(75)	(56)			(896)	(11,136)		
EBITDA before special items[1]	**849**	**594**	**–30.0**		**4,714**	**4,536**	**–3.8**	
EBITDA margin before special items[1]	18.3%	14.2%			23.8%	24.1%		
EBIT[1]	**(472)**	**91**	**.**		**514**	**(18,629)**	**.**	
Special items[1]	(596)	54			(1,418)	(20,420)		
EBIT before special items[1]	**124**	**37**	**–70.2**		**1,932**	**1,791**	**–7.3**	
Net cash provided by (used in) operating activities	**2,651**	**(577)**	**.**		**4,150**	**99**	**–97.6**	
Cash-flow relevant capital expenditures	484	404	–16.5		1,203	1,103	–8.3	
Research and development expenses	584	403	–31.0		2,264	4,138	+82.8	

2019 figures restated
Fx & p adj. = currency- and portfolio-adjusted
[1] For definition see A 2.3 “Alternative Performance Measures Used by the Bayer Group.”

Sales

Sales at Crop Science advanced by 1.3% (Fx & portfolio adj.) to €18,840 million in 2020. Our businesses in the Latin America and Asia / Pacific regions contributed to the increase, while declines occurred particularly in North America.

A 2.2.2/2

Sales by Strategic Business Entity

			Change %[1]				Change %[1]	
€ million	Q4 2019	Q4 2020	Reported	Fx & p adj.	2019	2020	Reported	Fx & p adj.
Crop Science	**4,652**	**4,176**	**–10.2**	**+4.3**	**19,832**	**18,840**	**–5.0**	**+1.3**
Corn Seed & Traits	1,100	980	–10.9	+1.2	5,164	4,970	–3.8	–0.5
Herbicides	1,203	1,074	–10.7	–0.7	5,097	4,740	–7.0	–1.0
Fungicides	788	669	–15.1	+5.0	2,718	2,639	–2.9	+8.5
Soybean Seed & Traits	587	505	–14.0	+8.4	2,119	1,956	–7.7	+2.3
Insecticides	380	312	–17.9	–1.0	1,448	1,370	–5.4	+3.9
Environmental Science	235	237	+0.9	+9.9	994	1,070	+7.6	+11.5
Vegetable Seeds	157	179	+14.0	+21.7	689	640	–7.1	–3.9
Other	202	220	+8.9	+26.1	1,603	1,455	–9.2	–5.2

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

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

// Sales at **Corn Seed & Traits** remained at the prior-year level. In North America, shifts in demand into 2019 and 2021 had a negative impact, while sales moved ahead in all the other regions. Our business in Latin America benefited from an expansion in volumes due to higher acreages and positive product mix effects. We also registered growth in Europe / Middle East / Africa, primarily thanks to price increases.
// The decline in sales at **Herbicides** was due in particular to a loss of registrations in Europe / Middle East / Africa and North America. Business in North America was also impacted by shifts in demand for selective herbicides into the prior year. However, we expanded our business in Asia / Pacific and Latin America.
// Sales at **Fungicides** rose year on year, with all regions registering growth. In Latin America, we recorded sales gains for Fox Xpro™, which was launched in the previous year, with an increase in volumes and prices. We also saw an increase in volumes in North America due to the normalization of weather conditions and synergy effects arising from the Bayer Plus program.
// Sales at **Soybean Seed & Traits** were up against the prior year. Greater market penetration in Latin America had a positive effect, while our business in North America saw lower selling prices and volumes, mainly due to increased competition.
// We posted an increase in sales at **Insecticides**, with all regions registering growth. Business in Latin America benefited from higher prices achieved in Brazil.
// We achieved strong growth at **Environmental Science**, with all regions showing positive development. Our consumer business posted substantial gains, particularly in North America due to favorable weather and shifts in demand as a result of advance sales.
// Sales at **Vegetable Seeds** fell year on year. Business in the North America region was particularly affected by lower demand attributable to COVID-19.
// Sales in the reporting unit **"Other"** declined overall. Sales of cotton seed in North America were especially impacted by lower acreages.

Earnings

EBITDA before special items at Crop Science declined by 3.8% in 2020 to €4,536 million (2019: €4,714 million). The EBITDA margin before special items increased by 0.3 percentage points to 24.1% (2019: 23.8%). Business was particularly impacted by negative currency effects of €537 million, while the decline in sales in North America due to shifts in demand was also a key factor. By contrast, earnings benefited from the realization of cost synergies as we progress with the integration of the acquired business and from additional effects arising from the COVID-19 pandemic, such as lower travel costs.

EBIT receded in 2020 to minus €18,629 million (2019: plus €514 million) after net special charges of €20,420 million (2019: €1,418 million) that mainly arose from the provisions established for the glyphosate and dicamba agreements. Further special charges comprised the noncash impairment charges on various assets, including goodwill, that were mostly recognized in the third quarter.

A 2.2.2/3

Special Items[1] Crop Science

€ million	EBIT Q4 2019	EBIT Q4 2020	EBIT 2019	EBIT 2020	EBITDA Q4 2019	EBITDA Q4 2020	EBITDA 2019	EBITDA 2020
Restructuring	–	–	(1)	–	–	–	(1)	–
Acquisition / integration	(63)	(36)	(688)	(245)	(64)	(37)	(688)	(234)
Divestments	37	1	(16)	(7)	37	1	(16)	(7)
Litigations / legal risks	(48)	–	(191)	(10,762)	(48)	–	(191)	(10,762)
Impairment losses / loss reversals	(522)	89	(522)	(9,406)	–	(20)	–	(133)
Total special items	**(596)**	**54**	**(1,418)**	**(20,420)**	**(75)**	**(56)**	**(896)**	**(11,136)**

2019 figures restated

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

Fourth quarter of 2020

Sales

In the fourth quarter, sales were up against the prior-year period. The Latin America and Asia / Pacific regions in particular contributed to the increase. Sales at **Corn Seed & Traits** grew thanks to higher volumes and prices in Latin America. However, sales at **Herbicides** declined, with business in North America temporarily hampered by the loss of a registration and the fact that XtendiMax™ was only registered in the fourth quarter. At **Fungicides,** business was up against the prior year, primarily thanks to higher prices. We also registered an increase in sales at **Soybean Seed & Traits**, primarily due to greater market penetration and higher prices in Latin America. At **Insecticides,** shifts in demand in the Asia / Pacific region had a negative impact. Sales at **Environmental Science** rose, driven by our consumer business in North America. At **Vegetable Seeds**, we recorded encouraging growth due to shifts in demand from the third quarter. Sales also increased in the reporting unit **"Other."** Growth was driven by our cotton seed business in the Asia / Pacific and Latin America regions, in part thanks to normalized weather conditions.

Earnings

EBITDA before special items fell by 30.0% in the fourth quarter to €594 million (Q4 2019: €849 million). Earnings were heavily impacted by negative currency effects of €450 million, mainly in Brazil, and by the decline in sales in North America and Europe / Middle East / Africa.

EBIT increased to €91 million in the fourth quarter (Q4 2019: minus €472 million) after net special gains of €54 million. These positive effects were due to impairment loss reversals on various assets, while special charges arose in connection with the integration of the acquired businesses.

Pharmaceuticals

Pharmaceuticals market shows slower growth

The pharmaceuticals market grew by 3% (Fx adj.) in 2020 (2019: 6%), with the slower growth attributable to the unprecedented challenges arising from the COVID-19 pandemic. Despite the pandemic, markets in North and Latin America and some parts of Europe showed a positive development. The increasingly aging population and improved access to health care were again among the drivers, while market expansion was also supported by innovative and in many cases higher-priced medicines. Market growth was held back not only by general uncertainties over the development of the global economy but also by continuing price pressure from generics and biosimilars along with reforms in local health care systems.

A 2.2.2/4

Key Data – Pharmaceuticals

			Change %[1]				Change %[1]	
€ million	Q4 2019	Q4 2020	Reported	Fx & p adj.	2019	2020	Reported	Fx & p adj.
Sales	**4,682**	**4,476**	**–4.4**	**+0.5**	**17,962**	**17,243**	**–4.0**	**–1.5**
Change in sales[1]								
Volume	+6.3%	+7.9%			+5.7%	+4.8%		
Price	+0.9%	–7.4%			–0.1%	–6.3%		
Currency	+1.9%	–4.9%			+1.8%	–2.5%		
Portfolio	0.0%	0.0%			–0.1%	0.0%		
Sales by region								
Europe/Middle East/Africa	1,847	1,918	+3.8	+8.1	6,918	6,940	+0.3	+2.3
North America	1,071	975	–9.0	–3.3	4,040	3,855	–4.6	–2.8
Asia/Pacific	1,501	1,357	–9.6	–7.5	6,031	5,598	–7.2	–6.3
Latin America	263	226	–14.1	+8.2	973	850	–12.6	+6.6
EBITDA[1]	**1,442**	**1,422**	**–1.4**		**5,837**	**4,311**	**–26.1**	
Special items[1]	41	(117)			(24)	(1,705)		
EBITDA before special items[1]	**1,401**	**1,539**	**+9.9**		**5,861**	**6,016**	**+2.6**	
EBITDA margin before special items[1]	29.9%	34.4%			32.6%	34.9%		
EBIT[1]	**1,060**	**1,308**	**+23.4**		**4,686**	**3,467**	**–26.0**	
Special items[1]	(72)	9			(137)	(1,565)		
EBIT before special items[1]	**1,132**	**1,299**	**+14.8**		**4,823**	**5,032**	**+4.3**	
Net cash provided by operating activities	**1,010**	**1,258**	**+24.6**		**4,427**	**4,064**	**–8.2**	
Cash flow-relevant capital expenditures	385	368	–4.4		811	915	+12.8	
Research and development expenses	744	816	+9.7		2,780	2,743	–1.3	

2019 figures restated
Fx & p adj. = currency- and portfolio-adjusted
[1] For definition see A 2.3 "Alternative Performance Measures Used by the Bayer Group."

Sales

Sales at Pharmaceuticals fell by 1.5% (Fx & portfolio adj.) to €17,243 million in 2020. This development was driven by the global COVID-19 restrictions, which particularly in the first half of the year led to a reduced number of elective treatments, especially in our ophthalmology and women's health businesses. The situation began to normalize mid-year. Sales in the radiology business were down compared with 2019, with stricter hygiene measures slowing down patient processing throughout the year.

In addition, the implementation of new tender procedures in China for our products Glucobay™ and Avelox™ weighed heavily on sales.

A 2.2.2/5

Best-Selling Pharmaceuticals Products

			Change %[1]				Change %[1]	
€ million	Q4 2019	Q4 2020	Reported	Fx & p adj.	2019	2020	Reported	Fx & p adj.
Xarelto™	1,148	1,212	+5.6	+10.9	4,126	4,515	+9.4	+12.4
Eylea™	667	669	+0.3	+3.6	2,494	2,468	−1.0	+0.2
Mirena™ / Kyleena™ / Jaydess™	302	288	−4.6	+2.6	1,223	1,081	−11.6	−8.7
Kogenate™ / Kovaltry™ / Jivi™	222	201	−9.5	−4.9	882	851	−3.5	−2.3
YAZ™ / Yasmin™ / Yasminelle™	172	168	−2.3	+6.2	681	670	−1.6	+3.2
Nexavar™	164	159	−3.0	+2.2	706	639	−9.5	−6.9
Aspirin™ Cardio	147	169	+15.0	+20.3	579	639	+10.4	+14.2
Adempas™	111	261	+135.1	+141.6	418	628	+50.2	+52.5
Adalat™	156	138	−11.5	−9.6	664	613	−7.7	−6.2
Stivarga™	106	109	+2.8	+8.8	411	475	+15.6	+18.6
Betaferon™ / Betaseron™	125	86	−31.2	−27.1	457	404	−11.6	−9.7
CT Fluid Delivery[2]	112	107	−4.5	+1.4	407	396	−2.7	−0.4
Gadovist™ product family	111	102	−8.1	−2.7	433	385	−11.1	−8.6
Ultravist™	87	80	−8.0	−1.6	340	303	−10.9	−7.1
Xofigo™	71	61	−14.1	−7.2	303	262	−13.5	−11.6
Total best-selling products	**3,701**	**3,810**	**+2.9**	**+8.1**	**14,124**	**14,329**	**+1.5**	**+4.0**
Proportion of Pharmaceuticals sales	79%	85%			79%	83%		

Fx & p adj. = currency- and portfolio-adjusted
[1] For definition see A 2.4 "Alternative Performance Measures Used by the Bayer Group."

// We registered strong growth in sales of our oral anticoagulant **Xarelto™** that resulted from a marked increase in volumes in China as well as substantial growth in Europe. We saw a significant expansion of business in Russia in particular. Our license revenues – recognized as sales – in the United States, where Xarelto™ is marketed by a subsidiary of Johnson & Johnson, declined due to currency effects.
// Sales of our ophthalmology drug **Eylea™** were level year on year. Particularly in the first half of the year, the reduced number of treatments due to the closure of some ophthalmology clinics and practices led to a decline in sales. The extension of treatment intervals by patients due to the contact restrictions and stay-at-home measures also diminished sales, particularly in Europe. This effect was offset by the normalization of treatment over the remainder of the year and the launch of Eylea™ prefilled syringes, which particularly benefited sales in Japan and Germany.
// Business with our **Mirena™ / Kyleena™ / Jaydess™** intrauterine systems was also impeded by the effects of the pandemic. Protective measures such as the prioritization of emergency treatments or the partial closure of some doctor's offices led to a reduced number of procedures.
// We registered significant sales gains for **Aspirin™ Cardio**, our product for secondary prevention of heart attacks. This was mainly attributable to a sharp increase in demand in China and to growth in Mexico, which was partly due to the use of this product in the treatment of COVID-19 patients.
// We posted a significant increase in sales of our pulmonary hypertension treatment **Adempas™**, particularly 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. Since a further milestone in this collaboration was reached in the fourth quarter of 2020, sales for the full year included the proportionate recognition of this milestone payment for the contract term to date.
// Sales of our cancer drug **Nexavar™** receded, mainly due to a decline in volumes in the United States as a result of strong competition. This effect was partly offset by strong growth in China.

// Our cancer drug **Stivarga™** continued to deliver substantial sales gains, especially in China and the United States. Among other factors, sales benefited from the product's oral administration, enabling treatment to continue outside of hospitals and doctor's offices during the ongoing pandemic.
// Sales of our cancer drug **Xofigo™** decreased markedly, especially in the United States. Business was weighed down by restrictions related to COVID-19, among other factors.

Earnings

EBITDA before special items advanced by 2.6% to €6,016 million. The EBITDA margin before special items increased by 2.3 percentage points to 34.9%. Thanks to stringent cost management, we were able to grow earnings despite recording a slight decline in sales. We particularly reduced our selling expenses, due in part to the COVID-19-related restrictions, while the cost of goods sold and research and development expenses were also lower year on year. Earnings were diminished by a negative currency effect of €132 million.

EBIT at Pharmaceuticals declined by a substantial 26.0% to €3,467 million. The significant increase in net special charges, from €137 million in 2019 to €1,565 million in 2020, had a negative impact. The special charges in 2020 primarily arose in connection with the settlement agreement reached in the Essure™ litigation in August.

A 2.2.2/6

Special Items[1] Pharmaceuticals

€ million	EBIT Q4 2019	EBIT Q4 2020	EBIT 2019	EBIT 2020	EBITDA Q4 2019	EBITDA Q4 2020	EBITDA 2019	EBITDA 2020
Restructuring	(144)	101	(157)	71	(31)	(25)	(44)	(69)
Integration costs	–	(35)	–	(35)	–	(35)	–	(35)
Litigations / legal risks	72	–	23	(1,543)	72	–	23	(1,543)
Impairment losses / loss reversals	–	(4)	(3)	(5)	–	(4)	(3)	(5)
Other	–	(53)	–	(53)	–	(53)	–	(53)
Total special items	**(72)**	**9**	**(137)**	**(1,565)**	**41**	**(117)**	**(24)**	**(1,705)**

2019 figures restated
[1] For definition see A 2.3 "Alternative Performance Measures Used by the Bayer Group."

Fourth quarter of 2020

Sales

Sales at Pharmaceuticals rose by 0.5% (Fx & portfolio adj.) to €4,476 million in the fourth quarter. Significant sales gains for important products more than offset the negative effects arising from the introduction of the volume-based procurement policy in China.

The **Xarelto™** growth trend continued in the fourth quarter. Strong volume gains, especially in Russia and China, were partly offset by a decrease in sales in Germany and lower license revenues in the United States as a result of currency effects. Sales of **Eylea™** were up slightly year on year, with the launch of the Eylea™ prefilled syringe contributing to growth. We posted considerable growth for **Aspirin™ Cardio** due to increased demand in China and Mexico. Fourth-quarter sales of **Adempas™** included the proportionate recognition of the milestone payment under the sGC collaboration with Merck & Co., United States, for the contract term to date. Sales of our multiple sclerosis treatment **Betaferon™ / Betaseron™** continued to decline sharply, largely due to heavy competition in the United States and Germany.

Earnings

EBITDA before special items rose by 9.9% to €1,539 million in the fourth quarter. Alongside the proportionate recognition of the Adempas™ milestone payment in sales, the significant growth in earnings was mainly driven by a decrease in selling expenses that was partly attributable to the COVID-19-related restrictions. We also recorded a decline in the cost of goods sold against the prior-year period. Earnings were diminished by a negative currency effect of €85 million.

EBIT at Pharmaceuticals rose by a substantial 23.4% to €1,308 million after net special gains of €9 million (Q4 2019: net special charges of €72 million). Special items in the "Restructuring" category were positive overall, partly due to the impairment loss reversal on a production facility at our Wuppertal site, while special charges arose in connection with the termination of development for vilaprisan and the integration of AskBio.

Consumer Health

Stable market growth

Growth of the global consumer health market in 2020 was 4% on a currency-adjusted basis (2019: 4%). While overall market growth remained stable, we saw a sharp rise in products that help support people's immune systems leading to high growth in the nutritionals category. On the other hand, the social distancing and hygiene measures led to a sharp decline in the incidence of flu around the world which led to a decline in the sales of cough and cold products.

A 2.2.2/7

Key Data – Consumer Health

			Change %[1]				Change %[1]	
€ million	Q4 2019	Q4 2020	Reported	Fx & p adj.	2019	2020	Reported	Fx & p adj.
Sales	**1,337**	**1,250**	**–6.5**	**+3.1**	**5,462**	**5,054**	**–7.5**	**+5.2**
Changes in sales[1]								
Volume	+3.0%	+0.7%			+0.9%	+3.3%		
Price	+3.2%	+2.4%			+1.7%	+1.9%		
Currency	+1.4%	–8.4%			+1.2%	–4.4%		
Portfolio	–7.1%	–1.2%			–3.6%	–8.3%		
Sales by region								
Europe / Middle East / Africa	479	452	–5.6	+1.3	1,838	1,739	–5.4	+2.6
North America	547	492	–10.1	–0.1	2,280	2,026	–11.1	+4.7
Asia / Pacific	160	178	+11.3	+14.3	749	744	–0.7	+6.1
Latin America	151	128	–15.2	+8.8	595	545	–8.4	+14.1
EBITDA[1]	**266**	**233**	**–12.4**		**1,357**	**1,060**	**–21.9**	
Special items[1]	(33)	(25)			215	(54)		
EBITDA before special items[1]	**299**	**258**	**–13.7**		**1,142**	**1,114**	**–2.5**	
EBITDA margin before special items[1]	22.4%	20.6%			20.9%	22.0%		
EBIT[1]	**381**	**352**	**–7.6**		**794**	**992**	**+24.9**	
Special items[1]	162	174			(16)	199		
EBIT before special items[1]	**219**	**178**	**–18.7**		**810**	**793**	**–2.1**	
Net cash provided by operating activities	**246**	**276**	**+12.2**		**876**	**987**	**+12.7**	
Cash flow-relevant capital expenditures	59	75	+27.1		169	159	–5.9	
Research and development expenses	58	53	–8.6		218	195	–10.6	

2019 figures restated
Fx & p adj. = currency- and portfolio-adjusted
[1] For definition see A 2.3 "Alternative Performance Measures Used by the Bayer Group."

Sales

Sales at Consumer Health rose by 5.2% (Fx & portfolio adj.) in 2020 to €5,054 million. The greater focus on health and prevention in connection with the COVID-19 pandemic generated substantial growth in demand in all regions, especially in the Nutritionals category. At the same time, increased protection and hygiene measures led to a decline in sales of cough and cold products.

A 2.2.2/8

Sales by Category

			Change %[1]				Change %[1]	
€ million	Q4 2019	Q4 2020	Reported	Fx & p adj.	2019	2020	Reported	Fx & p adj.
Consumer Health	**1,337**	**1,250**	**–6.5**	**+3.1**	**5,462**	**5,054**	**–7.5**	**+5.2**
Nutritionals	299	331	+10.7	+21.8	1,134	1,313	+15.8	+22.6
Allergy & Cold	298	253	–15.1	–9.0	1,155	1,080	–6.5	–4.1
Dermatology	279	259	–7.2	0.0	1,104	1,086	–1.6	+2.5
Pain & Cardio	222	207	–6.8	+4.5	818	807	–1.3	+6.1
Digestive Health	196	186	–5.1	+1.0	721	717	–0.6	+2.4
Other[2]	42	14	–66.7	–19.2	530	51	–90.4	–3.7

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

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

[2] The divested prescription dermatology (outside the United States), sun care and foot care businesses are included until the dates they were transferred (July 1, 2019; August 30, 2019; and November 1, 2019, respectively).

// In **Europe / Middle East / Africa**, sales rose by 2.6% (Fx & portfolio adj.) to €1,739 million. The increase was mainly attributable to the significant growth in demand for products in the Nutritionals category. In addition, we saw encouraging sales gains in the Dermatology category, especially for Bepanthen™ in the Middle East and Germany. Business also expanded in the Pain & Cardio category. By contrast, sales of cough and cold products fell significantly due to the increased protection and hygiene measures.
// Sales in **North America** advanced by 4.7% (Fx & portfolio adj.) to €2,026 million. The Nutritionals category showed double-digit percentage growth that was driven by continued strong demand, particularly for our One A Day™ vitamins, which also benefited from product line extensions launched at the start of the year. We also registered encouraging growth in the Digestive Health and Pain & Cardio categories. Our Allergy business saw an increase in sales of Claritin™, while business with cough and cold products declined in this region, as well, due to the increased protection and hygiene measures.
// Business in **Asia / Pacific** expanded by 6.1% (Fx & portfolio adj.) to €744 million, largely as a result of high demand for products in the Nutritionals category in Southeast Asia and China. Sales also rose in the Dermatology category due to the positive performance of Canesten™. Business in the Pain & Cardio and Allergy & Cold categories declined, mainly due to constraints related to COVID-19.
// In **Latin America**, sales climbed by 14.1% (Fx & portfolio adj.) to €545 million, with significant growth particularly for Redoxon™ in the Nutritionals category and for Aspirin™ in the Pain & Cardio category. In addition, we recorded inflation-driven price increases across all categories in Argentina.

Earnings

EBITDA before special items declined by 2.5% to €1,114 million in 2020 (2019: €1,142 million). The EBITDA margin before special items improved by 1.1 percentage points to 22.0%. Earnings primarily benefited from the significant increase in sales and the contributions from the efficiency program initiated in late 2018. Currency effects of €69 million, the absence of contributions from the businesses divested in 2019, and increased costs in connection with the COVID-19 pandemic had a negative impact.

EBIT at Consumer Health came in at €992 million (2019: €794 million), after net special gains of €199 million (2019: net special charges of €16 million) that arose primarily in connection with the impairment loss reversals recorded for Claritin™ and Afrin™.

A 2.2.2/9

Special Items[1] Consumer Health

€ million	EBIT Q4 2019	EBIT Q4 2020	EBIT 2019	EBIT 2020	EBITDA Q4 2019	EBITDA Q4 2020	EBITDA 2019	EBITDA 2020
Restructuring	(35)	(25)	(107)	(54)	(35)	(25)	(106)	(54)
Divestments	2	–	320	–	2	–	321	–
Impairment losses / loss reversals	195	199	(229)	253	–	–	–	–
Total special items	**162**	**174**	**(16)**	**199**	**(33)**	**(25)**	**215**	**(54)**

2019 figures restated

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

Fourth quarter of 2020

Sales

In the fourth quarter of 2020, sales at Consumer Health increased by 3.1% (Fx & portfolio adj.) to €1,250 million, continuing the previous quarter's positive business development. In the Nutritionals category in particular, we again posted significant gains across all regions. At the same time, increased protection and hygiene measures led to a decline in sales of cough and cold products.

Earnings

EBITDA before special items declined by 13.7% in the fourth quarter of 2020 to €258 million (Q4 2019: €299 million). The decline in earnings was due to negative currency effects of €28 million, portfolio effects and increased costs in connection with the COVID-19 pandemic. Positive earnings effects primarily came from the growth in sales and the contributions from the efficiency program initiated in late 2018.

EBIT at Consumer Health amounted to €352 million (Q4 2019: €381 million), after net special gains of €174 million (Q4 2019: €162 million) that arose primarily in connection with the impairment loss reversal recorded for Claritin™.

2.2.3 Value-Based Performance

A 2.2.3/1

Value-Based Performance

	Crop Science		Pharmaceuticals		Consumer Health		Group[2]	
€ million	2019	2020	2019	2020	2019	2020	2019	2020
EBIT[1]	514	(18,629)	4,686	3,467	794	992	4,162	(16,169)
Taxes[1, 3]	(123)	4,471	(1,125)	(832)	(191)	(238)	(999)	3,881
NOPAT[1]	391	(14,158)	3,561	2,635	603	754	3,163	(12,288)
Average capital employed[1]	58,590	49,502	14,966	16,554	10,496	9,802	84,768	74,678
ROCE[1]	0.7%	–28.6%	23.8%	15.9%	5.7%	7.7%	3.7%	–16.5%
WACC[1]	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%

2019 figures restated to reflect the recognition of Animal Health and Currenta as discontinued operations

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

[2] Including Reconciliation

[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 2020 amounted to minus 16.5% and was therefore significantly below the cost of capital (6.8%). This negative development against the prior year is mainly due to significant special charges within the Crop Science and Pharmaceuticals divisions. Both divisions saw a decline in net operating profit after tax (NOPAT), which was weighed down by high provisions for litigations. At Crop Science, there was a further negative effect from the aforementioned impairment charges. Consumer Health increased its ROCE year on year, with the division benefiting from an increase in NOPAT that was driven by impairment loss reversals and a further decline in its capital base.

The following overview shows the components of the average capital employed used in calculating ROCE.

A 2.2.3/2

Components of Capital Employed[1]

€ million	Dec. 31, 2019	Dec. 31, 2020
Goodwill	39,312	36,080
Other intangible assets	34,710	26,029
Property, plant and equipment	12,487	11,710
Other financial assets[2]	92	144
Inventories	10,650	10,961
Trade accounts receivable	11,459	9,555
Other receivables[2]	2,016	1,842
Deferred tax assets[2, 3]	7,676	2,381
Claims for income tax refunds	1,652	1,233
Assets held for sale	124	113
Gross capital employed	**120,178**	**100,048**
Other provisions[2]	(6,662)	(14,071)
Trade accounts payable	(6,321)	(5,683)
Other liabilities[2]	(2,515)	(2,957)
Refund liabilities	(4,239)	(4,463)
Contract liabilities	(4,052)	(4,312)
Financial liabilities[2]	(3)	(2)
Deferred tax liabilities[2, 3]	(9,350)	(1,263)
Income tax liabilities	(2,243)	(2,516)
Liabilities directly related to assets held for sale	(219)	–
Capital employed	**84,574**	**64,781**
Average capital employed	**84,768**	**74,678**

2019 figures restated to reflect the recognition of Animal Health and Currenta as discontinued operations
[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 for 2019. In the Bayer Group Statements of Financial Position (Table B3), 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 1.2.3

The contracted rating agencies 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	stable

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 2019	Q4 2020	2019	2020
Net cash provided by (used in) operating activities from continuing operations	**3,307**	**697**	**7,983**	**4,569**
Net cash provided by (used in) operating activities from discontinued operations	(61)	54	224	334
Net cash provided by (used in) operating activities	**3,246**	**751**	**8,207**	**4,903**
Net cash provided by (used in) investing activities	**35**	**(194)**	**(671)**	**(4,073)**
Net cash provided by (used in) financing activities	**(4,471)**	**(1,354)**	**(8,389)**	**423**
Change in cash and cash equivalents due to business activities	**(1,190)**	**(797)**	**(853)**	**1,253**
Cash and cash equivalents at beginning of period	**4,410**	**5,067**	**4,052**	**3,185**
Change due to exchange rate movements and to changes in scope of consolidation	(35)	(79)	(14)	(247)
Cash and cash equivalents at end of period	**3,185**	**4,191**	**3,185**	**4,191**

2019 figures restated

Net cash provided by operating activities

The net operating cash flow from continuing operations in 2020 came to €4,569 million (2019: €7,983 million). The decline compared with the prior year was largely attributable to payments of €3.9 billion to resolve litigations. Total net operating cash flow came to €4,903 million (2019: €8,207 million).

Net cash used in investing activities

Investing activities led to a net cash outflow of €4,073 million (2019: €671 million). The cash outflows for property, plant and equipment and intangible assets included in this figure declined by 8.8% to €2,418 million (2019: €2,650 million). Divestment proceeds less transferred cash amounted to €4,172 million (2019: €2,546 million) and mainly pertained to the sale of the Animal Health business unit. Cash outflows for acquisitions less acquired cash amounted to €2,263 million (2019: €410 million). This includes the acquisitions of Asklepios BioPharmaceutical, Inc., United States, and KaNDy Therapeutics Ltd., United Kingdom. The net cash outflow for current financial assets was €4,455 million (2019: €303 million) and mainly resulted from investments in money market funds. This line item also included the €1.5 billion in cash inflows in the fourth quarter from the sale of Elanco shares.

Net cash provided by financing activities

There was a net cash inflow of €423 million for financing activities (2019: outflow of €8,389 million). This included net borrowings of €4,467 million (2019: net loan repayments of €4,296 million). The difference to the prior year partly reflects the €6 billion bond issuance in July 2020 and the repayment of bonds in 2019, particularly in the fourth quarter. Net interest payments decreased to €1,276 million (2019: €1,478 million). The Bayer Group paid a dividend of €2,768 million (2019: €2,615 million).

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 €1,343 million in 2020 (2019: 4,214 million).

Capital expenditures

A 2.2.4/3

Cash Flow-Relevant Capital Expenditure for Property, Plant and Equipment and for Intangible Assets

€ million	2019	2020
Crop Science	1,203	1,103
Pharmaceuticals	811	915
Consumer Health	169	159
Reconciliation	269	209
Group[1]	**2,650**	**2,418**

[1] 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. The largest capital expenditure projects in 2020 included the expansion of fungicide production in Germany (€36 million). In the United States, we invested in the sourcing of an important raw material used in the production of glyphosate (€13 million). Alongside these projects, the development of digital solutions for our customers was a key focus of our capital expenditures in 2020 and will remain so in the coming years.

At **Pharmaceuticals**, the largest expenditures for property, plant, and equipment in 2020 were for the development of a modular production center for biologicals in Berkeley, United States (€65 million); modernization programs for the production network of our product supply organization at the sites in Leverkusen, Germany; Turku, Finland; and Garbagnate, Italy (€66 million); the building of a new research facility in Wuppertal, Germany (€55 million); and the construction of a sterile filling plant in Berlin, Germany (€27 million).

At approximately €24 million, **Consumer Health's** largest investment was the GMP upgrade program across its global production sites.

A 2.2.4/4

Material Capital Expenditures for Property, Plant and Equipment

		2019	2020
Crop Science	Expansion of production capacities for fungicides in Dormagen, Germany	initiated[1]	ongoing
	Expansion of research and development facilities in Monheim, Germany	ongoing	ongoing
	Establishment of a production site for fungicides in Kansas City, Missouri, U.S.A.	completed	
	Expansion of production capacities for insecticides in Vapi, India	ongoing	ongoing
	Construction of a corn seed production site in Pochuyki, Ukraine	ongoing[2]	ongoing
	Construction of a corn breeding station in Marana, Arizona, U.S.A.	completed	
	Expansion of R&D facilities in Petrolina, Brazil	initiated	ongoing
	Expansion of R&D facilities in Chesterfield, Missouri, U.S.A.	completed	
	Construction of a cotton seed production site in Lubbock, Texas, U.S.A.	completed	
	IT solutions to support digital transformation	ongoing	ongoing
	Sourcing of a raw material used in the production of glyphosate in Soda Springs, U.S.A.	initiated	ongoing
	Implementation of sustainability measures in Soda Springs, U.S.A.	initiated	ongoing
Pharmaceuticals	Expansion of Eylea™ production capacities in Berlin, Germany, and Shiga, Japan	ongoing	completed
	Pilot facility for solids production in Leverkusen, Germany	ongoing	completed
	Modernization of production facilities at sites across the production network (Leverkusen, Germany; Garbagnate, Italy; Turku, Finland)	ongoing	ongoing
	Construction of a new research building (preclinical pharmacology) 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	completed
	Construction of modular production center for biologicals in Berkeley, U.S.A.	ongoing	ongoing
	Construction of a sterile filling plant for launch products in Berlin, Germany	ongoing	ongoing
	Expansion of Xarelto™ production in Bitterfeld, Germany	ongoing	completed
	Expansion of active ingredient production for acarbose in Wuppertal, Germany	ongoing	ongoing
	Expansion of packaging capacities in Beijing, China		initiated
	Construction of a new production facility for solid launch products in Leverkusen, Germany		initiated
Consumer Health	Upgrade of global production site facilities to new GMP standards	ongoing	ongoing

[1] New capital expenditure project initiated at the same site
[2] Work continued in 2019 and 2020

Liquid assets and net financial debt

A 2.2.4/5

Net Financial Debt[1]

€ million	Dec. 31, 2019	Dec. 31, 2020	Change %
Bonds and notes	33,569	36,745	+9.5
of which hybrid bonds[2]	4,528	4,532	+0.1
Liabilities to banks[3]	4,062	3,671	–9.6
Lease liabilities	1,251	1,137	–9.1
Liabilities from derivatives[4]	123	136	+10.6
Other financial liabilities	89	77	–13.5
Receivables from derivatives[4]	(76)	(141)	+85.5
Financial debt	**39,018**	**41,625**	**+6.7**
Cash and cash equivalents	(3,185)	(4,191)	+31.6
Current financial assets[5]	(1,765)	(7,393)	.
Net financial debt	**34,068**	**30,041**	**–11.8**

[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, financial investments in debt and equity instruments that were recorded as current on first-time recognition, and shares in Elanco and Covestro

In 2020, the Bayer Group's net financial debt decreased by €4.0 billion to €30.0 billion. Cash inflows from operating activities and the sale of the Animal Health business unit, along with positive currency effects, more than offset the cash outflows for dividends, the acquisition of the U.S. pharmaceutical company Asklepios BioPharmaceutical, Inc. and settlement payments for litigations in the United States.

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 July 2020, Bayer AG placed bonds with a total volume of €6.0 billion. The issuance comprised four €1.5 billion tranches with maturities of 4 years, 6.5 years, 9.5 years and 12 years. The coupons on the notes are 0.375%, 0.75%, 1.125% and 1.375%, respectively.

In addition, debt instruments (exchangeable bond) with a nominal volume of €1.0 billion were repaid in cash in June 2020.

The increase in current financial assets mainly resulted from investments in money market funds.

Asset and Capital Structure of the Bayer Group

A 2.2.4/6

Bayer Group Summary Statements of Financial Position

€ million	Dec. 31, 2019	Dec. 31, 2020	Change (%)
Noncurrent assets	**93,735**	**81,386**	**– 13.2**
Assets held for sale	1,137	113	– 90.1
Other current assets	31,302	35,547	+ 13.6
Current assets	**32,439**	**35,660**	**+ 9.9**
Total assets	**126,174**	**117,046**	**– 7.2**
Equity	**47,433**	**30,699**	**– 35.3**
Noncurrent liabilities	**55,526**	**49,619**	**– 10.6**
Current liabilities	22,553	36,728	+ 62.9
Liabilities directly related to assets held for sale	662	–	– 100.0
Total current liabilities	**23,215**	**36,728**	**+ 58.2**
Liabilities	**78,741**	**86,347**	**+ 9.7**
Total equity and liabilities	**126,174**	**117,046**	**– 7.2**

2019 figures restated

Between December 31, 2019, and December 31, 2020, total assets decreased by €9.1 billion.

Noncurrent assets declined by €12.3 billion to €81.4 billion, mainly due to a €3.2 billion reduction in goodwill and a €8.7 billion decrease in other intangible assets that primarily related to the aforementioned impairment charges at Crop Science.

Total current assets increased by €3.2 billion to €35.7 billion, driven by a €5.6 billion increase in other financial assets and a €1.0 billion rise in cash and cash equivalents. The liquidity arising from the proceeds of the sale of the Animal Health business unit to Elanco and from the bond issuance was invested in money market funds. This stood against a €2.1 billion decline in trade accounts receivable due to lower sales, the improved collection of receivables and foreign currency effects as of the closing date, along with a €1.0 billion reduction in assets held for sale that primarily pertained to the aforementioned divestment to Elanco.

Equity declined by €16.7 billion compared with December 31, 2019, to €30.7 billion, mainly due to the negative earnings impact in 2020 (€10.5 billion), the dividend payment (€2.8 billion) and negative currency effects (€3.5 billion). The equity ratio declined to 26.2% as of December 31, 2020 (December 31, 2019: 37.6%).

Liabilities as of December 31, 2020, rose by €7.6 billion to €86.3 billion, largely as a result of changes in provisions for litigations. Allocations of €13.4 billion were made for this purpose in 2020, while provisions of €4.2 billion were utilized and there were positive currency effects of €1.1 billion. The resulting €8.1 billion increase comprised €7.3 billion in current provisions and €0.8 billion in noncurrent provisions. Noncurrent financial liabilities increased by €6.0 billion due to the issuance of new bonds. The reclassification of bonds and liabilities to banks to current financial liabilities (€7.6 billion) along with positive currency effects (€2.1 billion) resulted in a €3.7 billion net decline in noncurrent financial liabilities. The €2.4 billion decline in deferred tax liabilities to €1.3 billion was primarily attributable to the aforementioned impairment charges at Crop Science. In connection with the acquisitions of Noho Health, Inc., United States, and Asklepios BioPharmaceutical, Inc., United States, liabilities were recognized for potential milestone payments in the future and for commitments to purchase additional shares. The liabilities directly related to assets held for sale and discontinued operations recognized in the prior year (€0.7 billion) were derecognized following the divestment to Elanco.

2.3 Alternative Performance Measures Used by the Bayer Group

See also “About this Report” and Note [2] to B Consolidated Financial Statements

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:

// Change in sales (reported, currency-adjusted, currency- and portfolio-adjusted)
// 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 currency.

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 2.2.1/3 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**. This is calculated by adding the core financial result to core EBIT. Special items in the financial result include nonrecurring financial expenses or income that are not part of our normal financing activities. These primarily pertain to changes in the fair value of equity instruments that are not held for medium- or long-term strategic purposes, as well as to nonrecurring financial expenses or income arising from acquisitions, divestments and litigations. Income taxes – net of special items – are then deducted from this figure to give core net income. Special items relating to income taxes include material effects from tax reforms, among other things.

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 2.2.4/5 for the calculation of net financial debt

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 for the calculation of ROCE

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.

See A 2.2.3 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 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] 2020	Growth forecast[1] 2021
World	–3.9%	+4.4%
European Union[2]	–6.7%	+3.3%
of which Germany	–5.3%	+2.8%
United States	–3.6%	+4.0%
Emerging Markets[3]	–2.1%	+5.8%

[1] Real GDP growth: Source: IHS Markit
[2] EU excluding United Kingdom
[3] Including about 50 countries defined by IHS Markit as emerging markets in line with the World Bank
As of January 2021

Global economy expected to recover in 2021

In 2021, we expect the world economy to slowly recover from the deep recession seen in 2020. Global economic output is projected to increase substantially. The COVID-19 pandemic will likely continue to weigh on growth, with protective measures and contact restrictions remaining necessary in many countries and government assistance programs potentially being scaled back. However, vaccines are expected to be widely available throughout the world over the course of the year, helping to gradually contain the pandemic. This will likely trigger an increase in private consumption in the second half of the year and a further normalization of the economy. The recovery is expected to be particularly strong in the United States and the Emerging Markets, especially China and India. By contrast, the recovery in the European Union is likely to be somewhat slower, mainly due to a potential further increase in unemployment.

The economic forecasts – including those for our divisions – continue to involve considerable uncertainties with regard to the further development of the pandemic.

A 3.1.1/2

Economic Outlook for the Divisions

	Growth 2020	Growth forecast 2021
Seeds and crop protection market[1]	+2%	+2%
Pharmaceuticals market[2]	+3%	+5%
Consumer health market[3]	+4%	+2%

2020 data provisional
[1] Bayer's estimate (as of January 2021), plus various local sources; currency-adjusted
[2] Source: IQVIA Market Prognosis (as of September 2020); all rights reserved; currency-adjusted
[3] Bayer's estimate (as of November 2020), taking into account external sources; currency-adjusted

We foresee moderate growth for the global **seed and crop protection market** (+2%). This will primarily be driven by strong global demand for corn and soybean, leading to increased acreages in the North America and Latin America regions and improving farm incomes. However, growth

will be held back by continuing pressure from the COVID-19 pandemic and regulatory and competitive factors.

We expect the **pharmaceuticals market** to expand by 5% in 2021 (2020: 3%). Growth momentum is expected to be fueled by price and volume increases along with product innovation, especially in connection with the advancing digital transformation of health care. We anticipate rising growth rates in all regions compared with 2020, with very positive market development expected in Asia in particular.

At around 2%, we anticipate that growth of the **consumer health** market in 2021 will be significantly below the 2020 level (about 4%), as we cycle over exceptionally high growth seen during the early phase of the pandemic in 2020. We also expect that social distancing and economic conditions will continue to put pressure on market growth.

3.1.2 Corporate Outlook

The following forecast is based on the current business development and our internal planning. It was prepared using the exchange rates as of December 31, 2020. A 1% appreciation (depreciation) of the euro against all other currencies would decrease (increase) sales by some €350 million and EBITDA before special items by about €100 million on an annual basis.

In fiscal 2021, we expect to generate sales of approximately €41 billion, which corresponds to an increase of approximately 3% on a currency- and portfolio-adjusted basis. We are targeting an EBITDA margin before special items of approximately 26%. Based on the aforementioned sales figure, this would correspond to EBITDA before special items of between €10.5 billion and €10.8 billion. We expect core earnings per share to come in at approximately €5.60 to €5.80.

To enhance the comparability of operating performance, we are presenting our forecast on a currency-adjusted basis as well[15].

We expect to post currency-adjusted sales of approximately €42 billion to €43 billion, which corresponds to an increase of about 3% on a currency- and portfolio-adjusted basis. We expect to generate an EBITDA margin before special items of around 27% on a currency-adjusted basis. Based on the currency-adjusted sales forecast, this would correspond to EBITDA before special items of €11.2 billion to €11.5 billion and core earnings per share of approximately €6.10 to €6.30 on a currency-adjusted basis.

[15] Using the average monthly exchange rates from 2020 (see B 3/1)

A 3.1.2/1

Forecast for 2021

	2020 figures		2021 forecast at closing rates on Dec. 31, 2020		2021 forecast (Fx adj.)	
	€ billion	**Fx & p adj. change (%)**	**€ billion**	**Fx & p adj. change (%)**	**€ billion**	**Fx & p adj. change (%)**
Sales	**41.4**	**+0.6**	**~41**	**~+3**	**~42 to 43**	**~+3**
Crop Science	18.8	+1.3		~+2		~+2
Pharmaceuticals	17.2	–1.5		~+4		~+4
Consumer Health	5.1	+5.2		~+2 to 3		~+2 to 3
		Margin (%)		**Margin (%)**		**Margin (%)**
EBITDA before special items[1]	**11.5**	**27.7**		**~26**		**~27**
Crop Science	4.5	24.1		~23		~24
Pharmaceuticals	6.0	34.9		~32		~32
Consumer Health	1.1	22.0		~22 to 23		~23
Financial result (core)[2]	**–1.6**		**–1.5**		**–1.6**	
Tax rate (core)[3]	**23.7%**		**23%**		**23%**	
Free cash flow[1]	**1.3**		**~–3.0 to –4.0**		**~–3.0 to –4.0**	
Net financial debt[1]	**30.0**		**~35 to 36**		**~36 to 37**	
Special items in EBIT	–23.3		–1.5		–1.5	
	€		€		€	
Core earnings per share[1]	**6.39**		**5.60 to 5.80**		**6.10 to 6.30**	

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 €1.5 billion (currency-adjusted) in 2021 in connection with restructuring and integration measures.

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 and 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.

Risk management system

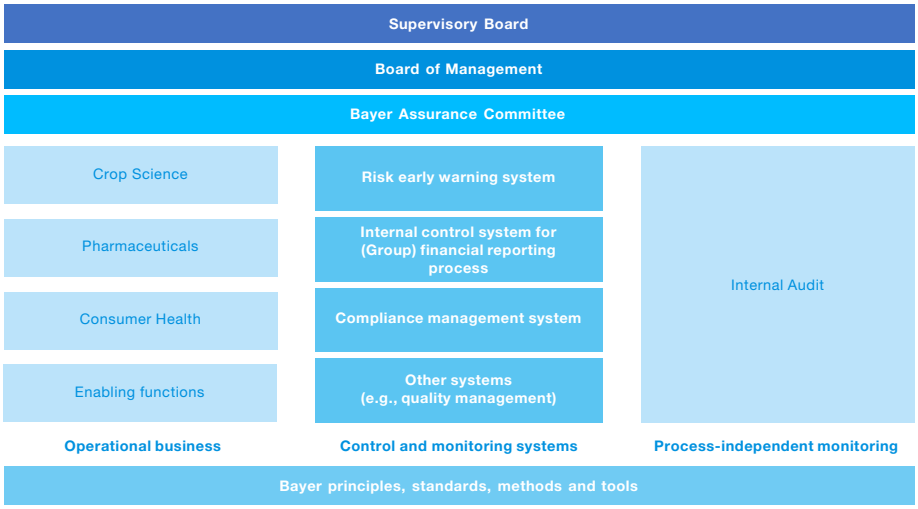
We have implemented a holistic and integrated risk management system designed to ensure the continued existence and future target attainment of the Group through the early identification, assessment and treatment of risks.

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. Besides 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. Responsibility for these systems lies with different enabling functions. The Internal Audit & Risk Management enabling function, including in particular this function's Enterprise Risk Management unit, 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, the Board of Management and the Supervisory Board.

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 Section 289, Paragraph 4 and Section 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 on 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 Group Finance 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 of Bayer AG has confirmed the effective functioning of the ICS and the relevant criteria for the 2020 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. Detailed information on compliance management can be found in Chapter A 4.2 "Compliance," which describes in particular the process of identifying risks and taking measures to mitigate them.

See also A 4.2

Process-independent monitoring

The Internal Audit & Risk Management enabling function conducts independent, risk-based and objective audit activities, employing a targeted and systematic 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

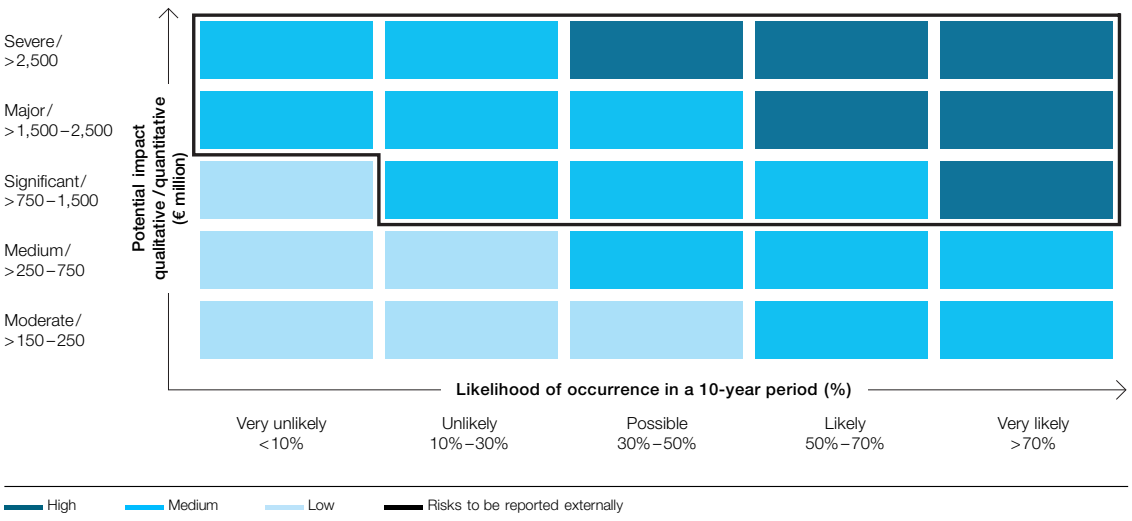
Identification: Risks are identified by risk owners in the divisions and enabling functions. To support the fullest possible identification of risks, we maintain a risk universe that reflects the company's potential risk categories. The Bayer Risk Universe, which is regularly updated, expressly accounts 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 Enterprise Risk Management unit within the Internal Audit & Risk Management enabling function. In addition, new risks above a defined threshold are reported to Enterprise Risk Management 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 Enterprise Risk Management unit within the Internal Audit & 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 into account the risk control measures in place (net risk). They encompass risks falling within the black outline in the assessment matrix in 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 the 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 grouped together 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 2020.

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.

In addition, the year 2020 was marked by the COVID-19 pandemic, the impact of which gives rise to risks such as a prolonged, significant decline in global demand as well as unfavorable geopolitical and macroeconomic effects. Such developments could have consequences for our company such as a decline in sales, disruptions to our supply chain including the inability to procure certain materials, an increase in input prices or longer development times. Our earnings, working capital, cash flow and ability to achieve strategic objectives might continue to be negatively impacted.

Social and macroeconomic trends (High: Group; Medium: Crop Science)[16]

The growing world population coupled with rising food demand gives rise to opportunities for our Crop Science Division. In addition, changing consumption patterns and increasing public awareness of the importance of healthy eating and sustainability, paired with new digital technologies, are giving rise to new pools of value in the agriculture market. Therefore, while high-quality seeds and crop protection will remain at our core, we will see opportunities arise to capture additional value with new customers, new selling approaches and digital capabilities. 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.

Moreover, a negative public perception of 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 our company, 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 scientifically founded, rational and responsible discussions and decision-making processes.

Furthermore, negative developments of a macroeconomic nature, such as crises in important sales markets for our company, could weigh on our business and reduce our earnings. Our seed and crop protection business in particular is cyclical and is shaped by economic developments and factors including fluctuating weather conditions and pest pressure that may adversely impact our Crop Science 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)

In the Crop Science Division, we could face increased competition in the seed and crop protection industry. New competitors entering the market and aggressive marketing and pricing strategies – not only for generic products – could negatively impact our profitability. Lower-than-anticipated demand could have a negative effect on our corn seed business, for example. In addition, increasing digitalization in the agriculture sector could lead to the rise of new players and alter the market. Greater precision in the application of products could lead to a decline in the quantities used, which in turn could potentially impact value creation within 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 1.2.2 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. This applies not only to our core business with crop protection products and high-quality seeds, but also to our tailored solutions.

[16] The classification pertains to the risks.

New developments such as cell and gene therapies and digitalization are enabling patient needs to be addressed in a more targeted and sustainable way. This provides an opportunity for our Pharmaceuticals Division. Cell and gene therapies can be used to treat or potentially even completely cure numerous as yet untreatable diseases. At the same time, digitalization is leading to improved diagnostic methods, enabling diseases to be diagnosed and treated in a more targeted way.

Regulatory changes (High: Pharmaceuticals; Medium: Crop Science, Group)
Our business activity is subject to extensive and changing regulations in which we see increased risks. For example, further restrictions could be imposed on the sale and use of various crop protection products, or approvals that have already been granted could be challenged. In addition, the pricing of pharmaceutical products could become more strictly regulated – not only for products already exposed to generic competition, but also for innovative, patent-protected products. 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 and enter into collaborations, while aligning our product portfolio to reflect anticipated changes. We also address these risks by engaging in dialogue with the authorities with the goal of promoting science-based decision-making.

See also A 1.6

Business strategy (Medium: Crop Science, Pharmaceuticals, Group)
Our business strategy is geared toward innovation, which is inherently associated with risks. In our Pharmaceuticals Division, we see challenges in setting up new therapy platforms, such as for cell and gene therapy, and in further developing established therapeutic areas through innovative solutions. In our Crop Science Division, the challenges we face include developing new business models, such as tailored solutions based on digital applications, and successfully establishing them on the market. In addition, we might encounter challenges in our endeavors to implement our voluntary sustainability commitments in a timely manner, which may also be due to external factors.

We counter these risks by aligning our organization and our processes to existing challenges. In the Crop Science Division, for example, our digital farming activities are supplemented by strategic partnerships with leading IT companies where necessary. In the Pharmaceuticals Division, meanwhile, we are establishing a cell and gene therapy unit.

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 arise 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.

See also A 1.2

Technological advances in pharmaceutical product development may at the same time also represent a risk for our company should we not be in a position to play a role in shaping such advances. Identifying a sufficient number of research candidates and ensuring their appropriate development represents a challenge. Targeting inlicensing and acquisitions as additional ways to strengthen our company involves the risk that we may be unable to identify suitable candidates on financially acceptable terms. 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.

Thanks to our innovation capacities and budgets within the Crop Science Division, we anticipate that we will be able to effectively tackle the challenges faced in developing and introducing product solutions in agriculture, including longer and more costly development cycles or stricter regulatory requirements. We plan to further leverage the strengths of the combined R&D platform to deliver pioneering technologies faster. In addition, we will leverage our existing expertise and strategically invest in new capabilities to unlock and capture new market segments.

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 due to restrictions on the use of certain chemical substances – 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, personal injury, damage to our reputation, and declines in sales and / or margins, and may also 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 spreading production across multiple sites, for example. Furthermore, an emergency response system based on a corresponding corporate policy has been implemented at all our production sites.

Disruptions in our upstream supply chain may also negatively impact our own supply capability. 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. Supplier risks are regularly reviewed and evaluated.

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 or advertised product characteristics surpass our own efforts in this regard, this may represent a risk for sales of our products. We address these risks by conducting a forward-looking analysis of possible scenarios and devising suitable strategies for projects such as planned product launches.

Human resources (Medium: Group)

See also A 1.4

Skilled and dedicated employees are essential for our company's success. Difficulties in recruiting, hiring and retaining urgently needed specialized employees (on a regional level) – also in view of competition between employers – and in employee development could have significant adverse consequences for our company's future development. It is also possible that organizational changes that are not implemented appropriately or transparently may reduce employee motivation or increase staff 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.

Information technology (High: Group)

Our business and production processes and our internal and external communications are dependent on global IT systems. Ensuring the optimal alignment of our IT architecture, which also encompasses the use of cloud-based services and management of any service providers commissioned, therefore represents a challenge. As such, system reliability and the confidentiality of internal and external data are 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 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. To counter these risks, we evaluate and utilize new technologies. 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 our 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 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. Furthermore, a reserve is maintained for unbudgeted shortfalls in cash receipts or unexpected disbursements 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 2025.

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 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

See also A 3.2.1/2
Risk Assessment Matrix

Opportunities and risks resulting from fluctuations in currency exchange rates, interest rates and commodity prices are managed by the 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 gauge the potential effects of market price 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.

Foreign currency opportunities and risks for our company arise 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. Increased volatilities within the year 2020, especially in emerging market currencies (BRL, RUB and TRY), have temporarily increased our anticipated foreign exchange risk. 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, 2020, by €16 million (December 31, 2019: €29 million). Derivatives used to hedge anticipated currency exposure that are designated for hedge accounting would have improved or diminished equity (other comprehensive income) by €319 million (December 31, 2019: €408 million). Currency effects on anticipated exposure are not taken into account. Of the amount impacting equity, €82 million is related to the Chinese renminbi (CNY), €61 million to the Brazilian real (BRL), €47 million to the Japanese yen (JPY) and €33 million to the Canadian dollar (CAD).

Interest-rate opportunities and risks for our company arise 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 2020 gave the following result: A hypothetical increase of one percentage point in these interest rates (assuming constant currency exchange rates) as of January 1, 2020, would have raised our interest expense for the year ended December 31, 2020, by €58 million (December 31, 2019: €62 million).

Commodity price opportunities and risks arise from the volatility of raw material prices, which can lead to an increase in the prices we pay for seeds and energy. We reduce commodity price risks by using commodity price derivatives such as futures, which are mainly designated as hedge accounting. A sensitivity analysis with a 10% change in commodity prices indicated an effect of €27 million on equity (December 31, 2019: €40 million).

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. The 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 that we undertake could also have an impact. We counter the resulting risks by continuously identifying and evaluating the tax framework. We establish 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 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 pay due attention to our corporate values and ethical, compliance and sustainability requirements. 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. Seed producers are subject to a separate human rights evaluation process, for which a new approach is being devised as we refine our human rights strategy.

See also A 1.5 Procurement

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, damage to property, reputation or the environment, 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 patents 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[17])

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, anti-corruption 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

Glyphosate matter

As of February 3, 2021, lawsuits from approximately 61,800 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.

In June 2020, Monsanto reached an agreement in principle with plaintiffs, without admission of liability, to settle most of the current Roundup™ litigation, involving most of the total approximately 125,000 then known filed and unfiled claims, and to put in place a mechanism to resolve potential future claims. The total costs of the executed and additional inventory settlements for all outstanding claims are currently expected to be up to US$9.6 billion. Monsanto continues in its efforts to reach settlement in a substantial number of the outstanding claims in the coming months. Monsanto may withdraw from the various settlement agreements if certain eligibility and participation rates are not satisfied. Plaintiffs who opt out of a settlement have the right to pursue their claims separately against the company.

As regards potential future litigation, the company intends to make an additional payment to support a separate class agreement between Monsanto and plaintiffs' counsel. In July 2020, Judge Chhabria of the U.S. District Court for the Northern District of California issued a pre-trial order raising concerns about certain aspects of the class settlement agreement and stating that he was tentatively inclined to deny the motion. The parties subsequently withdrew their motion, worked to comprehensively address the court's questions, and on February 3, 2021 filed with the court a revised class agreement and accompanying motion for preliminary approval of that settlement. Bayer remains strongly committed to a resolution that simultaneously addresses the current litigation on reasonable terms and provides a viable solution to manage and resolve future litigation.

[17] See also Note [29] 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 three cases that have so far gone to trial – Johnson, Hardeman and Pilliod – are continuing through the appeals process and are not covered by the settlement. In July 2020, the Court of Appeal of the State of California (First Appellate District) affirmed the judgment in favor of Johnson but reduced the total judgment from US$78.5 million to approximately US$20.5 million. The court reduced the total compensatory damages award from US$39.3 million to approximately US$10.25 million and the punitive damages award to the same amount. The parties have separately petitioned for appeal to the Supreme Court of California. In October 2020, the court denied the request to review the appeal. Both parties have the option to petition for appeal to the U.S. Supreme Court. Oral argument before the Ninth Circuit Court of Appeal in the first federal case to go to trial (Hardeman) took place in October 2020. A decision by the court is expected for mid-2021. Briefing is complete in the Pilliod case appeal, and no date for oral argument has yet been scheduled. Bayer is convinced that the verdicts are not supported by the evidence at trial and the law and therefore intends to pursue the appeals vigorously.

As of February 3, 2021, a total of 22 Canadian lawsuits relating to Roundup™ and 14 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 (Medium: Crop Science, Pharmaceuticals)

Despite extensive studies prior to approval or registration, products may be partially or completely withdrawn from the market due, for example, to the occurrence of unexpected side-effects or negative effects of our products. Such a withdrawal may be voluntary or result from legal or regulatory measures. In the agriculture business in particular, 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.

See also A 1.6
Product Stewardship

While these risks have diminished compared with the prior year, they could still give rise to liability claims and also harm our reputation. We counter these risks 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 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 our reputation and lead to declining sales and / or margins. We counter these risks through binding principles, standards and the control mechanisms in place. Quality requirements are defined and implemented in global quality management systems.

See also A 1.6

Security (Medium: Group)

Potential criminal activities targeting our employees, property or business activities represent a risk for our company. 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. 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 take further 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 Internal Audit & Risk Management enabling function assesses business continuity risks and defines appropriate measures together with the responsible specialist units.

See also A 1.7 Environmental Protection and Safety

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

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. Compared with the previous year, we see a slight intensification of our risk status. 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.

No risks that could endanger the company's existence