Royal DSM Integrated Annual Report 2019

NUTRITION · HEALTH · SUSTAINABLE LIVING

DSM
BRIGHT SCIENCE. BRIGHTER LIVING.

DSM at a glance

About DSM

We are a global, purpose-led, science-based company active in Nutrition, Health and Sustainable Living. Our purpose is to create brighter lives for all. With our products and solutions we address some of the world's biggest challenges while simultaneously creating economic, environmental and societal value for all our stakeholders – customers, employees, shareholders, and society at large. We deliver innovative solutions for human nutrition, animal nutrition, personal care and aroma, medical devices, green products and applications, and new mobility and connectivity. Including our associated companies, we deliver annual net sales of about € 10 billion with approximately 23,000 employees. We were founded in 1902 and are listed on Euronext Amsterdam.

Purpose-led

We are a company that strives to do well by doing good – because ultimately, we cannot be successful, nor even call ourselves successful, in a world that fails.

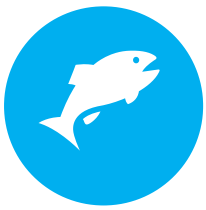
Active in Nutrition, Health and Sustainable Living, we address the opportunities that are driven by global megatrends and the United Nations' Sustainable Development Goals (SDGs). Our purpose aligns most closely with five of the SDGs:

Science-based

Our bright science delivers benefits across multiple dimensions, already reaching more than 2.5 billion people in the world today in our three focus domains of Nutrition & Health, Climate & Energy and Resources & Circularity.
We are accelerating our innovative power and enhancing our long-term growth with breakthroughs such as:

Fermentative Stevia: for sugar reduction

Project Clean Cow: feed additives for reduced methane emissions from cattle



Veramaris®: algae-based omega-3 for sustainable aquaculture

Niaga®: technology for fully recyclable carpets, furniture and mattresses

Results at a glance

PEOPLE

22,174

Workforce
(at year-end 2019,
excluding affiliates)

0.28

Frequency Index of
Recordable Injuries versus 0.33 in 2018
(per 100 DSM employees and contractors)

28:72[1]

Female:male ratio
equal to 2018

20%

Female executives
versus 19% in 2018.
50% of MB, EC and SB
as of 15 February 2020

74%

Employee Engagement
Index, with a response rate
of 92%, versus 76% in 2018

PLANET

~17%

GHG scope 1 + 2 reduction –
cumulative structural
improvement[2] versus ~8%
in 2018 (baseline 2016)

2.3%

Energy efficiency
improvement year on year
versus 1.4% in 2018

50%

Purchased electricity
from renewable sources
versus 41% in 2018

BRIGHTER LIVING SOLUTIONS

63%[3]

Sales of
Brighter Living Solutions
versus 62%[4] in 2018

1 Excluding companies that are not integrated into our HR systems (approx. 6% of the total workforce).
2 We estimate that the effect of the underlying cumulative structural improvements in absolute GHG emissions was approximately 17% and 8% in 2019 and 2018 respectively, versus the 2016 baseline. The total cumulative absolute reduction was 25% and 18% respectively, versus the 2016 baseline.
3 For a small percentage of sales (approximately 2%) classified as BLS, the environmental impact is considered 'best in class' together with other solutions.
4 Excluding the temporary vitamin effect in 2018 of € 415 million sales, for further information see table on page 65.

PROFIT

€ 9,010

Net sales, up 2% from € 8,852[1] in 2018 (in millions)

€ 1,684[2]

Adjusted EBITDA[3] versus € 1,532[1] in 2018 (in millions)

+10%[2]

Adjusted EBITDA[3] growth versus 2018[1] and versus a high single-digit target

€ 801[2]

Adjusted net operating free cash flow[3] versus € 545[1] in 2018 (in millions)

+47%[2]

Adjusted net operating free cash flow[3] growth versus 2018[1] and versus an average annual target of ~10%

21%

Innovation sales, in line with our ambition of ~20%

€ 764

Total net profit versus € 1,079[4] in 2018 (in millions)

€ 4.27

Net earnings per ordinary share versus € 6.10[4] in 2018

€ 4.64

Adjusted net earnings[3] per ordinary share versus € 5.84 in 2018

€ 2.40

Proposed[5] dividend per ordinary share for 2019 up from € 2.30 for 2018

1 Excluding temporary vitamin effect in 2018 of € 415 million sales and € 290 million (Adjusted) EBITDA, for further information see table on page 65.
2 Including the impact of IFRS 16, see table on page 164.
3 For reconciliation to IFRS performance measures, see table on page 180.
4 2018 includes the temporary vitamin effect, for further information see table on page 65, and the book profit on the sale of DSM Sinochem Pharmaceuticals.
5 Subject to approval by the Annual General Meeting of Shareholders.

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Key data

Key data[1]

	2019[2]	2018
People		
Workforce at 31 December (headcount)	22,174	20,977
Female:male ratio[3]	28:72	28:72
Total employee benefit costs (in € million)	1,811	1,753
Frequency Index of Recordable Injuries (per 100 DSM employees and contractor employees)	0.28	0.33
Employee Engagement Index (in %)	74	76
Planet		
Primary energy use (in PJ)	21.2	20.8
Energy Efficiency Improvement (in %, year on year)	2.3	1.4
Greenhouse gas emissions, market-based (scope 1 + 2, in CO_2 equivalents, x million tons)	1.17	1.23
Greenhouse gas scope 1 + 2 cumulative absolute reduction (in %, baseline 2016)	25	18
Water consumption (x million m^3)	23	22
Brighter Living Solutions (as % of running business)	63	62[4]
Profit (in € million)		
Net sales	9,010	9,267 / 8,852[4]
Adjusted EBITDA[5]	1,684	1,822 / 1,532[4]
EBITDA	1,586	1,754
Adjusted operating profit (EBIT)[5]	1,075	1,345 / 1,055[4]
Operating profit (EBIT)	954	1,245
Net profit	764	1,079
Adjusted net operating free cash flow[5]	801	810 / 545[4]
Capital expenditure, cash based	609	646
Dividend for DSM shareholders (based on profit appropriation)	425[6]	412
Net debt	1,144	113
Shareholders' equity	7,731	7,782
Total assets	13,443	13,641
Capital employed	9,311	8,181
Market capitalization at 31 December[7]	21,063	12,961
Per ordinary share in €		
Net earnings	4.27	6.10
Dividend	2.40[6]	2.30
Financial ratios (%)		
Sales to high-growth economies / net sales	43	43[4]
Innovation sales / net sales	21	19[4]
Adjusted EBITDA margin[5]	18.7	19.7 / 17.3[4]
Average working capital / annualized net sales	21.2	18.7[4]
ROCE[5]	12.0	16.8 / 13.3[4]
Gearing (net debt / equity plus net debt)	12.7	1.4
Equity / total assets	58.3	57.3
Cash provided by operating activities / Adjusted EBITDA[5]	82.2	76.3

1 For definitions, see 'Explanation of some concepts and ratios' on page 249.
2 Including the impact of IFRS 16, see table on page 164.
3 For the indexes based on age, nationalities, gender, inflow and outflow, the companies that are not integrated into the HR systems (approx. 6% of the total workforce) are not taken into account.
4 Excluding temporary vitamin effect in 2018 of € 415 million sales and € 290 million (Adjusted) EBITDA, for further information see table on page 65.
5 In presenting and discussing DSM's financial position, operating results and cash flows, DSM (like many other publicly listed companies) uses certain Alternative performance measures (APMs) not defined by IFRS and referred to as 'Adjusted'. These APMs are used because they are an important measure of DSM's business development and DSM's management performance. A full reconciliation of IFRS performance measures to the APMs is given in the 'Alternative performance measures' on page 178.
6 Subject to approval by the Annual General Meeting of Shareholders.
7 Source: Bloomberg.

Introduction letter

Dear reader,

The year 2019 was again a record year for DSM. The hard work and engagement of our employees delivered good results, in a not so easy economic, as well as (geo)political and societal, context. We can all be very proud of what has been achieved. We made decisive progress as a performance-driven and purpose-led company, creating brighter lives for all, and already reaching more than 2.5 billion people worldwide.

Delivering on Strategy 2021

We are pleased that we once more delivered a good financial performance for the year. Our total sales were just above € 9 billion, up 2% compared to last year and Adjusted EBITDA was almost € 1.7 billion. We delivered on our two ambitious financial targets of Strategy 2021, with a double-digit growth of Adjusted EBITDA of 10% and an Adjusted net operating free cash flow increase of 47% compared to the underlying business in 2018. Our Adjusted EBITDA margins were also in line with our strategic ambitions at 20.7% and 18.5% for Nutrition and Materials respectively, both up compared to the underlying business in 2018. Our Capex was 6.8% of sales, also on target. The operating working capital as a percentage of sales at end-of-period increased to 26.3%, mainly due to acquisitions and foreign exchange rate effects. Adjusted earnings per share (EPS) increased ahead of Adjusted EBITDA growth when corrected for the temporary vitamin effect of 2018.

Nutrition delivered above-market sales growth and high single-digit Adjusted EBITDA growth, compared to the underlying business in 2018. In Animal Nutrition & Health, sales were strong for all species and in all regions, except for sales to the swine business in China and South-East Asia which were impacted by African swine fever (ASF). This region accounts for more than half of global pork production, with culling measures introduced in response to ASF affecting 35-50% of pork production in the area. In Human Nutrition & Health, sales were up despite softer end-markets in the second half of the year. Personal Care & Aroma Ingredients and Food Specialties both delivered a strong performance. We made good progress in terms of inorganic growth in 2019. We strengthened our position in vitamin E by creating a 75:25 partnership with Nenter; we increased our shareholding in Andre Pectin, Asia's largest producer of hydrocolloids, from 29% to 75%; we further strengthened our position in personalized nutrition by acquiring the personalized nutrition platform AVA; and we acquired Royal CSK in order to better serve the world's fast-growing and attractive dairy cultures markets. In February 2020, we announced the acquisition of Glycom, the world's leading supplier of Human Milk Oligosaccharides, to accelerate growth in our early life nutrition business.

Materials reported a decline in organic growth in 2019. Lower volumes resulted from weak macroeconomic conditions and specifically in some end-markets. This weakness was mainly related to global trade issues. The lower prices fully reflect lower input costs, and we maintained our margins. Our Materials business demonstrated earning's resilience in persisting weak market conditions, with an almost stable Adjusted EBITDA. Key highlights in Materials included further strengthening our market-leading position in specialty materials in India by acquiring the engineering plastics business of SRF Ltd, launching a new production line for Arnitel®, and increasing our manufacturing capacity for Dyneema®.

Based on our confidence in the quality of our businesses, our cash generation and our strong balance sheet we announced a € 1 billion share buy-back program in February 2019 and repurchased shares for a total consideration of € 600 million in 2019. We intend to repurchase the remaining € 400 million during the first half of 2020. On the back of the 2019 results, we will propose to the Annual General Meeting of Shareholders an increase in the dividend from € 2.30 to € 2.40. We made good progress with our large innovation projects, as well as in keeping up with our long-standing commitment to balancing the needs of People, Planet and Profit. We can be pleased with the significant strides we took in sustainability in 2019.

Our core competence: bright science and innovation

We continue to leverage our unique technology capabilities to develop innovative, sustainable solutions that address some of the biggest challenges facing society and the planet today, as anchored in the Sustainable Developments Goals (SDGs) of the United Nations (UN), such as climate change, malnutrition and resource scarcity. In 2019, we invested approximately 5% of sales in R&D and continued to build a strong and focused innovation pipeline to drive long-term growth. Consequently, 21% of our sales in 2019 came from innovations introduced in the past five years, achieving our aspiration. The year 2019 was a milestone in the history of our company, as we celebrated 150 years of innovation in fermentation and biotechnology at our Delft site (Netherlands). Building on the solid foundations of our heritage, we currently rank among the world's top three companies in industrial biotechnology, and these activities account for 20% of our total sales. We made good progress on our large innovation projects. To name a few: our Veramaris joint venture with Evonik started commercial production of its algae-based omega-3 fatty acids for aquaculture and is currently supplying three of the world's largest salmon feed producers. Project Clean Cow, our innovative feed solution that reduces the emissions of the greenhouse gas (GHG) methane from cattle by at least 30%, reached a key milestone, filing for European registration to commercialize the product by late 2020 or early 2021.

Avansya, our partnership with Cargill to bring zero-calorie, cost-effective sweeteners to market faster, started commercial production.

Our sustainability leadership

At DSM, sustainability is our core value and a key responsibility. It is also an important business driver that is fully engrained in our strategy, business and operations. Our approach for bringing about positive change is to *improve*, *enable* and *advocate*.

Improve is all about reducing the environmental impact of our own operations. We are very well on track this year with respect to our greenhouse gas (GHG) reduction, energy efficiency and purchased renewable electricity targets. The underlying cumulative structural improvement in absolute GHG reduction compared to the 2016 baseline was approximately 17%. Energy efficiency improved by 2.3% compared to 2018 versus an average annual ambition of more than 1%, and 50% of purchased electricity came from renewable resources compared with 41% in 2018. We continued to apply an internal carbon price of € 50 per ton of CO_2eq. In addition, starting from 2019, business growth projects must either be GHG-neutral or else be compensated for. We are pleased that we were the first company in our sector to set new science-based targets for GHG emission reduction, reviewed and approved by the Science Based Targets initiative and aligned with the Paris Climate Agreement. We committed to a long-term pathway to work toward net-zero GHG emissions across our operations and value chains by 2050. We are proud that we are one of the first companies to do so. We also continued making steps in financial transparency on climate risks and opportunities by further disclosing against the TCFD (Taskforce Climate-related Financial Disclosures) recommendations.

We also *enable* our customers in their sustainability endeavors with our innovative solutions. We see continued growth of demand for solutions that address sustainability challenges. In 2019, 63% of our sales came from products that have a better environmental (ECO+) and/or social (People+) impact than mainstream solutions. We call these our Brighter Living Solutions. Our innovation pipeline is focused on three strategic domains: Nutrition & Health, Climate & Energy and Resources & Circularity, and includes for example our Project Clean Cow, Veramaris®, Avansya, Balancius®, Niaga® and Akulon® RePurposed. Furthermore, in 2019 our materials businesses initiated additional sustainability ambitions and programs to offer recycled and/or bio-based alternatives. We took further steps to address malnutrition in 2019. The UN World Food Programme (WFP) reaches 35 million beneficiaries annually with food that has been improved by the DSM-WFP partnership. Through our Africa Improved Foods (AIF) joint venture in Rwanda, we are working hard to tackle the issue of malnutrition and stunting, while using local sourcing and production in-country helps to develop the local economy and to create self-sufficiency. Together with UNICEF, we announced a partnership for Generation Unlimited to embed a longer-term vision for sustainable food systems in Africa.

We continue to *advocate* on (mal)nutrition, climate change and circularity and the role of business in society. These are issues that define our times and can be addressed by our competences. We continued in 2019 to help address malnutrition globally via the UN, WFP, UNICEF and the Scaling Up Nutrition (SUN) Global Business Network. We were equally active on the Climate front, with Feike Sijbesma being appointed Co-chair of the High-Level Commission on Carbon Pricing and Competitiveness of the World Bank Group. Feike was also one of the commissioners of the Global Commission on Adaptation, which published its flagship report in September 2019. We continued our support for the UN Global Compact in 2019 and remain committed to reporting our progress within the framework of this initiative. We are proud to be recognized as a constructive contributor to a changing world, achieving this by working together with governments, industry bodies and peers. We received, for instance, the highest rankings in important ESG (Environmental, Social & Governance) indices such as MSCI and Sustainalytics (ranked number one within our sector). In addition, we are proud that our company is part of Forbes' best employer list globally and that Feike Sijbesma was ranked 42 on the Harvard Business Review Top 100 best performing global CEOs in 2019.

Our people, leadership and digitization

We worked on further improving our safety performance in 2019. We can be proud that we substantially improved our Safety Frequency Recordable Index from 0.33 to 0.28, in line with our goals and values. Safety remains our highest priority and we strive to be incident- and injury-free. We aim to deliver this by creating a culture in which everyone working for DSM, whether as an employee or a contractor, is engaged in maintaining high safety standards.

We continued to develop our organization, leadership, people, and culture to enable continued high performance and engagement. We accelerated leadership development for both people and teams. The results of these initiatives are reflected in our annual Employee Engagement Index rating of 74%, with a response rate of 92% and over 40,000 comments received. This indicates that our people feel engaged and committed. Additionally, we boosted our digitization efforts to drive our growth and improve our efficiency through digital collaboration tools with customers and data analytics to increase our productivity and digital value propositions in personalized nutrition.

We continued to focus on internationalization and diversity in 2019. We are pleased with the progress to date. Our executive base became more international and we already achieved our 2020 target on nationality mix last year. Nowadays 62% of our executives are non-Dutch, and our focus shifted to expanding our non-European population. Today, there is a better gender balance both at management and executive levels. As of 15 February 2020, the percentage of women in our Executive Committee, Managing Board and Supervisory Board is 50% in each. With these percentages we are clearly achieving our aim of having at least 30% male and at least 30% female members in each one. We are delighted at the appointment of Erica Mann and the re-appointment of Pauline van der Meer Mohr as members of DSM's Supervisory Board.

It is with great sadness that in 2019 we had to say a final farewell to our former Managing Board Chairman, Simon de Bree. Under his leadership, the first steps were taken to transform from a bulk-chemicals company into one focused on biochemistry and fine chemicals, laying the foundations for the company we are today.

Leadership change

Feike Sijbesma: *"At the end of 2019, after 20 years on the Managing Board and almost 13 years as CEO, I decided to step down as CEO and hand over the leadership of DSM. Our Supervisory Board appointed Geraldine Matchett and Dimitri de Vreeze as Co-CEOs. I am honored and humbled: for having served DSM and society for such a long time and for being able to hand over to my valued Managing Board colleagues Geraldine and Dimitri. We have driven the transformation and successes of the business together, making their dual leadership structure rooted in a long history of collaboration."*

Geraldine Matchett and Dimitri de Vreeze: "*Under the leadership of Feike, we have gone through a significant transformation, from a bulk-chemicals company into one which focuses on Nutrition, Health and Sustainable Living, generating Total Shareholder Return of about 400%. For more than a decade we have significantly expanded our nutrition business, divested our non-core bulk chemical activities, and upgraded the materials portfolio. In addition to focusing on business performance and financial discipline, we have repositioned ourselves into the successful science-based company that DSM is today: Purpose-led and performance-driven, putting innovation and sustainability at the heart of our company and our strategy.*

Today, we are a truly global company with a diverse and engaged employee and leadership base, creating value for all our stakeholders. With Feike handing over formally with effect from 15 February, 2020, we too will maintain the focus on business performance, financial discipline, innovation, sustainability, and people, as DSM continues its journey. We are pleased that Feike will help ensure a smooth handover until 1 May and that he will continue to be an ambassador for DSM in his new capacity as Honorary Chairman of the Company."

Thank you

A warm thank-you to everyone who helped make 2019 a good year for DSM, in challenging circumstances. We are deeply grateful to our Supervisory Board, our colleagues in the Executive Committee, all DSM colleagues and business partners for working closely together and for their enormous commitment and contribution. We also thank our customers and shareholders for their trust and loyalty. Last, but not least, we are humbled for having been given the opportunity to work together to serve society by creating value on three dimensions simultaneously: People, Planet and Profit.

Feike Sijbesma, CEO/Chairman Managing Board Royal DSM (until 15 February 2020)[1]

Geraldine Matchett and Dimitri de Vreeze, Co-CEOs Royal DSM (as of 15 February 2020)[1]

DSM Managing Board (from left to right): Geraldine Matchett, Feike Sijbesma and Dimitri de Vreeze.

[1] This date will not be repeated throughout the rest of the Report

DSM and the Sustainable Development Goals

In 2016, the United Nations launched the Global Goals for Sustainable Development (SDGs), a roadmap to a more environmentally and socially conscious and responsible world by 2030. At DSM, we believe that companies have a key role to play in achieving the SDGs. We believe that our combination of Health, Nutrition and Sustainable Living contributes in a positive way toward achieving the SDGs.

Our purpose and three focus domains align most closely with five of the SDGs, and we show here some examples of our contributions and commitments toward these core SDGs. Information about our engagements (Improve, Enable, Advocate) can be found in our Brighter Living Agenda, the Sustainability statements and throughout this Report.

Nutrition & Health

We contribute through...

... our Nutritional Products that support the nutritional requirements both in the developed and developing world.
... our joint venture, Africa Improved Foods in Rwanda, that sources local maize and soy to locally produce fortified porridges, helping local people access the nutrients they need.
... our Food Specialties that reduce salt, fat and sugar in the daily diet.
... our Biomedical devices, which contribute to improved quality of life for surgical patients.
... our leadership, support and technical assistance to the Scaling Up Nutrition (SUN) Business Network, enhancing and accelerating the potential of SMEs that are working to improve the nutritional quality of the food system.
... working with partners to advocate for dietary switches that enable improved health within planetary boundaries.

Our commitments

- Together with the United Nations World Food Programme, we will raise awareness for improved nutrition while continuing to develop new food solutions
- We take responsibility to control and minimize all possible safety risks and adverse effects that could be caused by (the substances present in) our products throughout the value chain
- Together with Generation Unlimited and Sight & Life, we will develop a business plan in Africa to reach one million smallholder farmers by transforming the food system, providing better nutrition, stimulating youth job creation and reducing reliance on food imports

Our key SDG targets*

2.1 2.2 3.2 3.4 3.9

Climate & Energy

We contribute through...

... our Advanced Solar and biofuel solutions which contribute to the uptake and efficiency of renewable energy sources.
... our high-performance materials which improve energy efficiency in and lower emissions from the automotive, maritime and food sectors.
... our animal feed solutions (such as Project Clean Cow), which promote resource efficiency and reduce greenhouse gas emissions.
... advocating for a shift to a low-carbon economy, including implementing a meaningful price on carbon.

Our commitments

- Our Science Based Targets comprising a scope 1 + 2 absolute reduction of 30% and a scope 3 intensity reduction of 28% by 2030 versus baseline 2016 toward our net zero by 2050 commitment
- Supporting targets of an average annual energy efficiency improvement of >1% and 75% purchased electricity from renewable sources by 2030
- We apply an internal carbon price of €50/t CO_2eq on our key investments, acquisitions and in our management reporting

Our key SDG targets*

7.2 7.3 13.2 13.3

* The key targets demonstrate how our contributions and commitments link to the SDGs.
The full text of the SDG targets can be found at https://sustainabledevelopment.un.org/sdgs by clicking each of the SDG icons.

Resources & Circularity

We contribute through...

… materials that enable a circular economy, such as Niaga®, Akulon® RePurposed, and bio-based Stanyl® and Arnitel®.

… supporting the food system through our joint venture, Veramaris®, which replaces wild caught fish in fish feed for aquaculture, and by reducing food waste through packaging and preservation solutions.

… our waterborne resins that have lower VOC emissions.

… our biofuel solutions, which enable fuel production from biomass from agricultural residues.

… working with advocacy partners to scale up circular economy solutions, reduce food waste and promote the role of renewable raw materials.

Our commitments

- Commitments on bio-based and recycled-based raw materials and products in our Materials cluster
- ‘Safe by design’ is the leading principle in the development of new and better products and processes
- 80–90% of our waste will be recycled by 2020
- We will improve our VOC emissions efficiency by 50% by 2021 (vs. 2015)

Our key SDG targets*

12.2 12.3 12.4 12.5

Engaging with the SDGs

In addition to our ‘core’ SDGs, we believe that we can Improve, Enable and Advocate to a varying extent across all the SDGs. Below we indicate our estimated contribution on all the SDGs.

Minor
Moderate
Major

	Improve	Enable	Advocate
1 No Poverty	Moderate	Minor	Moderate
2 Zero Hunger	Minor	Major	Major
3 Good Health and Well-Being	Moderate	Major	Major
4 Quality Education	Minor	Minor	Moderate
5 Gender Equality	Moderate	Minor	Major
6 Clean Water and Sanitation	Minor	Moderate	Minor
7 Affordable and Clean Energy	Major	Major	Major
8 Decent Work and Economic Growth	Moderate	Minor	Moderate
9 Industry, Innovation and Infrastructure	Minor	Moderate	Moderate
10 Reduced Inequalities	Moderate	Minor	Moderate
11 Sustainable Cities and Communities	Minor	Moderate	Moderate
12 Responsible Consumption and Production	Moderate	Major	Major
13 Climate Action	Moderate	Moderate	Major
14 Life Below Water	Minor	Moderate	Moderate
15 Life on Land	Minor	Moderate	Minor
16 Peace, Justice and Strong Institutions	Minor	Minor	Moderate
17 Partnerships for the Goals	Moderate	Moderate	Major

Improve: The impact within our own operations
Enable: Products that enable our customers to deliver sustainable products for planet and society
Advocate: Advocating for the future we believe in and acting on our responsibilities


Our purpose is to create brighter lives for all

We are already reaching* more than 2.5 billion people worldwide

* Lives Reached is a measure of the number of consumers reached each year via products of customer and other third parties which contain DSM products and solutions. This estimate is based on key market insights relating to market share, usage patterns and product composition. Mathematical modelling is used to eliminate double counting. For more information, see ‘Explanation of some concepts and ratios’ on page 249.

Purpose

For more than a decade, we have distinguished ourselves by embracing sustainability and providing value for all our stakeholders across the three dimensions of People, Planet and Profit. We have taken a decisive next step as a purpose-led company, contributing to a brighter world for all with our science-based solutions. Our purpose is therefore fully anchored in our Strategy 2021: *Growth & Value - Purpose led, Performance driven.*

> “ We cannot be successful, nor can we call ourselves successful, in a society that fails.”
>
> **Feike Sijbesma, CEO/Chairman Managing Board**

Our purpose is to create brighter lives for all

Businesses need to generate profitable growth while at the same time playing a positive role in the world.

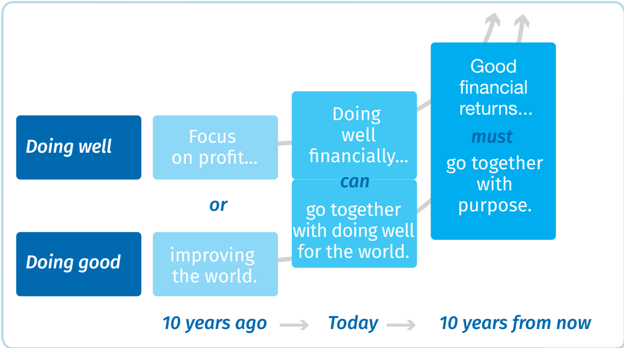
We use our bright science to create solutions for people today and generations to come. We use our scientific competences to deliver transformation at scale for as many people as possible, within the constraints of the world's resources. We aim to redefine how we live and work in order to create a fairer, more prosperous and more sustainable society.

We aspire to be a company for all, creating value for all our stakeholders — customers, employees, shareholders and society at large — and building a stronger legacy and a brighter future for generations to come.

Acting on our purpose

We make change happen in three ways:

- *Improve*: we optimize our own operational impact by continually raising safety standards, promoting health and well-being in our own workforce, reducing our emissions, increasing our use of renewable energy and unlocking more value from the limited resources
- *Enable*: we create products and services that enable our customers and partners to deliver sustainable and healthy solutions for the planet and society
- *Advocate*: we advocate for the future we believe in and we fully accept our responsibilities as a corporate member of society



We recognize the growing scale of companies in the global economy, and the increasing impact they are having on our world. With increased impact comes increased responsibility. The private sector as a whole needs to deliver value for all stakeholders — not just employees, customers and shareholders, but the world's communities and the individuals who live in them. We therefore take an integrated approach to our responsibilities. Our Brighter Living Agenda brings together many purpose-led initiatives and creates an actionable framework for further engagement with our stakeholders.

Progress in 2019

We implemented a range of initiatives designed to embed our purpose throughout the company during the course of 2019.

These included translating the DSM Brighter Living Agenda into versions for our business groups and functions so as to create clear ownership and focus. In our businesses, we also focused on connecting customer needs with our purpose and sustainability ambitions, thereby creating a pull for purpose-led business. An example is our cooperation with FrieslandCampina. *"DSM and FrieslandCampina both have a purpose-driven strategy in which various aspects of sustainability like nutrition and environmental impact are key. By working together in these areas, we can build on each other's expertise and increase impact. One of the areas of cooperation is the reduction of the carbon footprint at the farm. With DSM's knowledge of animal nutrition and health and our knowledge of milk and farming, we explore together the effect of feed additives on reducing methane emissions. Together we can make a difference and build a leading position with sustainability,"* said Margrethe Jonkman, Global Director Research & Development FrieslandCampina.

We set additional circularity-related targets at business-group level in Materials in order to boost our transformation into a purpose-led business throughout the entire product life cycle. For more information, see 'Materials' on page 84.

Through key corporate functions such as People & Organization, Finance, Operations and Innovation, we are creating a culture in which purpose and performance go hand in hand, while making all employees feel they can contribute to our global agenda. We established a purpose-led innovation program that defines the innovation platforms that will deliver growth in our three focus domains going forward.

We created local ownership to help transform markets worldwide by connecting regional business dynamics and sustainability challenges to our global strategy. We also worked on a combination of global and regional initiatives to create a workplace that reflects our purpose-led approach. For more information, see 'People' on page 40.

In addition to these efforts, we hosted a number of multi-stakeholder events, including at the World Economic Forum in Davos, Switzerland, in January. In September, we gathered leaders from the private and public sector as well as civil society in New York City (New York, USA) to discuss the role of business in society and identify initiatives that have transformational potential.

DSM CEO Feike Sijbesma at a key panel of the World Economic Forum in January 2020.

DSM Brighter Living Agenda 2019

Improve

Nutrition & Health

Reducing occupational safety incidents and promoting health and well-being in our own workforce

Occupational Safety:
- Safety Frequency Recordable Index <0.25 by 2021
- DSM Life Saving Rules

Employee well-being programs:
- Regional health programs
- Skin care protection

Climate & Energy

Our long-term goal is net-zero emissions by 2050. To put us on track to achieve this, by 2030 we will reduce our own carbon footprint by:
- 30% absolute reduction in GHG emissions (scope 1 + 2)
- 28% reduction per ton of product in our value chain GHG emissions (scope 3), starting with suppliers
- Purchasing 75% of our electricity from renewable resources
- Extending the breadth and depth of our internal carbon pricing of €50/ton CO_2 equivalent
- Ensuring our assets and supply chains are resilient to the physical impacts of climate change

Resources & Circularity

Unlocking more value from the limited resources that are available by:
- Executing our Responsible Care Plan addressing waste, water and emissions
- Embedding circular and bio-based thinking into sourcing, operations, innovation and portfolio steering

Enable

Nutrition & Health

Enabling healthy lives for all:
- Maintaining or improving existing good health status (reducing salt, sugar and fat intake; improving digestive health; improving comfort and well-being)
- Protecting existing good health status (reducing risks of injury; reducing emissions to air; reducing anti-microbial resistance)
- Restoring compromised health status (contributing to the development of new regenerative health techniques and materials)

Climate & Energy

Enabling the low-carbon economy through solutions that help customers cut emissions and improve society's ability to adapt to climate change:
- Limiting the use of fossil fuels and accelerating the energy transition (biofuels, solar, materials for windfarms)
- Enabling the future of mobility (weight reduction and hydrogen storage; biofuels)
- Cutting livestock GHG emissions (reducing enteric methane emissions, improving lifetime performance)
- Improving resilience to the adverse effects of climate change (agricultural and food security innovations, applications of our advanced materials)

Resources & Circularity

Enabling the transition toward a circular & bio-based economy:
- Increased use of bio-based raw materials (e.g., Decovery®, Engineering Plastics portfolio)
- Replacing hazardous and potentially harmful ingredients with safer alternatives
- Creating solutions to reduce food loss and waste (e.g., Pack-Age®, bio preservatives)
- Extending the lifetime of materials & products (e.g., Dyneema®, coatings)
- Designing for recyclability (e.g., Niaga®)
- Recovering and valorizing waste streams (e.g., CanolaPRO™, Akulon RePurposed®)
- Eliminating waste from prototyping (3D printing)
- Reducing the reliance on finite marine resources (Veramaris®, aquaculture feed)
- Enabling efficient use of feed raw materials for more sustainable animal production (Ronozyme® feed enzyme portfolio)

Advocate

Nutrition & Health

Advocating healthy diets within planetary boundaries

Active in partnerships to fight malnutrition:
- UN World Food Programme
- Global Alliance for Improved Nutrition
- World Vision
- Scaling Up Nutrition
– UNICEF
- Vitamin Angels

Active in partnerships to address sustainable and healthy nutrition:
- Food Reform for Sustainability and Health (FReSH), part of the World Business Council for Sustainable Development (WBCSD)
- European Institute of Innovation and Technology (EIT) Food
- World Economic Forum (WEF), e.g., 'WEF Meat the Future Series'
- Sustainable Food Initiative

Climate & Energy

Advocating climate action and building the movement for a low-carbon, resilient economy

Leading roles/engagement in:
- World Bank Carbon Pricing Leadership Coalition
- WEF CEO Climate Leaders
- WBCSD Climate & Energy
- Taskforce on Climate-related Financial Disclosures
- Renewable Energy 100 (RE100)
- United Nations Global Compact
- Global Commission on Climate Adaptation

Resources & Circularity

Advocating in favor of the transition from a linear to a circular and bio-based economy

Leading roles/engagement in:
- Platform for Accelerating the Circular Economy (PACE)
- WBCSD Factor10
- Circle Economy
- Ellen MacArthur Foundation, Circular Economy 100 (CE100)

Results at a glance

Strategy 2021

€ 1,684[1]

Adjusted EBITDA[2] versus € 1,532[3] in 2018 (in millions)

+10%[1]

Adjusted EBITDA[2] growth versus 2018[3] and versus a high single-digit target

+47%[1]

Adjusted net operating free cash flow[2] growth versus 2018[3] and versus an average annual target of ~10%

-1%

Organic sales growth versus 2018[3]

21%

Innovation sales, in line with our ambition of ~20%

~17%

GHG scope 1 + 2 reduction — cumulative structural improvement[4] versus ~8% in 2018 (baseline 2016)

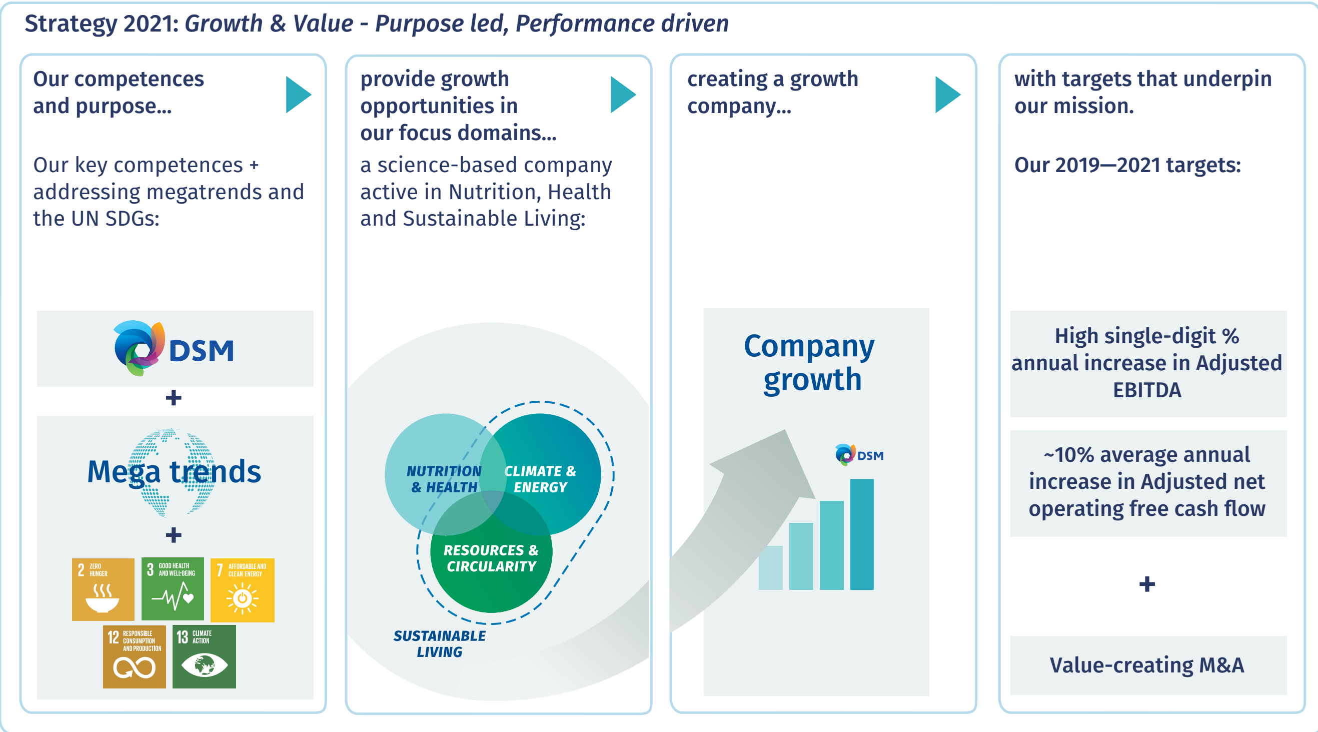
74%

Employee Engagement Index versus 76% in 2018

63%[5]

Sales of Brighter Living Solutions versus 62%[3] in 2018

1 Including the impact of IFRS 16, see table on page 164.
2 For reconciliation to IFRS performance measures, see table on page 180.
3 Excluding temporary vitamin effect in 2018 of € 415 million sales and € 290 millions (Adjusted) EBITDA, for further information see table on page 65.
4 We estimate that the effect of the underlying cumulative structural improvements in absolute GHG emissions was approximately 17% and 8% in 2019 and 2018 respectively, versus the 2016 baseline. The total cumulative absolute reduction was 25% and 18% respectively, versus the 2016 baseline.
5 For a small percentage of sales (approximately 2%) classified as BLS, the environmental impact is considered 'best in class' together with other solutions.



Purpose sets scope for further growth and evolution

With Strategy 2021: *Growth & Value - Purpose led, Performance driven*, we will evolve further toward being a purpose-led, science-based company operating in the fields of Nutrition, Health and Sustainable Living. Our strong growth platform, centered on developing innovative solutions addressing Nutrition & Health, Climate & Energy and Resources & Circularity, together with increased customer-centricity and our large innovation projects, will drive above-market growth. At the same time, we will remain focused on cost control and operational excellence, allowing us to accelerate profit growth and cash generation. Organic growth will be complemented by acquisitions, predominantly in Nutrition.

Our Nutrition business will focus on human nutrition (ingredients and solutions for food & beverages, as well as specialty nutrition, nutritional ingredients, consumer-branded products and personalized nutrition), animal nutrition (with premix and specialty solutions), and personal care and aroma ingredients.

Our Materials business will further develop as a high-growth, higher-margin specialty business, and will focus on the categories Improved Health & Living, Green Products & Applications, and New Mobility & Connectivity.

By improving the impact of our own operations, enabling sustainable solutions for our customers, and advocating sustainable business, we can grow faster and reduce our cost and risk profile. We will further step up our ambitions regarding the reduction of greenhouse gas emissions (in line with the Paris Agreement), our energy efficiency and our use of renewable energy.

Performance to deliver growth and value

We have set two ambitious targets for profit growth and cash generation to drive value creation for the period 2019–2021:

- A high single-digit percentage annual increase in Adjusted EBITDA
- An average annual increase of about 10% in Adjusted net operating free cash flow

We are committed to top-line growth ahead of market, which will be supported by expanded solution offerings that place the customer even more firmly in the center of our activities, as well as by harnessing digital capabilities to increase customer intimacy, improve productivity and efficiency, and support new business models. Approximately 45% of sales will come from high-growth economies.

We will leverage our unique technology capabilities to develop innovative sustainable solutions in Nutrition & Health, Climate & Energy and Resources & Circularity, and will invest approximately 5% of sales in R&D to develop differentiating science and technology. Our innovation projects, including Veramaris®, Project Clean Cow, fermentative Stevia and Niaga®, will result in about 20% of sales coming from innovation. The following table describes the ambitions underpinning our financial targets:

2021 targets [1]	Ambitions underpinning our targets [1]	
High single-digit percentage annual Adjusted EBITDA increase	**1. Sales**	Above-market sales growth for Total DSM, Nutrition and Materials
	2. Adjusted EBITDA margin	Nutrition: >20% Materials: 18–20%
~10% average annual Adjusted net operating free cash flow [2] increase	**3. Working capital**	Reduce by 50 bps annually to ~16%
	4. Capex	~6.5% of sales
	5. ROCE	~1%-point increase per annum
	6. Adjusted EPS	Increase ahead of Adjusted EBITDA growth

1 Based on 2018 underlying business, defined as Sales and Adjusted EBITDA corrected for our best estimate of the temporary vitamin effect.
2 Adjusted net operating free cash flow is the cash flow from operating activities, corrected for the cash flow of the APM adjustments, minus the cash flow of capital expenditures and drawing rights.

Greater efficiencies and a yet sharper focus on higher-margin specialty solutions will enable new Adjusted EBITDA margin ambitions by 2021 for Nutrition (above 20%) and Materials (18–20%). Organic top-line growth combined with these enhanced margins will drive high single-digit Adjusted EBITDA growth.

We aim to accelerate growth in Adjusted net operating free cash flow, generating an average annual increase of approximately 10%. This results from the ambition to:

- Reduce working capital levels by around 50 basis points annually
- Take a disciplined approach to capital expenditure, with an overall level of spend of approximately 6.5% of sales
- Drive improvements in organic Return on Capital Employed (ROCE) of around 1% annually

Our overall deployment of capital is expected to drive Adjusted Earnings Per Share (EPS) growth ahead of Adjusted EBITDA growth. Our cash allocation policy remains unchanged and has a clear order of priority for cash deployment:

- Disciplined capital expenditure for organic growth: about 6.5% of annual sales
- A stable, preferably rising dividend
- Disciplined M&A, predominantly in Nutrition
- In the absence of value-creating M&A, capital to be returned to shareholders

We remain committed to maintaining a strong, investment-grade credit rating.

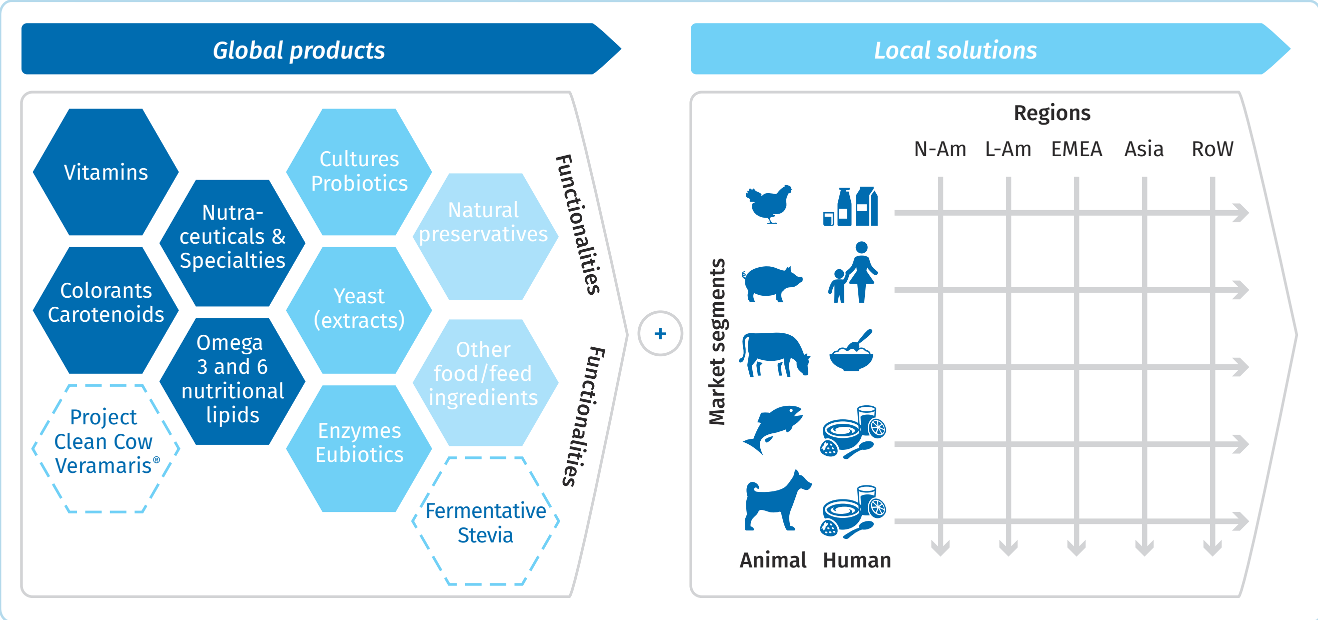
In line with our dividend policy of a stable, preferably rising dividend, we increased the dividend over 2019 from € 2.30 to € 2.40 (+4.3%) per ordinary share, reflecting our confidence in future earnings growth.In line with the targets set for the period 2019–2021, our performance is expected to result in further dividend growth, which could lead to an expected average payout of 40–50% of adjusted earnings.

We will target M&A predominantly in Nutrition, given this business' unique growth potential, resilience, strong leadership position and potential for value creation.

Nutrition

We have built a unique, highly integrated, global and broad nutritional and other specialty ingredient solutions business in food & beverages, specialty nutrition, animal feed and personal care, meeting differentiated local needs through our unparalleled network. We possess a diverse and significant premix footprint, with superior formulations and delivery systems, helping to drive sustainable nutritional and health solutions. This infrastructure is fueled by our complete portfolio of nutritional ingredients, which includes vitamins, nutritional lipids, carotenoids, minerals, eubiotics, enzymes and yeasts, as well as texturants, flavors and cultures. This diversity and level of integration creates a resilient portfolio with limited exposure to single products or customers, while benefiting from the opportunities provided by global megatrends.

Focused on Nutrition & Health, we will continue to aim for above-market growth and an Adjusted EBITDA margin greater than 20% by 2021. We will complement organic growth with inorganic opportunities that broaden our portfolio and enhance our ability to provide customized solutions. At the same time, we will further build on the successful initiatives of Strategy 2018, increasingly placing the customer at the center of everything we do, while delivering large, sustainability-driven innovation projects.



Animal Nutrition & Health

Building on the results of our programs as part of Strategy 2018, we will continue to seek to deliver above-market sales growth through:

- Marketing & Sales excellence, especially building specialist capabilities to address wider species opportunities and pursue new health solutions
- Customer-centricity & agility, to place the customer at the heart of everything we do, by improving the end-to-end experience for the customer
- Further investing in our direct business-to-farmer (for instance in China) and overall go-to-market capabilities

In addition, we pursue radical innovation for core sustainability topics, all of which seek to deliver long-term solutions for the industry with the potential to create significant value for our company and our customers. With examples such as algal-based omega-3 for fish feed (Veramaris®) and methane-reducing feed additives for cows (Project Clean Cow), we position ourselves at the forefront to benefit from global megatrends.

Human Nutrition & Health

Building on the success of the first two parts of the LiftOff! Program as part of Strategy 2018, we will step up further in Strategy 2021 with increased focus on customer-centricity and commercial excellence to drive above-market organic growth through:

- Seeking to move closer to the customer by strengthening the value propositions of our products and services, improving end-to-end customer experiences, and enhanced innovation and application capabilities
- Continuing to invest in business-to-consumer to ensure the growth of i-Health beyond the US, as well as further development and building on our personalized nutrition platform

In addition, we will continue to pursue inorganic opportunities in specialty nutrition and food & beverages, to enhance and complement our already strong market positions.

Our business is well positioned to benefit from strong trends, as evidenced by the disruptive value chain shifts we are witnessing, which are leading to new opportunities in Human Nutrition & Health.

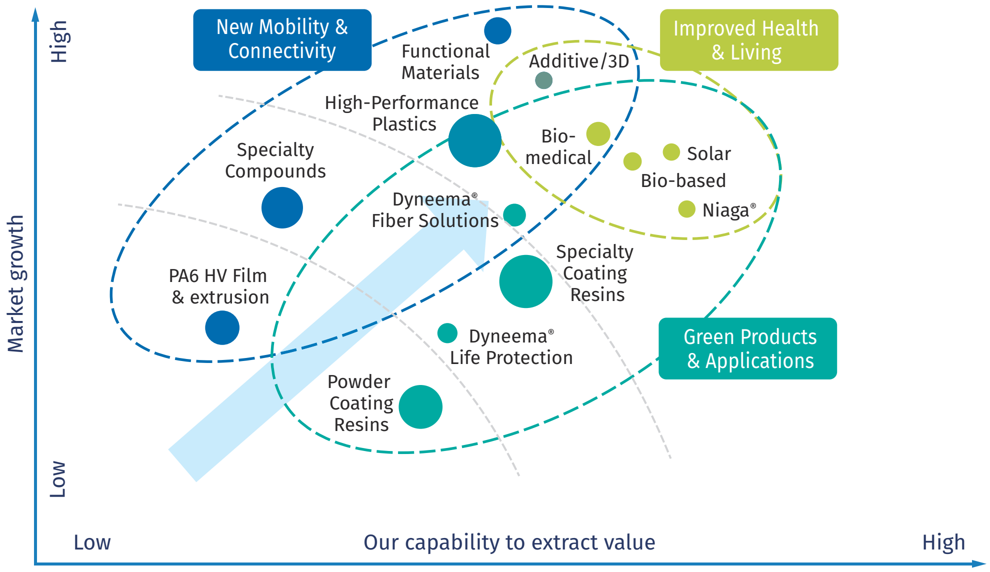
In food & beverages, we see an increasing number of local players entering the market in answer to the growing demand for local, healthy products of natural origin with reduced sugar, salt and fat. These new players have generally limited development and production assets and market their products through social media. Global players are facing the challenge of having to reduce costs in order to remain competitive while innovating their products. This scenario represents a unique opportunity for us. We offer tailored nutritional solutions to local players through our global presence and our R&D competences. At the same time, we help global players reduce their manufacturing and R&D costs with our premix capabilities, but also provide innovative solutions to replace sugar, salt and fat. As an example, our partnership with Cargill (Avansya) to bring zero-calorie, cost-effective, non-artificial sweeteners to market faster is well positioned to help food & beverage producers deliver the products and brands consumers prefer, with significantly reduced calories.

In specialty nutrition (especially dietary supplements), more health-conscious and educated consumers are increasingly seeking more personalized products based on their lifestyle, diet and genetic make-up, leading to a demand for more individualized advice, delivery systems and diagnostic tools. This requires a more integrated offering beyond the supply of nutritional ingredients alone, one that involves turning scientific know-how into expert advice for the consumer. To help us meet these needs, we are building on our existing business-to-business and business-to-consumer strengths, while also acquiring business-to-me capabilities from leading start-ups such as Mixfit, Tespo and Biomarker.

Materials

We are further future-proofing our Materials business by aligning it toward Sustainable Living, in line with our key focus domains of Climate & Energy and Resources & Circularity. This will further develop Materials into a high-growth, higher-margin specialty business, delivering above-market organic growth, focused on Improved Health & Living, Green Products & Applications and New Mobility & Connectivity.

Materials strategy



In Improved Health & Living, we are focusing on the increasing demand for advanced healthcare applications. In addition, we offer solutions that enhance end-user safety and health conditions.

In Green Products & Applications, we are providing solutions that enable customers to cut emissions by using materials that are lighter, stronger, more efficient and more sustainable. We are also increasingly focusing on bio-based, recycled, and fully recyclable solutions.

In New Mobility & Connectivity, we are targeting materials that support the transition from fossil fuel to electric automotive power. We are also addressing the growing need for increased connectivity between products, devices and applications.

Across our businesses, we have intensified our focus on customer-centricity and have implemented several programs that focus on creating a positive experience for our customers.

Innovation

Innovation is what transforms our 'Bright Science' into 'Brighter Living'. We can leverage our unique technology capabilities for developing innovative sustainable solutions through possessing a profound understanding of:

- The science behind nutrition, and the capability to develop new nutritional ingredients with proven health benefits, supported by our state-of-the-art Biotechnology Center, providing sustainable alternatives for chemical synthesis, as well as plant/animal-derived ingredients
- Material synthesis and characterization, and the capability to convert this into Sustainable Living applications, supported by our state-of-the-art Materials Science Center

Our sales growth is driven by our ability to continually deliver innovative and improved products and solutions to meet our customers' needs. Our innovations reflect our commitment to healthier and more sustainable outcomes and so help drive the performance of our Brighter Living Solutions portfolio. Innovation sales have also improved our profitability, delivering higher margins than the average of our running business. Our innovation sales are defined as products and applications that have been introduced over the past five years. We aspire to maintain a level of around 20% during the strategy 2019–2021 period, which we consider to be a healthy proportion in view of the overall balance of our product portfolio and product life cycles. We will continue to invest in differentiating science and technology, allocating approximately 5% of sales to R&D.

Our organic growth will be supported by a number of focused, large innovation projects — for example, Project Clean Cow, Veramaris®, fermentative Stevia, enzymes and yeasts for 1.5th- and 2nd-generation bio-ethanol, Niaga®, Additive Manufacturing, plant-based proteins, and bio-agriculture. These solutions are expected to be introduced to the market in the 2019–2025 timeframe. All these innovations seek to meet significant, global sustainability challenges in Nutrition & Health, Climate & Energy and Resources & Circularity. Altogether, we expect these to generate around € 350 million in sales and € 100 million in Adjusted EBITDA from 2021 to around € 1 billion and € 400 million, respectively, from 2025 onward.

As well as supporting innovation in our core businesses, the DSM Innovation Center also aims to develop its Emerging Business Areas (EBAs). These are promising growth platforms outside the scope of our business groups. They comprise DSM Biomedical, which focuses on innovative materials for medical devices; DSM Bio-based Products & Services, which focuses on clean energy from crop residues as well as bio-chemicals with enzymes and yeasts for biomass conversion; and DSM Advanced Solar, which offers yield-boosting solutions for solar energy.

Enabling programs for accelerated growth

Our enabling programs will underpin and facilitate our ambitions by focusing on key areas such as performance-driven organization, leadership and people, culture, digitalization and sustainability leadership across DSM.

Organization, leadership and people, and culture
We continue to develop our organization, leadership and people, and culture to enable continued performance. In terms of organization, we are maintaining our focus on cost discipline and customer-centricity as we optimize our set-up and align our activities and organization with specific market and customer segments.

Regarding leadership and people, we are accelerating leadership development for both people and teams, as well as for effectiveness in growing our businesses. We are also embedding a global mindset through further internationalization.

In terms of culture, we introduced The DSM Ways of Working, which describe a daily mindset that enables everyone in our company to make a difference. These are described in more detail in 'People and organization strategy' on page 44.

Digitization and digitalization
Digitization and digitalization drive our growth and improve our efficiency on three levels:

- Customer intimacy: improving top-line results by, for example, customer data analytics, omnichannel apps providing 24/7 customer experiences, and digital collaboration tools
- Operational performance: reducing costs by means of automation and data analytics to increase productivity in support functions and manufacturing, optimize operational processes, and improve safety, quality and plant reliability
- New business models: supporting entrepreneurship and artificial intelligence. Examples are our partnerships for digital value propositions and our pilots in the areas of personalized nutrition and animal feed

Sustainability leadership
Sustainability is not only our core value and a key responsibility, it is increasingly an important business growth driver at DSM that is fully engrained in our strategy. We are stepping up our sustainability aspirations. By improving the impact of our own operations, enabling sustainable solutions for our customers and advocating sustainable business, we can grow faster and reduce our cost and risk profile. This is integral to our strategy and is detailed in the 'Brighter Living Agenda' on page 12 in 'Purpose'. For more details, see 'People' on page 40 and 'Planet' on page 50.

Strategy 2021: report on progress

Total DSM financial results
During the first nine months of 2018, the industry experienced an exceptional supply disruption. This event provided additional sales for € 415 million and a corresponding Adjusted EBITDA of € 290 million in the first nine months of 2018, as estimated and reported last year in Nutrition. 'Underlying business' is defined as the sales and Adjusted EBITDA in Nutrition, corrected for this temporary vitamin effect.

As of January 2019, we adopted IFRS 16 on 'Leases' using the modified retrospective approach: the financial results of 2019 are reported including and excluding this impact, where applicable.

2021 targets [1]	Ambitions underpinning our targets [1]	
High single-digit percentage annual Adjusted EBITDA increase ✓	1. Sales	Above-market sales growth for Total DSM, Nutrition and Materials
	2. Adjusted EBITDA margin	Nutrition: >20% ✓ Materials: 18–20% ✓
~10% average annual Adjusted net operating free cash flow [2] increase ✓	3. Working capital	Reduce by 50 bps annually to ~16%
	4. Capex	~6.5% of sales ✓
	5. ROCE	~1%-point increase per annum
	6. Adjusted EPS	Increase ahead of Adjusted EBITDA growth ✓

1 Based on 2018 underlying business, defined as Sales and Adjusted EBITDA corrected for our best estimate of the temporary vitamin effect.
2 Adjusted net operating free cash flow is the cash flow from operating activities, corrected for the cash flow of the APM adjustments, minus the cash flow of capital expenditures and drawing rights.

In 2019, we delivered on our key financial targets with double-digit growth in Adjusted EBITDA of 10% to € 1,684 million, including 3% from IFRS 16. The strong Adjusted EBITDA growth in the businesses was also supported by our continued focus on cost reduction and operational efficiency. The Adjusted EBITDA margin was 18.7%, compared to 17.3% in the underlying business in 2018. Adjusted net operating free cash flow increased by 47% to € 801 million compared to the underlying business in 2018, including 10% from IFRS 16.

Nutrition delivered above-market sales growth and high-single digit Adjusted EBITDA growth, despite challenging market conditions in some of its end-markets. Materials demonstrated earnings resilience in persisting weak market conditions with an almost stable Adjusted EBITDA.

Our Return On Capital Employed (ROCE) from underlying business was down 130 basis points to 12.0% (including 30 basis points from IFRS 16), mainly driven by the impact of acquisitions and the implementation of IFRS 16.

One of our key focus areas remains the improvement in our working capital as percentage of total sales. At the end of 2019, total working capital was € 1,852 million, compared to € 1,674 million in 2018, fully driven by the consolidation of acquisitions and foreign exchange rate effects. The average total working capital as a percentage of sales was 21.2%, compared to 18.7% in 2018.

Including the estimated temporary vitamin effect of € 415 million on sales driven by the exceptional supply disruption in the industry in 2018, our total sales were down 3% to € 9,010 million (compared to € 9,267 million in 2018). The total Adjusted EBITDA declined 8% to € 1,684 million when considering the total estimated € 290 million temporary vitamin effect of 2018. Our Total ROCE was 12.0% (including 30 basis points from IFRS 16), a reduction of 480 basis points from 16.8%.

In 2019, we delivered a good financial performance, despite an increasingly challenging macroeconomic environment. Nutrition's broad, global portfolio in food and feed ingredients, as well as its expanded portfolio of solutions, drove solid growth. Meanwhile, Materials demonstrated its relative earnings resilience as it continued its ongoing transformation into a high-growth, higher-margin specialty business, focused on Improved Health & Living, Green Products & Applications and New Mobility & Connectivity.

Nutrition financial results

Our Nutrition business delivered a good result, with a solid performance in Animal Nutrition & Health, a softer one in Human Nutrition & Health, and a strong one in Personal Care & Aroma Ingredients and Food Specialties. Sales in the underlying business were up 5% to € 6,028 million compared to the underlying business in 2018. The organic sales growth in the underlying business was 2%, driven by volumes, which were up by 2%.

Animal Nutrition & Health reported 4% organic growth, against a strong 8% last year and despite the negative effect of African swine fever (ASF). This demonstrates the resilience of the integrated and diversified business model and our ability to address a wide range of species as well as our diversified geographical presence.

Sales were strong for all species and in all regions, except for sales to the swine business in China and South-East Asia, which were impacted by ASF. This region accounts for more than half of global pork production, with culling measures introduced in response to ASF, affecting 35–50% of pork production in the area. The rapid spread of this disease disrupted the global equilibrium of animal protein in the short term. As a result, in the second half of 2019, we were unable to fully offset the impact of the decline in pork production in the region with increases in production from other regions and species. Overall, volumes and prices were both up 2%. The price increase was due to positive sales mix effects, as well as price increases earlier in the year for some ingredients to compensate for higher costs.

Human Nutrition & Health delivered 3% sales growth driven by foreign exchange effects, which were largely US-dollar-related. Organic growth was minus 1%, against a tough comparison of 7% organic growth in 2018, in increasingly challenging end-markets. Volumes were up 2% and prices were down 3%.

After a strong start to the year, softer macroeconomic conditions increasingly weighed on the Food & Beverage segment, especially in North America. The softness was most pronounced in the case of larger customers. Smaller customers were less impacted. Medical Nutrition and Dietary Supplements (driven by the double-digit growth in the i-Health segment, our business-to-consumer business) performed well over the year. Early Life Nutrition showed a strong performance in the first three quarters of the year, with a softer fourth quarter. Lower prices for vitamin C and negative mix effects resulted in 3% lower prices.

In Food Specialties, sales were 17% higher versus the prior year, resulting from 4% organic growth, 12% from the consolidation of Andre Pectin following the increase in DSM's shareholding from 29% to 75%, and 1% from exchange rate effects. All major business lines performed well over the year, with especially a good sales growth in cultures and food enzymes in dairy and baking. Andre Pectin performed well.

In Personal Care & Aroma Ingredients, sales were up 11%, with very strong organic growth of 9% and a 2% contribution from foreign exchange rate effects. All Personal Care product lines, including sun, skin and hair care delivered good above-market growth, with Aroma Ingredients also performing well in 2019. Successful commercialization of the innovation pipeline further contributed to a very good year for the business.

For Nutrition, the Adjusted EBITDA growth in the underlying business was up 12% to € 1,250 million compared to the previous year, including a 3% contribution from IFRS 16. This was driven by volume growth, lower costs, and a small contribution from positive foreign exchange rate effects. The Adjusted EBITDA margin in the underlying business was 20.7% (including 0.5% from IFRS 16) compared to 19.5% in 2018.

We made good progress on the inorganic growth front. In 2019, we increased our shareholding in Andre Pectin (China) from 29% to 75%. We also acquired Royal CSK (Netherlands), combining complementary strengths to better serve DSM's largest food & beverage segment and we created the 75:25 partnership, Yimante (China), with Nenter in 2019. Through this partnership, we strengthened our vitamin E position for animal nutrition premix solutions.

Materials financial results

In 2019, our Materials business was confronted with weak macroeconomic conditions in China and in some of its end-markets. Materials reported organic growth down by 8%, driven by lower volumes (-5%) and prices reduced by 3%, with a relative resilience due to lower input costs.

DSM Engineering Plastics saw persistent softness in China and in the global automotive segment, resulting in a minus 10% organic growth. Electrical & electronics saw some signs of improvement in the second half of the year. Business conditions in other end-segments were solid.

DSM Resins & Functional Materials reported a minus 6% organic growth. Business conditions in Coating Resins stabilized versus previous year: while the European end-markets remained weak, the business experienced a small uptick in the Chinese building & construction sector. Functional Materials saw its sales of specialty coatings for glass fiber optic cables decline in the second half of the year. The 4G network investments started to tail off in anticipation of the upcoming infrastructure investments for the 5G networks, which led to temporarily lower sales.

DSM Dyneema reported a minus 4% organic growth. The focus on strong growth in the high-margin personal protection business resulted in lower volumes in other segments. The shift had a strong positive effect on the margins. New production capacity was started up by the end of the year in the Netherlands and in the US, which will allow the business to continue its growth.

Total Adjusted EBITDA was € 509 million, 1% lower compared to the previous year and including 1% from IFRS 16. Our specialty portfolio demonstrated its relative earnings resilience in current market circumstances. Due to the strong performance of the higher-margin businesses (especially in DSM Dyneema), good margin management, cost control and some benefits from exchange rate effects, Materials reported almost flat earnings in 2019. The Adjusted EBITDA margin was 18.5% (including 0.2% from IFRS 16) compared to 17.6% achieved in the previous year.

Innovation results

The DSM Innovation Center has multiple functions within DSM, including accelerating the innovation power of our core businesses and extracting value from our Emerging Business Areas (EBAs). At DSM, we want at least ~20% of our sales to come from innovation sales, which we define as sales from products and solutions introduced in the last five years. In 2019, innovation sales amounted to 21%. For more information on innovation and R&D, see 'Innovation' on page 94.

DSM Innovation Center sales were up 13%, with 9% organic growth and a 4% contribution from foreign exchange rate effects. DSM Biomedical reported strong sales growth over the year. DSM Bio-based Products & Services continued to benefit from the license income for yeast technologies used for bio-based fuels. DSM Advanced Solar was soft due to the challenging Chinese market.

The Adjusted EBITDA increased to € 22 million, benefiting from a strong increase in license income at DSM Bio-based Products & Services as well as a good performance of DSM Biomedical and a positive contribution from exchange rate effects.

Balanced global footprint
Sales growth was solid among all regions, with favorable growth in Latin America. We experienced increasing challenging market conditions in China in Materials (automotive and industrial) and in Animal Nutrition & Health (due to African swine fever). All high-growth economies together currently represent 43% of our sales, in line with 2018. The share of sales in these economies as a proportion of our total sales gives us a well-balanced global footprint.

Sustainability results
At DSM, sustainability is not only our core value and a key responsibility it is also increasingly an important business driver that is fully engrained in our purpose, strategy, business and operations. Our approach for bringing about positive change is to improve, enable and advocate. We further *improved* the environmental impact of our own operations. We are well on track with respect to our greenhouse gas reduction, energy efficiency improvement and purchased renewable electricity targets.

- The underlying cumulative structural improvement in absolute greenhouse gas reduction in 2019 compared to the 2016 baseline was ~17%
- Energy efficiency improved by 2.3% compared to 2018 versus an average annual ambition of more than 1%
- 50% of purchased electricity came from renewable resources compared with 41% in 2018

Continued step-up in sustainability leadership

	GHG structural improvement (vs. 2016)	Energy efficiency improvement year-on-year	Purchased renewable electricity	Employee engagement favorable score	Safety Frequency Recordable Index	Female executives	Brighter Living Solutions
Realization 2019	~17%[1]	2.3%	50%	74%	0.28	20%	63%[2]
2021 / 2030 Ambitions	30% by 2030 (vs. 2016)	>1% average annually till 2030	75% by 2030	>75% by 2021	<0.25 by 2021	25% by 2021	>65%[3] by 2021

1 We estimate that the effect of the underlying cumulative structural improvements in absolute GHG emissions was approximately 17% and 8% in 2019 and 2018 respectively, versus the 2016 baseline. The total cumulative absolute reduction was 25% and 18% respectively, versus the 2016 baseline.
2 For a small percentage of sales (approximately 2%) classified as BLS, the environmental impact is considered 'best in class' together with other solutions.
3 KPI will be updated as part of the Responsible Care Plan update in 2020.

We *enabled* our customers to deliver more sustainable solutions to their (end) consumers focusing on the domains of Nutrition & Health, Climate & Energy, and Resources & Circularity. We made good progress in our large innovation projects such as Veramaris, Avansya®, Project Clean Cow, Balancius® and Niaga®. All our materials businesses initiated additional sustainability ambitions to reduce the environmental impact of their operations and to increase the sustainability value they deliver. In 2019, our Brighter Living Solutions accounted for 63% of sales.

We are proud to be globally recognized for our leadership in this area. Our climate change strategy received an A- rating from CDP, the non-profit global environmental disclosure platform. We further improved our rankings in key ESG (Environmental, Social & Governance) indices, achieving leading positions in four important ESG indices for investors: we are #1 out of 120 in our industry in Sustainalytics, we have an AAA rating in MSCI, we have a Prime rating in ISS-Oekom, and we have a leading position in Vigeo.

To read more about our environmental performance, see 'Planet' on page 50.

Organization, leadership, people and culture
We worked on further improving our safety performance in 2019. We are proud that we substantially improved our Safety Frequency Recordable Index from 0.33 to 0.28 in line with our goals and values. Safety remains our highest priority and we strive to be incident- and injury-free. We aim to deliver this by creating a culture in which everyone working for DSM, whether as an employee or a contractor, is engaged in maintaining high safety standards.

We continued to develop our organization, leadership, people, and culture to enable continued high performance and engagement. We also further shaped a customer-centric organization aligned with market or customer segments. We accelerated leadership development for both people and teams. The results of these initiatives are reflected in our annual Employee Engagement Index rating of 74%, with a response rate of 92% and over 40,000 comments received. This indicates that our people feel engaged and committed.

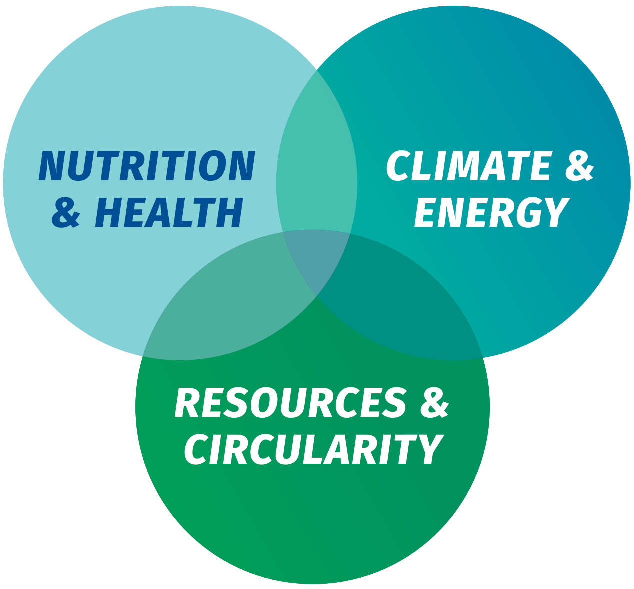
We continued to focus on internationalization and diversity in 2019. Our executive base became more international and we already achieved our 2020 target on nationality mix last year. Nowadays, 62% of our executives are non-Dutch, and our focus has shifted to expanding our non-European population. Today, there is a better gender balance both at management and executive levels. As of 15 February 2020, the percentage of women in our Executive Committee, Managing Board and Supervisory Board is 50% in each. With these percentages we are clearly achieving our aim of having at least 30% male and at least 30% female members in each one. For more information, see 'People' on page 40.

Digitization & Digitalization
We boosted our digitization efforts to drive our growth and improve our efficiency through digital collaboration tools with customers, data analytics to increase our productivity, and digital value propositions in personalized nutrition. A Chief Digital Officer was appointed to oversee our digital transformation and ensure that we will thrive in an increasingly digital world. In 2019, we continued to strengthen our cybersecurity. Following risk assessments, a multi-year program is being rolled out focusing on improving cybersecurity capabilities in three areas: information technology, operations technology and R&D laboratory systems.

DSM Executive Committee (from left to right): Philip Eykerman, Judith Wiese, Geraldine Matchett, Dimitri de Vreeze, Chris Goppelsroeder and Patricia Malarkey.

Focus domains

With our unique science-based competences, we have created a strong platform for growth and are ideally positioned to capture the growth opportunities offered by the global megatrends and Sustainable Development Goals (SDGs), with a particular focus on developing innovative solutions addressing Nutrition & Health, Climate & Energy and Resources & Circularity.



The link between nutrition and health has never been clearer. For the first time in human history, diet-related non-communicable diseases have overtaken communicable diseases as the primary cause of deaths worldwide. Malnutrition in its various forms affects more than 30% of the world's population: more than 2.3 billion[1] adults and children are obese or overweight, more than 820 million[2] people go to bed hungry each night, and approximately two billion[1] suffer from hidden hunger. Our work in Nutrition & Health supports healthy living and nutritious diets for all. We work tirelessly to provide micronutrients as well as to enable the production of sustainably sourced protein in all its forms. We make affordable nutrition available, such as fortified rice, for those people who lack access to micronutrient-rich foods. We supply solutions for early life nutrition, food fortification, dietary supplementation and easy-to-use personalized nutrition.

We continue to develop solutions that offer viable alternatives to the use of sugar, salt and saturated fats in processed foods and beverages. We are, for instance, now producing EverSweet™ — a non-artificial, zero-calorie, great-tasting fermentative Stevia sweetener — at commercial scale. We support the positive trend for personalized nutrition, and are continuing to expand our offering in this field. In animal nutrition and health, we offer the world's most innovative portfolio of enzymes and eubiotics to promote animal performance, health and welfare, replace antibiotic growth promoters, and reduce the environmental impact of livestock farming. Meanwhile, we develop innovative biomedical solutions to address previously unmet clinical needs, such as the production of affordable, durable and minimally invasive replacement heart valves.

[1] Source: IFPRI
[2] Source: UN FAO

The stability of the world's climate is under threat. If the most devastating effects of irreversible climate change are to be avoided, we must dramatically limit greenhouse gas emissions by transitioning to renewable energy and by adopting low-emission solutions and processes. The transition to a low-carbon economy will also create business opportunities and drive growth for our innovative and sustainable solutions. We are enabling the low-carbon economy not just by reducing our own emissions but also by developing solutions to help customers and consumers to cut theirs.

In animal nutrition, our innovative 'Project Clean Cow' feed additive cuts methane emissions from dairy cows by about 30%. Our solutions significantly help to reduce the environmental footprint of dairy and beef products, a key source of protein around the world. Working in sectors as diverse as transportation, electrical & electronics, marine, personal protection and high-performance coatings, we develop advanced materials that are bio-based, recycled, reusable and recyclable. To help accelerate the energy transition, our recyclable backsheet and innovative coating technologies increase output from solar panels. Meanwhile, the strength and lightness of Dyneema®, the world's strongest fiber™, is supporting the development of offshore wind parks and helping to drive down the cost of wind energy.

The world's resources are finite, and with a population projected to grow to 9.8 billion people by 2050, some estimates suggest we will need the equivalent of four planet Earths by then to sustain our current lifestyles. New ways of achieving a balance between demand and supply have to be found, including approaches that are not based on single use and subsequent disposal. We are making important contributions to the development of an effective circular, bio-based economy founded on closed-loop solutions.

Veramaris®, our algae-based omega-3 oil, replaces the fish-based omega-3 traditionally used in fish meal, and has the potential to make aquaculture truly sustainable. It goes right back to the source — algae are the original source of omega-3 fatty acids — reducing our reliance on marine resources for fish feed. Our Niaga® technology, which now allows carpets, mattresses and furnishing products to be fully recycled, is likewise finding more and more market applications. With CanolaPRO®, which is derived from rapeseed pressings, we are making a new and sustainable source of plant-based protein available to the food & beverage sector. Akulon® RePurposed uses abandoned fishing nets as the raw material to produce a recycled polyamide that is used in specialist watersports applications.

Working with and for our stakeholders, we will create a stronger legacy and brighter future for generations to come

We cannot do it alone

How we create value for our stakeholders

Capital inputs

People

- Employees
- Training & development
- Stakeholder engagement & Public-Private Partnerships
- Philanthropy & sponsoring

Planet

- Raw materials (including renewable and recycled materials)
- Energy (including renewable sources)
- Water

Profit

- Shareholder equity
- Borrowings
- Partnerships & open innovation
- Purchased goods & services
- Manufacturing asset base

Our business

Value outcomes

People

- Safety & health
- Brighter Living Solutions
- Engaged workforce
- Skills & employability
- Employee benefits
- Improved nutrition

Planet

- Reduced environmental footprint
- Brighter Living Solutions
- Enabling the transition to a more circular economy
- Safer ingredients & materials

Profit

- Financial performance (Adjusted EBITDA & Adjusted net operating free cash flow)
- Dividend
- Contribution to business success for customers & suppliers
- Contribution to civil society via taxes
- Patents & royalties

Human capital

We employ skilled and talented people from diverse backgrounds. We strive to provide employees with a safe and inspiring workplace as well as with the tools and training they need to be effective and to develop their abilities. We reward employees with competitive benefit packages.

Societal & relationship capital

We engage with our various stakeholders to ensure close alignment between our aims and societal needs. We generate value for stakeholders outside our direct value chains of employees, suppliers, customers and end-users; these include employees' families, governments, local communities and civil society.

Natural capital

We recognize that the world is an interconnected system of resources. For us, this represents a responsibility and a business opportunity. We aim to improve the environmental impact of our supply chain, operations and products and services, while developing innovative solutions that deliver sustainability benefits to customers and beyond.

Financial capital

Providers of capital – shareholders and bondholders, banks and the financial markets – supply funds that we use in our business to create value, driving growth and delivering sustainable returns.

This diagram is based on the International Integrated Reporting Council's Integrated Reporting <IR> framework and gives an overview of how we create value for our stakeholders based on six capital inputs:

- Human capital
- Societal & relationship capital
- Natural capital
- Financial capital
- Intellectual capital
- Manufactured capital

Since 2002, we have reported on our performance in terms of People, Planet and Profit, and so the six capitals shown here continue to be clustered accordingly.

Our organizational and operating model is made up of market-facing business groups focused on the primary business functions (Innovation and R&D, Direct Sourcing, Manufacturing & Operations, and Marketing & Sales), global support and functional excellence departments, and regional organizations.

We seek to minimize risk and take advantage of the opportunities around megatrends, thereby transforming the capital inputs into value and positive impact. A key part of our strategy, aside from our financial targets, is to continue to strengthen our commitment to sustainability. We especially try to have a positive impact through our engagement in relation to the Sustainable Development Goals (SDGs). We engage with all 17 SDGs, especially on the five shown in this figure. For more information, see 'DSM and the Sustainable Development Goals' on page 8 and throughout this Report.

Stakeholders

Our purpose can only be realized by working with our stakeholders. Through empowering our employees, engaging with our customers and suppliers, and with the support of our investors, we will create a stronger legacy and brighter futures for generations to come. We discuss topics that are relevant to our operations and our impact on society regularly with our stakeholders. These conversations shape how we define and execute our strategy, including risk management, materiality, and new business opportunities.

Employees
Our people are our most important asset, and our employees represent more than 100 nationalities, working at more than 210 sites and offices in 47 countries worldwide. The safety of our people is our highest priority and we aspire to provide an incident- and injury-free working environment for everyone, including our contractors. Our People & Organization strategy defines our approach toward our people.

For information on how we engage our employees, see 'People' on page 40.

Customers
Our customers are key stakeholders. They drive our business and through our collaborations, we enable solutions that help solve some of the world's biggest problems.

For information on our business and customers, see 'Review of business' on page 66. For information on how we engage with our customers, see 'Customers' on page 152.

Investors
Capital providers play a significant role in the success and prosperity of our company. They support us in our pursuit of a long-term oriented strategy which aims to continually create value for shareholders while offering a low-risk environment for debt holders.

For more information on how we communicate with investors, see 'Investors' on page 154 and elsewhere in this Report.

Suppliers
Our supply chain consists of more than 32,000 suppliers. Our suppliers are important partners for achieving our purpose, and we work closely with them through our Sustainable Procurement Program.

For more information on how we work with our suppliers, see 'Suppliers' on page 153.

Society
We engage with society at multiple levels — from local community initiatives, to collaborations with universities and research institutes. We work with NGOs and civil society toward solutions for societal issues, and advocate with governments and society on important issues relating to the Sustainable Development Goals and the Paris Agreement. We also engage in philanthropic and sponsorship activities to the yearly amount of approximately € 6 million for the coming period. As outlined in our Code of Business Conduct, we do not make political donations.

For more information on how we engage with these stakeholders, see 'Society' on page 155.

Top 5 material topics by stakeholder group

	Customers	Employees	Investors	Suppliers
1.	Climate & Energy	Occupational health & safety	Innovation	Climate & Energy
2.	Business ethics & transparency	Leadership & development	Product stewardship	Geopolitical shifts & dynamics
3.	Innovation	Digital transformation	Climate & Energy	Advocacy, engagement & partnering
4.	Nutrition & Health	Business ethics & transparency	Nutrition & Health	Resources & Circularity
5.	Labor practices & human rights	Labor practices & human rights	Resources & Circularity	Nutrition & Health

Materiality

In order to assess material topics that are both of interest to society and have impact on our businesses, we annually update our materiality analysis. In 2019, we conducted a thorough and extensive materiality analysis, based upon and aligned with the timeline of the new Strategy 2021: *Growth & Value - Purpose led, Performance driven*.

Our update in 2019 used Strategy 2021 as its point of departure. The initial analysis was supported through desk research of peers and other institutions to arrive at a list of potential material topics. Direct feedback on the proposed topics was obtained through stakeholder interviews, employee workshops and surveys, as well as a stakeholder dialogue, to arrive at a shortlist. The results were reviewed and validated by the Executive Committee. The resulting matrix was compared with the Corporate Risk Assessment to make sure all relevant topics were captured from a materiality and/or risk perspective. Finally, the matrix was reviewed and approved by the Managing Board.

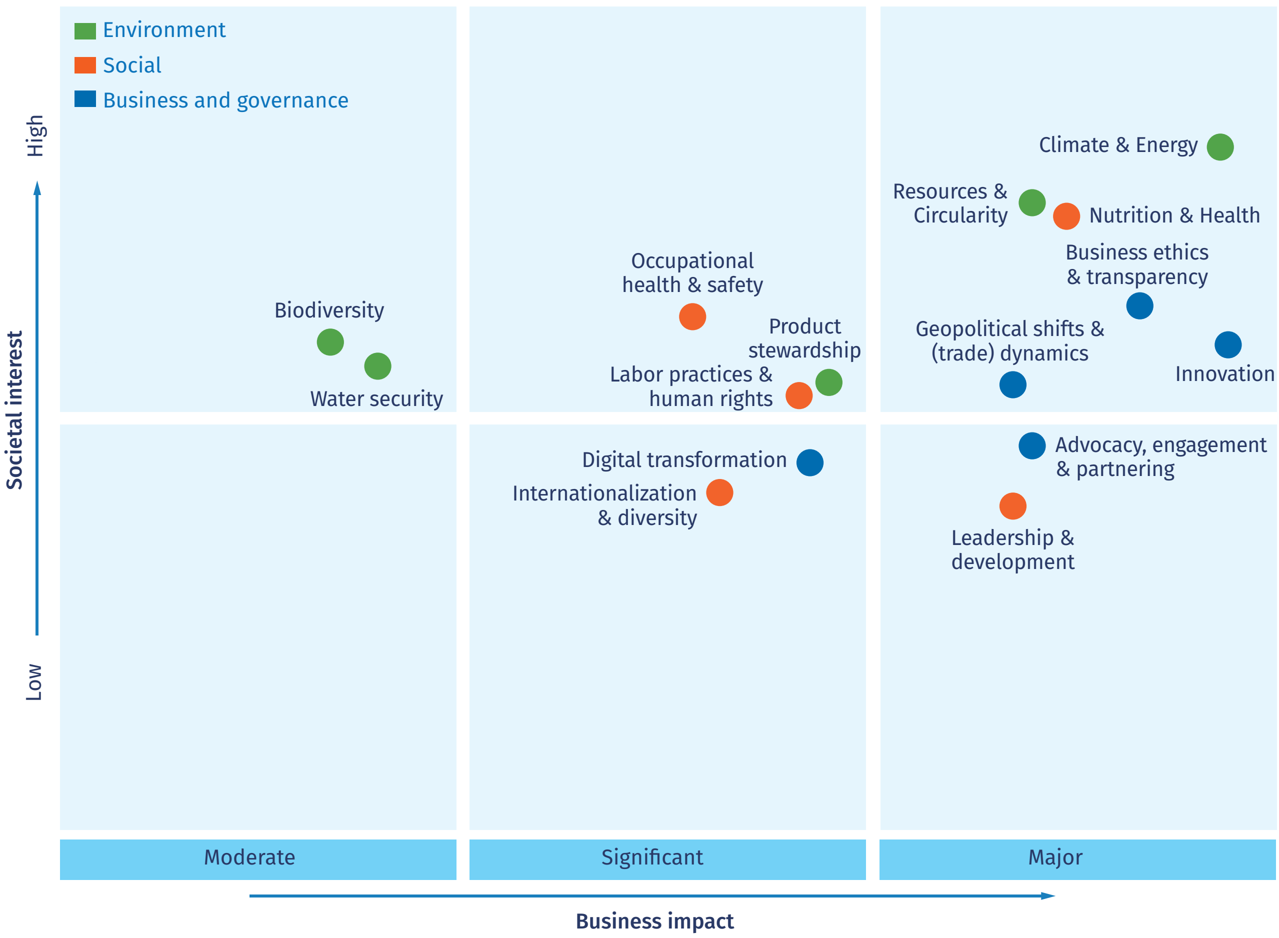
Changes in 2019

In the Materiality matrix 2019, the topics have been aligned with the new strategy, so a number of topic names have changed, or topics have been combined or split. The most significant changes include aligning material topics with our focus domains and the inclusion of 'Labor practices & human rights' as a topic in its own right.

For more information on materiality, see 'Management approach for material topics' on page 157.

For more information on our position on relevant societal issues, see the company website.

Materiality matrix 2019



Collaborative platforms and networks

We collaborate with like-minded peers through platforms and networks that contribute to our purpose of creating brighter lives for all. These collaborations are chosen to amplify and accelerate our advocacy efforts in support of a transition to more sustainable economic models on topics that align to our focus domains of Nutrition & Health, Climate & Energy and Resources & Circularity. Collaborative platforms and networks such as these can help formulate new solutions, and measurement and performance methods, as well as roadmaps for business contributions toward achieving the Sustainable Development Goals (SDGs). In this section, we describe some of the most significant initiatives.

Cross-domain initiatives

World Economic Forum (WEF)

We are a strategic partner of WEF. We actively participated in their meetings throughout 2019, including the annual meeting in Davos. We continued to strengthen our presence at regional events, including in Africa, the Middle East, and China, to highlight key partnerships and initiatives concerning nutrition, climate change and circularity. We engaged in many projects and initiatives of WEF, including the Future of Proteins, and Low-carbon Emitting Technologies.

During the WEF Annual Meeting 2019, in collaboration with partners including Salesforce, Yara and Cargill, we successfully introduced the SDG Tent, a venue for discussing business engagement for achieving the SDGs. Several highly successful events were hosted at the SDG Tent. In 2019, our CEO Feike Sijbesma co-chaired the Consumer Governors and chaired the Alliance of CEO Climate Leaders. He also became a Member of the Board of Trustees of WEF.

World Business Council for Sustainable Development (WBCSD)

We are a member of WBCSD and participate in various working groups and coalitions.

We are a founding member of Food Reform for Sustainability and Health (FReSH) project and a Board member of the Food and Nature Program, to drive food system change. In October, WBCSD launched the 'CEO Guide to Food System Transformation', based on input from, and signed by, CEOs of 17 WBCSD member companies. The Guide describes seven pathways whereby business can help transform the system, such as 'sustainable agriculture', 'healthier diets' and 'food loss and waste reduction'.

In 2019, our CFO Geraldine Matchett joined the Redefining Value Board, and Managing Board member Dimitri de Vreeze joined the Circular Economy Board.

Factor10 is WBCSD's Circular Economy program and consists of 30 leading companies across multiple sectors, including DSM. We are co-leading the circular metrics workstream of Factor10, convening 25 other global companies to develop a harmonized set of indicators for measuring circularity on a business or company level. In November, the 'CEO Guide to the Circular Bioeconomy' was published by WBCSD to call for the shift toward a sustainable, low-carbon, circular bioeconomy, and was signed by 16 companies including DSM.

Redefining Value is WBCSD's program supporting external disclosure and decision-making. Within this program, the Taskforce on Climate-related Financial Disclosures (TCFD) Preparer Forum for Chemicals, a collaboration between WBCSD, DSM and four industry peers, published 'Climate-related financial disclosure by chemical companies: implementing the TCFD recommendations'. We ran a pilot within Dynamic Risk Assessment focusing on the food sector and participated in the Integrated Performance Management project. We also contributed to the ESG (Environment, Social, Governance) Disclosure Handbook.

We are also active within the WBCSD Climate Policy Working Group and the Climate & Energy Program.

Accounting for Sustainability (A4S)

Ms. Matchett continued her role as Co-Chair of the A4S CFO Leadership Network. This network brings together leading CFOs to help embed the management of environmental and societal issues into business processes and strategy, particularly through the finance function. Ms. Matchett is a signatory to the A4S CFO Statement of Support for the TCFD recommendations and the A4S CFO Net Zero Statement of Support.

In 2019, we participated in the various events and meetings throughout the year. We shared our perspectives on investor engagement through presentations at workshops and webinars, and on the TCFD recommendations during workshops in the UK and Brazil. In New York City (New York, USA), Ms. Matchett participated in a panel discussion on behalf of DSM at the US East Coast launch of the A4S CFO Leadership Network.

Dutch Sustainable Growth Coalition (DSGC)

The DSGC is a CEO-led coalition of eight Dutch multinational corporations which aims to drive sustainable growth business models that combine economic profitability with environmental and social progress and thus contribute to the achievement of the SDGs. To accelerate this transition in the Netherlands and abroad, the Coalition wants to lead the way and pursues a strategy of Scale – Share – Shape.

In 2019, the Coalition assessed new fields for collaboration such as internal change management and sustainable packaging. Moreover, together with other business leaders, they urged EU Heads of State to aim for net-zero carbon emissions by 2050.

Climate & Energy initiatives

Carbon Pricing Leadership Coalition (CPLC) and High Level Commission on Carbon Pricing and Competitiveness, convened by the World Bank

Represented by Mr. Sijbesma, who has served the World Bank Group as a Climate Leader since 2017, we continued to drive carbon pricing and share our experiences on the topic through the Carbon Pricing Leadership Coalition (CPLC). The CPLC's long-term objective is for effective carbon pricing to be applied throughout the global economy. In addition to facilitating leadership dialogues, the CPLC, together with partners, is also mobilizing business support to put an internal price on carbon. We apply an internal carbon price of € 50 per ton CO_2eq when reviewing large investments and acquisitions, and we include this in internal management reporting by the business groups.

Mr. Sijbesma also co-chaired the High-Level Commission on Carbon Pricing and Competitiveness, convened by the World Bank Group. Launched at the 2018 World Bank High-Level Assembly, the Commission is composed of CEOs and senior executives from leading global companies, as well as former high-level government officials and representatives from academia. The Commission addresses competitiveness concerns that have the potential to inhibit the worldwide uptake of carbon pricing. The Commission convened at various high-level events throughout 2019, such as the Annual Meeting of WEF in Davos, with the flagship report published during the UNSG Climate Action Summit in New York City (New York, USA).

Global Commission on Adaptation (GCA)

Mr. Sijbesma serves as one of the commissioners on The Global Commission on Adaptation, managed by the Global Center on Adaptation and the World Resources Institute. The Commission was launched in October 2018 and is composed of over 30 Commissioners and 20 convening countries, bringing together leaders to drive action and find solutions to respond to the disruptive effects of climate change. A flagship report from the Commission was published in September. This report was part of the launch of the Year of Action that will focus on a series of work streams that can jumpstart the necessary adaptation actions across all sectors of society. We are partnering with GCA, particularly by lending our expertise in the food security and agriculture sectors, but also by mobilizing the private sector to adopt an integrated strategy to address climate adaptation alongside climate mitigation efforts.

RE100

Our engagement with RE100, the world's leading campaign to scale up the corporate sourcing of renewable power, continued throughout 2019. We participated in the learning opportunities, conferences and advocacy opportunities offered to us in Europe, the US and China. For more information on renewable energy, see 'Renewable energy' on page 53 in 'Planet'.

We Mean Business

We Mean Business activates hundreds of companies and investors to commit to low-carbon initiatives. Our Vice President Sustainability sits in the Business Advisory Board. In 2019, we worked on several advocacy and communications activities that called for governments to match their ambition and policies to limit global temperature rise to 1.5°C above pre-industrial levels and demonstrated the private sector's support for these efforts. We were one of the first companies to join the 'Business Ambition for 1.5°C: Our Only Future' campaign launched in 2019, committing to reach net-zero emissions by 2050 across our operations and value chains.

Global Environment Facility (GEF)

The GEF is an international co-financing mechanism that provides for global environmental projects catalyzing transformational change in key systems that are driving major environmental loss, in particular energy, cities and food. We are a member of the Private Sector Advisory Group of the GEF, advising the Secretariat on private sector engagement.

Resources & Circularity initiatives

Platform for Accelerating the Circular Economy (PACE)

PACE is a public-private collaboration platform and project accelerator for the circular economy. With its broad membership, it aims to create systems change for the circular economy at speed and scale. The organization has initiated projects that focus on major material flows such as electronics, plastics, and food, and focuses on cross-cutting topics such as business models and metrics. In 2019, PACE expanded its leadership group and refined a three-year strategic action plan to focus their projects and activities. Feike Sijbesma represents DSM in the Global Leadership Group, which includes over 40 CEOs, Ministers and heads of international organizations.

Ellen MacArthur Foundation

CE100 is the Foundation's global innovation platform. It brings together companies, emerging innovators, universities and cities to accelerate the transition toward a circular economy. In 2019, representatives from DSM Additive Manufacturing and DSM Engineering Plastics attended the CE100 acceleration workshops in Europe, to share their businesses' circularity goals and solutions and engage with its members. At the Foundation's Annual

Summit in May, DSM-NIAGA presented its journey to create 100% recyclable carpets and the use of blockchain to provide value chain information to customers in a trustworthy way. We were also part of the sounding board of the Foundation's circularity metrics work throughout the year.

Circle Economy

In 2019, we continued our membership of Circle Economy, a Dutch social enterprise that emphasizes practical and scalable solutions in the transition toward a circular economy. DSM Dyneema participated in Circle Economy's Circle Textiles Programme, which included workshops and matchmaking with circular brands in the textile industry. We also continued our participation in the Circle Built Environment Programme (with DSM Advanced Solar). Circle Economy supported our engagement program through an introductory seminar organized for employees in our materials cluster, and our attendance at the Circle Economy's Beyond Next festival in February. We were involved in the review of the next version of the Circularity Gap report, which focuses on nation states and is scheduled for publication in early 2020.

Nutrition & Health initiatives

UN World Food Programme (WFP)

In place since 2007, the DSM-WFP partnership 'Improving Nutrition, Improving Lives' aims to improve the nutritional value of the food that WFP distributes through product innovations such as fortified rice. Together, we make a difference to millions of people. The DSM-WFP partnership was extended for a further three years in 2018. The next phase of the partnership will place even greater emphasis on raising awareness for improved nutrition while continuing to develop new scientific and technical solutions — one of which is a major project to continue developing fortified rice, a crucial staple food in the developing world.

In 2018, WFP reached 35 million beneficiaries with food that had been improved by the DSM-WFP partnership. Additionally, we collaborate on training and development initiatives and on employee fundraising campaigns.

UNICEF

The DSM–UNICEF partnership has been in place since 2013. The partnership with UNICEF and Sight and Life supports the Government of Nigeria in realizing its vision of scaling up the micronutrient powder (MNP) program nationally, reaching people suffering from malnutrition. Together, we have directly impacted the lives of one million children in Nigeria by providing access to MNP.

In 2019, the partnership expanded to India as an additional focus country by supporting the UNICEF India nutrition program, engaging private-sector stakeholders as part of the government of India's Social Movement on Nutrition program. The cooperation in India focused on mobilizing the private sector around nutrition literacy, through the platform IMPAct4Nutrition, which was established in March.

Furthermore, the partnership is being expanded to address agri-food business development as one of the Global Breakthroughs identified by Generation Unlimited, a partnership that forms part of the United Nations Secretary General's Youth 2030 Strategy. The key objective of this expanded partnership is to embed a longer-term vision for sustainable food systems in Africa. The partners will develop a business plan to attract young people and prepare them to contribute to sustainable food systems in a way that creates nutrition and food business at scale.

World Vision International

Our partnership with World Vision and Sight and Life, titled 'Joining Forces for Last Mile Nutrition', aims to impact the well-being of people at risk of micronutrient deficiencies, improve livelihoods across the agri-food value chain, and influence key stakeholders. We leverage our scientific excellence, technical expertise and extensive customer base to facilitate the development and supply of innovative nutrition, formulation and food fortification.

In Rwanda, the partners further enabled the transformation of the local maize value chain, ensuring a more efficient supply chain, working with farmers and other stakeholders on improving the quality of, and access to, raw materials in Rwanda for Africa Improved Foods. The results of the first pilot were positive, and the next phase will focus on scale-up.

The project EGGciting in Indonesia focuses on eggs as an important source of nutrition. This initiative will increase the availability, accessibility, and consumption of eggs at the household level in Sulawesi (Indonesia) by working with farmers to address bottlenecks in the supply chain, improving the quality of feed and driving demand on the consumer side for improved nutrition. Furthermore, in Brazil, market research for a pilot project started in 2019. This pilot is projected to transform the distribution of micronutrient-enriched products in Brazil, by incubating last-mile nutrition entrepreneurs — those entrepreneurs whose businesses serve populations living in inaccessible areas.

Partners in Food Solutions

Partners in Food Solutions (PFS) works to increase the growth and competitiveness of food companies in Africa. These aims are achieved by inspiring business leaders and linking highly skilled corporate volunteers from a consortium of leading companies including DSM, Cargill, General Mills, Hershey, Bühler and Ardent Mills with promising entrepreneurs and other influencers in the food ecosystem. The six corporate partners have empowered hundreds of entrepreneurs to work toward stronger, more resilient food value chains across the African continent.

In 2019, DSM employees contributed over 1,300 volunteer hours, working with 43 African clients across ten countries. By sharing expertise, volunteers were able to assist local entrepreneurs in growing their businesses and supporting a supplier base of more than 78,000 farmers. Volunteer Shelagh Dwyer commented, *"What began as a volunteer opportunity through my job evolved into a 'Purpose Ambassador' role at DSM. My PFS volunteer experience reconnected me through DSM to my vocation of creating conversation around wellness and well-being through nutrition, and SDG2 of Zero Hunger."*

Scaling Up Nutrition

The SUN Business Network (SBN) — co-hosted by the Global Alliance for Improved Nutrition (GAIN) and WFP — is the private-sector branch of the Scaling Up Nutrition (SUN) Movement. It aims to support businesses in growing the role they play in nutrition and to support SUN countries in developing national business engagement strategies. The SBN is established in 14 countries, with 27 emerging country networks. These include more than 400 companies, mostly small and medium-sized enterprises. The global membership platform currently has 23 members, who have a combined workforce of 1.1 million employees. Mr. Sijbesma is a member of the Lead Group of the SUN Movement and Co-Chair of the Advisory Group of the Network. Our Vice President Malnutrition Partnerships & Programs is on the Operations Committee of the SBN.

Via the Network, we supported a number of SBN projects focusing on Sub-Saharan Africa. Together with the SBN global team, we built on the impact and energy of the first ever Nutrition Africa Investor Forum (NAIF), which reframed the dialogue around nutrition. As an SBN global member, we are supporting the implementation of SBN principles, notably around workforce nutrition commitments; overweight, obesity and diet-related non-communicable diseases; and the delivery of technical assistance to national SBNs and their members. We advocate for business to take a leading role in these important issues.

Africa Improved Foods

Africa Improved Foods (AIF) is a joint venture between the Government of Rwanda and a consortium of Royal DSM, the Dutch Development Bank (FMO), DFID Impact Acceleration Facility managed by CDC Group plc (CDC), and International Finance Corporation (IFC), the private sector arm of the World Bank Group. AIF produces fortified foods made mainly from maize and soybean sourced from over 35,000 Rwandan farmers. These foods help meet the nutritional needs of vulnerable population groups such as pregnant and breastfeeding mothers, older infants and young children. AIF's Kigali factory also provides 300 skilled workers with well-paid jobs. In addition, the regional procurement of goods and services (such as transport) has led to indirect economic development across East Africa.

AIF is the first and only certified producer of Super Cereal Plus in Africa, and more than 70% of the price paid for this product flows back into the regional economy. A study executed by the University of Chicago estimated that the AIF intervention is expected to contribute almost USD 760 million to the Rwandan economy over a 15-year period. Another estimated USD 142 million will be contributed to the East African economy through regional purchases.

In 2019, AIF concluded its third year of business. During the year, AIF scaled up production and introduced nine new business-to-business and business-to-consumer products. Heightened demand and prices for Super Cereal Plus from existing customers, together with the acquisition of new institutional customers and entry into the Kenyan consumer market, contributed to an estimated 20% increase in sales compared to 2018. On the sourcing side, AIF and its partners scaled up direct farmer purchases. AIF CEO Amar Ali was recognized as intrapreneur of the year by the Schwab Foundation at WEF, and AIF won the Sustainable Community Initiative of the Year award at the Africa Foodex Awards.

MANDI

In 2019, we continued to expand MANDI (Making A Nutrition Difference to India), a socio-commercial consumer products business model delivering local nutritious products that are affordable and aspirational. The range of home fortification products branded as Nu-Shakti™ include solutions for staples such as rice and flour, as well as fortified beverage powder. The business also aims to facilitate community awareness and education to help tackle the issue of malnutrition in India. In 2019, we started distributing through trade partners in modern and traditional retail channels in Tamil Nadu (India).

Sight and Life

The Sight and Life Foundation pioneers science-based innovation with the aim of eliminating all forms of malnutrition in children and women of childbearing age and improving the lives of the world's most vulnerable populations. With the continued support of DSM, the Foundation delivers value in the nutrition community by accelerating the translation of science into effective nutrition programming, building public-private partnerships and developing viable social business models for nutritious foods.

The Foundation is engaged in many initiatives, such as OBAASIMA, which aims to create demand for nutritious food in Ghana; the use of its Nutrition Kiosk to engage companies in support of the Government of India's 'Nutrition Mission' through a public-private platform, IMPAct4Nutrition, together with UNICEF; and the EGGciting project, which is about making eggs available and affordable to low-income households through new poultry-farming business models.

Creating new knowledge and thought leadership on key public health topics, such as multiple micronutrient supplementation (MMS), is an essential part of Sight and Life's work. In July 2019, the Foundation launched an insightful edition of Sight and Life Magazine on data in nutrition, which brings new voices to the discourse, including thought leaders and influential practitioners. For more information, visit: https://sightandlife.org

Initiatives complementing the focus domains

Catalyst

We continued to be a Global Supporter of Catalyst — the NGO accelerating women's progress in the workplace. Mr. Sijbesma continued his role on the Board of Directors and Ms. Matchett her role on the European Advisory Board.

In 2019, we participated in a number of Catalyst events, including two Roundtable conversations in the Netherlands, a Men Advocating Real Change (MARC) inclusion program, and the Catalyst Awards dinner in the US. We committed to sponsor a new Catalyst work program on The Future of Work for women, with a focus on the impact of technology and artificial intelligence on women's experience of work. We were involved in shaping the content of this project and participated in the inaugural Symposium. Catalyst profiled our campaign on Women in Science and Technology.

One Young World (OYW)

The One Young World Summit gathers 2,000 young leaders from more than 190 countries and all sectors, empowering them to make lasting connections to generate positive change for sustainable development. In 2019, we participated for the ninth time, with Mr. Sijbesma, who is also an OYW Global Advisory Board member, delivering a keynote speech on the need for leadership to adapt to change. Our delegation consisted of 12 young talents representing all our businesses and regions, and six recipients of the DSM Brighter Living Scholarship. The recipients were social entrepreneurs from Africa and Asia with links to our strategic focus domains, specifically in malnutrition and design for circularity. They were chosen with the aim of exploring possible business collaborations between DSM and their businesses. After the summit, the delegates were tasked with driving purpose-led initiatives inside and outside the organization.

External recognitions

We are proud when our efforts receive positive recognition from others. Below is a selection of some awards and recognitions that we received from NGOs and trade organizations, customers, suppliers and academia in 2019. A full list of our recognitions can be found on the company website.

In June, we were awarded the Best UN Sustainable Development Goals Award at the Sustainable Business Awards Singapore 2019. The award recognizes the alignment between our business strategy and objectives with the SDGs, driving societal impact and delivering on business goals.

In August, DSM Brazil was named for the ninth consecutive year in the Great Place to Work® list in Brazil. In the Brazilian agribusiness sector, it was ranked fourth overall.

In October, DSM was listed in the Forbes Global 2000: The World's Best Employers.

In October, Helen Mets, President DSM Resins & Functional Materials, won the 2019 World Business Council for Sustainable Development (WBCSD) Leading Women Award in the Excellence category for her sustained and outstanding contribution to advancing sustainability in DSM.

In November, Mr. Sijbesma was listed number 42 on the Harvard Business Review The Best-Performing CEOs in the World, 2019.

In November, DSM was listed in the inaugural Financial Times Diversity Leaders, a ranking on companies in 10 European countries on a diverse and inclusive workplace.

In December, DSM was ranked in Fast Company's '2019 The Most Innovative Companies in China 50' and our DSM China President was profiled in their December publication. Fast Company highlighted our sustainable innovations in Health, Nutrition and Sustainable Living in their ranking.

ESG Ratings and Benchmarks

Sustainability is at the heart of our business. It is our core value: we see it as a key responsibility and an important business driver. This is reflected by our inclusion in several Environmental, Social, Governance (ESG) Benchmarks and Ratings (see table below), many of which rate us a (sector) leader.

It is impossible for any company to actively participate in every ESG benchmark, so we annually review and prioritize these.

We base this on the following criteria:

- Recognition and use by our stakeholders, including our investors
- Transparency of methodology
- Primary reliance on publicly accessible information
- Avoidance of additional administrative work
- Provision of sufficient feedback to participating companies to enable them to make meaningful year-on-year improvements

Our priorities in 2019, and the outcomes, are listed below

We maintained the lowest risk rating (1 out of 10) from ISS QualityScore. In December, ISS ESG classified DSM as 'Prime' according to its rating methodology. Our rating of B^- puts us in the top decile relative to our industry group.

In the April update by MSCI, we were informed that DSM had been upgraded to AAA. This change was effective as of the end of 2018. Our continued strength in the areas of carbon emissions and corporate governance, along with a lowering of our risk profile, were key contributors to this upgrade.

In October, we were again listed in the Vigeo Eiris Benelux, Europe, Eurozone and World indices and were reconfirmed as a constituent of the Ethibel Sustainability Index (ESI) Excellence Europe and the Ethibel Sustainability Index (ESI) Excellence Global.

In December, we were once again confirmed as a constituent of the FTSE4Good Index. We have been listed on this index since 2004.

In January 2020, we were assessed by Sustainalytics as being at low risk of experiencing material financial impacts from ESG factors, ranking 1 out of 120 companies in the specialty chemicals industry.

In January 2020, for our climate strategy, and water governance and strategy in 2019, we were assessed as A^- and B respectively by CDP.

EcoVadis awarded our company a Gold CSR Rating in November 2018. At the time of publication of this Report, we are in the process of being reassessed by EcoVadis.

Results at a glance

People

0.28

Frequency Index of Recordable Injuries versus 0.33 in 2018[1]

74%

Employee Engagement Index versus 76% in 2018

72%

Inclusion Index equal to 2018

28:72[2]

Female:male ratio equal to 2018

20%

Female executives versus 19% in 2018

50%

Of female members of MB, EC and SB since 15 February 2020

1 Per 100 DSM employees and contractors
2 Excluding companies that are not integrated into our HR systems (approximately 6% of the total workforce).

People remain our most important asset. Our performance and success are built on their commitment and capabilities. In 2019, we invested again in continuously supporting the safety, health and development of our people. To achieve this, we focused on:

- Investing in our safety culture, led by the DSM Responsible Care Plan (DRCP)
- Fostering health & well-being through regional programs and best practices
- Further anchoring our customer-centricity strategy and strengthening our international footprint
- Investing in people and team development as well as our Employee Value Proposition to attract, engage and retain the right talent
- Exploring digitalization, automation and analytics in preparing the organization for the 'Future of Work'

The key material topics for People are:

- Occupational health & safety (covered in Safety, health & well-being)
- Labor practices & human rights (covered in Human Rights)
- Leadership & development
- Internationalization & diversity

For more information about our People performance, see 'Sustainability Statements — People' on page 150. See also 'How we create value for our stakeholders' on page 30 and 'Stakeholders' on page 32.

Safety, health & well-being

	Aspiration	2019	2018
Occupational safety			
- Frequency Index REC	0.25 in 2020	0.28	0.33
- Frequency Index LWC		0.09	0.11
Process safety			
- PSI Rate	0.15 in 2020	0.23	0.22
Occupational health cases		16	29

Safety remains our highest priority and we strive to be incident- and injury-free. We aim to deliver this by creating a culture in which everyone prioritizes safety and drives relentless execution of our SHE policies. In 2019, we defined the new DSM Responsible Care Plan (DRCP), which addresses the topics of safety and health, among others. More information about the DRCP can be found in 'DSM Responsible Care Plan 2019–2021' on page 51.

Our safety priorities are to focus on high-risk and high-frequency incident categories and locations, to further drive the standardization and digitalization of our key SHE (Safety, Health, Environment) processes, and to continue our 'I Care, We Care' campaign, keeping safety awareness high through global guidance and locally relevant programs. These support the realization of our safety aspirations of a Safety Frequency Recordable Index (FI-REC) below 0.25 and a Process Safety Rate (PSI) of 0.15 by 2020.

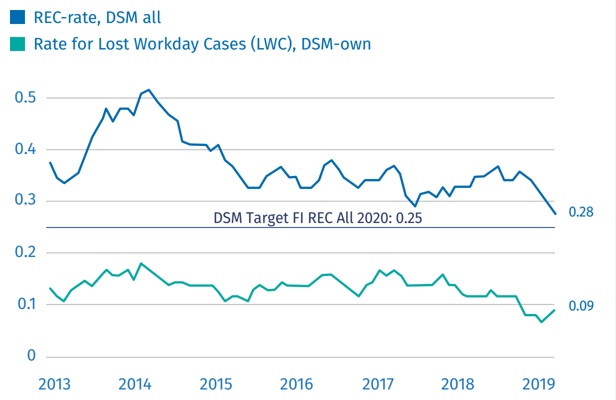
Our health & well-being ambition is to create a positive culture of health at work and support our employees to be 'fit for the future' by promoting vitality and well-being. Through regional programs focused on prevention, we facilitate healthy work conditions.

Occupational safety

Occupational safety is the safety of our employees and contractors. In 2019, the Frequency Index of all DSM Recordable Injuries significantly improved from 0.33 to 0.28. Special attention was given to the sites where the majority of reportable safety incidents occurred in 2018. These sites reported an improvement in reportable incidents of 65%. The Frequency Index of Lost Workday Cases (LWC) for DSM employees improved to 0.09.

Frequency Index of Recordable Injuries

12-month moving average



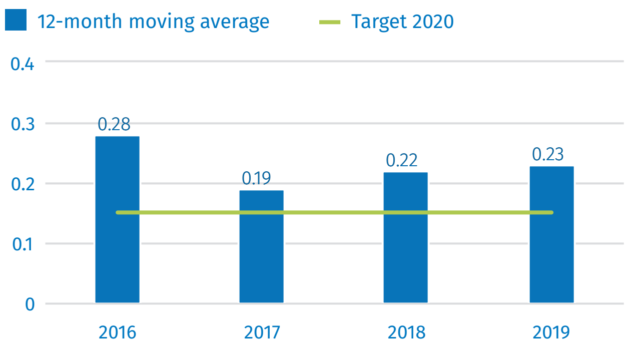
Hand safety was identified as a focus area, and actions were taken to eliminate knives and make cut-resistant gloves a mandatory part of personal protective equipment, where relevant. The number of hand injuries did not drop significantly in 2019 but we expect to see the impact of this change in 2020. Diligent follow-up on selected safety incidents and serious near-misses took place company-wide to secure sustainable learnings for the prevention of these incidents.

The Frequency Index of Recordable Injuries among contractors improved from 0.51 to 0.49. This was due to a substantial decrease in the number of contractor incidents — supported by improvements in contractor supervision and diligent implementation of learnings from previous accidents — and offset by a significant decrease in contractor hours due to the completion in 2018 of the Blue Sky Project in China, which recorded 2.2 million man-hours without safety incidents and only one health incident.

DSM Life Saving Rules
Our Life Saving Rules (LSR) play a key role in our approach to safety and address the highest risks in our operations. In 2019, the learnings from serious safety incidents in the recent years were integrated into the updated LSR. Ambiguity in several of the dimensions has been removed. This includes changes such as moving to zero tolerance regarding alcohol/drugs (including company-related social events if driving afterwards), and allowing no mobile phone use (even handsfree) when driving a vehicle on DSM business. The changes were followed by a communication campaign in which our senior leaders explain what the LSR mean for them and why these are so important for our company.

Process safety
Process safety is the safe operation of our facilities. The Process Safety Rate stayed almost flat, moving from 0.22 in 2018 to 0.23 in 2019. Asset and mindset improvements are needed to address small product leakages, which account for the larger part of these incidents. Our leading KPIs continue to play a key role in driving capability improvements and relentless execution of all process safety life-cycle actions. They also drive visible leadership — a key element of our 'I Care, We Care' campaign that plays a significant part in our journey toward an incident and injury-free workplace.

Frequency Index of Process Safety Incidents



The standardization of processes and implementation of digital tools such as our electronic permit-to-work process are progressing. These are designed to prevent the potentially most serious process safety incidents.

Health & well-being
Our health management system is based on prevention, primary care and promotion. Through the design of our processes and products, as well as the provision of proper protective equipment, we aim to prevent occupational illness. Primary care is provided by site-based medical professionals and also includes emergency preparedness and first aid. Promotion of good health is continuously addressed through a wide range of health promotion activities and is reflected in our SHE policies.

We recorded 16 occupational health cases in 2019, involving, for example hearing loss, ergonomics and allergic reactions.

Regional health activities are encouraged and support employees worldwide who would like to improve their health and well-being in the short term. We also take a long-term perspective in encouraging long-term health and employability. Examples include DSM FIT in the Netherlands and the Brighter Living Wellness Program in North America.

DSM FIT
The DSM FIT department was created in 2017 with the ambition to create a sound, safe and healthy work environment. In 2019, the team finalized their transformation from a medical/occupational health department into an all-round employability department in which employees of DSM FIT also serve as employability ambassadors. To complement this, a trained network of employees was created to support the well-being of their colleagues through advice and coaching. DSM FIT provides onsite guidance for employees whose employment relationship is coming to an end, focusing on the full aspects of employability. Besides this, it supports initiatives that create an open culture in which employability and well-being are openly discussed and valued.

In 2019, a project to improve long-term employability was started, owned by both the Works Council and the President of DSM Netherlands. A survey was conducted within the Dutch employee base to identify how people feel about their work and how resilient they feel in times of high workload or pressure. The survey had a response rate of 60% among the Netherlands-based workforce. In addition, we introduced the employability monitor, providing valuable feedback about the employability of an individual. The monitor also provides the opportunity for conversation with an employability advisor — a DSM colleague trained to help employees interpret and act on their personal monitor results.

The Brighter Living Wellness Program
The Brighter Living Wellness Program has enjoyed a participation rate of over 60% since it began in 2018. The program provides incentives to all employees (including spouses/domestic partners (DPs) enrolled in their medical plans) to live healthier lives.

The program hosts a network of more than 60 wellness champions, who meet monthly and help support employees on site to encourage healthy habits. Employees and their spouses/DPs can receive incentives that contribute toward their health care costs and other incentives for financial wellness checkups, preventative care checkups and age-appropriate screenings.

All locations in North America possess onsite resources including health stations that monitor weight and blood pressure. Affordable and easy access to medical care is offered via telemedicine, including doctors' visits and counseling by phone and online.

The North American Nomad Challenge was a team step-counting challenge in which employees 'walked' to each of our 37 locations in North America, with the winning teams and individuals receiving incentives within the framework of the Brighter Living Wellness Program.

Human Rights

In addition to taking care of the safety, health and well-being of our employees, we also have a responsibility as a company to protect human rights. This is fundamental to achieving the sustainable societal advances to which we aspire. We believe that the basic rights and freedoms to which all people are entitled — human rights — should be understood, respected and promoted by all companies as the cornerstone of socially responsible business.

We have a long-standing commitment to international declarations and the relevant instruments to safeguard these, including:

- The UN Universal Declaration of Human Rights
- The UN Guiding Principles on Business and Human Rights (the Ruggie Framework)
- The ILO International Labour Standards
- The OECD Guidelines for Multinational Enterprises

We apply the International Labour Standards of the International Labour Organisation. We respect the role of works councils and collective bargaining, and work with these groups in the countries and regions in which they are present. We develop social plans and severance programs in the event of significant reorganizations. We promote employee empowerment and human rights protection, and we maintain dialogues with employees and representative bodies to enable this.

We have been a signatory to the UN Global Compact since 2007. For more information, see our human rights position paper on the company website.

Our human rights cross-functional working group was launched in 2018 to further embed our approach to human rights. It focuses on the following seven areas in our own operations and in the supply chain: non-discrimination; prohibition of child labor; health and safety; fair remuneration; protection of personal information; corruption and bribery; and grievance mechanisms.

Own operations
A thorough review of our internal processes was conducted in 2019 to obtain an in-depth inventory of policies and practices across the seven focus areas mentioned above. This enabled us to concentrate our efforts in terms of further assessment, gap analysis and mitigating actions moving forward. The initial findings show that our focus areas are well covered at a global level regarding a policy and broader legal perspective.

The next phase will be to design, test and roll out a new due diligence approach to check to what extent our actual practice is consistent with our internal policies and to define our salient human rights areas.

In addition to these topics, a specific area of attention was fair remuneration, with a focus on equal pay / gender pay gap and living wage.

Equal pay / Gender pay gap
Our commitment is to set equal pay and remuneration for men and women for doing similar work that requires equivalent qualifications and skills. We have further elaborated our position in our Equal Pay statement, which is published on the company website.

In 2019, we conducted an initial analysis on gender pay gap to calculate the global ratio of the average base salary of women compared to men. The gender pay gap in 2019 was 9% in favor of women (female:male pay ratio — 109:100). This ratio is based on validated employee base pay data for our significant locations of operations[1] and covers approximately 63% of our global employee base. The pay gap can primarily be attributed to a higher proportion of male employees in lower-level positions.

In 2020, we aim to conduct further in-depth analysis and data validation. Any learnings and observations will be

[1] Significant locations of operations include Brazil, China, Netherlands, Switzerland and US, excluding Pentapharm (Switzerland and Brazil) and Jiangshan (Jiangsu Province, China).

converted into further action planning, which will involve internal communication and awareness activities (such as incorporation into reward training modules), and alignment with our inclusion and diversity agenda. In the coming years, further efforts will also be made to increase the coverage of this analysis.

Living wage
We are committed to providing a living wage to all our employees. In 2019, as an initial step toward this commitment, we performed a first measurement on our significant operations to gain insights into the difference between actual salaries and country-level living wage standards. The outcome of this exercise was shared with the Executive Committee. We also operate in countries for which living wage standards are not yet available or where a variety of different living wage standards exist (for example, differences between urban and rural contexts, or between provinces). To address this, we have partnered with an external agency to develop a methodology and approach for these countries which will be further rolled out through 2020.

Supply chain
Beyond our own operations, potential labor and human rights implications are handled through our Sustainable Procurement Program (SPP). We assess suppliers for potential human rights issues through Together for Sustainability/EcoVadis sustainability assessments and audits. Read more about our SPP and how we manage potential human rights issues within our supply chain in 'Suppliers' on page 153. See the company website for our Modern Slavery Statement.

People and organization strategy

In 2018, we formulated and shared our ambitions in our people and organization (P&O) strategy in support of Strategy 2021. The P&O strategy is built around six strategic levers: Operating model, Customer-centricity, Internationalization & diversity, Leadership & development, Team by team, and Culture / The DSM Ways of Working. The following sections show the progress that has been made in respect of each of these levers.

Operating model
Our operating model as described in our value creation model on page 30, is composed of our market-facing business groups (focusing on the primary business functions), global support and functional excellence departments, and regional organizations. In this matrix we need to make sure we stay competitive and are equipped to integrate acquisitions. This was successfully executed in acquisitions such as SRF (India), along with the expansion of our share in Andre Pectin (China) in 2019.

We continue to develop and optimize our model, leveraging our shared services and digitalization. We employ digital solutions, such as our P&O dashboard, to support us in tracking our progress.

In 2019, we initiated a 'Future of Work' program within the P&O function, to ensure that our P&O strategy anticipates and addresses projected changes to work, workforce and workplace driven by digitalization, demographics, and other factors. A global P&O project team was formed, and recommended DSM-specific priorities for action, which will be embedded in the strategy going forward.

> “ Work is an important part of people’s lives and identities. At DSM, we strive to create a working environment in which our people can be themselves, have room to develop, and add value to our organization in their unique ways. That’s what drives me every day.”
>
> **Judith Wiese, DSM Executive Committee**

Group business Services (GbS) NextGen Transformation program
GbS is tasked with taking care of the growing portfolio of internal services that enable our employees and people managers to focus their time and energy on their core business. Automation and digitalization are key to help create efficiencies and ensure that GbS is able to manage a higher volume of transactional work with a better employee experience as well as at a competitive and sustainable price.

The GbS NextGen program was set up in 2019 to leverage the benefits of digitalization and new technologies such as Artificial Intelligence (AI) and robotization. GbS will continue to restructure its geographical footprint to deliver this. As a result, we are strengthening the role of Hyderabad (India) as our central hub for the shared service functions Finance, Information Technology, Purchasing and HR.

Digital Acceleration Group
The Digital Acceleration Group comprises senior leaders across DSM whose responsibility is to identify and accelerate the funding of relevant digital solutions. They meet on a monthly basis with the brief to shape our digital future, enable digital transformation, accelerate and scale digital solutions, and boost the digital mindset and capabilities of the company. Investments for acceleration are selected on the basis of clear criteria and follow venturing practices: a phased approach with clear stage gates and phased funding.

Customer-centricity
The market-facing business groups focus on the primary business functions of Innovation and R&D, Direct Sourcing, Manufacturing & Operations, and Marketing & Sales. With the fast-changing and increasing localization of our markets, it is essential to put our customers first in determining how we innovate, organize ourselves and build capabilities, and how we reward our people.

In DSM Nutritional Products, the customer-centricity program, started in 2018, focused on three elements: fostering understanding, building capabilities and reinforcing behaviors. The focus in 2019 was on building capabilities through a collaboration with DUKE Corporate Education. It was launched with an eight-week virtual and collaborative learning journey employing gamification, followed by a global summit. The program aims to embed change by sharing learnings, using role modeling, and celebrating best practices.

Within DSM Engineering Plastics, the multi-year integrated program on customer-centricity launched customer-focused scorecards in 2019. The scorecard gives insight into our Net Promoter Score, see 'Sustainability Statements — Customers' on page 152, as well as how employees can use customer feedback to improve their work. They reflect on how we engage with customers online and how this leads to a follow-up, how we build and commercialize, and how we care for supply chain reliability and complaint handling. This initiative engages many employees across the company, not only the sales department.

The global short-term incentive (STI) framework better aligns pay and performance and focuses on the achievement of business objectives across all levels within the organization (non-sales). The framework covers approximately 4,700 employees. In 2019, KPIs measuring customer-centricity were added such as 'on time in full' and 'customer complaints resolution.' Specifically applicable to sales employees, the Sales Compensation Framework and the respective business unit Sales Incentive Plans (SIPs) have been further revised and deployed, leading to more alignment between pay and sales performance as well as increased cost-effectiveness. These SIPs are tailored to the specific needs of the respective businesses and applicable sales roles. In addition, advanced tooling is being rolled out, leading to better insights into sales achievements and subsequent further fine-tuning of KPIs, along with more efficient monitoring of cost-effectiveness.

Internationalization & diversity

	Aspiration	2019	2018
Female executives	25% by 2021	20%	19%
Under-represented nationalities	35% by 2021	31%	31%

We aim to develop a talent base that is global and diverse, reflecting the markets and customers we serve. In 2019, we continued our focus on increasing the representation of women and under-represented nationalities at executive level and throughout our management pipeline in order to fuel innovation and growth in every country where we operate.

In 2019, we were ranked first in the Female Board Index by TIAS School for Business and Society, and we were also one of only three companies that complied with the Dutch targets (>30%) of gender diversity at Managing Board and Supervisory Board level, as well as with the European Supervisory Board gender target (>40%). Both our Supervisory Board and our Managing Board were well balanced in 2019 in terms of gender, comprising 50% and 33% women respectively, which is in line with Dutch legislation and with the company's own diversity policy. The gender diversity levels of 50% women within our Supervisory Board and 43% women within our Executive Committee exceed our target for at least 30% of these positions to be held by women and at least 30% by men. The composition of both our Supervisory Board and our Executive Committee is in line with our target of not having more than 50% of the members drawn from a single nationality. Furthermore, in the Supervisory Board of DSM Nederland B.V., a subsidiary of Royal DSM, one of the three members is female. As of 15 February 2020, the percentage of women in our Executive Committee, Managing Board and Supervisory Board is 50%.

The percentage of female executives increased slightly to 20%. Our target for female executives of 25% remains challenging and we aspire to deliver the targeted level by the end of the current strategic period.

We aim to shift the geographical distribution of executives and other key functions to ensure that relevant decisions can be made close to where our customers are. We keep a keen eye on our nationality balance, which should reflect our global footprint. In 2018, we achieved our 2020 target on nationality mix. As a result, we have switched our focus from non-Dutch to non-European, setting ourselves an ambitious target of 35% non-European executives by 2021. In 2019, 62% of our executives were non-Dutch compared to 60% in 2018, with 31% being non-European in line with 2018. Our executive base became more international, and we have seen a positive trend in onboarding local executives in Asia, as replacements for internationally-posted executives in the region.

We will continue to focus on our hiring process to support our diversity ambitions. In 2019, we raised awareness by highlighting unconscious bias in our (he)ART of Hiring manager training, encouraging more inclusive approaches at every stage in the hiring process and facilitating evaluation calls to ensure better and fairer hiring decisions. Over this period, we saw a 30% increase in the female pipeline and a 10% increase in gender-diverse hires for our middle and upper management population.

Leadership & development

	Aspiration	**2019**	2018
Training hours per employee		8	6

Demographic and technological shifts mean that it is more important than ever that people remain 'fit for the future', both as professionals and as individuals. We believe that there are talents in everyone, and as such, development is a key and joint responsibility of every employee and their manager. We encourage our people to proactively work on leveraging the development tools and opportunities available to them. To facilitate this, we are working on improving the overall employee experience and are leveraging relevant digital tools.

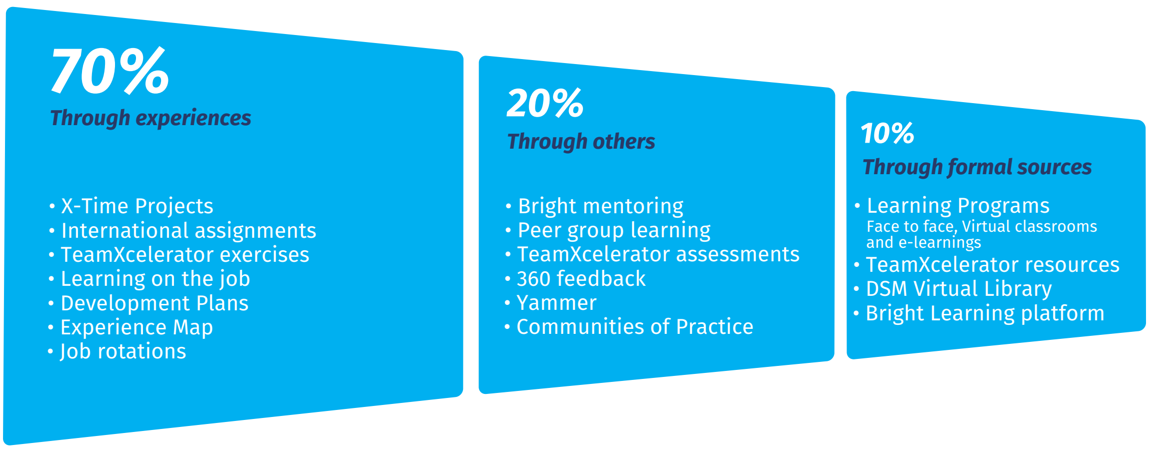
Regular performance evaluations play an important role in ensuring we are performance-driven and develop our people for roles today and into the future. In 2019, almost 15,000 employees had access to the global digital evaluation tool for performance reviews. All other employees participated in performance evaluation on paper or by means of local systems.

We follow the 70:20:10 principle in learning and development: approximately 70% of learning happens through experiences, 20% through others and 10% through formal sources. In June 2019, a campaign was launched to update every employee on the development opportunities that are available to them, such as in-depth development plans, learning platforms and mentoring.

Following a successful pilot in the US, we launched the 'X-Time' platform across the company in 2019. This platform enables employees who are looking to develop through experiences to find projects that would benefit from diverse, cross-functional team members. Employees can spend up to 10% of their time on these projects. Since the launch of X-Time, almost 600 employees have signed up for this initiative, over 200 projects have been posted, and more than 100 matches have been made.

Learning from others takes various forms at DSM. We continued our global and regional mentoring program in 2019, as well as team-based workshops that focus on collaboration and inclusiveness. In 2019, more than 420 employees participated in our regional mentoring programs, and almost 50 employees engaged in a cross-regional mentoring relationship as part of the global mentoring program. The reverse mentoring program was integrated into the mentoring program, enabling all relationships to benefit from reverse mentoring.

The 70:20:10 principle for learning and development



Developing our leaders and people managers remains a key priority for us and thus a key element of our people development strategy. The DSM Leadership Model provides a common vision and language for leadership and specifies the behaviors we expect from our leaders and people managers. Building on that foundation, our Leadership Transition Programs address the learning and development needs of leaders in each phase of their careers.

After the successful launch of these programs in 2018, we were able to increase participation by 20% in 2019. To complement our current leadership development offering, we are preparing the launch of a program for senior managers who are transitioning to leading an organization within DSM.

Broadening our pipeline

To assess the potential and accelerate the development of our leadership talents, we perform annual talent reviews throughout the company. In these reviews, leadership teams, and ultimately the Executive Committee, discuss how to strengthen the talent base and consider succession, discussing employees who have the potential to progress to senior leadership positions. This quantitative and qualitative review ensures we have the right amount of talent at each level for future growth but also that our workforce and leadership are as diverse as the markets and customers we serve.

In 2019, we focused on improving our employer branding for graduates and invested in our global and regional graduate programs. We updated our Employee Value Proposition, which will not only help to attract and engage a higher-quality and diverse candidate pool, but will also mobilize our existing employees to become purpose-led talent ambassadors. We will further roll out our Employee Value Proposition through 2020.

We additionally launched a global graduate framework to ensure we build deeper partnerships with target universities that are globally recognized as innovative, inclusive and progressive in the realm of social entrepreneurship.

In 2019, we took several steps to improve our executive leadership pipeline: we focused on targeted external hiring but also invested in leadership assessment and the development of key leaders. Our long-term succession pool for business group and functional leadership team positions improved significantly. We assessed 75% of all leadership hires for learning potential and saw a 35% increase in the hiring of broad, entrepreneurial talent at this level. We expect that these steps will continue to drive more integrated, customer-centric and innovative business solutions.

Team by Team

	Aspiration	2019	2018
Employee engagement	75% by 2020	74%	76%
Inclusion index		72%	72%

In an increasingly international and diverse workforce at DSM, we operate more and more in different, virtual (project) teams and project organizations. To support this, we invest time in building high-performing, inclusive and engaged teams. In 2019, we continued our journey in defining how to make our teams more effective and how to leverage them for growth, making investments in equipment and the skills of our employees to enable them to use technology to connect with each other more effectively.

The building of high-performing teams is enabled by TeamXcelerator, a toolkit launched in 2019 to help teams develop and accelerate their performance. The online toolkit — which has already been used by more than 1,200 employees — contains over 200 ready-to-use team assessments and exercises to help teams improve their day-to-day teamwork and performance. The toolkit also includes a self-facilitated team development process that enables teams to discover and compare each other's personality types. The development process helps teams learn how they can improve the way they conduct meetings, make decisions, and navigate conflicts. Our P&O business partners were trained to act as internal consultants to facilitate these workshops.

Participating in an international and diverse workforce requires a working environment in which all employees feel respected and included. After its successful launch in 2018, we continued the global roll-out of our Inclusion & Diversity workshop 'Brighter Together'. Over 600 employees from across the company participated in one of these workshops in 2019. The program also proved its resilience and adaptability by inspiring a promising pilot run in Dyneema for virtual high-performing teams.

In 2019, we added an e-learning on the topic of 'Respectful Behavior' to our set of e-learnings that outline the underlying principles of our 'Code of Business Conduct' on page 113. This e-learning is mandatory for all employees and creates more awareness of how we can treat each other respectfully and therefore be more inclusive toward each other.

A strong focus on teams also helps us attract external talents. In 2019, we launched a new global referral program in our key markets, making it faster, simpler and more rewarding for employees to refer high-quality and diverse talents from their network. This has led to a 10% increase in global as opposed to only local market referrals.

Continuous Improvement in Operations

One of the ways we drive organizational performance is by fostering high-performance teams and a culture of continuous improvement in our manufacturing sites and supply chain environments. This mindset is driven by the DSM Integral Continuous Improvement (DICI) journey, currently running at 92% of our Manufacturing and Supply Chain organizations. Our premix locations are currently excluded from the scope of this program.

The goal of DICI is to allow anyone in our organization to make small improvements that can have a significant impact on operations and our employee engagement, thereby unleashing the talent in everyone. This journey involves one common way of working, which enables us to share experiences and learn across sites and businesses and to drive a sustainable culture transformation less sensitive to managerial and employee changes.

For example, in Delft (Netherlands), the shop floor designed and developed digital tools and dashboards that provided them with key insights. In addition, machine-learning models provided new opportunities to improve key processes. This resulted in a significant step-up in the performance of the plant and in the quality of work processes while still meeting the increasing demands of customers.

In Taiwan, the Site Steering Committee team initiated several activities in which they likewise applied the mindset and behavior approach of DICI, resulting in an improvement in people development, interaction with other sites, communication and transparency, and visual management. The main learnings included having an open mind to other people's opinions and building trust. This culminated in a site-wide awards ceremony, bringing the whole site together to celebrate these achievements and embed the learnings.

We celebrated the successes in the DICI journey by organizing the 2019 Continuous Improvement Awards. We received 77 submissions, covering all business groups and all continents. There were five winners, including the Delft team mentioned above.

Presentation of awards to the Delft team in the 'Overall' category of the Continuous Improvement Awards.

Employee engagement

Our goal is that people feel proud to work at DSM and are able to be and give their best, every day. We want them to feel part of a team where every contribution matters, and where we all can learn and grow. To measure this, we run an annual Employee Engagement Survey. The survey results provide important insights into how our employees experience our company, and the impact their experience has on their motivation, perceptions and performance. The Engagement Index measures four attributes: commitment, pride, advocacy and satisfaction.

In 2019, we migrated to a new survey provider and platform but retained the same survey structure and content as in 2018, comprising questions on safety, engagement, management, inclusion and other key themes. Feedback from employees suggests that the new platform provides a more positive user experience, and that they appreciate the broader language options and faster feedback of results to managers. The survey also included an option for employees to provide text comments. More than 40,000 such comments were received.

The survey was sent to all employees (excluding contractors) and was available in 21 languages. The 2019 response rate of 92% (up five percentage points versus 2018) was the highest recorded since we began this annual survey in 2007.

Overall employee engagement decreased by two percentage points to 74%, driven by small decreases in each of the four questions that make up the Engagement Index. In general, the survey generated relatively stable responses; however, we saw a significant decrease of five percentage points in response to the question "I believe DSM has a promising future". This could be attributable to employee concerns regarding the challenging macroeconomic and geopolitical environment in which we are currently operating, but will be further explored through the sessions described below.

The safety index decreased by one percentage point, however it remained the highest scoring index at 91%. There was an increase in manager ratings of two percentage points — a positive result for a focus area from the previous year. Ratings for the Inclusion Index remained stable at 72%. The survey results pointed out three areas for improvement: inclusion, strategy and talent, which will be embedded into company-wide programs during 2020.

Involving team members in understanding the survey results and contributing to the design of improvement actions is a key part of the annual Engagement Survey process. Managers whose team provided more than eight survey respondents were eligible to receive team survey reports. In 2019, more than 1,600 reports were generated for managers within a month of the survey closing. Local engagement champions, people & organization colleagues and communication colleagues provided training and support to assist managers in sharing the results with their teams, leading a dialogue, and agreeing actions for improvements.

Following the dissemination of the results, in 2020 a number of Executive Committee-led dialogue sessions will be planned to gain deeper understanding of the employee experience, and to further engage employees in shaping improvement initiatives. These will include regional dialogues with the executive leadership tier, and global-level digital conversations open to all employees.

Culture

Throughout 2019, we began to roll out The DSM Ways of Working culture pillars, which we had communicated in 2018. As set out in last year's Report, we have committed to three areas of culture and behavioral focus.

Customer passion means putting our customers first, knowing them and making their success our business. To achieve this, we invested in training and awareness through management and performance-focused programs. These programs combine development, empowerment, technology and outside-in thinking to link customer needs with our innovation capabilities.

Accountability and agility means delivering on our promises and responding to challenges quickly. Across the company, we are exploring an agile approach to working, through examples such as a self-managed team at DSM-NIAGA and agile pilot programs within our IT function. Based on some of the focus group discussions in the regions during 2019, accountability and agility became the central focal area of our short- and medium-term cultural development agenda.

Inclusiveness means we value uniqueness and foster a sense of purpose and belonging. Deepening engagement within DSM shows us new ways of enhancing connectivity and collaboration with all our stakeholders. The 'Brighter Together' workshops, described above, continued to be rolled out throughout 2019 and are designed to strengthen inclusiveness in our teams. In addition, our Women Inspired Network (WIN) chapters held events in the Netherlands, the US and Switzerland, among other locations. In the Netherlands for example, WIN hosted a lively and engaging event in March, attracting 200 female and male colleagues to a program that included speakers, a panel and an interactive creative session. We continue to sponsor the WINConference for women. In 2019, a group of 25 employees attended a global, virtual leadership development program 'WIN for WIN', designed and facilitated by members of WIN.

Results at a glance

Planet

63%[1]

Sales of Brighter Living Solutions versus 62%[2] in 2018

~17%

GHG scope 1 + 2 reduction — cumulative structural improvement[3] versus ~8% in 2018 (baseline 2016)

50%

Purchased electricity from renewable sources versus 41% in 2018

2.3%

Energy efficiency improvement year on year versus 1.4% in 2018

A- rating

CDP Climate, ranked no. 1 in Sustainalytics and MSCI

1 For a small percentage of sales (approximately 2%) classified as BLS, the environmental impact is considered 'best in class' together with other solutions.
2 Excluding the temporary vitamin effect in 2018 of € 415 million sales, for further information, see table on page 65.
3 We estimate that the effect of the underlying cumulative structural improvements in absolute GHG emissions was approximately 17% and 8% in 2019 and 2018 respectively, versus the 2016 baseline. The total cumulative absolute reduction was 25% and 18% respectively, versus the 2016 baseline.

We take our global environmental and social responsibilities very seriously. These extend beyond our own operations to include those of our suppliers, customers and end-users. We fulfill our environmental responsibilities through our portfolio of Brighter Living Solutions, our Safety, Health & Environmental (SHE) policy, and our position on issues such as product stewardship and biodiversity. We focus on:

- Improving our own environmental footprint
- Enabling our customers to do the same through innovative solutions
- Advocating on our key environmental topics

Our Brighter Living Solutions — solutions that are better than the mainstream reference solution for people and/or the planet — account for 63% of our net sales.

Our operations network spans more than 110 commercial production facilities in over 40 countries. Our operational approach is led by the DSM Responsible Care Plan, described below, and supports the Sustainable Development Goals (SDGs), especially SDG 7 (Affordable and Clean Energy), SDG 12 (Responsible Consumption and Production) and SDG 13 (Climate Action), among others. Our approach also addresses several topics from our Materiality matrix:

- Climate & Energy
- Resources & Circularity
- Water security
- Biodiversity
- Product stewardship

DSM Responsible Care Plan 2019–2021

In 2019, we brought the DSM Responsible Care Plan (DRCP) in line with Strategy 2021. The DRCP defines our ambitions, targets and actions in the fields of safety, health, environmental footprint, value chain sustainability, climate adaptation and security.

Our key environmental targets for the updated DSM Responsible Care Plan 2019–2021 are our Science-Based Targets, comprising a greenhouse gas (GHG) scope 1 + 2 emission absolute reduction of 30% and a GHG scope 3 intensity reduction of 28% by 2030 versus our 2016 baseline. These were reviewed and approved by the Science Based Targets initiative in early 2019, for more information, see the company website. Our scope 1 + 2 target is supported by our renewable electricity target — 75% of purchased electricity to be sourced from renewables by 2030 — and our annual average energy efficiency improvement of at least 1% through until 2030, and our scope 3 target is supported by the CO2REDUCE program.

Our additional targets are:

- Water: water risk assessments — 100% completed and more than 90% of high-risk actions closed in 2020
- Water: maintain or improve our water consumption efficiency
- Other emissions to air: show continued reduction in volatile organic compounds (VOC) — resulting in a reduction in our emissions intensity of more than 50% by 2021 compared to 2015

We also set ourselves the ambition to develop the following key plans during this DSM Responsible Care Plan period:

- Climate adaptation heatmaps covering the physical risks of our material sites, by the end of 2020
- Water and waste reduction roadmaps in order to set quantifiable, context-based reduction targets in the next DRCP
- An action plan for all products containing substances of high concern at a concentration higher than 0.1% by the end of 2020 (excluding those products defined as 'essential for life')

For more detailed information about our Planet performance, see 'Sustainability statements — Planet' on page 151. See also 'How we create value for our stakeholders' on page 30 and 'Stakeholder Engagement' on page 152.

Climate & Energy

	Aspiration	2019	2018
Greenhouse gas (GHG)			
GHG emissions scope 1 + 2 absolute reduction versus 2016	30% in 2030	25%	18%
GHG emissions scope 1 + 2 market-based (million tons)		1.17	1.23[1]
GHG emissions scope 3 (million tons)		11.6	11.3
Energy			
Primary energy use (PJ)		21.2	20.8
Final consumed energy (PJ)		17.4	17.1
Energy efficiency improvement year on year	> 1%	2.3%	1.4%
Purchased electricity from renewable sources	75% in 2030	50%	41%

1 Including a one-time effect in 2018, estimated at approximately 150 kt.

In 2015, the Paris Agreement first established a common ambition to take urgent action on GHG emissions to limit average temperature increases to well below 2°C. Later in 2018, the Intergovernmental Panel on Climate Change (IPCC) provided a clear and compelling case to redouble efforts to limit the warming to 1.5°C by 2100. Meeting the 1.5°C ambition will require emissions of carbon dioxide to reach net-zero by 2050, which involves rapidly accelerating the rate of emission reduction over the coming decade.

We were one of the first companies to align our efforts with the latest science as presented in the IPCC Special Report 'Global Warming of 1.5°C' by setting a long-term pathway to reach net-zero GHG emissions across our operations and value chains by 2050. Our Science Based Targets are our foundation to achieve this goal, supported by our ambitions on renewable electricity and energy efficiency, and through working intensively with our key suppliers through our CO2REDUCE program.

> "I am proud that we were the first European company in our sector to set Science Based Targets, including an ambitious target on our scope 3 emissions, setting us on course to achieve net-zero by 2050. Through our Targets, we are proactively delivering on our contribution to the Paris Agreement."
>
> **Feike Sijbesma, CEO/Chairman Managing Board**

In support of our ambition to substantially reduce our carbon footprint, we have introduced new measures which we apply to all growth projects. Starting from 2019, business growth projects must either be GHG-neutral or else be compensated for within the same business. In addition, to encourage investments in low-carbon and carbon-free technologies, we use an internal carbon price of € 50/t CO_2eq in the valuations of key investment projects and in the Profit and Loss statements of the business groups for internal management reporting. This increases the visibility of, and encourages accountability for, the impact of carbon on the business.

As a complement to our efforts on climate change mitigation, we also work on an integrated strategy of climate adaptation measures to improve the resilience of our assets and supply chains against potential physical impacts of climate change.

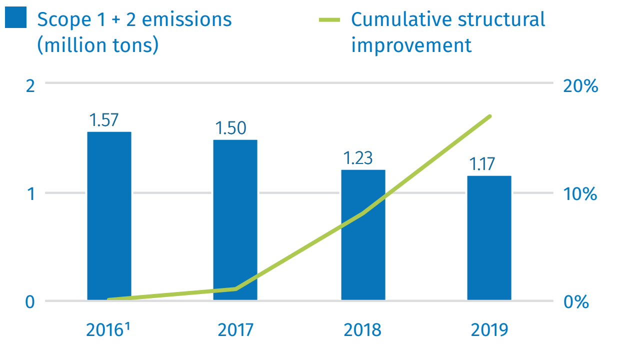
The climate action agenda brings together our key climate actions addressing the three pillars of improve, enable and advocate. The progress of the agenda, including the implementation of the Taskforce on Climate-Related Disclosures (TFCD) recommendations, and the GHG reduction program are managed and actively reviewed by the Executive Committee several times a year. Concrete actions within the agenda are owned by individual Executive Committee members. Through the agenda, we ensure that the business opportunities relate to mitigation and adaptation, and the identified transition and physical risks of climate change are addressed. Our climate change strategy received an A^- rating from CDP in 2019.

In order to achieve the targeted absolute GHG reduction by 2030, we have started a dedicated program to help our key locations implement appropriate energy transition and energy efficiency measures. We identify GHG emission reduction opportunities using performance diagnostics that are carried out at all our main contributing sites. These opportunities range from relatively easy-to-implement modifications in operations and maintenance using Best Available Technologies, to transitioning to renewable energy sources. The identified opportunities are analyzed and ranked, and the projects are implemented based on their impact. A dedicated corporate budget is available to our business groups for the execution of these GHG reduction projects.

Scope 1 + 2 GHG emissions

Our scope 1 + 2 market-based GHG emissions improved compared to 2018, with total emissions of 1.17 million tons CO_2eq in 2019. Our baseline GHG emissions figure of 2016 of 1.50 million tons CO_2eq was increased to 1.57 million tons CO_2eq, due to the inclusion of nine acquired sites in our reporting scope in the period 2017–2019. Our GHG efficiency (year-on-year) improved further to 12.7% in 2019.

Scope 1 + 2 emissions and estimated structural improvement



1 2016 baseline was increased due to the inclusion of nine acquired sites

The absolute reduction in scope 1 + 2 GHG emissions was 25% compared to the corrected baseline of 2016. We estimate that of the 25% absolute reduction in scope 1 + 2 GHG emissions compared to baseline 2016, 17% is due to structural improvements. This was mainly due to an increase in purchased renewable electricity, the implementation of significant GHG reduction measures, such as the start-up of the biomass plant in Sisseln (Switzerland), and the closure of our less efficient power plant in Jiangshan (Jiangsu Province, China). Absolute GHG emissions are also impacted by business and portfolio variations, and external factors such as grid emission factors.

Energy transition
Our energy efficiency improvement (on primary energy) was 2.3% versus 2018, above our target of an average annual improvement of 1%. This result was due to product portfolio changes and the implementation of improvement projects at our key sites.

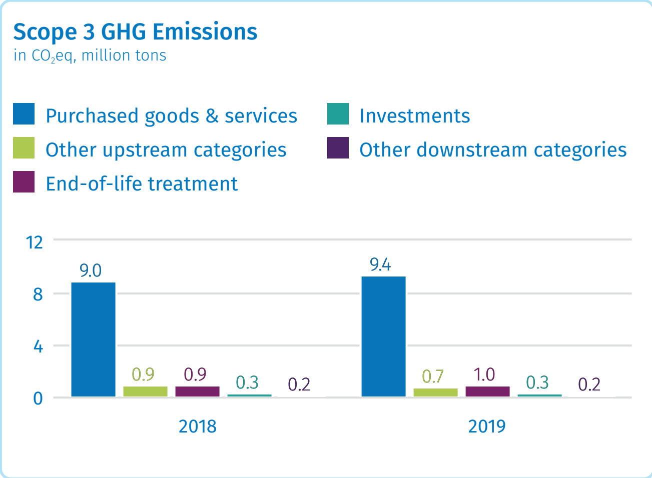
We implemented a range of reduction proposals from the business groups, encompassing projects for saving heat, fuel and electricity with an expected total of GHG improvement potential of approximately 30 kt in GHG reductions and 2% of energy efficiency savings annually. Projects executed in 2019 include a project in Belvidere (New Jersey, USA) where we replaced a large chiller installation with a state-of-the-art version with much lower energy consumption that uses a GHG-neutral refrigerant. Further steps to reduce our energy consumption at this site are ongoing. In a project at Jiangshan (Jiangsu Province, China) we installed a membrane filtration system to concentrate a product solution, thereby significantly reducing the amount of steam needed for further concentration.

Renewable energy
We are a member of the Climate Group's RE100, comprising leading companies that have committed to sourcing 100% of their electricity from renewable sources at the earliest possible opportunity. Our commitment is to source 75% of our electricity from renewable sources by 2030 and 100% at the earliest possible opportunity.

In 2019, we continued to make good progress toward our target of purchased renewable electricity. The percentage of purchased electricity from renewable sources increased globally from 41% in 2018 to 50% in 2019, resulting in a ~60kt CO_2eq reduction for the year. In the Netherlands, our portfolio of agreements continued to provide 100% purchased electricity from wind parks to all locations. At our DSM Nutritional Products manufacturing sites in Switzerland, approximately 50% of the electricity currently comes from hydropower. Following the first Power Purchase Agreement in the US, which provides electricity from wind power, we completed another Agreement in 2019 that will become operational in 2022 to provide solar-powered electricity. The production from the first Agreement combined with pre-production renewable energy certificates (RECs) from both Agreements resulted in around 69% coverage of purchased electricity from renewable resources in North America in 2019, from an estimated 40% in 2018.

We also look for opportunities to replace heat from fossil fuels on our premises. The biomass cogeneration plant at our DSM Nutritional Products site in Sisseln (Switzerland) replaced the site's old natural gas-fired cogeneration plant and is the first major success in this area. Our partners, ENGIE and EWZ, own, operate and maintain the biomass plant, which started production early 2019. This milestone was celebrated at the grand opening in April, which was attended by representatives from all partners and the local authorities. The replacement results in 50 kt CO_2eq reduction per year (of which about 80% is for us and 20% for the other partners).

Scope 3 GHG emissions



Our absolute scope 3 GHG emissions amounted to 11.6 million tons of CO_2eq in 2019, which is 0.3 million tons higher than 2018. The largest change in 2019 compared to 2018 was caused by an increase of emissions in the category Purchased goods & services. This was attributable to updated emission factors and changes in product mix.

The 2019 figures were calculated using updated product emission factors. Updated values and changed assumptions due to improved insights and supplier-specific situations resulted in adjusted emission values. The main scope 3 categories in the 2019 figures remain Purchased goods and services and End-of-life-treatment of sold products.

Science Based Targets
Our new Science Based Target for scope 3 is an intensity reduction target of 28% per unit of product in 2030 versus the base year of 2016. The categories in scope for this Target are Purchased goods and services, Upstream transportation and distribution and Waste generated in operations. To track the progress toward this intensity target, a detailed tracking process was developed and will be fully implemented in 2020.

A recalculation of the emissions for 2016 (the baseline year for the Science Based Target) was made using improved insights and updates of the most relevant emission factors according to our defined standard. This recalculation covers the categories in scope for the Target and will be used solely for reporting performance against the Science Based Target. Emissions for the year 2017 are not recalculated.

Progress on the Science Based Target for scope 3 will not be reported for 2019 because the baseline has only just been set, and any progress toward, or movement away from, our target will be incidental. However, progress on structuring supplier engagements has been significant and the processes are in place to advise, track and report on improvements.

CO2REDUCE supplier engagement program
Emissions related to Purchased goods & services are the largest contributor to our scope 3 emissions. A company-wide supplier engagement program called CO2REDUCE was designed and initiated at the end of 2018, involving multiple key suppliers. The program aims to generate deeper insights into the emission performance of our supplier base, identify the GHG reduction options at key suppliers, and support the collaboration needed to enable these initiatives. This helps to reduce the transition risks in our supply chain. This program was activated, accelerated and extended to the suppliers and products that contribute the highest GHG emissions in our value chain. Our Supplier Engagement Rating on climate was given an A rating by CDP in 2019.

CO2REDUCE lessons learned and new supplier insights resulted in an increased understanding of supplier emission performance for key categories in our scope 3 emissions. With the scope 3 target in place and the experience gained in 2019, we were able to increase our focus on key steps in the program.

Firstly, good insight into supplier performance with respect to GHG emissions is an important aid to identify strategic procurement initiatives to lower the carbon emissions portfolio. The first reduction options are emerging, and supplier GHG performance has been integrated into the procurement strategies of some key categories. Supplier collaboration projects with key suppliers aimed at realizing emission reduction projects are underway. Running projects show several options to reduce GHG emissions through supplier selection, efficiency improvements and the use of renewable energy. One example is suppliers sourcing renewable electricity based on best practices we shared with them.

Secondly, the increased understanding gained in 2019 enabled each of our businesses to develop roadmaps for the reduction of their scope 3 emissions. These roadmaps help focus our efforts to realize the ambitious Science Based Target for scope 3 and consist of a pipeline of multiple additional projects, supplier engagement initiatives, and sourcing strategies to fulfill our sustainability ambitions.

Finally, we also develop products for the circular and bio-based economy that contribute to further reducing our scope 3 emissions. See 'Stakeholder engagement' on page 152 and 'Resources & Circularity' below.

Climate Adaptation
As an essential complement to our efforts to cut emissions, we also apply an integrated strategy of climate adaptation measures. For example, to improve the resilience of our assets and supply chains against potential physical impacts of climate change, we are developing our physical risk assessment. This involves mapping high-risk areas and major sites for emerging hazards and long-term impacts using different time horizons and climate scenarios.

Avoided emissions
Brighter Living Solutions can have benefits at any stage in the value chain. 'Avoided emissions' refers to the emissions-related environmental benefits that occur downstream in the use phase of our products. While avoided emissions do not count toward our own Science Based Targets, they result in reduced emissions for our customers and end-users.

For example, DSM Engineering Plastics supplies products for food packaging films requiring effective oxygen barrier properties and high puncture resistance. These films play an important role in reducing food waste by protecting food during transport, retail and consumer use, and extending shelf life. Reducing food waste diminishes the burden on the food production system, leading to significant avoided emissions. Products sold in this segment in 2019 contributed to an estimated avoided emission of 27,500 kt CO_2eq.

As another example, our powder coating resins can be used to replace solvent-borne coatings in many applications, allowing faster and more efficient curing, at lower temperatures, with less waste. Powder coatings also remove the need for solvents, leading to further reductions in GHG and other emissions. In 2019, sales of powder coatings avoided GHG emissions of approximately 520 kt CO_2eq.

Other emissions to air

	Aspiration	2019	2018
VOC efficiency improvement versus 2015	continuous improvement	75%	48%
VOC (x 1,000 tons)		2.7	4.9

Our reporting on Other emissions to air focuses on VOCs, as these are the most significant emissions in this area. We continue to report our NO_x and SO_2 emissions in the Sustainability statements and via the company website; however, these emissions are not material due to improvement actions executed in the past. Our target is to continuously reduce our Volatile Organic Compounds (VOC) emissions, resulting in a more than 50% efficiency improvement by 2021 — an increase on our previous aspiration of 40% for the three emissions by 2020. In 2019, we saw a large improvement in our VOC efficiency, mainly due to the start-up of a VOC treatment plant in Jiangshan (Jiangsu Province, China).

Resources & Circularity

	Aspiration	2019	2018
Renewable raw materials			
Renewable raw materials		14.7%	14.3%
Waste			
Waste recycled	80–90% in 2020	88%	83%
Total process-related waste efficiency improvement	at least maintain	2.8%	-
Non-hazardous waste (kt)		138	97[1]
Hazardous waste (kt)		85	81
Non-process related waste (kt)		5	27

1 The 2018 non-hazardous waste figure has been restated due to a correction in the calculations at two locations.

With the global population having doubled over the past 50 years, resource extraction has tripled, putting pressure on the Earth's finite resources. At the same time, the Circularity Gap Report 2019 finds that the global economy is only 9% circular — in other words, just 9% of the 92.8 billion tons of minerals, fossil fuels, metals and biomass that enter the economy are re-used annually, and the trend is negative — the gap is not closing. That is why we are committed to securing the future availability of natural resources and unlocking more value from the limited resources available. By working closely together with our value chain, we continue to develop closed-loop, circular solutions. As part of our Resources & Circularity approach, we aim to improve our own impact through resource efficiency improvements and measures, to enable our customers to deliver sustainable and circular solutions, and to advocate for the transition to a circular, bio-based economy.

We enable our customers to transition toward a circular & bio-based economy by focusing on five drivers:

- Reduce the use of critical resources throughout the value chain
- Replace scarce, hazardous, and potentially harmful resources with safe and renewable alternatives
- Extend the lifetime of products by means of improved durability or shelf-life
- Design for recyclability
- Recover waste streams by viewing waste as a resource

Renewable & secondary raw materials

Circularity includes replacing finite fossil resources with regenerative, renewable resources, as well as secondary (recycled) materials. The use of such sustainable resources is an essential step in securing future resource availability, but can also have environmental benefits in reducing the carbon footprint.

The renewable raw materials we use include waste from agriculture, yeasts and enzymes, carbohydrates and natural oils, and acids. In 2019, the share of our spend on renewable raw materials increased from 14.3% in 2018 to 14.7%. The percentage increase is due to an increase in spend on glycerol, maltodextrin, and other carbohydrates.

We have a strong track record of sustainable innovations and pioneering in bio-based solutions. This year, our businesses again made a big step forward in driving the transition toward a circular and bio-based economy.

One example is DSM Engineering Plastics, which announced ambitious plans to introduce bio- and recycled-based alternatives for its entire portfolio, to be completed by 2030. In addition to existing bio-based grades including EcoPaXX® and ForTii®Eco, we launched bio-based versions of both Arnitel® and Stanyl® grades in 2019. Arnitel® is a thermoplastic elastomer (TPE) with high temperature resistance and is mainly used to replace rubber in automotive, electronics and other industries. Stanyl® is a high-temperature-resistant polyamide and the only aliphatic polyamide in its class. The bio-based grades of Arnitel® and Stanyl®, launched in 2019, deliver the same functional and regulatory qualities as the conventional grades and do not require any special handling equipment or different processing steps. In this way, we are offering our customers the chance to choose a sustainable future where they can reduce their environmental impact without compromising their products or processes. Similarly, both DSM Resins & Functional Materials and DSM Dyneema have also set their own circular and bio-based ambitions. For more information, see 'Materials' on page 84.

An example of the use of secondary raw materials is Akulon® RePurposed. We use discarded fishing nets to produce this recycled-based polyamide. The nets are collected, cleaned and sorted along the coastlines of India, contributing to cleaner oceans, litter-free beaches and jobs for local communities. The polyamide is used in high-end applications in the sports and leisure segment (such as surfboard accessories).

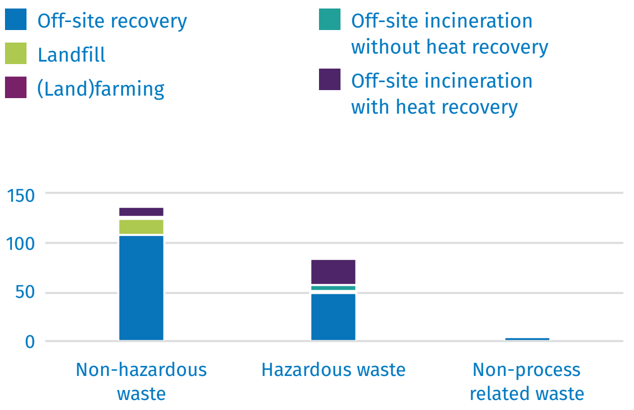
In the coming months and years, we will work with more parties within the value chain — including our suppliers, customers, collaborative partners and even competitors — to lead the transition toward more circular and sustainable materials.

See also our position paper on Sustainable Biomass on the company website.

Waste

Our definition of waste recycled is the percentage of total process-related waste that is recycled or, if this is not possible, incinerated off-site with heat recovery. We pay careful attention to meeting local waste management legislation. We aim to maintain our percentage of recycled waste in the range of 80–90%, which was achieved in 2019.

Waste breakdown by stream (in thousand tons)



Besides measuring our percentage of recycled waste, we also pay attention to reducing our total amount of process-related waste. In 2019, our total process-related waste efficiency improvement was 2.8%. The overall increase in process-related waste is due to the inclusion in our reporting of new acquisitions, which are not included in the efficiency calculations. We also managed to reduce our total amount of hazardous waste to landfill by 12%, mainly due to improvement activities at our site in Piura (Peru). The significant decrease in non-process related waste from 27 kt in 2018 to 5 kt in 2019 was due to a large demolition project conducted in 2018, whereby a large volume of waste was sent for land reclamation. These effects did not occur in 2019.

Water security

	Aspiration	2019	2018
Sustainable water management			
Water risk assessments	100% in 2020	100%	100%
Closure of high-risk related actions	90% in 2020	39%	25%
Water consumption efficiency improvement	at least maintain	4.0%	-
Water consumption[1] (million m^3)		23	22
Water use (million m^3)		111	114
Emissions to water			
COD (kt)		2.1	2.2

1 Water consumption is calculated as water use minus once-through cooling.

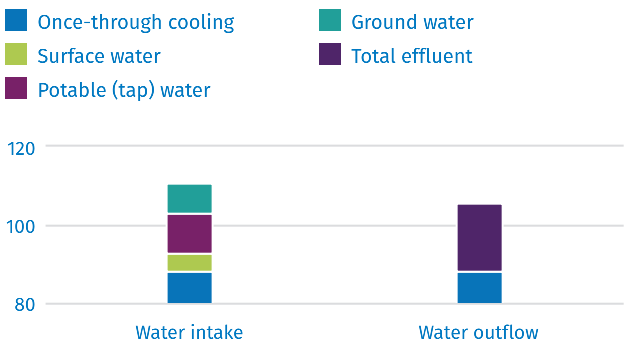
Water is essential to life. It is also essential to the viability of our business, and we recognize that this precious resource will come under increasing pressure in the face of climate change and growing global demand. We are committed to measuring, tracking and continually improving our water stewardship as well as our position as a global sustainability leader within the chemical sector. As part of this commitment, we are a signatory of the CEO Water Mandate, a UN Global Compact initiative that mobilizes business leaders to advance water stewardship, sanitation, and the Sustainable Development Goals, in partnership with governments, peer institutions, civil society, and others.

"Water security is a global issue impacting billions of people and will only grow in importance with a changing climate. Water security continues to be a material topic to DSM, and we will use this strategic period to define additional relevant and contextual water targets for the company. Through this Report, we report our progress on water security toward the UN Global Compact CEO Water Mandate."

Feike Sijbesma, CEO/Chairman Managing Board

We recognize water management as integral to our risk mitigation and environmental impact reduction strategies. We believe that water risks are local by nature, and therefore focus on local water risk assessments and thorough follow-up of these. In 2019, we received a B rating from CDP for our water governance and management strategy. In 2019, we completed water risk assessments at our new material water sites and we worked further on mitigating actions in our high-risk areas. The main water risks identified related to water quality and limitations in local infrastructure. Current risk exposure to water scarcity was identified as limited in the regions where we operate. A longer-term water risk horizon will be considered in conjunction with the physical risk assessments scheduled for 2020.

Water intake and outflow (in million m³)



Our water consumption efficiency improved by 4.0% versus 2018. This is partly due to the water-related benefits from our energy efficiency improvement projects, such as steam usage or chilling and cooling improvement projects. Our water pollution reduction programs aim to reduce total water pollution, mainly by cutting Chemical Oxygen Demand (COD). Total COD was stable at 2.1 kt in 2019. We are also investing in improving our water treatment facilities.

Biodiversity

	2019	2018
Sites in or adjacent to protected areas	25%	66%
Sites in registered protected area	3%	-

Biodiversity and healthy ecosystems are key conditions for a sustainable world. Each year, we identify and monitor the protected areas in the vicinity of our sites and the impact that our activities have on these. In 2019, we further clarified our metric 'Sites in or adjacent to protected areas', resulting in a decrease in this metric. The clarification is that protected areas are formally recognized as such (for example, through national legislation or Ramsar sites), and that sites must directly border a protected area. Being in the vicinity of one of these areas does not equate to directly bordering it. We also improved our reporting, which informed us that of the reported sites near high biodiversity, 3% of our sites are in, or contain portions of a registered protected area. For more information, see our position paper on Biodiversity on the company website.

Product stewardship

Product stewardship is an important pillar of our sustainability strategy. We minimize and control possible SHE risks that could be caused by the substances used in our products throughout the value chain. The use of certain chemicals can lead to health and environmental risks. We believe that minimizing these risks goes together with the creation of a circular economy, which is a key part of Strategy 2021. Central to our vision on product stewardship is a risk-based approach and the use of safer alternatives whenever feasible, and always when required. For our innovation portfolio, 'safe by design' is the leading principle in the development of new and better products and processes.

Last year, we started assessing our full product portfolio to fulfill our ambition to have an action plan for all products that contain more than 0.1% Substances of Very High Concern by 2020. Substances in products that are considered 'essential for life' (i.e., that have a proven beneficial nutritional or pharmaceutical effect when used at the officially recommended dose) are excluded from this assessment.

An important source of information on health and environmental hazards and risks of chemicals is the database generated with the implementation of REACH in Europe a decade ago. The quality of data that has been submitted in good faith by industry was recently questioned by the authorities. The European chemical industry association consequently started a program to improve the quality of the REACH dossiers. We were among the first companies to sign the Declaration of Intent, and we started the re-evaluation of the dossiers in which we are the lead registrant.

For more information on product stewardship, see the company website.

Results at a glance

Profit

-1%

Organic sales growth versus 2018[1]

+10%[2]

Adjusted EBITDA[3] growth versus 2018[1] and versus a high single-digit target

+47%[2]

Adjusted net operating free cash flow[3] growth versus 2018[1] and versus an average annual target of ~10%

21%

Innovation sales, in line with our ambition of ~20%

43%

Sales to high-growth economies, in line with our ambition of ~45%

6.8%

Capital expenditure (cash-based) as a % of sales versus 7.3%[1] in 2018

€ 764

Total net profit versus € 1,079[4] in 2018 (in millions)

€ 2.40

Proposed[5] dividend per ordinary share for 2019 versus € 2.30 for 2018

€ 1,144[2]

Net debt versus € 113 end of 2018 (in millions)

[1] Excluding temporary vitamin effect in 2018 of € 415 million sales and € 290 million (Adjusted) EBITDA, for further information see table on page 65.
[2] Including the impact of IFRS 16, see table on page 164.
[3] For reconciliation to IFRS performance measures, see table on page 180.
[4] 2018 includes the temporary vitamin effect, for further information see table on page 65, and the book profit on the sale of DSM Sinochem Pharmaceuticals.
[5] Subject to approval by the Annual General Meeting of Shareholders.

Overall financial results

In our strategic plan for the period 2019–2021, called Strategy 2021: *Growth & Value - Purpose led, Performance driven*, we illustrate how we will evolve further toward being a purpose-led, science-based company, operating in the fields of Nutrition, Health, and Sustainable Living. Our strong growth platform together with increased customer-centricity and large innovation projects, will drive above-market growth. Concurrently, we will continue our strong focus on cost control and operational excellence, allowing us to accelerate profit growth and cash generation. Organic growth will be complemented by acquisitions, predominantly in Nutrition given its growth potential, resilience, strong leadership position and value creation potential.

In Strategy 2021, we emphasize two headline financial targets: high single-digit annual percentage increase in Adjusted EBITDA and about 10% average annual increase in Adjusted net operating free cash flow. We also highlighted the ambitions underpinning these targets, for more information, see 'Strategy 2021' on page 16.

This chapter includes an overview of the key financial metrics of the company and our performance in 2019.

In 2019, we delivered on our financial targets with double-digit growth in Adjusted EBITDA of 10% to € 1,684 million, including 3% from IFRS 16, compared to the underlying business in 2018. The strong EBITDA growth in the businesses was also supported by our continued focus on cost reduction and operational efficiency. Adjusted net operating free cash flow increased by 47% to € 801 million compared to the underlying business in 2018, including 10% from IFRS 16.

Compared to the underlying business in 2018, Nutrition delivered above-market sales growth, with organic sales up 2%, and high-single digit Adjusted EBITDA growth (12%, including 3% from IFRS 16), despite challenging market conditions in some of its end-markets. Materials recorded lower volumes (down 5%), but demonstrated its earnings resilience in persisting weak market conditions with an almost stable Adjusted EBITDA (down 1%, including 1% from IFRS 16).

The Adjusted EBITDA margins were 20.7% (including 0.5% from IFRS 16) and 18.5% (including 0.2% from IFRS 16) for Nutrition and Materials respectively, both up versus the previous year in the underlying business and in line with our strategic ambitions.

Our Return On Capital Employed (ROCE) from underlying business was down 130 basis points, to 12.0% (including 30 basis points from IFRS 16), mostly driven by the impact of acquisitions and the adoption of IFRS 16.

Income statement and key data

x € million	**2019**[1]	2018	Change
Net sales underlying business	9,010	8,852[2]	2%
Net sales	9,010	9,267	-3%
Adjusted EBITDA underlying business	**1,684**	**1,532**[2]	**10%**
Adjusted EBITDA	**1,684**	**1,822**	**-8%**
EBITDA	**1,586**	**1,754**	**-10%**
Adjusted operating profit	**1,075**	**1,345**	**-20%**
Operating profit	**954**	**1,245**	**-23%**
Adjusted net profit underlying business	**830**	**769**	**8%**
Adjusted net profit	**830**	**1,034**	**-20%**
APM adjustments	(66)	45	
Net profit	**764**	**1,079**	**-29%**
Net profit attributable to equity holders of Koninklijke DSM N.V.	**758**	**1,077**	**-30%**
ROCE underlying business (in %)	12.0	13.3[2]	
ROCE (in %)	12.0	16.8	
Adjusted EBITDA margin underlying business (in %)	18.7	17.3[2]	
Adjusted EBITDA margin (in %)	18.7	19.7[2]	
Adjusted net operating free cash flow underlying business	801	545[2]	
Adjusted net operating free cash flow	801	810	

1 Including the impact of IFRS 16, see table on page 164.
2 Excluding temporary vitamin effect in 2018 of € 415 million sales and € 290 million (Adjusted) EBITDA, for further information see table on page 65.

One of our key focus areas remains the improvement in our working capital as a percentage of total sales. At the end of 2019, total working capital was € 1,852 million, compared to € 1,674 million in 2018. The average total working capital as a percentage of sales was 21.2%, compared to 18.7% in 2018, above our aspiration of 'below 20%', but fully driven by the consolidation of acquisitions and exchange rate effects.

Including the estimated temporary vitamin effect of € 415 million on sales driven by the exceptional supply disruption in the industry in 2018, our total sales were down 3% to € 9,010 million (compared to € 9,267 million in 2018).

The total Adjusted EBITDA was 8% lower at € 1,684 million when considering the total estimated € 290 million temporary vitamin effect of 2018. Our Total ROCE was 12.0% (including 30 basis points from IFRS 16), down 480 basis points from 16.8%.

Innovation plays an important role in driving both top-line and bottom-line growth. With 21% innovation sales in 2019, which we define as sales from products and solutions introduced in the last five years, we are delivering against our ambitious aspiration of around 20%. In 2019, we also made progress on promising innovation projects that could have a wider societal impact and drive future growth. These include our Project Clean Cow, Veramaris®, Avansya, Balancius® and Niaga®.

Net sales and Adjusted EBITDA

At € 9,010 million, net sales in 2019 were 2% higher than in 2018 (€ 8,852 million excluding the temporary vitamin effect) or 3% lower than total sales in 2018 (€ 9,267 million). Underlying organic growth in 2019 was down by 1% (including the temporary vitamin effect in 2018, total organic growth was down by 5%). Volume development was rather stable, while price/mix had a 1% negative effect on growth compared to underlying sales in 2018. Exchange rate fluctuations had a positive impact of 2%, and acquisitions contributed another 1% to sales.

Total sales in 2019 were € 257 million lower, mainly due to the temporary vitamin effect in 2018. Growth was achieved in LATAM and India. All high-growth economies together currently represent 43% of our sales (45% when Africa is included), which is in line with 2018. The share of sales in these economies as a proportion of our total sales gives us a well-balanced global footprint.

The Adjusted EBITDA (Adjusted operating profit before depreciation and amortization) increased by 10% or € 152 million, from € 1,532 million in 2018 (excluding the temporary vitamin effect) to € 1,684 million in 2019. Part of the increase is the impact of IFRS 16 of € 52 million. Including the temporary vitamin effect, the Adjusted EBITDA decreased by € 138 million. Adjusted EBIT (Adjusted operating profit) rose from € 1,055 million in 2018 (excluding the temporary vitamin effect) to € 1,075 million in 2019, up 2%. Including the temporary vitamin effect, this is a decrease of 20%.

	Net sales			Adjusted EBITDA		
x € million	**2019**	2018	% change	**2019**[1]	2018	% change
DSM underlying business	9,010	8,852[2]	2%	1,684	1,532[2]	10%
DSM	9,010	9,267	-3%	1,684	1,822	-8%
Nutrition underlying business	6,028	5,722[2]	5%	1,250	1,117[2]	12%
Nutrition	6,028	6,137	-2%	1,250	1,407	-11%
Materials	2,746	2,913	-6%	509	512	-1%
Innovation Center	194	172	13%	22	8	175%
Corporate Activities	42	45	-7%	(97)	(105)	-8%

1 Including the impact of IFRS 16, see table on page 164.
2 Excluding temporary vitamin effect in 2018 of € 415 million sales and € 290 million (Adjusted) EBITDA, for further information see table on page 65.

Net profit

Adjusted net profit of € 830 million was up versus the underlying business in 2018. Net profit attributable to equity holders of DSM decreased by € 319 million to € 758 million. This decrease was mainly a result of the higher Adjusted underlying EBITDA (up € 152 million, including € 52 million attributable to the IFRS 16 effect), the temporary vitamin effect of € 290 million in 2018, and the gain of € 109 million on the disposal of our 50% share in DSM Sinochem Pharmaceuticals in 2018. Expressed per ordinary share, net earnings amounted to € 4.27 in 2019 (2018: € 6.10).

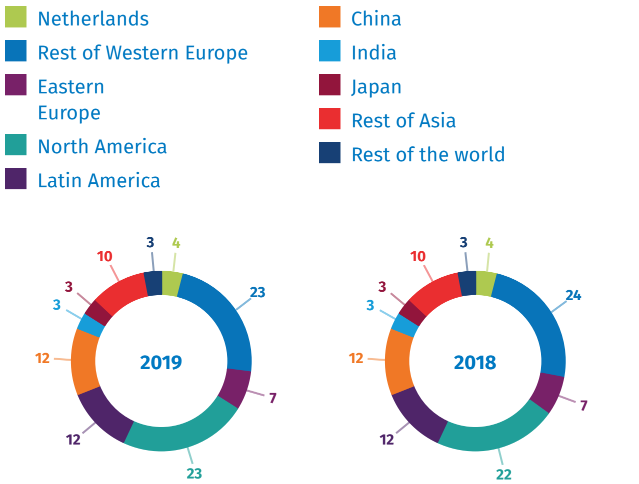
Financial income and expense decreased by € 9 million year on year to € 92 million. This was mainly caused by positive results on derivatives.

The reported effective tax rate over Adjusted taxable result 2019 was 18.2% (2018: 17.4%). This increase was mainly caused by the impact of increased tax rates.

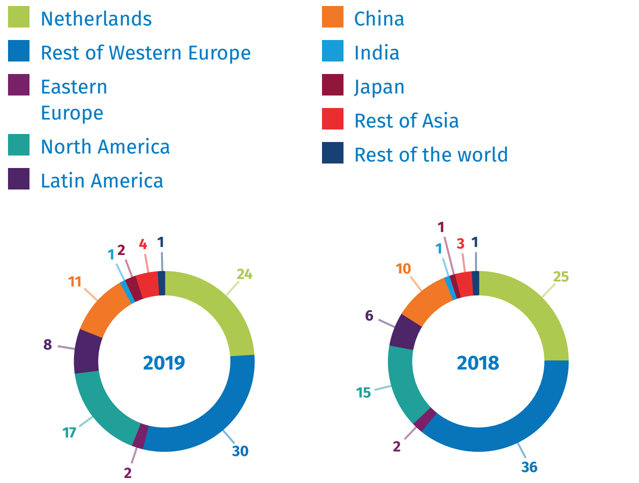
Adjustments made in arriving at DSM's Alternative performance measures (APM adjustments)

Total APM adjustments for the full year amounted to a loss of € 66 million (2018: profit of € 45 million), consisting of a loss in EBITDA of € 98 million (including restructuring costs of € 68 million), impairments of € 23 million, a related tax benefit of € 27 million and a profit of € 28 million relating to associates and joint ventures (mainly related to the step-up to the fair value of Andre Pectin prior to the acquisition).

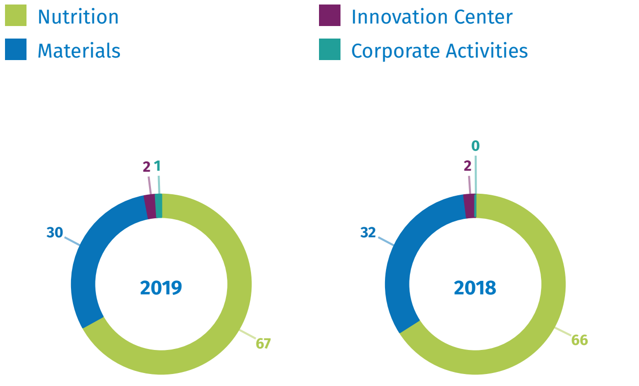
Net sales by destination
in %



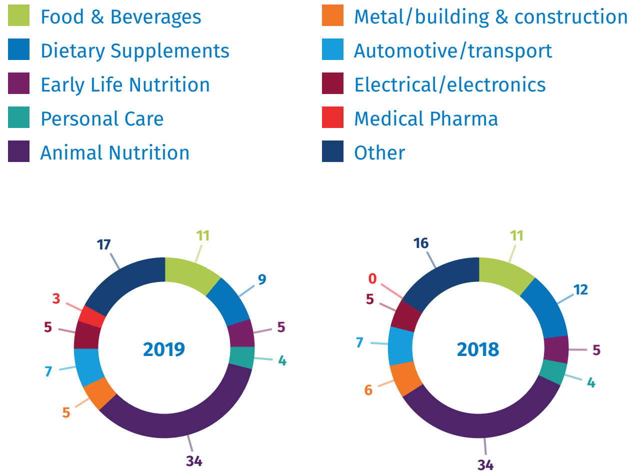
Net sales by origin
in %



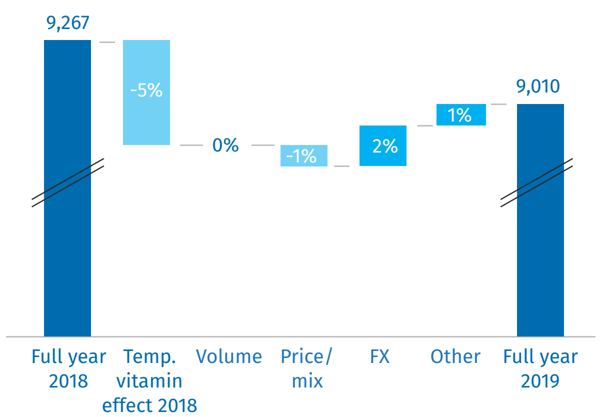
Net sales by business segment
in %



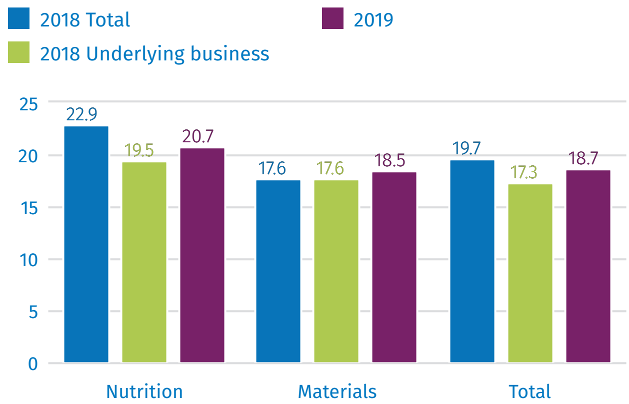
Net sales by end-use market
in %



Net sales bridge 2019
x € million



Adjusted EBITDA margin
in %



Cash flow statement

x € million	2019[1]	2018
Cash and cash equivalents at 1 January	**1,281**	**899**
Cash flow provided by operating activities	1,385	1,391
Cash from / (used in) investing activities	(525)	(605)
Cash from / (used in) financing activities	(1,332)	(401)
Effect of exchange differences	(9)	(3)
Cash and cash equivalents at 31 December	**800**	**1,281**

1 Including the impact of IFRS 16, see table on page 164.

Cash flow of € 1,385 million provided by operating activities mainly consists of the EBITDA for the year (€ 1,586 million) less various cash-out items including income tax of € 140 million and defined benefit plans of € 39 million. Our focus on cash flow resulted in a full-year operating cash flow of € 1,385 million, similar to the level of 2018, which was driven by the one-time vitamin effect in that year. Excluding this 2018 effect, the cash from operating activities increased by € 259 million, or 23%, mainly due to the increase in the underlying EBITDA. See also 'Consolidated financial statements' on page 171.

The cash used in investing activities included capital expenditure (€ 627 million) and acquisitions (€ 556 million), partly offset by the decrese in fixed-term deposits (€ 588 million).

The cash used in financing activities consisted mainly of the repayment of the corporate bond (€ 300 million), dividend paid (€ 291 million) and the repurchase of shares (€ 869 million).

For the full cash flow statement, see Note 26 'Notes to the cash flow statement' on page 223.

Balance sheet

The balance sheet total (total assets) reached € 13.4 billion at year-end (2018: € 13.6 billion). Equity was rather stable, with an increase of € 20 million compared to the position at the end of 2018. The net result and reissue of shares more or less balanced out with the dividend and repurchase of shares. Equity as a percentage of total assets increased from 57% to 58%.

Compared to year-end 2018, net debt increased by € 1,031 million to € 1,144 million. The gearing at year-end was 12.7%, an increase compared to 1.4% at year-end 2018.

Capital expenditure on intangible assets and property, plant and equipment amounted to € 623 million in 2019 (€ 609 million on a cash basis), which was in line with the level of amortization and depreciation.

Total working capital amounted to € 1,852 million compared to € 1,674 million at year-end 2018. This represents 21.5% as a percentage of annualized fourth quarter 2019 sales (2018: 19.0%), which is above our aspiration of 20%. Cash-wise, the operating working capital (OWC) decreased by € 52 million, mainly due to lower cash-out for inventories. The OWC percentage increased from 24.2% at year-end 2018 to 26.3% of annualized sales at year-end 2019.

Cash and cash equivalents came to € 800 million at the end of the year; including current investments, this amounted to € 1,488 million (2018: € 2,558 million). Besides the regular cash flow elements, this decrease was mainly due to acquisitions (€ 556 million), the repayment of the bond (€ 300 million) and the repurchase of shares (€ 869 million).

Balance sheet profile

	2019[1]		2018	
	x € million	in %	x € million	in %
Intangible assets	3,515	26	3,090	23
Property, plant and equipment	4,040	30	3,511	26
Other non-current assets	664	5	730	5
Cash and cash equivalents	800	6	1,281	9
Other current assets	4,424	33	5,029	37
Total assets	**13,443**	**100**	**13,641**	**100**
Equity	7,835	58	7,815	57
Provisions	168	1	153	1
Other non-current liabilities	3,325	25	3,139	23
Other current liabilities	2,115	16	2,534	19
Total equity and liabilities	**13,443**	**100**	**13,641**	**100**

1 Including the impact of IFRS 16, see table on page 164.

“ We delivered a good financial performance and achieved key milestones in the first year of Strategy 2021. We are focused on growth, costs and operational excellence initiatives across the company to offset a challenging macroeconomic environment. ”

Geraldine Matchett, Co-CEO

Outlook 2020

DSM expects to deliver a mid-single digit increase in Adjusted EBITDA for 2020 compared to prior year, together with an improvement in Adjusted net operating free cash flow in line with our Strategy 2021 targets. This outlook is driven by DSM's own growth initiatives, innovation programs and self-help actions, and does not assume any significant improvement to the current macroeconomic environment. With regard to any potential impact of the Coronavirus, DSM will monitor the situation closely.

Key business figures at a glance

Our activities are grouped in three clusters: Nutrition, Materials and Innovation Center. We report separately on Corporate Activities. Results presented in this section (and elsewhere in this Report) relate to consolidated activities only (therefore non-consolidated partnerships are excluded).

Net sales

x € million	2019	2018[2]
Nutrition	6,028	5,722
Materials	2,746	2,913
Innovation Center	194	172
Corporate Activities	42	45
Total	**9,010**	**8,852**

Adjusted operating profit (EBIT)

x € million	2019[1]	2018[2]
Nutrition	881	821
Materials	363	383
Innovation Center	(19)	(14)
Corporate Activities	(150)	(135)
Total	**1,075**	**1,055**

Adjusted EBITDA

x € million	2019[1]	2018[2]
Nutrition	1,250	1,117
Materials	509	512
Innovation Center	22	8
Corporate Activities	(97)	(105)
Total	**1,684**	**1,532**

Capital employed at 31 December

x € million	2019[1]	2018
Nutrition	6,731	5,683
Materials	1,927	1,878
Innovation Center	616	597
Corporate Activities	37	23
Total	**9,311**	**8,181**

Adjusted EBITDA margin

in %	2019[1]	2018[2]
Nutrition	20.7	19.5
Materials	18.5	17.6
Total	**18.7**	**17.3**

ROCE

in %	2019[1]	2018[2]
Nutrition	13.9	14.7
Materials	18.6	20.6
Total	**12.0**	**13.3**

[1] Including the impact of IFRS 16, see table on page 164.
[2] Excluding temporary vitamin effect in 2018 of € 415 million sales and € 290 million (Adjusted) EBITDA, for further information see table below.

Capital expenditure

x € million	2019	2018
Nutrition	420	463
Materials	139	132
Innovation Center	34	32
Corporate Activities	30	26
Total, accounting based	**623**	**653**
Non-cash items	4	2
Customer funding	(18)	(9)
Total, cash based	**609**	**646**
In % of net sales	6.8	7.3[1]

1 Excluding temporary vitamin effect in 2018.

R&D expenditure (including associated IP expenditure)

	x € million		as % of net sales	
	2019	2018	2019	2018[1]
Nutrition	218	206	3.6	3.6
Materials	124	122	4.5	4.2
Innovation Center	70	67	36.0	38.9
Corporate Activities	4	3	10.8	7.1
Total	**416**	**398**	**4.6**	**4.5**

1 Excluding temporary vitamin effect in 2018.

Workforce at 31 December

headcount	2019	2018
Nutrition	14,599	13,628
Materials	4,762	4,643
Innovation Center	726	701
Corporate Activities	2,087	2,005
Total	**22,174**	**20,977**

Temporary vitamin effect 2018

x € million	Animal Nutrition & Health	Human Nutrition & Health	Total Nutrition[1]	Total DSM[2]
Net sales	3,134	2,019	6,137	9,267
One-time vitamin effect	385	30	415	415
Sales from underlying business	2,749	1,989	5,722	8,852
Adjusted EBITDA			1,407	1,822
One-time vitamin effect			290	290
Adjusted EBITDA underlying business			1,117	1,532
Adjusted operating profit (EBIT)			1,111	1,345
One-time vitamin effect			290	290
Adjusted operating profit (EBIT) underlying business			821	1,055
Adjusted net operating free cash flow				810
One-time vitamin effect				265
Adjusted net operating free cash flow underlying business				545

1 Including other Nutrition businesses not impacted by the vitamin effect.
2 Including other DSM businesses not impacted by the vitamin effect.

Results at a glance

Nutrition

€ 6,028

Net sales versus € 5,722[1] in 2018 (in millions)

+2%

Organic sales growth versus 2018[1]

20.7%[2]

Adjusted EBITDA[3] margin versus 19.5%[1] in 2018 and versus a >20% ambition

#1

Supplier of vitamins, nutritional lipids, carotenoids, nutraceutical ingredients and custom nutrient premixes

~15

Million consumers serviced annually by our i-Health B2C business

46

Animal nutrition premix facilities plus 15 human nutrition premix facilities

>70%

Of our skin care portfolio is more than 90% of natural origin

#1

Supplier of lactase enzymes for lactose-free dairy

1 Excluding temporary vitamin effect of € 415 million sales and € 290 million (Adjusted) EBITDA, for further information see table on page 65.
2 Including the impact of IFRS 16, see table on page 164.
3 For reconciliation to IFRS performance measures, see table on page 180.

x € million	2019[1]	2018	
	Total	Total	Underlying business[2]
Net sales:			
DSM Nutritional Products:			
- Animal Nutrition & Health	2,892	3,134	2,749
- Human Nutrition & Health	2,046	2,019	1,989
- Personal Care & Aroma Ingredients	425	382	382
- Other[3]	93	112	112
	5,456	5,647	5,232
DSM Food Specialties	572	490	490
Total	**6,028**	**6,137**	**5,722**
Organic sales growth (in %)	2	14	7
Adjusted EBITDA	1,250	1,407	1,117
Adjusted operating profit	881	1,111	821
Capital expenditure	420	463	463
Capital employed at 31 December	6,731	5,683	5,683
ROCE (in %)	13.9	19.9	14.7
Adjusted EBITDA margin (in %)	20.7	22.9	19.5
R&D expenditure	218	206	206
Workforce at 31 December (headcount)	14,599	13,628	13,628

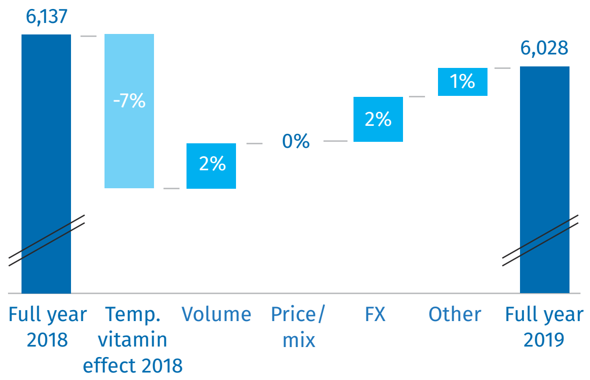
1 Including the impact of IFRS 16, see table on page 164.
2 Excluding temporary vitamin effect, see table on page 65.
3 Other covers pharma and custom manufacturing & services activities.

Business

Our Nutrition cluster comprises DSM Nutritional Products and DSM Food Specialties. This cluster provides solutions for animal feed, food & beverages, pharmaceuticals, early life nutrition, nutrition improvement, dietary supplements and personal care. Our company is positioned in all steps of the respective value chains: the production of pure active ingredients, their incorporation into sophisticated forms and the provision of tailored premixes, forward solutions and branded consumer products. Our unique portfolio of products and services is global and highly diversified, serving customers and other stakeholders locally across various end-markets around the world.

Nutrition cluster performance

Net sales bridge 2019
x € million



During the first nine months of 2018, the industry experienced an exceptional supply disruption. This event provided additional sales of € 415 million and a corresponding Adjusted EBITDA of € 290 million in the first nine months of 2018, as estimated and reported last year. 'Underlying business' is defined as the sales and Adjusted EBITDA, corrected for this temporary vitamin effect.

Nutrition reported total sales of € 6,028 million in 2019, up from € 5,722 million in the underlying business in 2018. Adjusted EBITDA was € 1,250 million, up 12% from € 1,117 million in the underlying business in 2018. The Adjusted EBITDA margin was 20.7%, up from 19.5% in the underlying business in 2018.

In 2019, Nutrition reported sales up 5% compared to 2018. Nutrition delivered 2% organic growth, which was volume-driven. Additionally, it recorded 1% from the consolidation of Andre Pectin and 2% from exchange rate effects driven by the US dollar. Nutrition delivered a good performance, with a solid performance in Animal Nutrition & Health, a softer one in Human Nutrition & Health, and a strong one in Personal Care & Aroma Ingredients and DSM Food Specialties.

Trends

The world is facing an increasing number of food-related health issues and challenges. According to the UN Food and Agriculture Organization (FAO), more than 820 million people go to bed hungry each night. The International Food Policy Research Institute (IFPRI) meanwhile estimates that approximately two billion people suffer from hidden hunger — meaning that their diet lacks sufficient micronutrients such as vitamins and dietary minerals. IFPRI additionally puts the number of adults and children who are obese or overweight at more than 2.3 billion.

With our nutritional solutions, we are well positioned to actively combat malnutrition in all its forms: undernutrition, micronutrient deficiency (hidden hunger), overweight, obesity and the double burden of malnutrition (the coexistence of micronutrient deficiency with overweight and obesity), as well as diet-related non-communicable diseases (NCDs). We have established numerous partnerships in this field, including those with the UN World Food Programme (WFP), UNICEF, Vitamin Angels and World Vision. We are also addressing malnutrition through the humanitarian organization Sight and Life and our dedicated Nutrition Improvement business segment — specialized in supplementation programs and the fortification of staple foods and therapeutic or emergency foods with essential vitamins and minerals in developing countries.

Mounting research over the past few decades continues to highlight the role nutrition plays during early life and its effect on life-long health. The first 1,000 days between the onset of a woman's pregnancy and her child's second birthday offer a unique window of opportunity for nutrition to shape healthier futures. Women hoping to become pregnant, pregnant women, infants and children must receive the necessary nutrients at appropriate levels to help set them on a path to a long, healthy life. Our Essentials For Early Life Solutions aim to ensure proper nutrition of parents-to-be, pregnant and nursing women, and young children, from preconception through the first 1,000 days of life.

Whereas earlier generations struggled primarily with the threat of communicable diseases such as tuberculosis, cholera and plague, non-communicable diseases are now the number one cause of death worldwide, accounting for 70% of all mortalities. These include cardiovascular disease, type 2 diabetes and cancer. Research increasingly identifies unhealthy and/or unbalanced diets as a major contributor to many NCDs. Intermediate indicators that can be related to an increased risk of NCDs are elevated levels of markers such as increased blood pressure, Body Mass Index (BMI) and high blood glucose. Balanced nutrition plays a role in keeping these indicators at healthy levels, hence helping to reduce the risks of NCDs. Besides solutions to reduce sugar and salt in processed foods, including EverSweet™ and Maxarome®, we also produce products such as OatWell®, a nutritional ingredient that harnesses the scientifically-proven health benefits of oat beta-glucan to reduce cholesterol levels.

The World Health Organization (WHO) predicts that antimicrobial resistance (AMR) will overtake NCDs by 2050 as the world's leading cause of death. WHO defines AMR as "the ability of a micro-organism (such as bacteria, viruses, and some parasites) to stop an antimicrobial (such as antibiotics, antivirals and antimalarials) from working against it". AMR is on the increase due to the over-prescription of antibiotics, the continued use of antibiotics in some livestock farming operations, and the release of antibiotics into the environment from pharmaceutical factories. At DSM, we address the topic of AMR and the responsible use of antibiotics in livestock production through our broad portfolio of nutritional products, such as our eubiotics for gastrointestinal functionality.

Environmental scientists warn that we are on the verge of breaching several planetary boundaries if we do not change our food system, risking people's livelihoods and the ability to produce the food for all. The planetary boundaries include the Earth's limits of greenhouse gas (GHG) emissions, biochemical flows, water quality and quantity, land use, and biodiversity. The agri-food sector is one of the major contributors to global GHG emissions, and almost a third of wild fisheries are overexploited.

We work with customers and other stakeholders to deliver more sustainable solutions that have less impact on the environment. With a growing population and growing middle class, we will see a rising demand for animal protein such as dairy, meat, eggs and fish, with a clear regional differentiation. Building on our strengths in animal nutrition science and sustainability, we have identified six business drivers to enable the sustainable growth of animal protein production for healthy diets within planetary boundaries. The business drivers comprise improving the lifetime performance of farm animals; making efficient use of natural resources; reducing emissions from livestock; helping tackle antimicrobial resistance; reducing our reliance on marine resources; and improving the quality of meat, milk, fish and eggs while reducing food loss and waste. For example, our enzymes help animals digest more efficiently and extract more nutritional value from the feed. They therefore still grow well even when consuming less. As a result, fewer natural resources, such as land and water, are needed for animal protein production.

In parallel to the growing demand for foods and beverages based on animal protein, there is a growing trend — especially in the Western world — in favor of natural and plant-based foods, such as meat and dairy alternatives. We have developed a Meat Alternatives Taste Toolbox based on natural yeast extracts, process flavors and hydrocolloids that deliver the savory, salty and umami flavor, and the fatty mouthfeel that consumers favor and expect from meat alternatives.

Sustainability & Innovation

Sustainability is one of the key drivers of our Nutrition cluster. Our nutrition businesses support many of the UN Sustainable Development Goals (SDGs), especially SDGs 2, 3, 12 and 13.

We are proud of our strategic partnership with the UN World Food Programme (WFP), which we extended in 2018 for another three years. We have partnered with WFP since 2007 to develop cost-effective, sustainable and nutritious food solutions for those in need. Today, the UN World Food Programme (WFP) reaches 35 million beneficiaries annually with food that is improved by the DSM-WFP partnership. Thanks to our expertise in nutrition and food fortification, WFP has improved its food basket and developed more nutritious food products for disadvantaged people around the world. These products include Super Cereal and Super Cereal Plus (complementary foods), ready-to-use supplementary foods, high-energy biscuits, micronutrient powders such as MixMe™, and fortified rice. We also provide funding for WFP's operations and motivate employees to engage in fundraising campaigns and awareness-raising initiatives for WFP's school meal programs. Finally, we combine our strengths to put local networks in place that ensure sustainable and increased access to more nutritious food as an essential part of healthy diets. Together, we are helping people survive and thrive.

In addition to our work on hunger, malnutrition, health and well-being, our innovations are increasingly focused on improved sustainability throughout the product lifecycle, and the value this can bring to customers and society at large.

For example, after a successful launch last year in the Americas, in 2019 we introduced Balancius®, a broiler feed ingredient that helps to facilitate digestion and the absorption of nutrients from the diet, in Europe and Asia-Pacific. This solution helps farmers to get more from their feed and to reduce GHG emissions.

We also made significant progress in Veramaris, our joint venture with Evonik to produce the omega-3 fatty acids EPA and DHA from natural marine algae as an alternative to fish oil. This innovation helps to reduce the pressure on wild fish stocks, helps the aquaculture industry to sustainably meet the rapidly growing global demand for seafood, and enables the production of healthier fish for the consumer.

In 2019, we also continued our work on Project Clean Cow, our feed additive that helps to reduce methane emissions from cows by at least 30%. Methane is a potent greenhouse gas that makes a significant contribution to climate change. Ruminants such as cows are responsible for approximately 27% of anthropogenic methane emissions globally. In 2019, we filed for EU market authorization under the product name Bovaer®. Registrations in other regions are to follow. The product will be available in Europe as soon as EU authorization is granted.

We accelerated our large innovation project for fermentative Stevia in 2019 by establishing a 50:50 partnership with Cargill called Avansya and starting the commercial-scale production of EverSweet™. EverSweet™ is a zero-calorie, great-tasting, cost-effective sweetener that can replace sugar in foods and beverages.

Governments around the world are focusing increasingly on the environmental footprint of their domestic industries. In recent years, China in particular has tightened the enforcement of its environmental regulations, also known as its 'Blue Skies' policy. This policy addresses air, soil and water pollution and sets significantly higher standards than before, including those standards applicable to China's vitamin manufacturers. Over time, the result is a more level playing field for non-Chinese competitors versus these manufacturers.

As part of our ongoing commitment to quality, safety, sustainability and production efficiencies, we made further upgrades to our vitamin C facility in Jiangshan (Jiangsu Province, China). Vitamin C from Jiangshan was already the lowest carbon footprint vitamin C in China thanks to this continuous investment program. Another example of our sustainability efforts is the opening of a new green co-generation plant in Sisseln (Switzerland) together with energy company ENGIE and Swiss energy provider EWZ, reducing CO_2 emissions by 50,000 tons per year. For more information, see 'Renewable energy' on page 53.

Aerial view of the biomass plant at the DSM Sisseln site (Switzerland), April 2019.

Strategy

We have built a unique, highly integrated, global and broad nutritional and other specialty ingredient solutions business in food & beverages, animal feed and personal care, meeting differentiated local needs through our unparalleled network. We possess a diverse and significant premix footprint, with superior formulations and delivery systems, helping to drive sustainable nutritional and health solutions. This infrastructure is fueled by our complete portfolio of nutritional ingredients, which includes vitamins, nutritional lipids, carotenoids, dietary minerals, eubiotics, enzymes and yeasts, as well as texturants, flavors and cultures. This diversity and level of integration creates a resilient portfolio with limited exposure to single products or customers, while benefiting from the opportunities provided by global megatrends.

Focused on Nutrition & Health, we will continue to aim for above-market growth and an Adjusted EBITDA margin greater than 20% by 2021. We will complement organic growth with inorganic growth opportunities that broaden our portfolio and enhance our ability to provide customized solutions. At the same time, we will further build on the successful initiatives of Strategy 2018, increasingly placing the customer at the center of everything we do and achieving commercial excellence, while delivering large, sustainability-driven, innovation projects.

We made good progress on the inorganic growth front. In 2019, we increased our shareholding in Andre Pectin (China) from 29% to 75%. Andre Pectin is Asia's largest producer of apple and citrus pectin, hydrocolloids providing texture solutions for food, beverages and personal care, with premier access to the world's fastest-growing specialty food ingredients market. To further strengthen our position in personalized nutrition, we acquired AVA (USA), offering a personalized nutrition platform that provides nutrition and coaching recommendations across a wide range of health and wellness segments. We also acquired Royal CSK (Netherlands), combining complementary strengths to better serve DSM's largest food & beverage segment: the fast-growing and attractive dairy cultures markets.

We created the 75:25 partnership, Yimante (Hubei Province, China), with Nenter in 2019. Through this partnership, we strengthened our vitamin E position: it will provide us with cost-effective access to additional capacity, allowing us to continue to grow organically in vitamin E, which is an essential ingredient in our animal nutrition premix solutions.

In terms of our large, sustainability-driven, innovation projects, we also advanced well with Project Clean Cow (under the product name Bovaer®), Veramaris®, Avansya and Balancius®. Many other examples of new innovations and solutions can be found throughout this chapter.

Animal Nutrition & Health

Building on the results of our programs as part of Strategy 2018, we will continue to seek to deliver above-market sales growth through:

- Marketing & sales excellence, especially building specialist capabilities to address wider species opportunities and pursue new health solutions
- Customer-centricity and agility, to place the customer at the heart of everything we do, by improving the end-to-end experience for the customer
- Further investing in our direct business-to-farmer offering (e.g., in China) and overall go-to-market capabilities

In addition, we pursue radical innovation for core sustainability topics, all of which seek to deliver long-term solutions for the industry with the potential to create significant value for our company and our customers. With examples such as algal-based omega-3 for fishfeed (Veramaris®) and methane-reducing feed additives for cows (Project Clean Cow), we position ourselves at the forefront to benefit from global megatrends.

Human Nutrition & Health

Building on the success of the first two parts of the LiftOff! Program as part of Strategy 2018, we will step up further during the implementation of Strategy 2021 with increased focus on customer-centricity and commercial excellence to drive above-market organic growth through:

- Focusing on customer-centricity and agility, seeking to move closer to the customer by strengthening the value propositions of our products and services, improving end-to-end customer experiences, and enhanced innovation and application capabilities
- Continuing to invest in business-to-consumer to ensure the growth of i-Health beyond the US, as well as further developing and building our personalized nutrition platform

In addition, we will continue to pursue inorganic growth opportunities in food & beverages as well as dietary supplements, to enhance and complement our already strong market positions.

An example of progress includes our continued investment in the breadth of our capabilities to support our customers' growth, with the establishment of Innovation & Application Centers in Isando (South Africa) and in Cairo (Egypt) in 2019. These are designed to stimulate and accelerate co-innovation with customers worldwide.

Partnerships

We have many partnerships that support and accelerate innovation in Nutrition. In Animal Nutrition & Health we have, for example, The Alliance of DSM and Novozymes, combining the world-leading competencies and technologies of the two companies to deliver feed enzyme innovation to the customers. The Alliance is the global market leader in feed enzymes. Another partnership is Veramaris, our 50:50 joint venture with Evonik with its breakthrough innovation — an algal oil — that, for the first time, enables the production of the omega-3 fatty acids EPA and DHA for aquaculture without using fish oil from wild-caught fish.

In Human Nutrition & Health, one example is Avansya, our partnership with Cargill to bring sustainably produced, great-tasting zero-calorie, cost-effective sweeteners to market faster. In personalized nutrition, we partner with companies such as Panaceutics and Wellmetrix. Combining their competences with our world-class nutrition science, products and solutions, we aim to be the partner of choice for dietary supplements as well as food & beverage brand owners that wish to offer personalized and healthy nutrition.

In early December, we also announced a brand new partnership in our Personal Care & Aroma Ingredients business: an exclusive, global strategic collaboration with METEX NØØVISTA, a subsidiary of biological chemistry company METabolic EXplorer, to deliver a 100% bio-sourced and sustainably produced, multifunctional ingredient for skincare products.

DSM Nutritional Products

DSM Nutritional Products consists of Animal Nutrition & Health, Human Nutrition & Health and Personal Care & Aroma Ingredients. In 2018, an exceptional supply disruption in the industry positively impacted our sales. We estimated a temporary vitamin effect of € 415 million additional sales in 2018, mainly in Animal Nutrition & Health. The following sections compare results in the underlying business, so excluding this temporary vitamin effect. In 2019, DSM Nutritional Products reported sales of € 5,456 compared to € 5,232 million in the underlying business in 2018.

> “ In 2019, we achieved good sales and earnings growth across our Nutrition cluster and took a big step toward market launch of our radical innovation projects in our Animal and Human Nutrition businesses.”

Chris Goppelsroeder, DSM Executive Committee and President & CEO DSM Nutritional Products

Animal Nutrition & Health

Highlights 2019

- Solid performance despite the rapid spread of African swine fever
- Completion of the global launch of Balancius®
- Vitamin E partnership with Nenter completed
- Opening of Veramaris commercial-scale production facility in Blair (Nebraska, USA)
- Filed for EU authorization for methane-reducing Project Clean Cow feed additive

Animal Nutrition & Health reported sales of € 2,892 million in 2019 versus € 2,749 million in the underlying business in 2018. In 2019, Animal Nutrition & Health reported 4% organic growth, against a strong 8% last year and despite the negative effect of African swine fever (ASF). This demonstrates the resilience of the integrated and diversified business model and our ability to address a wide range of species as well as a diversified geographical presence.

Sales were strong for all species and in all regions, except for sales to the swine business in China and South-East Asia, which were impacted by ASF. This region accounts for more than half of global pork production, with culling measures introduced in response to ASF affecting 35–50% of pork production in the area. The rapid spread of this disease disrupted the global equilibrium of the animal protein sector in the short term. As a result, in the second half of 2019, we were unable to fully offset the impact of the decline in pork production in the region with increases in production from other regions and species. Overall, volumes and prices were both up by 2%. The price increase was due to positive sales mix effects, as well as price increases earlier in the year for some ingredients to compensate for higher costs.

Animal Nutrition & Health serves the global feed industry with innovative and sustainable nutritional solutions. A pioneer since the earliest days of feed additives, we draw on the latest science to provide a unique portfolio that runs from vitamins through carotenoids to cutting-edge eubiotics and feed enzymes.

Population growth and rising incomes are driving global demand for animal protein. We focus our passion and expertise on the following six business drivers to support the livestock value chain and address the challenges facing our planet:

- Improving the lifetime performance of farm animals
- Making efficient use of natural resources
- Reducing emissions from livestock
- Helping tackle antimicrobial resistance
- Reducing our reliance on marine resources
- Improving the quality of meat, milk, fish and eggs while reducing food loss and waste

We strongly believe in sustainable food systems, and that the livestock industry can transform itself from within to deliver the solutions to the challenges facing society and the animal protein industry. We want to play a key role in this transformation, and we work at species and country level to provide tangible and actionable solutions that will help build a sustainable future for us all.

The global pork industry was impacted significantly by ASF in 2019, with China and Asia feeling its adverse effects on herd size and production. The decline in pork production in China was partly offset by an increase in imports of pork to China, as well as other sources of protein in the form of poultry and fish. Our swine business was well placed to adapt to these market conditions and address changes in the protein production value chain with our well-balanced species and solutions approach. Other regions — EMEA, Latin America and North America — are well positioned to help meet the increased demand for exported pork.

Our Crina® range of essential oils enjoyed strong demand in key markets during 2019. Crina® Poultry Plus is the market-leading solution, combining a unique and complementary blend of essential oil compounds with the most efficient organic acid (benzoic acid) to modulate the microbiota and stimulate the secretion of digestive enzymes. Furthermore, Crina® Digest, the latest innovation in our portfolio, was launched in Europe at the end of 2018.

Its global expansion is currently taking place for poultry applications.

In 2019, we completed the global launch program for our latest breakthrough innovation, Balancius®, introducing it in the EU and Asia-Pacific. Balancius® is the first and only feed ingredient capable of breaking down peptidoglycans (PGNs) in bacterial cell debris, thus releasing otherwise inaccessible nutrients and unlocking a hidden potential in gastrointestinal functionality. Scientific data demonstrates that the addition of Balancius® to the diet of broiler chickens significantly improves the ability to digest and absorb nutrients. It consistently improves the feed conversion ratio (FCR) by 3%, thus making a measurable contribution to sustainable poultry production. Balancius® additionally improves breast meat yield and contributes to better animal welfare by helping to keep litter dryer.

By comparison with 2018, the global broiler meat market experienced a more balanced supply in most regions during 2019. Our broiler business delivered robust performance, and we are stepping up our efforts to offer broiler meat producers more tools to meet consumer demands for a high-quality, affordable meat product.

Our business with layers showed profitable volume growth in 2019 thanks to the strong performance of China, EMEA and Asia-Pacific. This was attributable to the impact of ASF and the growing demand for eggs. We also entered into on a collaboration with the International Egg Commission, supporting the Commission's work on sustainability in egg production.

In the ruminant sector, ongoing growth opportunities exist in the US, Eastern Europe, Asia, Argentina, Brazil and now also China. The year 2019 was a challenging one for this sector, but we were able to maintain growth in our core portfolio, and we succeeded in further growing certain key products for dairy cows. Our initiatives to become a leader in sustainable dairy farming made us a preferred partner in the global alliance Farming for Generations, which is led by the global food industry leader Danone.

Our aquaculture business performed strongly in 2019. Improving survival rates, reducing environmental impact and optimizing raw materials are key enablers for both cold-water and warm-water fish and shrimp species.

In the pet food industry, the increasing trend to treat pets as part of the family has driven up product standards through the use of higher-value functional ingredients. This has translated into higher pricing. Marketing and product labeling trends in the pet food market are mirroring those observed in human nutrition and consumer goods, and are driving growth in the US, Europe, and Japan especially.

In terms of our regional presence, our business enjoyed strong growth in Asia–Pacific during 2019, led by South East Asia and the Indian subcontinent.

Challenged by the unprecedented outbreak of ASF in 2019 as well as by its knock-on effect on all other species, our business in China successfully developed and implemented a strategy of promoting growth across all six species served by our portfolio. This resulted in robust volume growth in poultry in China that significantly outperformed the market. A holistic action plan was created and trialed to ensure that we are prepared for the forthcoming regulations on ASF. Significant resources were allocated, and global and regional teams are collaborating closely to ensure effective implementation.

We made significant progress in Latin America during 2019, notably at our new premix plant in Peru, increasing and improving production capacity for the country as a whole. Our enhanced species expertise stimulated expansion in strategic markets, delivering growth in the poultry sector in the Southern Cone and Central America; in aquaculture in Chile and Ecuador; in swine in Brazil; and in ruminants in Mexico and Paraguay. EMEA and North America both remained important sources of revenue.

We took a game-changing step in sustainable aquaculture in 2019, commencing commercial-scale production of algal-based omega-3 at our Veramaris facility in Blair (Nebraska, USA) — a USD 200 million facility. Our proprietary technology delivers a breakthrough in the cultivation of marine algae naturally rich in EPA and DHA omega-3, facilitating production on an unprecedented scale. Sales of the first salmon fed with Veramaris® algal oil also commenced in retail outlets in Germany (Kaufland) and France (Supermarché Match).

Regarding methane reduction, we filed for EU authorization in 2019 and took the next step toward implementing our Project Clean Cow (under the product name Bovaer®) methane inhibitor in the Netherlands. It is the most extensively studied and scientifically proven solution to the challenge of burped methane from ruminants to date. Over the past ten years, 35 on-farm beef and dairy trials have been conducted across the globe and in the context of various feeding systems. These show that a reduction in enteric methane of approximately 30% can be consistently achieved. Some trials achieved a reduction of as much as 80%.

Human Nutrition & Health

Highlights 2019

- Good growth in Medical Nutrition and Dietary Supplements
- Softer macroeconomic conditions increasingly weighed on Food & Beverage
- Acquisition of AVA, a personalized nutrition platform
- Growing consumer preference for plant-based nutritional products, such as *life's™OMEGA*
- Vitamin C facility in Jiangshan has the lowest carbon footprint in China

Human Nutrition & Health reported sales of € 2,046 million in 2019 versus € 1,989 million in the underlying business in 2018. Our Human Nutrition & Health business delivered 3% sales growth and -1% organic growth, against a tough comparison of 7% organic growth in 2018, in increasingly challenging end-markets. Volumes were up 2% and prices declined by 3%. After a strong start to the year, softer macroeconomic conditions increasingly weighed on the Food & Beverage segment, especially in North America. The softness was most pronounced in the case of larger customers. Smaller customers were less impacted.

Medical Nutrition and Dietary Supplements (driven by the double-digit growth in the i-Health segment, our business-to-consumer business) performed well over the year. Early Life Nutrition showed a strong performance in the first three quarters of the year, with a softer fourth quarter. Lower prices for vitamin C and negative mix effects resulted in 3% lower prices.

Human Nutrition & Health provides solutions for the food & beverage, dietary supplement, early life nutrition, medical nutrition, nutrition improvement and active pharmaceutical ingredient (API) markets. We serve these industries with a portfolio of products (vitamins, nutritional lipids, carotenoids, nutraceuticals, digestive enzymes, probiotics and prebiotics, as well as APIs), a suite of customized solutions (premix, coloration, shelf-life and market-ready solutions), and a range of expert services. i-Health — a global consumer health and wellness company, and a subsidiary of DSM — develops, markets and distributes branded products that support health and wellness. Core categories include microbiome health, healthy aging, and urinary health.

Our business continues to get closer to the consumer in the value chain, focusing more intensely on the business-to-consumer and personalized nutrition sectors. A growing proportion of our revenue — more than 40% — now comes from custom nutrient premixes, market-ready solutions and direct-to-consumer products that address diverse health or lifestyle benefits.

Culturelle® was the main driver of the i-Health business in 2019. The world's number one probiotic brand enjoyed double-digit growth despite the relatively sluggish progress of the category in its biggest market, the US. This was thanks to innovative line extensions as well as progress in new sales channels.

During 2019, we continued to invest in the breadth of our capabilities to support our customers' growth. We established Innovation & Application Centers in Isando (South Africa) and in Cairo (Egypt) in 2019. These hubs, as well as the newly-opened center in Kaiseraugst (Switzerland), join our global network of Innovation & Application Centers designed to stimulate and accelerate co-innovation with customers worldwide.

Our strong progress in the pharmaceutical industry in the past few years can be attributed to our leading and growing position in regulatory capabilities, which allows us to help register customers' products containing our APIs in target markets. In 2019, we continued to expand these capabilities, including the Drug Master File (DMF) numbers in China for Vitamin B_1 and B_6 APIs and the renewal of 25 Indian API registrations, thereby enabling our biopharmaceutical partners to use these ingredients in the development of proprietary drug products.

Personalized Nutrition continues to play a key role in our human nutrition strategy. The acquisition of AVA in the US, a state-of-the-art digital health platform that provides sophisticated data analysis and recommendations, complements previous investments in key capabilities. These include personalized nutrition delivery platforms, such as Panaceutics, Mixfit and Tespo, as well as partnerships related to selected measurement and tracking technologies, such as Wellmetrix. Combining this with our world-class nutrition science, products and solutions, we aim to be the partner of choice for dietary supplements as well as food & beverage brand owners that wish to offer personalized nutrition and gain unique consumer insights.

We work with our customers to develop sustainable products with a high nutritional value that help keep the world's growing population healthy and have a limited impact on the environment. For example, our *life's™OMEGA* is an algae-based source of omega-3 EPA and DHA and nearly twice as potent as fish oil. It provides important heart health benefits throughout life. This product was the first vegetarian ingredient to make both EPA and DHA available in a capsule, providing a sustainable alternative to traditional fish oil. This business has grown at double-digit rates since 2018, reflecting consumers' increasing preference for plant-based solutions.

Another example of our sustainable solutions is the upgrade of our plant in Jiangshan (Jiangsu Province, China). This facility produces vitamin C with the lowest carbon footprint in China and generates GHG emissions 32% lower than alternative sources in the country.

Personal Care & Aroma Ingredients

Highlights 2019

- Above-market growth in both Personal Care and Aroma Ingredients
- First results of full operationalization of new business unit strategy
- Launch of new innovations in skin and sun care

DSM Personal Care & Aroma Ingredients reported total sales of € 425 million in 2019 compared to € 382 million in 2018. Full year 2019 sales were up 11%, with a very strong 9% organic growth and a 2% contribution from foreign exchange rate effects. All Personal Care product lines, including sun, skin and hair care delivered good above-market growth, with Aroma Ingredients also performing well in 2019. Successful commercialization of the innovation pipeline further contributed to a very good year for the business.

Personal Care & Aroma Ingredients offers solutions for customers in the personal care, home care and fine fragrance markets. Our extensive portfolio includes aroma ingredients, vitamins and natural bio-actives, as well as UV filters, peptides and polymers. Our solutions support the health and beauty needs of an aging population with various skin and hair types around the world, and address increasing concerns around global public health issues such as air pollution and skin cancer.

Our new business unit strategy started to show results in 2019. Our Personal Care portfolio enjoyed above-market growth across regions and segments, with exceptional growth in Asia-Pacific as well as in the photoprotection and skin bio-actives segments. Our Aroma Ingredients portfolio, meanwhile, showed ongoing strong growth, with some shifts toward higher-value products on the part of certain global key customers, in full alignment with our new strategy.

With the current strong trend for natural Personal Care products, our biotechnology capabilities are encountering considerable interest among major flavor & fragrance players. Bergalin — an allergen-free aroma solution for skin-sensitive applications — was launched, and received positive market feedback.

We continued building and leveraging our innovation competences in photoprotection, peptides and polymers in 2019. At the same time, we kept up our expansion into new fields such as the skin microbiome and technical and performance ingredients.

Examples include the launch of TILAMAR® Boost 150, a unique hyper-branched polymer that offers high volume and care properties, and PARSOL® ZX, a mineral UV filter that builds on the growing consumer demand for natural sunscreens. In addition, DSM Venturing made an equity investment in Belgium-based skin microbiome company S-Biomedic in 2019. This investment underlines our commitment in the skin microbiome, an area with significant growth potential. In December we also announced a brand new partnership in our Personal Care business: an exclusive, global strategic collaboration with METEX NØØVISTA, a subsidiary of biological chemistry company METabolic EXplorer, to deliver a 100% bio-sourced and sustainably produced, multifunctional ingredient for skincare products.

In 2019, DSM Personal Care & Aroma Ingredients rolled out a SUSTAINABILITY IMP'ACT CARDS program that provides transparency regarding the environmental impact, social impact, traceability and identity of our ingredients.

DSM Food Specialties

Highlights 2019

- Good sales growth in hydrocolloids, enzymes, cultures and yeast extracts
- Acquisition of Royal CSK, combining complementary strengths to better serve the global dairy industry
- Leading position in taste solutions for plant-based meat alternatives
- Avansya, our partnership with Cargill, opened a commercial-scale fermentation facility in the US for sustainably produced non-artificial, zero-calorie, great-tasting stevia sweeteners
- Increase of shareholding in Andre Pectin from 29% to 75%

DSM Food Specialties reported total sales of € 572 million in 2019 compared to € 490 million in 2018. In 2019, sales were 17% higher versus the prior year, 4% resulting from organic growth, 12% from the consolidation of Andre Pectin following the increase in our shareholding from 29% to 75% and 1% from exchange rates effects. All major business lines performed well over the year, with especially a good sales growth in cultures and food enzymes in dairy and baking. Andre Pectin performed well.

DSM Food Specialties is a leading global supplier of specialty food enzymes, cultures, probiotics, bio-preservation, hydrocolloids, sugar reduction, and savory taste solutions to customers in the food & beverage industry in dairy, baking, beverages, and savory. Our ingredients and solutions are widely used to create a broad range of food products, from grocery favorites such as yogurt, cheese and soups to specialized products including gluten-free bread and beer, meat alternatives, lactose-free milk, and sugar-reduced beverages.

Demand for our products is driven by five main market trends: sugar reduction; enhanced taste experience; improved health and wellness; more efficient and sustainable production; and reduction of food loss and waste. With 150 years of experience in biotechnology and fermentation, we aim to enable better food for everyone, helping to make existing diets healthier and more sustainable, and giving increasing numbers of people around the world access to affordable, quality food.

In dairy, our single largest segment in food & beverages, we acquired specialty dairy solutions provider Royal CSK (Netherlands). The highly complementary combination of our dairy business and CSK's business greatly strengthens our ability to serve the needs of dairy industries worldwide, and makes us well-placed to address the fast-growing and attractive dairy cultures markets.

In baking, shelf-life and freshness are a key trend. Our enzymes play a key role in keeping bread fresh for longer as it moves from bakery to store and finally into the consumer's hands. We introduced a well-received suite of new freshness solutions during 2019 that deliver improved softness and resilience along with optimum sliceability in products including bread, wraps and tortillas, helping to combat waste in the segment.

In beverages, production efficiency improvements and a reduced environmental footprint remain major drivers for many of the world's leading brewers. Demand remained strong for our enzymatic solutions, including Brewers Clarex® and Brewers Compass®, which enable significant energy savings.

Demand for plant-based meat alternatives is growing fast. Recreating meat flavor in plant-based meat replacers, such as plant-based patties, is notoriously challenging. We have developed a Meat Alternatives Taste Toolbox based on natural yeast extracts and process flavors that deliver the savory, salty and umami flavor, as well as the fatty mouthfeel that consumers favor. This helped us take a leading position in this space in 2019.

Shelf-life extension is a trend that touches all food & beverage segments. Our portfolio of bio-preservation and anti-oxidant solutions offers brand owners clean-label alternatives to artificial preservatives. In dairy, we provide for example enzymes, protective cultures, and anti-oxidant and anti-fungal solutions to protect foods against physical, chemical and microbial spoilage. This is a growth area with significant upward potential for DSM.

We accelerated our innovation project for fermentative Stevia. We established the Avansya partnership with Cargill announced at the end of 2018. We opened the first commercial-scale fermentation facility for stevia sweeteners in the US and saw the launch of the first consumer products in the US and Mexico. For more information, see 'Case studies Nutrition' on page 77.

Another growth platform in specialty food ingredients is hydrocolloids — thickeners and stabilizers that dissolve, disperse or swell in water to provide a broad range of important functionalities and physical attributes including gelling, texture, mouthfeel, viscosity and suspension. Demand for hydrocolloids, especially our natural hydrocolloids, is driven by three underlying consumer trends:

- The quest for convenient foods and beverages
- Increasing demand for dairy- and plant-based protein drinks
- The trend toward clean labeling

Our hydrocolloids are primarily delivered in the form of pectin and bio-gums. Both are used as gelling and stabilizing agents in a variety of foods and beverages. Our natural hydrocolloids are enjoying strong sales growth.

Responding to rapidly growing global demand for pectin, we increased our shareholding in Andre Pectin from 29% to 75% in 2019. Andre Pectin is a leading specialty food ingredient producer. Our share increase in Andre Pectin, together with our earlier announced pectin plant expansion, further demonstrates our full commitment to the fast-growing pectin industry and enhances our position as one of the leading global hydrocolloids players.

Commercial-scale production of fermentative Stevia sweetener commences

As consumers around the world strive for healthier lifestyles, food & beverage manufacturers are looking to deliver zero-calorie sweeteners that can support their choices. In 2018, we joined forces with Cargill in the 50:50 partnership Avansya to meet this demand. A year later, production of EverSweet™ — a non-artificial, zero-calorie, great-tasting stevia sweetener — started at a new facility in Blair (Nebraska, USA).

The USD 50 million facility is the first-ever commercial-scale facility for stevia sweeteners in the US. At full capacity this fermentation facility will produce enough EverSweet™ to sweeten many millions of bottles of soft drinks or servings of yogurt each month. EverSweet™ has 250 to 300 times the sweetness of sugar, without the calories.

The fermentation facility produces the steviol glycosides Rebaudioside M and Rebaudioside D (Reb M, Reb D), which occur in the sweet-tasting leaves of the stevia plant. The innovative production process offers a more scalable, sustainable and low cost-in-use solution compared to molecules extracted directly from the stevia leaf.

The next-generation clean taste profile of EverSweet™ is well suited for use in products such as yogurt, chocolate milk, soft drinks, ice cream, cereal, bars and confections. Avansya has commercial volumes available and is already supplying EverSweet™ to various customers. Further consumer products are scheduled for launch across multiple market segments, and over 300 customer trials and product development projects are currently in progress.

EverSweet™ is approved for use in food & beverage products in the US and Mexico, and additional regulatory approvals for use in other countries are under way.

Purpose-led

With EverSweet™, we can enable food & beverage brands to provide consumers around the world with reduced- and zero-calorie options, with no compromise on taste, and so help support good health and well-being in our societies.

Performance-driven

The market for high-intensity sweeteners produced by fermentation is expected to exceed USD 3 billion by 2025. Avansya is well positioned to capitalize on the significant potential of this market.

Solution for sustainable animal protein now available globally

With the world's population projected to reach 9.8 billion by 2050, global demand for poultry is rising sharply. It is anticipated that 470 million tons of meat will have to be produced each year to meet this need, much of it from broiler chickens.

At the same time, consumers are looking for high-quality, affordable animal protein and sustainably produced food as key components of healthy, balanced diets.

Poultry producers are therefore looking to strike a fine balance in a highly competitive global market. On the one hand, they need to deliver healthy and sustainably produced poultry products for consumers, while on the other hand, they need to employ farm management practices that are environmentally viable.

Balancius® helps with this challenge by improving the gastrointestinal functionality of broiler chickens.

Balancius® is the first and only feed ingredient with the capability of breaking down dead cell debris in the gut. It increases the Feed Conversion Ratio (FCR) by 3%, improving digestion and nutrient absorption and helping broilers to obtain more nutritional value from their feed. Balancius® increases breast meat yield, contributes to better animal welfare by helping to keep litter dryer, and also reduces greenhouse gas emissions by increasing the FCR.

Following its successful 2018 launch in the US and Latin America, Balancius® was introduced in Europe and Asia-Pacific in 2019.

Purpose-led

Balancius® improves the Feed Conversion Ratio (FCR) of broilers by about 3%. A 3% improvement on the broiler meat market would result in a reduction of approximately 9 million tons of CO_2 emissions, equal to the removal of approximately 3.7 million cars from the road (based on FAO's estimates of greenhouse gas (GHG) emissions in broiler meat production). Balancius® is well placed to contribute to this GHG emission reduction.

Performance-driven

Enzymes and eubiotics are key components for sustainable animal production, and this market is expected to grow by 5–7% per year over the next decade.

Video

Supermarché Match and Veramaris join forces to deliver healthy and sustainable salmon

Nicolas Baroux
Head of Procurement at Supermarché Match

Owned by the Louis Delhaize Group and headquartered in La Madelaine, France, Supermarché Match is a chain of supermarkets — 114 in north-eastern France. Nicolas Baroux, Head of Procurement at Supermarché Match, discusses the retailer's introduction of salmon fed with innovative Veramaris® omega-3 EPA & DHA algal oil in all its stores in France.

Why has Supermarché Match introduced salmon fed with Veramaris® natural marine algal oil?

We are committed to ensuring that everyone has access to fresh and healthy food. The salmon we are now able to offer to our customers is rich in omega-3 EPA & DHA from natural marine algae. These two essential fatty acids are vital for brain, eye and heart health. Additionally, feeding salmon with Veramaris® algae-based oil helps preserve the wild fish stocks from which omega-3 is traditionally obtained. The algal oil contains twice the levels of EPA and DHA as fish oil. This twofold approach offers our customers food choices that are both healthy and sustainable. This is our contribution to conserving marine resources.

Where are these sustainably fed supplies of salmon sourced from?

Since October 2018, the Norwegian salmon farmer Lingalaks has been using a diet developed and manufactured by the Norwegian feed producer Skretting. This diet contains Veramaris® algal oil, which offers a sustainable, non-GMO and contaminant-free alternative to fish oil. It does not require a change to the feed process.

How are your customers responding to the introduction of salmon fed with Veramaris® algal oil?

At Supermarché Match, we put the customer at the heart of everything we do. We want all the products we retail to be good for our customers and good for the planet as well. That's the philosophy that drives us. Offering salmon fed with Veramaris® algal oil is fully in line with that philosophy, and uptake among our customers has been very pleasing so far.

The salmon industry has welcomed the Veramaris® algal oil solution, and new premium salmon products have been launched by retailer Kaufland in its German branches.

New vitamin A form for plant-based diets

Vitamin A plays an essential role in supporting healthy vision, growth, development, the immune function and the improvement of gut health. Its key role in eye health is indicated by its scientific name, retinol, as it supports the functioning of the retina.

Two types of vitamin A occur naturally in the diet: preformed vitamin A, which is found in animal products such as meat, fish, poultry, and dairy foods, and provitamin A, which is found in plant-based foods such as fruits and vegetables. Provitamin A is converted into vitamin A in the body.

More than 46% of consumers worldwide today are looking for an increasingly plant-based diet, with consumer demand growing for vegetarian and vegan options. To meet this rising demand, we further expanded our portfolio of plant-based nutritional ingredients in 2019 and launched a new form of vitamin A, supporting plant-based diets.

Our Quali®-A with Flexilease™ is an innovative new product that helps to create a flexible solution for customers wishing to broaden their vegetarian dietary supplement offering in response to the changing expectations of diet-conscious consumers. Furthermore, it can be used for prenatal and postnatal supplements for early life nutrition, dry food applications and multivitamin and mineral tablets.

Quali®-A with Flexilease™ delivers vitamin A with the highest stability, performance and potency available, making it an excellent solution for dietary supplement tablets. It is also suitable for halal, kosher, vegetarian and vegan diets, and does not include any allergens or preservatives.

Purpose-led

As more and more consumers worldwide seek plant-based diets, our vitamin A Quali®-A with Flexilease™ delivers all the health benefits of this key nutrient in a highly stable, bioavailable and plant-based form.

Performance-driven

With the introduction of Quali®-A with Flexilease™ vitamin A, we are supporting one of the fastest-growing new lifestyle trends worldwide. In the US alone, the share of plant-based food & beverage products on the market grew by 278% between 2012 and 2018, representing an industry worth USD 3.3 billion annually.

Further expanding our digital capabilities in personalized nutrition

Vitamins, nutritional lipids and minerals are essential for human health and well-being, and a balanced and nutritious diet is key to prevent diseases. There is a growing interest worldwide in personalized nutrition — science-based, data-driven nutritional solutions tailored to consumers' specific health goals and needs.

In 2019, we expanded our growing capabilities in this field further by acquiring AVA, a Boston (Massachusetts, USA) based state-of-the-art digital health platform. AVA leverages artificial intelligence and machine learning to analyze behavior, wellness and consumption patterns, and provides sophisticated data analysis, recommendations and coaching for a broad range of audiences.

Combining AVA's technology with our own world-class nutritional science, products and solutions, we aim to be the partner of choice for dietary supplement as well as food & beverage brand owners wishing to offer personalized and healthy nutrition and gain unique consumer insights.

The acquisition of AVA builds on previously announced investments in personalized nutrition delivery platforms such as Panaceutics, Mixfit and Tespo, as well as partnerships related to selected measurement and tracking technologies, such as Wellmetrix. Together, these investments bring complementary capabilities, allowing us to offer end-to-end solutions along the personalized nutrition value chain, which is an important element in our nutrition strategy.

Purpose-led

Differences in age, genotype and health status mean that individuals can react in very different ways to the same foods. Personalized nutrition allows individuals to make dietary choices tailored to their specific needs, reducing their exposure to a wide range of non-communicable diseases and helping to lower healthcare costs.

Performance-driven

The global personalized retail nutrition and wellness market was valued at around USD 1.5 billion in 2018 and is projected to grow at a compound annual growth rate of 9.5% to 2025.

Video

How cows can help us fight climate change one burp at a time

Methane is a greenhouse gas which, like carbon dioxide, contributes to climate change. Methane is a volatile, but much more potent greenhouse gas than CO_2 and ruminants (mainly cows) emit about 20% of all methane gasses globally. Reducing global methane emissions from cows will immediately help slow the pace of global warming in the next decade already, helping society to take longer-term action on CO_2 reduction. Through our Project Clean Cow, we have developed a proprietary feed additive. Just a quarter of a teaspoon per cow per day inhibits the enzyme that triggers methane production in a cow's stomach and reduces methane emissions.

The feed additive is scientifically proven to cut methane emissions from dairy cows by about 30%, thereby significantly reducing the environmental footprint of dairy and beef products, a key source of protein around the world.

In 2019, we filed for EU market authorization of our methane-reducing feed additive under the product name Bovaer®. Registrations in other regions are to follow. The product will be available in Europe as soon as EU authorization is granted.

Meanwhile, we are already taking the next steps to prepare for the market launch of our methane inhibitor. In the Netherlands, for example, a trial across the Dutch Dairy Chain, together with Wageningen University & Research, FrieslandCampina, Agrifirm, De Heus and ForFarmers, was started in 2019. It aimed to gather all the information necessary for accreditation of our feed ingredient by the Carbon Footprint Monitor/Climate Module of the Annual Nutrient Cycling Assessment. The insights from this study will be applicable across Europe.

Additionally, we continue to develop new forms and applications for a broad range of farming systems. In New Zealand for example, we have been exploring the potential benefits for a slow-release version of our methane-reducing feed additive in the dairy farming market in collaboration with Argenta, Otago University School of Pharmacy and AgResearch.

Purpose-led

Project Clean Cow has been recognized by the World Resources Institute as one of the ten global breakthrough technologies that can help feed the world without destroying it. Adding the feed additive to the diet of three cows is the equivalent of taking one family-sized car permanently off the road.

Performance-driven

We are working with key players and influencers across the value chain to shape a more sustainable, low-emission future. The potential market for innovative solutions such as our feed additive is estimated at € 1–2 billion.

Combating skin cancer through innovative approaches to UV protection

An astonishing three million cases of skin cancer are diagnosed each year. In the US alone, more than two people die of the disease every hour. Despite the known risks, however, many people do not protect themselves adequately from the harmful effects of the sun's ultra-violet (UV) rays. Only 30% of women worldwide use sun protection on a daily basis, and only 14% of men.

One of the reasons why people do not use adequate sun protection is that they find traditional sunscreens greasy and uncomfortable. And those who do use sunscreens, only apply around a fifth of the recommended amount on average, which reduces their effectiveness.

To help raise awareness of the importance of sun protection, DSM Personal Care & Aroma Ingredients has been working with the professional cycling team, Team Sunweb, to showcase a powerful example of men building sun protection into their daily safety routine. The riders are using an innovative, light-texture lotion that is comfortable, easy to apply, and fast to absorb. The riders found it effective even after lengthy physical activity, standing up to long hours of exposure to athletes' sweat.

In 2019, our collaboration with Team Sunweb was highlighted in a broad communication campaign about the importance of sun protection, particularly among groups who traditionally neglect to protect themselves adequately.

Purpose-led

Our UV filters and sensory modifiers offer protection from the suffering associated with sun-related skin cancer. Team Sunweb's positive experiences were highlighted in a wide-ranging communication campaign that raised awareness of the importance of building sun protection into daily safety routine, particularly among groups who traditionally do not use sun protection on a regular basis.

Performance-driven

The global market for sunscreens was estimated at USD 10.5 billion in 2017. As most people who use sunscreens apply much less than the recommended amount, the potential of this market is in fact much greater.

Materials

€ 2,746

Net sales versus € 2,913 in 2018 (in millions)

-8%

Organic sales growth versus 2018

18.5%[1]

Adjusted EBITDA[2] margin versus 17.6% in 2018 and versus an 18–20% ambition

100%

Renewable electricity used in the manufacture of materials for Apple's products by end of 2019

#1

Supplier of fiber optic coatings

>1

Million first responders and service personnel protected by Dyneema®

1 Including the impact of IFRS 16, see table on page 164.
2 For reconciliation to IFRS performance measures, see table on page 180.

x € million	2019[1]	2018
Net sales:		
DSM Engineering Plastics	1,406	1,516
DSM Dyneema	338	344
DSM Resins & Functional Materials	1,002	1,053
Total	**2,746**	**2,913**
Organic sales growth (in %)	(8)	5
Adjusted EBITDA	509	512
Adjusted operating profit	363	383
Capital expenditure	139	132
Capital employed at 31 December	1,927	1,878
ROCE (in %)	18.6	20.6
Adjusted EBITDA margin (in %)	18.5	17.6
R&D expenditure	124	122
Workforce at 31 December (headcount)	4,762	4,643

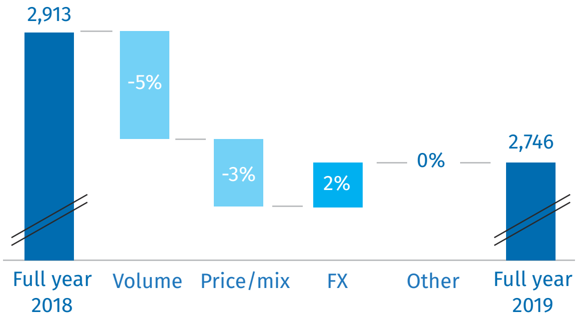
1 Including impact IFRS 16, see table on page 164.

Business

Our Materials cluster comprises DSM Engineering Plastics, DSM Dyneema and DSM Resins & Functional Materials. We are a global player in specialty plastics for the electrical components and electronics, automotive, flexible food packaging and consumer goods industries. Our portfolio also includes Dyneema®, the world's strongest fiber™, for protective solutions and commercial marine applications, as well as resins for use in paints, industrial applications and optical fiber coatings, Niaga® technology for circular design, and advanced materials for additive manufacturing/3D printing applications.

Materials cluster performance

Net sales bridge 2019
x € million



In 2019, Materials continued its ongoing transformation into a high-growth, higher-margin specialty business, focused on Improved Health & Living, Green Products & Applications and New Mobility & Connectivity. DSM Engineering Plastics expanded its production capacity for specialty plastics in India through the acquisition of the Engineering Plastics business of SRF (India), while DSM Dyneema opened new production lines in the Netherlands and in the US to support further growth.

While building a strong platform for its long-term growth ambitions, in the short-term Materials was confronted with weak macroeconomic conditions in China and in some of its end-markets. Materials reported € 2,746 million sales in 2019, with organic growth down by 8%, driven by lower volumes (-5%) and prices down by 3% (fully reflecting lower input costs).

Due to the strong performance of the higher-margin businesses (especially DSM Dyneema), good margin management, cost control and some benefit from exchange rate effects, Materials reported almost flat earnings in 2019, demonstrating the strong resilience of our specialty portfolio in weak economic conditions. Total Adjusted EBITDA was € 509 million, 1% lower compared to the previous year and including 1% from IFRS 16. The Adjusted EBITDA margin was 18.5% (including 0.2% from IFRS 16) compared to 17.6% achieved in the previous year.

> “We are playing a key role in enabling the transition toward a bio-based and circular economy by delivering commercially attractive bio- and recycled-based alternatives.”
>
> **Dimitri de Vreeze, Co-CEO**

Trends

Advanced materials with ever-higher performance levels are required across a wide range of applications and industries today. Our Materials cluster serves these global markets, delivering innovative and sustainable solutions that serve society's rapidly changing needs.

The world's urgent requirement for sustainable transportation systems calls for higher-performing materials that enable autonomous, lightweight and more energy-efficient automotive design.

Advanced materials also have a key role to play in the generation and storage of renewable energy, 3D printing, sustainable packaging solutions, and advanced healthcare applications.

Consumers are increasingly seeking 'smart' connected and customized products and services that call for high-performance materials. Meanwhile, advances in medical technology are creating new performance requirements for materials to be used both inside and outside of the body.

Across the globe, circular economy concepts such as recycling and the use of bio-based materials are gaining traction. Consumer sentiment and regulatory pressure are combining to stimulate the development of materials that can facilitate the creation of a genuinely circular economy — materials that are bio-based, recycled-based, reusable and recyclable.

Additionally, people everywhere are increasingly aware of the importance of safety, including safe manufacturing and product safety. DSM Engineering Plastics and DSM Resins & Functional Materials offer solutions that eliminate or reduce the use of hazardous substances in plastics and paints, while DSM Dyneema is used in protective apparel for sports, outdoor recreation, law enforcement, and the first-responder sector.

Sustainability & Innovation

Our innovation projects deliver sustainable solutions for a more circular and bio-based economy. Technology from DSM-NIAGA, which enables the production of fully recyclable carpets, mattresses and furniture components, is an excellent example of this philosophy. For more information on Niaga®, see 'DSM Resins & Functional Materials' on page 89.

In 2019, all our materials businesses initiated additional circularity ambitions and programs to reduce the environmental impact of their operations and to increase the sustainability value they deliver.

At DSM Resins & Functional Materials, we announced for example that we will have zero waste to landfill by 2022 and we have committed that by 2030, at least 30% of our raw materials will be bio-based and/or recycled-based.

At DSM Engineering Plastics, we will offer a full portfolio of alternatives that contain at least 25% recycled and/or bio-based content by 2030. As an immediate step, we launched bio-based grades of our Stanyl® and Arnitel® portfolio in October 2019.

At DSM Dyneema, we committed to sourcing at least 60% of our raw materials from bio-based feedstocks by 2030 and created a circular-economy consortium with a remit to establish an end-of-life recycling program.

At the same time, demand for renewable energy technologies such as solar, wind and water is driving the development of higher-performance materials. Several renewable energy technologies, including those for tidal and wind energy, contain Dyneema® as a key enabler.

At DSM Additive Manufacturing, we launched a strong sustainability strategy focused on delivering bio-based products (such as Arnitel®) and recyclable products, such as PBT (polybutylene terephthalate — a thermoplastic engineering polymer that is used, for instance, as an insulator in the electrical and electronics industries).

Our cross-company DSM Materials Science Center helped expand our innovation capabilities in 2019, working ever more closely both with the running businesses of our Materials cluster and with our Emerging Business Areas (EBAs) Biomedical and Advanced Solar, which form part of the 'DSM Innovation Center' on page 94.

Strategy

We continue to future-proof our Materials business by centering it on the delivery of Sustainable Living and further strengthening our key focus domains of Climate & Energy and Resources & Circularity.

This will further develop our Materials cluster into a high-growth, higher-margin specialty business that delivers above-market organic growth in the fields of Improved Health & Living, Green Products & Applications, and New Mobility & Connectivity.

In Improved Health & Living, we are focusing on the growing demand for advanced healthcare applications. In addition, we offer solutions that enhance end-user safety and health conditions.

In Green Products & Applications, we are providing solutions that enable customers to cut emissions by using materials that are lighter, stronger, more efficient and more sustainable. We are also increasingly focusing on bio-based, recycled-based, and fully recyclable solutions.

In New Mobility & Connectivity, we are targeting materials that support the transition from fossil fuel to electric automotive power and hydrogen-fueled cars. We are also addressing the growing need for increased connectivity between products, devices and applications.

Across our businesses, we further intensified our focus on customer-centricity in 2019, implementing several programs designed to deliver a positive experience for our customers. These include the multi-year integrated program within DSM Engineering Plastics that launched customer-focused scorecards in 2019 that give insight into our Net Promoter Score, see 'Sustainability Statements — Customers' on page 152, and an initiative to help employees use customer feedback to improve their work.

Partnerships

We have many partnerships and coalitions that support and accelerate innovation within Materials. An example of our customer-centric cross-sector collaboration and innovation was the active membership of ARENA2036 (Active Research Environment for the Next Generation of Automobiles), the leading technology platform for mobility in Germany. ARENA2036 is the initiator of sustainable automotive engineering and automobile production for the next generation of vehicles and a platform in which suppliers, customers and research institutes participate.

In 2019, together with ECOR, DSM-NIAGA started a consortium comprising leading furniture manufacturers Royal Auping, Canary Company, Cartoni Design, Concourse, INTOS, König+Neurath, Occony, Triboo and Zwartwoud to explore the use of circular panels in their furniture. In DSM Additive Manufacturing we are working with a range of partners to create a complete additive manufacturing ecosystem to accelerate the adoption of 3D printing. These partners include companies such as Stratasys, Fortify, CEAD Group, e-Xstream, Origin, Twikkit, Ultimaker and Royal HaskoningDHV.

DSM Engineering Plastics

Highlights 2019

- Persisting softness in China and the global automotive segment
- Continued shift of portfolio toward higher-value, specialty materials
- Launch of bio-based offering of Stanyl® and Arnitel® grades
- Acquisition of the specialty materials business of the Indian company SRF Ltd.

DSM Engineering Plastics reported total sales of € 1,406 million in 2019 compared to € 1,516 million in 2018. DSM Engineering Plastics saw persistent softness in China and in the global automotive segment, resulting in a 10% reduction in organic growth versus 2018. Electrical & electronics saw some signs of improvement in the second half of the year. Business conditions in other end-segments were solid.

DSM Engineering Plastics addresses the key market trends in automotive and electronics. Besides serving these two sectors, we provide solutions to specialized industries that address a range of evolving consumer and societal needs. Example application areas include water management, power distribution, outdoor power equipment, and multilayer flexible food packaging.

The quest for new forms of mobility remains a key driver for our business. We create products that help reduce the fuel consumption and thus the tailgate emissions of light vehicles, and which also improve the safety and connectivity of cars. Our products find applications in the automotive industry in fields such as powertrain, auto electronics and electricals, as well as vehicle interiors and exteriors.

The other key trend for our business is the rapidly growing demand for device connectivity. We have a strong track record in the consumer electronics industry, with our materials finding extensive use in connectors in mobile devices such as smart phones and notebooks. This expertise can be deployed in other fields too, such as connected vehicles and smart electricals and appliances.

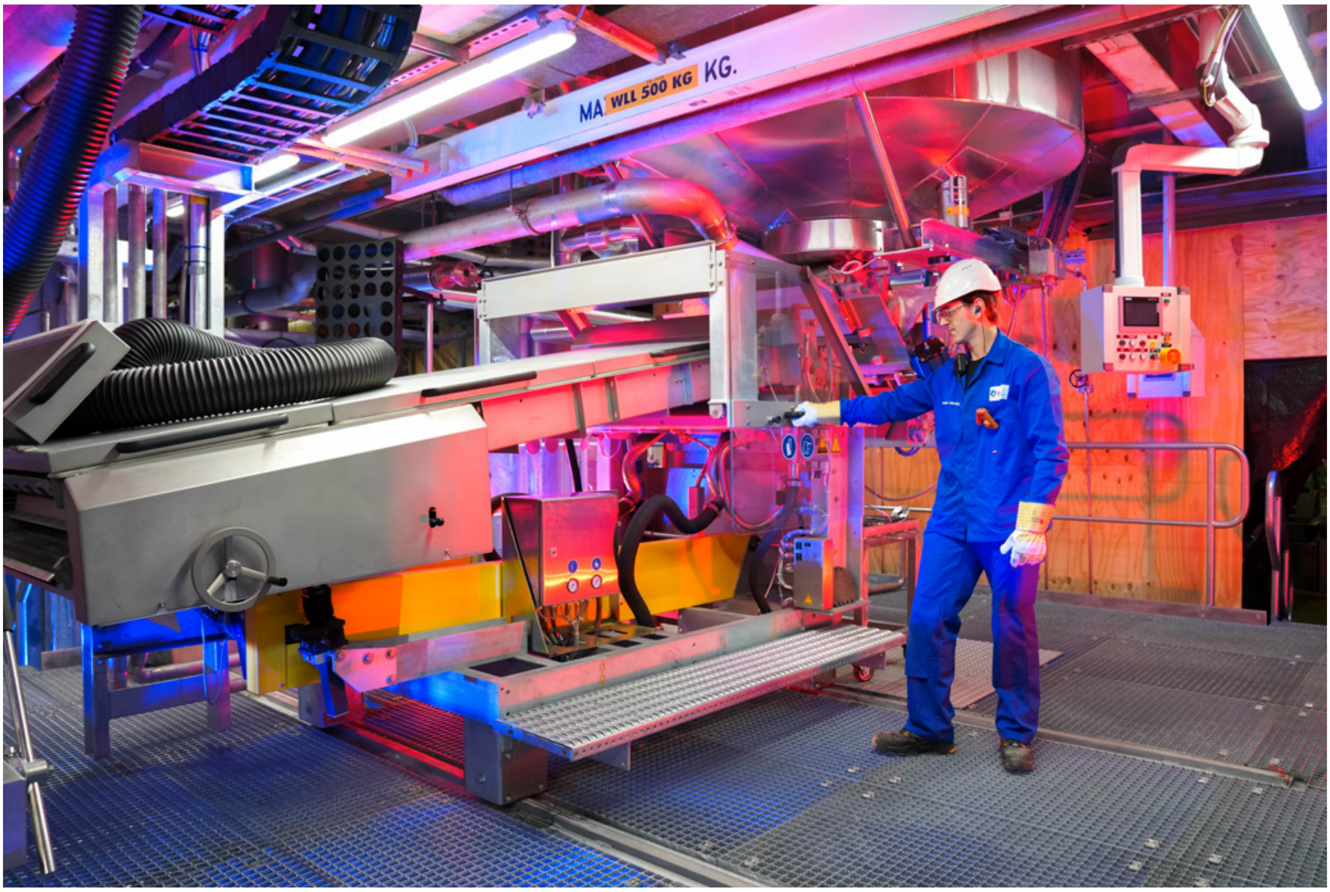
During 2019, we continued to shift our portfolio toward higher-value, specialty materials with advanced grades and improved properties. We increased our number of differentiated grades, offering high performance in areas as diverse as heat resistance, thermal conductivity, electromagnetic interference shielding, electrical insulation performance, halogen-free flame retardancy, and hydrolysis resistance.

We also launched new approaches in support of the circular and bio-based economy. We will be offering a full portfolio of alternatives that contain at least 25% recycled and/or bio-based content by 2030. As an intermediate step, we introduced bio-based Stanyl® and bio-based Arnitel® grades founded on a certified, mass-balancing biomass feedstock approach. We also engaged with companies in our value chain to explore and further develop chemical and mechanical recycling routes.

In 2019, we acquired the specialty materials business of the Indian company SRF Ltd. to further strengthen our market-leading position in that country. This fits well with our strategic aim of generating leading positions in fast-growing economies.

We also announced the operational launch of a new production line for Arnitel® in Emmen (Netherlands). The capacity has been expanded by 20% and will enable greater flexibility and security of supply.

In alignment with Apple's Clean Energy Program, we transitioned to 100% renewable electricity in the manufacture of our materials for Apple's products by the end of 2019.



Operational launch of a new production line for Arnitel® in Emmen (Netherlands).

DSM Dyneema

Highlights 2019

- Continued high demand in the high-margin personal protection segment
- New Dyneema®next-generation UD technology line opened to increase capacity
- Launch of sustainability strategy covering bio-based Dyneema® and industry coalition for end-of-life recycling

DSM Dyneema reported total sales of € 338 million in 2019 compared to € 344 million in 2018. DSM Dyneema reported minus 4% organic growth. The focus on strong growth in the high-margin personal protection business resulted in lower volumes in other segments. The shift had a strong positive effect on the margins.

Dyneema®, the world's strongest fiber™, is 15 times stronger than steel on a weight-for-weight basis, 40% stronger than aramid, and floats on water. This combination of extreme strength, lightness and high durability makes it suitable for a wide and expanding range of applications, including personal protection, workwear and sports apparel, outdoor equipment and nets for the rapidly growing aquaculture sector. Products made with Dyneema® provide an environmental and/or societal benefit compared to their mainstream counterparts.

We are the only global and backward-integrated producer of ultra high molecular weight polyethylene (UHMWPE) products. Dyneema® offers exceptional safety in combination with excellent ergonomics. It protects over one million first responders and service personnel around the globe, such as ambulance crews and law enforcement officers, while approximately 22 million pairs of hands worldwide are protected by gloves made with Dyneema®. We aim to grow the number of people protected by our life-saving and high-risk applications to 40 million worldwide by 2023.

During 2019, we continued our strategy of expanding into existing market segments and applications by offering a range of innovative, unique and patent-protected technologies. Examples include:

- Dyneema® Force Multiplier Technology for comfortable, ultra-light-weight ballistic protection
- Dyneema® Diamond Technology, which offers increased cut protection and comfort for heavy-duty gloves
- Dyneema® Max Technology for mooring offshore floating wind parks and for maximizing deep-water installation crane capacity
- Dyneema® Composite Fabric ultralight and high-performance material for outdoor, apparel and leather in consumer and professional markets

Besides benefiting from continuing strong uptake for Dyneema® Force Multiplier Technology and Dyneema® UD (Uni-Directional laminate), we enjoyed strong demand for Dyneema® fiber during 2019.

In 2019, we expanded our manufacturing capabilities with a new Dyneema® UD line in Heerlen (Netherlands). Increased production capacity of next-generation UD technology was also made available in Greenville (North Carolina, USA). The expansion at both locations will help to meet the growing demand from law enforcement and first responders.

We also took important new steps in the field of sustainability. In alignment with DSM's overall purpose, we launched our additional sustainability ambitions, which focus on reducing the use of scarce resources and increasing circularity across our production processes. By 2030, at least 60% of the Dyneema® fiber feedstock will be sourced from bio-based raw material. This will enable our customers to easily shift to a more sustainable product and solution, without compromising on fiber performance. By 2020, we will also establish an industry coalition consisting of customers, waste processors, and recycling companies to address the recycling of end products made with Dyneema® fiber. As a first step, a DSM Dyneema Circularity Summit with key partners and recyclers took place in Brussels in November 2019. The participants jointly created and committed to the coalition structure.

DSM Resins & Functional Materials

Highlights 2019

- Business conditions stabilizing and anticipation of upcoming investments in 5G network
- Continued expansion of bio-based Decovery® technology in the decorative market
- Acquisition of founders' shares in DSM-NIAGA, gaining 100% ownership

DSM Resins & Functional Materials reported sales of € 1,002 million in 2019 compared to € 1,053 million in 2018, with organic growth down by 6%. Business conditions in coating resins stabilized versus previous year: while the European end-markets remained weak, the business experienced a small uptick in the Chinese building & construction sector. Functional Materials saw its sales of specialty coatings for glass fiber optic cables decline in the second half of the year. The 4G network investments started to tail off in anticipation of the upcoming infrastructure investments for the 5G networks, which led to temporarily lower sales.

At DSM Resins & Functional Materials, together with our customers and value chain partners, we are driving the resins and functional material industries forward by developing solutions that offer reduced impact on the environment and people's health. In 2019, we kept up our efforts to enable a more circular economy by offering resin solutions that improve the recyclability of packaging and reduce single-use consumption of materials. We remain the world's number one supplier of fiber-optic coating solutions.

In the decorative market, we continued to leverage our bio-based Decovery® technology platform. We launched a ground-breaking self-matting resin that enables better coating processing and higher performance for ultra-matt coatings. Together with the Chinese paint manufacturer Chenyang, we launched a new eco-friendly paint solution based on our Decovery® technology in 2019, and continued to work on improving indoor and outdoor air quality.

For the furniture market, we further developed our offering to address growing consumer demand for furniture made from sustainable and healthy materials. Our improved powder coating, waterborne and UV-cured technologies enable the sustainable production of furniture with low levels of volatile organic compounds (VOCs), for example.

In the telecommunications market, we are continuing to build our innovation pipeline to meet the growing demand for greater connectivity and network reliability. We are doing this by driving forward with our 5G coating. This coating enables the use of LED lamps in the curing process rather than traditional higher-energy-consuming light sources. By comparison with the mainstream alternative, this UV LED-cured coating enables an 80% reduction in energy consumption combined with higher functional performance.

DSM Coating Resins launched an ambitious set of sustainability commitments underlining DSM's purpose. For example, the acceleration of the phase-out of all chemicals of high concern from our finished products by 2025 and the commitment that at least 30% of our sourced raw materials will be bio-based and/or recycled-based by 2030. Chemsec — an independent, non-profit organization committed to the development of sustainable chemicals — described these targets as a 'major earthquake' for the chemicals sector.

Niaga®
We acquired 100% ownership of DSM-NIAGA, purchasing the shares held by the founders of DSM-NIAGA. DSM-NIAGA is the developer of a VOC-free adhesive and a proprietary production technology for fully recyclable carpets. Mohawk Industries in the US was one of the first industry players to use Niaga® technology. Some European carpet manufacturers have since adopted the technology too.

DSM-NIAGA's philosophy is now being applied to other product categories, including mattresses and laminated panels for furniture manufacture. We are producing the latter together with our partner ECOR. In 2019, together with ECOR, we started a consortium of leading furniture manufacturers to explore the use of circular panels in their furniture. The commitment of these industry innovators enables DSM-NIAGA and ECOR to scale up the production of Niaga®ECOR® panels as a sustainable alternative to traditional furniture panels.

Additive Manufacturing
Following the establishment of Additive Manufacturing as a separate business unit in 2018, we maintained our focus on selected market segments during 2019. These included the healthcare, transportation, sports and lifestyle, and electronics sectors.

We deploy our materials science and application expertise to meet the needs of end-users, developing new business models to accelerate the adoption of 3D printing, and help customers to benefit from the potential of this innovative technology. To achieve this, we are working with a range of partners to create a complete additive manufacturing ecosystem. An example is the creation of a digital platform together with start-ups and mature software companies that provides customers different additive manufacturing scenarios, enabling them to select the best option across performance, cost and sustainability.

Our key partners include Stratasys, Fortify and Origin. Through new partnerships with Twikit and Ultimaker we have supported the development of improved orthotic braces for children, with enhanced speed of delivery, personalization, and overall quality. In addition, and with the support of DSM Venturing, we invested in partnerships with Voxel8, Adaptive3D, AMT and Inkbit in 2019.

Making wind energy a viable alternative to fossil fuels

Global energy consumption is rising in response to population growth and increasing urbanization. Demand rose by 2.3% in 2018. There is consensus that our dependency on fossil fuels is untenable and that sustainable energy sources must take their place. Global electricity capacity from renewable sources reached 2,351 GW in 2018, accounting for approximately a third of total installed capacity. This figure is rising year on year as sustainable energy mega-projects deliver more and more electricity. In many cases, these projects test existing material and engineering solutions to their limits, calling for radical new approaches.

Offshore wind parks are a highly effective means of generating affordable, clean electricity. However, as more and more of these are built, at increasing distances offshore, they provide a new challenge, since highly innovative mooring solutions are needed to keep them in position.

Ropes, slings and synthetic chains made with Dyneema® can play a key role in making renewable energy from offshore wind parks viable, at an affordable cost. Synthetic lifting and lashing equipment made with Dyneema® significantly reduces the weight and size of equipment used in constructing and operating wind parks, as well as reducing the physical effort required of their crews. Dyneema® fiber will also be crucial in delivering the cutting-edge floating foundation technology necessary to keep wind parks safely anchored offshore at ever-greater depth.

Purpose-led

As the world seeks to produce more and more energy from wind parks, the unique combination of lightness and strength of Dyneema® enables solutions that are both operationally viable and cost-effective.

Performance-driven

Growth in offshore wind energy is projected to outpace onshore wind by a factor of two. Floating offshore wind farms represent the next generation of offshore wind, and can be operated at water depths of more than 100 meters, where wind speeds are typically higher. It is anticipated that within the coming five years, floating platforms will represent more than 15% of total global offshore wind investments. Mooring systems made from Dyneema® are a critical enabler for efficient construction of these wind farms.

Upcycling abandoned fishing nets into a high-performance consumer product

Svein Rasmussen
CEO Starboard

Owner of the Tiki brand – the world's premiere brand in windsurfing and paddle boarding – Starboard was founded in 1994 by Svein Rasmussen, a windsurfing world champion and Olympic participant. CEO Svein Rasmussen explains how DSM's Akulon® RePurposed is helping Starboard maintain its leading market position while helping to protect the oceans.

What are the key properties of Akulon® RePurposed from your perspective?

It is a highly versatile, reliable and sustainable high-performance polyamide made from abandoned fishing nets. We use it to produce the fins and other accessories of our windsurf and stand-up paddle (SUP) boards. Akulon® RePurposed is currently used in about 45% of Starboard's SUP and Windsurf boards. These products are branded as NetPositive!

Why has Starboard opted to use Akulon® RePurposed?

Waste plastic in our oceans is wreaking havoc on marine wildlife and fisheries collected in India. Abandoned plastic fishing nets are part of the problem. Known as 'ghost' fishing nets, they can result in the accidental capture of dolphins, turtles and other marine animals. There are roughly 640,000 tons of these nets currently in our oceans, accounting for almost 10% of all plastic waste in the sea. Retrieving and upcycling them has a major positive impact on the oceans from which they are collected, and represents an important step in the direction of a genuinely circular economy. With this solution we contribute to litter-free beaches and a healthier marine environment, and also make a positive social impact on local communities in India.

How does DSM help Starboard realize the company's societal and sustainability goals?

One of the most satisfying parts of our work is the challenge of redesigning our products to lower their environmental impact and achieve higher performance. Through our collaboration with DSM, we showcase how quick and easy it can be to change the way we build better boards for the planet. We want to continuously push boundaries for more eco-innovations for our boards.

Enhancing performance, reducing energy consumption

Philippe Vanhille
Executive Vice President Telecom BU at Prysmian Group

DSM Resins & Functional Materials is a key enabler of the continuing rapid expansion of the global telecommunications market. Around the world, there has never been stronger demand for connectivity. Our optical fiber and cable coatings support the growth of fiber and cable manufacturers such as Prysmian Group, the world leader in the energy- and telecom cable systems industry.

With almost 140 years' experience, 29,000 employees in over 50 countries and 112 plants worldwide, Prysmian Group is listed on the Italian Stock Exchange, in the FTSE MIB index and generates annual sales in excess of € 11 billion. Philippe Vanhille, Executive Vice President Telecom BU at Prysmian Group, discusses Prysmian's collaboration with DSM on the development of next-generation optical fiber solutions.

What is the scope of Prysmian's current activities worldwide?

Each year, Prysmian Group manufactures thousands of miles of underground and submarine cables and systems for power transmission and distribution, as well as medium- and low-voltage cables for the construction and infrastructure sectors. We also produce a comprehensive range of optical fibers, copper cables and connectivity systems for voice, video and data transmission for the telecommunications sector.

And what is the focus of Prysmian's collaboration with DSM?

We are working together on reducing the deployment costs of fixed and mobile networks by enabling cable solutions with enhanced fiber density. DSM's contribution allows us to pioneer certain key innovations and to offer the market decisive solutions such as ultra-high fiber count cables and high-density cable systems.

How does DSM help Prysmian realize the company's societal and sustainability goals?

Besides improved product performance, our joint development work focuses on enhanced energy-saving technology along with improved health and safety initiatives for our production workforce.

What benefits does this collaboration bring to Prysmian?

Prysmian and DSM have shared values regarding innovation and sustainable growth, along with a common vision to enable our customers, partners and stakeholders to achieve their own goals in an efficient, ethical and sustainable way.

Results at a glance

Innovation

Accelerating the innovative power of our core business with breakthroughs such as:

Fermentative Stevia: for sugar reduction

Project Clean Cow: feed additives for reduced methane emissions in cattle

Veramaris®: algae-based omega-3 for sustainable aquaculture

Niaga®: technology for fully recyclable carpets, furniture and mattresses

Every second

A patient receives a medical device containing a biomedical solution from DSM

3–5%

Yield improvement for ethanol producers who use our *e*BOOST™

> 250

Million PV modules use DSM coating technologies

21%

Innovation sales, in line with our ambition of ~20%

4.6%

R&D expenditure as a % of sales in line with our ambition of ~5%

2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
7 AFFORDABLE AND CLEAN ENERGY
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION

DSM Innovation Center

x € million	2019[1]	2018
Net sales	194	172
Organic sales growth (in %)	9	5
Adjusted EBITDA	22	8
Adjusted operating profit	(19)	(14)
Capital expenditure	34	32
Capital employed at 31 December	616	597
R&D expenditure	70	67
Workforce at 31 December (headcount)	726	701

1 Including the impact of IFRS 16, see table on page 164.

The DSM Innovation Center has two functions. The first is to help develop new business, focusing on areas outside the current scope of the company's business groups. The Innovation Center identifies and invests in new and innovative growth options, initially through the Business Incubator and then by developing and extracting value through the Emerging Business Areas (EBAs).

The Innovation Center's second function is to accelerate the innovation power and speed of our core businesses. In this role, it supports all of DSM's businesses through the Excellence in Innovation Program, DSM Venturing, and the IP & Licensing department. In addition, the Chief Technology Officer, acting through the Science & Technology Department, ensures the quality of the total R&D competence base, including monitoring and ensuring access to early-stage technologies with disruptive potential through the Corporate Research Program. Our innovation community also lays the groundwork for future opportunities by identifying rising stars within the current innovation pipeline and considering how longer-term, purpose-led innovation projects could offer solutions for Nutrition & Health, Climate & Energy, and Resources & Circularity.

Full-year 2019 sales were up 13%, with 9% organic growth and a 4% contribution from exchange rate effects. Biomedical reported strong sales growth over the year. Bio-based Products & Services benefited from the license income for yeast technologies used for bio-based fuels. Solar was soft due to the challenging Chinese market.

The Adjusted EBITDA increased to € 22 million, benefiting from a strong increase in license income at Bio-based Products & Services as well as a good performance of Biomedical and a positive contribution from exchange rates effects.

Creating opportunities for future earnings growth through innovation

In 2019, innovation sales across DSM amounted to 21% from sales, in line with our aspiration of around 20%. Furthermore, a strong and focused innovation pipeline of large innovation projects was created to enhance long-term growth. Examples include:

- Project Clean Cow for feed additives that reduce methane emissions from cattle
- Veramaris, creating algae-based omega-3 for sustainable aquaculture
- Avansya, the fermentative Stevia sweetener platform
- Niaga® technology for fully recyclable carpets, mattresses and furniture
- Plant-based proteins for human nutrition
- Enzymes and yeasts for 1.5G and 2G ethanol production
- Additive manufacturing

> “ I am proud of our healthy innovation pipeline, which addresses key challenges in our focus domains of Nutrition & Health, Climate & Energy, and Resources & Circularity.”
>
> **Patricia Malarkey, DSM Executive Committee**

Enabling DSM's Bright Science

The ability to deliver innovative products and solutions is essential to the success of our business and our positive impact on society. The Innovation Center plays a central role in guiding, enabling and accelerating innovation and R&D across the company.

R&D is instrumental to the realization of our innovation strategy. Most of our expenditure in this area is directed to business-focused programs that underpin our science-based, sustainable solutions.

R&D expenditure (including associated IP expenditure)

x € million	**2019**	2018
Nutrition	218	206
Materials	124	122
Innovation Center	70	67
Corporate Activities	4	3
Total	**416**	**398**
Total as % of net sales underlying business	4.6	4.5[1]
Staff employed in R&D activities	1,885	1,880

1 Excluding temporary vitamin effect, for further information see table on page 65.

Our toolbox of scientific competences is grouped into seven areas: analytical, biological, chemical, engineering, macromolecular, materials, and nutritional sciences. These seven areas are key to our continued success. The Science & Technology department ensures that we have the right combination of skills, capabilities and partners to deliver on our competences.

We have more than 30 laboratories spread across ten countries, and our science network comprises about 1,900 internal scientists, including 23 professors and academic associates, distributed around the globe. These employees co-operate with more than 100 universities and external R&D institutions worldwide, both in public-private partnerships and in academic collaborations such as with the Massachusetts Institute of Technology (MIT) and Delft University of Technology, see 'Innovation partnerships' on page 99.

Our collaborative approach increases our scientific scope and helps us make joint scientific contributions to address significant scientific and societal challenges. We participate in more than 200 academic networks, more than 80 industry networks, and more than 40 public-private partnerships (PPPs) in the fields of Nutrition, Health and Sustainable Living.

We continue to increase our investments in the digital transformation of our R&D capabilities. This includes making our collective organizational knowledge more easily available across the entire R&D organization, using artificial intelligence, deep learning and modeling, as well as extending lab automation. These investments are accelerating our core processes, increasing our operational efficiency and improving the speed of our innovation processes and delivery.

We also continue to recognize, reward and nurture scientific talent. The Bright Science Awards reward excellence in PhD research in areas of particular interest to DSM's strategy. Winning a Bright Science Award gives PhD graduates not only financial recognition for their achievements, but also a platform to make a name for themselves in their chosen discipline. The program helps participants make the vital connection between scientific achievement and commercial and industrial success — an increasingly important consideration.

As an innovative, science-based company that seeks a strong and diverse talent pipeline in the sciences, we are running an ongoing campaign to advocate for more women in Science, Technology, Engineering and Math (STEM) professions across the globe. In 2019, we published a progress report in which we explain how DSM is accelerating gender equality and inclusion across our own science & technology workforce — as well as share our vision of what the world should do to stop women being lost from the STEM talent pipeline. By sharing some of our experiences and insights gained in recent years from both company initiatives and women and men working at DSM today, via videos, blogs and debates, we hope to spark a debate and encourage the industry to join us.

In 2019, we celebrated 150 years of fermentation and biotechnology expertise and innovation at our site in Delft (Netherlands). To mark the occasion, DSM and the world's first museum of microbes, ARTIS-Micropia, presented a unique 'pop-up' experience titled *'Small Life, Big Impact: microbes shape our world'*, which was from September to December. More than 10,000 people, including some 1,500 school children, visited the experience center to learn about the crucial role microbes and biotechnology play in enabling life on earth, as well as in tackling some of the world's greatest challenges including climate change, resource scarcity, circularity, and enabling healthy nutrition for a fast-growing global population. Building on the strong foundation of our predecessors, the Royal Dutch Yeast and Spirits Factory and Royal Gist-brocades, our biotechnology competences today remain an essential pillar for innovation and a driver for growth. Around 20% of our company's total sales are currently derived from biotechnology.

At DSM, we regularly connect with our international Scientific Advisory Board. Acting under the supervision of the Chief Technology Officer, the Board provides valuable perspectives and insights, challenges and reviews our scientific work, and gives advice on trends and upcoming disruptive technologies. The Scientific Advisory Board comprises seven internationally recognized experts in the fields of materials, biotechnology and nutrition, drawn from leading universities in the US and Europe.

Scientific Advisory Board

Member	Background
Frank Bates (m)	Regents Professor of Chemical Engineering and Materials Science at the University of Minnesota (USA). His research involves the thermodynamics and dynamics of polymers and polymer mixtures. He has co-authored more than 450 publications and holds more than 25 patents. Nationality: American.
Thomas Hankemeier (m)	Professor of Analytical Biosciences at the Leiden Academic Centre for Drug Research at Leiden University. Medical Delta Professor of Translational Epidemiology at Erasmus MC, Rotterdam. Co-founder of MIMETAS, the first organ-on-a-chip company. He has co-authored more than 250 publications and holds over 10 patents. Nationality: German.
Craig Hawker (m)	Director of the California NanoSystems Institute, Dow Materials Institute, Facility Director of the Materials Research Lab and Alan and Ruth Heeger Professor in Interdisciplinary Science at the University of California, Santa Barbara (USA). He has co-authored over 550 scientific papers and holds more than 70 US patents. Nationality: Australian/American.
Kirk Klasing (m)	Distinguished Professor of Animal Biology in the Department of Animal Science at the University of California, Davis (USA). He is an extensively published expert on poultry nutrition and immunology, with more than 250 peer-reviewed publications, 10 edited books and nine awards to his name for his work in animal biology. Nationality: American.
Wolfgang Marquardt (m)	Chairman of the Board of Forschungszentrum Jülich (Germany), Vice-President of the Helmholtz Association, and Coordinator of the Research Field Key Technologies. He also co-founded AixCAPE e.V., a technology transfer platform in the field of computer-aided process engineering, and its spin-off S-PACT GmbH. He has more than 350 ISI-listed publications. Nationality: German.
Helene McNulty (f)	Director of the Nutrition Innovation Centre for Food and Health (NICHE), a center of excellence for nutrition research, and Professor of Human Nutrition and Dietetics, at Ulster University. She is an elected Member of the Royal Irish Academy (since 2008) and Fellow of the International Union of Nutritional Sciences (since 2017). Nationality: Irish.
Chris Voigt (m)	D.I.C. Wang Professor of Advanced Biotechnology in the Department of Biological Engineering at Massachusetts Institute of Technology (USA). He is the co-director of the Synthetic Biology Center at MIT and the co-founder of the MIT-Broad Foundry. He is also Editor-in-Chief of ACS Synthetic Biology. Nationality: American.

DSM Venturing

DSM Venturing invests in innovative companies in areas strategically relevant to our current and future businesses. Every year, we review more than 500 new candidates. In 2019, we made seven new venturing investments, many follow-on investments, and generated several collaboration leads between start-ups and businesses at DSM. By the end of the year, our portfolio had grown to more than 35 start-ups (2018: 30). We completed several exits, including a significant financial exit from ingredients company Isobionics, and also supported accelerator programs. Together with DSM Additive Manufacturing and several external partners, the DSM Venturing team led the 'I AM Tomorrow' Challenge for start-ups and scale-ups focused on data analytics, Artificial Intelligence and other advanced software solutions for large-scale 3D printing.

For more information on DSM Venturing, see the company website.

IP & Licensing

IP & Licensing is a global group of qualified IP professionals who protect DSM's innovations by securing patents and trademarks. This group also includes certified licensing professionals who offer expertise for intellectual property-intensive deals across all DSM businesses, including joint development agreements, technology acquisitions and sales, and in-, out- and cross-licensing deals. DSM filed 277 patents in 2019. This reflects our continued focus on innovation projects with higher potential for business impact.

Emerging Business Areas

Our EBAs provide strong, long-term growth platforms in promising end-markets that are based on the company's core competences. We have three EBAs:

- DSM Biomedical
- DSM Bio-based Products & Services
- DSM Advanced Solar

DSM Biomedical

DSM Biomedical is a trusted partner to the global medical device industry, enhancing the quality and delivery of healthcare, and shaping the future of biomaterials and regenerative medical devices. Every second, a patient somewhere in the world receives a medical device containing a biomedical solution from DSM.

Key trends shaping the global medical device industry in 2019 included:

- The continuing shift toward value-based reimbursement with market success for products that have proven clinical and health economic outcomes
- The continuing rise in demand for healthcare services
- The continuing increase of merger and acquisition activity in the MedTech sector
- Medical Device Regulation (MDR) changes in the EU that require companies to comply with growing requests for clinical data as well as technical documentation covering devices

More broadly, the aging of the global population, the increasing incidence of lifestyle diseases, and the growing demand for sustained quality of life and need for quality healthcare services continue to create opportunities for DSM Biomedical.

Through our investment in research and our state-of-the-art capabilities, we create, develop and produce innovative materials for our partners, along with components, sub-assemblies and full medical devices. Our technology portfolio of high-quality, advanced healing solutions includes biomedical polyurethanes and polyethylenes, resorbable polymers, bioceramics, collagens, extracellular matrices, device coatings, and cellular therapy platforms. These are used in applications in some of the world's most attractive high-growth markets, including orthopedics, soft tissue repair, cardiology, diabetes management, and general and reconstructive surgery.

Our collaboration with Aerie Pharmaceuticals progressed significantly in 2019, with the first clinical trial of the AR-13503 Sustained Release Implant in patients with neovascular age-related macular degeneration or diabetic macular edema.

Using our Colossis™ technology, the global medical device company Arthrex launched its new fast-setting synthetic bone void filler, BoneSync™ [1] calcium phosphate cement in 2019. A key benefit of the BoneSync™ bone void filler is that it sets in 5–8 minutes. It also offers improved handling in preparation and delivery and can be mixed with saline, blood and bone marrow aspirate, allowing affordable, easy-to-use, fast remodeling, settable and drillable solutions to bone fractures.

In 2019, we entered into a partnership with Strait Access Technologies (SAT), a medical device company focused on innovations for the heart, to develop the world's first-ever durable and cost-effective transcatheter replacement heart valves equipped with polymeric leaflets. For more information, see 'Case studies Innovation' on page 100.

DSM Bio-based Products & Services[2]

As the world looks for alternatives to fossil resources, there are significant commercial opportunities in biofuels and bio-based alternatives to chemical building blocks. DSM Bio-based Products & Services pioneers advances in biomass conversion and seeks to demonstrate the commercial viability of sustainable, renewable technologies in collaboration with strategic partners in the value chain.

In particular, we have developed patented bioconversion technologies (yeast and enzymes) for various feedstocks and processes including starch-based, corn-fiber-based and cellulosic conversion for the biofuels industry. We deliver unique and differentiating technologies that enable biofuel plant operators to optimize their processes and maximize their yield and co-product creation for more sustainable, profitable production of biofuels. Our yeast technology for starch conversion has been demonstrated to provide consistent, increased ethanol yields at commercial scale while improving the value of distillers' dried grains with solubles, an important side stream.

Starch- and corn-fiber-based biofuel

Following the 2018 launch of *e*BOOST™, a proprietary yeast for corn-ethanol production, we launched two new solutions in 2019, *e*BOOST™ GT and *e*BREAK™ 1000F, for starch-based and corn-fiber-based biofuels, respectively. *e*BOOST™ GT adds value for starch-based biofuels producers by reducing the levels of glucoamylase that must be added to fermentations by up to 60%. *e*BREAK™ 1000F facilitates high-yield hydrolysis for corn fiber conversion and optimizes plant economics. In 2019, we also created recurring income by licensing part of our unique portfolio of patented technologies.

Cellulosic bio-ethanol

Since 2011, POET-DSM Advanced Biofuels, our joint venture with POET, has been a pioneer in the production of cellulosic biofuels made from corn stover. The joint venture recently announced that it will pause the production of cellulosic biofuels at Project LIBERTY in Emmetsburg (Iowa, USA) and shift its focus to R&D. The focus is now on improving mechanical reliability, creating additional technological efficiencies and licensing technology in

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[1] BoneSync™ is a trademark owned by Arthrex, Inc.

[2] DSM's interest in the net result of the joint venture POET-DSM is reported as part of 'Share of the profit of associates and joint ventures'.

countries which favorably support the use of low-carbon fuels from crop residue and other biomass.

DSM Advanced Solar
Solar photovoltaic capacity continues to grow more rapidly than any other power source, fossil or renewable. DSM Advanced Solar aims to accelerate the uptake and effectiveness of solar energy by focusing on the development and commercialization of technologies and materials that increase the efficiency of solar modules. Increased efficiency reduces the cost of energy delivered.

In 2019, we introduced our new Endurance backsheet, which offers all-round performance and 100% recyclability combined with superior durability. In early 2019, this innovative backsheet received the TÜV All Quality Matters award, in recognition of its excellent performance in desert-like environments.

Our strategic alliance with Silfab in conductive backsheets progressed well during 2019. The alliance uses back-contact technology to produce high-power, aesthetically pleasing solar modules for the residential market. We celebrated the official opening of the 150 MW high-power module production line in Bellingham (Washington State, USA). In October, we reached the milestone of the production of the first 100,000 conductive backsheets.

In 2019, we launched Retrofit anti-reflective (AR) coating in Italy and Germany, following a trend to repower existing older solar parks. This spray-on coating, which delivers up to 3% extra solar power, is a derivative of our leading AR coating, which has been applied to more than 250 million solar panels worldwide to date. In this area, we are partnering with operations & maintenance companies Stern Energy and greentech, which have applied this coating on multiple large utility-scale solar parks.

DSM Business Incubator

The DSM Business Incubator explores potential future business opportunities in areas with a close link to our technologies and competence base. Platforms are created within the scope of securing society's food, health and energy requirements. This occurs in close collaboration with industry partners and existing and potential customers. The Business Incubator feeds our new product pipeline with opportunities that address previously unmet customer needs.

In 2019, we announced a collaboration with the agro-industrial group Avril (France) to produce CanolaPRO®, a unique protein based on non-genetically modified canola. The properties of CanolaPRO® make it ideal for a range of applications including meat and dairy alternatives, beverages, baked products, bars and ready-to-mix. For more information on CanolaPRO®, see 'Case studies Innovation' on page 101.

Our partnership with Syngenta for the joint development of microbials for crop protection agents continued successfully in 2019 with the discovery of several biofungicide leads on major plant diseases.

We launched Purpose-Led Innovation, an initiative to help develop the next innovation platforms for our future pipeline. Our efforts focused on Nutrition & Health, Climate & Energy and Resources & Circularity, drawing additional inspiration from major cities such as Singapore, Jakarta (Indonesia), and Lagos (Nigeria).

Innovation partnerships

We have many partnerships that support and accelerate innovation. Highlights include our involvement in MIT.nano, a ground-breaking academic nanotechnology laboratory at the heart of the MIT campus (Boston, USA). We are engaged with this state-of-the-art facility through common research programs and the exchange of scientists. We joined the PPP Soft Advanced Materials, funded by the Dutch Research Council (NWO). As materials play a pivotal role in addressing pressing global issues, we continue to focus on finding new, improved materials that are not only lighter, smarter and more affordable, but also 'greener' — supporting the transition to a low-carbon, circular economy.

Other examples include our ongoing partnership with Syngenta, in which we are developing and commercializing a range of agricultural solutions that are based on naturally occurring microorganisms rather than synthetic solutions. In addition, we started the collaboration with French agro-industrial group Avril to produce CanolaPRO®, and we have a strategic alliance with Silfab in conductive backsheets for solar panels, as described above.

New pathways in heart valve disease treatment

Professor Peter Zilla
CEO & Medical Director

Strait Access Technologies (SAT) develops technologies to treat heart valve diseases. The company's focus on the complex requirements for devices suitable for younger patients with rheumatic heart disease (RHD) has delivered breakthrough solutions. These new approaches also promise benefits for older patients with degenerative heart valve conditions. Professor Peter Zilla, CEO & Medical Director, discusses SAT's collaboration with DSM on innovative replacement heart valves.

What is the focus of SAT's collaboration with DSM?

Together we are developing affordable, durable and minimally invasive replacement heart valves.

Why is this important in societal terms?

In 2018, the World Health Organization declared RHD a global health priority. RHD is a major health concern in emerging economies, affecting similar numbers of people as HIV. Our products treat RHD — a potentially fatal condition that can develop from lack of access to antibiotics.

What is DSM's contribution to this collaboration?

DSM's R&D capabilities and advanced biomaterials expertise have allowed us to produce a ground-breaking product with compelling commercial prospects.

How does DSM's technology help SAT meet the necessary clinical requirements?

Our new heart valves are made with polymeric leaflets composed of DSM's CarboSil® Thermoplastic Silicone-Polycarbonate-Urethane (TSPCU). CarboSil® TSPCU gives the valves durability and also dispenses with the need for anticoagulants. Traditional replacement heart valves either require the patient to take anticoagulants on a daily basis, with potentially negative side-effects, or else are of limited durability, especially in the case of younger patients.

When will SAT's new heart valves be available for patients who need them?

These products are still in the development and testing phase but have already received strong encouragement from non-governmental organizations such as the World Heart Federation. They will be launched on receipt of regulatory approval.

Creating better-tasting, nutritious, plant-based foods

The world's growing population calls for a rethinking of today's food systems if we are to feed everyone healthy diets within planetary boundaries. Whether for personal, health or sustainability reasons, more and more people are adopting vegan, vegetarian and flexitarian diets. At the same time, consumers have increasing expectations regarding the taste, quality, and nutritional content of plant-based foods and beverages.

To meet these demands, food & beverage companies are looking for plant proteins that enable better taste, are highly versatile, offer complete amino acid profiles, and meet requirements on topics such as allergenicity and GMO. Recognizing this, scientists at DSM have developed an innovative way of making a previously untapped source of plant protein available at scale.

Our patented process for the production of CanolaPRO® isolates plant protein from what remains of canola (rapeseed) seeds after these have been pressed to produce vegetable oil, and makes the protein available for human consumption. CanolaPRO® can be added to vegetarian and vegan foods to improve texture and taste in meat alternatives such as vegetarian hamburgers and dairy alternatives, or to enrich the protein levels in lifestyle and wellness products such as shakes and bars.

We are working with Avril, a leading producer and processor of canola, to produce CanolaPRO®. Together, we are making a wholly new and sustainable source of plant-based protein available to the food & beverages sector.

Purpose-led

CanolaPRO® helps meet the growing global challenge of feeding everyone healthily and within planetary boundaries. It is a sustainably produced, nutritious protein that creates, for example, pleasing textures in food products and good mouthfeel in beverages.

Performance-driven

CanolaPRO® supports the rapidly growing market for vegetarian and vegan products such as meat alternatives and dairy alternatives, improving sensorial experience in these products and adding nutritional value.

Corporate Activities

Any consolidated activities that are outside the three reporting clusters are reported as Corporate Activities. These comprise operating and service activities, as well as a number of costs that cannot be allocated to the clusters. While this segment reports net sales to third parties from its service units, it normally has a negative operating result.

Corporate Activities includes various holding companies, regional holdings and corporate overheads. The most significant cost elements are corporate departments and the share-based compensation for the company.

Corporate Activities

x € million	**2019**[1]	2018
Net sales	42	45
Adjusted EBITDA	(97)	(105)
Adjusted operating profit	(150)	(135)
Capital expenditure	30	26
R&D operating expenditure	4	3
Workforce at 31 December (headcount)	2,087	2,005

1 Including the impact of IFRS 16, see table on page 164.

DSM Insurances

We retain a limited part of our material damage and business interruption and (product) liability risks via our captive insurance company. In 2019, the total retained damages were € 22.9 million.

Corporate Research

The function of the Corporate Research Program (CRP) is to develop key Science & Technology competences. Falling under the responsibility of the Chief Technology Officer, the CRP typically funds competence development programs with a longer time horizon than those run by the business groups. It also focuses on competences that have a broader relevance for the company. The CRP additionally supports Science & Technology programs that are carried out with external parties and programs covering relevant new trends.

Share-based payments

Executives participate in the Long-Term Incentive (LTI) scheme. This links their compensation to the long-term interests of our company's stakeholders. It also provides a vehicle for the attraction and retention of suitable employees. As shares / share units have become more prevalent in the market, we replaced stock options with shares / share units in 2017. This resulted in better alignment with the LTI vehicle already in place for the Managing Board and the Executive Committee. The use of shares / share units also targets yet closer alignment with the interests of our stakeholders. As a consequence of this switch, we have reduced our hedge obligations. For detailed information, see Note 27 of the 'Consolidated financial statements' on page 223.

Reporting policies

Financial and reporting policies

As a basis for, and contribution to, effective risk management and to ensure that we are able to pursue our strategies, even during periods of economic downturn, DSM aims to retain a strong balance sheet and limit our financial risks.

Our Strategy 2021: *Growth & Value - Purpose led, Performance driven* has ambitious strategic and financial targets, which are outlined starting on page 16. Within the context of this strategy, we aim to maintain a strong investment grade and a strong long-term credit rating.

Most of our external funding needs are financed through long-term debt. Debt covenants are not included in the terms and conditions of outstanding bonds and financing arrangements. We aim to spread the maturity profile of outstanding bonds in order to have adequate financial flexibility.

An important element of our financial policy is the allocation of cash flow. We primarily allocate cash to investments aimed at strengthening our business positions and securing stable, and preferably rising, dividend payments to our shareholders. Remaining cash flow is used for acquisitions, targeting investments predominantly in Nutrition and in line with our strategy. Share buy-backs will be considered in the absence of value-creating M&A opportunities.

We aim to provide a stable, and preferably rising, dividend. Dividends are paid out in cash or in the form of ordinary shares at the option of the shareholders, with a maximum of 40% of the total dividend amount available for stock dividend.

In order to cover our commitments under the dividend policy and under management and employee option and share plans, we buy back shares insofar as this is necessary and feasible.

We continuously monitor and assess risks arising from currency exposures. It is our policy to hedge 100% of the currency risks resulting from sales and purchases at the moment of recognition of trade receivables and payables. Additionally, we may opt to hedge currency risks from firm commitments and forecast transactions. The currencies giving rise to these risks are primarily the US Dollar, the Swiss Franc and the Chinese Renminbi.

We acquire businesses and enter into partnerships that add value in terms of technological or market competences. In addition, these businesses and partnerships are required to contribute to our cash earnings per share, as well as our profitability, sustainability and growth requirements. In the case of small innovative growth acquisitions, we consider their potential to contribute to these requirements in the future.

Our policies in the finance function are strongly oriented toward solidity and reliability of reporting, as well as the protection of cash flows. The finance function plays an important role in business steering.

For detailed information on our tax policies, see 'Taxation at DSM' on the company website.

Non-financial reporting policy

Reporting policy and justification of choices made

In this Report, we report for the calendar year 2019. The company reports on People, Planet and Profit information in such a Report on an annual basis. The previous DSM Integrated Annual Report was published on 7 March 2019.

In the Report by the Managing Board, we explain our vision and policy with respect to sustainability practices and report on our activities in this field during 2019. In addition to disclosing data and developments in the categories of People, Planet and Profit, we also report on the global societal megatrends that drive our strategy, sustainability governance framework, stakeholder engagement activities, and management approach on material topics. We proactively seek out the views of key stakeholders on issues of material importance to the company.

UN Global Compact

We have been a signatory to the UN Global Compact since 2007 and commits to annually report on progress in implementing the UN Global Compact's 10 Principles in the areas of human rights, child and forced labor, the environment and anti-corruption. This Report is our Communication on Progress 2019, submitted to the UN Global Compact Office. Our Code of Business Conduct, our Sustainability, Human Resources, and Safety, Health and Environment (SHE) policies, and our Supplier Sustainability Program are the foundations on which we apply the standards of the Global Compact.

We have also aligned our strategy with the Sustainable Development Goals (SDGs). We are familiar with the opportunities and responsibilities that the SDGs represent for our business. Based on our mapping, we believe that we contribute to all of them, and have chosen to focus on the goals which most closely align with our strategic ambitions. In this Report, we continue to include the SDGs into our reporting process, for example by mapping SDG reporting priorities in our value creation model, our material topics, and the solutions that we highlight.

Global Reporting Initiative

At DSM, we base our sustainability reporting on international non-financial reporting guidelines. We frequently assess to what extent sustainability aspects become material to our company and our stakeholders. In case specific indicators become relevant to the company's sustainability performance, appropriate actions are taken that allow the necessary data to be collected so as to be able to disclose progress in the future.

This Report has been prepared in accordance with the GRI Standards: Comprehensive option. A detailed overview of how we report according to the GRI Standards comprehensive indicators, including a reference to relevant sections in this Report, is provided on our company's Integrated Annual Report website.

Integrated Reporting Framework

We align with the recommendations of the International Integrated Reporting Council <IR> Framework where possible. The intention of the <IR> Framework is to provide additional guiding principles and content elements for an integrated report. Aligning with the framework allows us to better identify and communicate how the company creates value for stakeholders in People, Planet and Profit, as well as the interconnection between these three dimensions.

The Taskforce on Climate-related Financial Disclosures

The recommendations from the Taskforce on Climate-related Financial Disclosures (TCFD) are a set of voluntary, climate-related financial disclosures for use by companies to provide information to their stakeholders. DSM was among the first companies in 2017 to commit to implementing, as fully as practicable, these recommendations over the following three years as outlined in the TCFD's implementation path. This Report contains our second TCFD relevant disclosures on Governance, Strategy, Risk Management, and Metrics and Targets. For more information on how we report against the TCFD recommendations, see the 'Sustainability statements — TCFD' on page 162.

Selection of topics

The topics covered in this Report were selected on the basis of input from internal and external stakeholders and the related materiality analysis, which assessed the relevance and impact of selected topics for our company and various stakeholders. On the basis of the principle of materiality (using the GRI Standards), we distinguish between topics whose importance warrants publication in this Report (relevant to both DSM and stakeholders), and topics whose importance warrants publication on the company website only (topics important to either DSM or stakeholders). We report on 'External recognitions' on page 38 in 'Stakeholders'. Other examples of external recognition can be found on the company website.

Scope

The People and Brighter Living Solutions data in this Report cover all entities that belong to the scope of the Consolidated financial statements, provided that DSM also has operational control. As such, three small units have been excluded from the scope. Planet reporting covers manufacturing units where commercial production by DSM occurs.

Acquisitions and divestments

The People data for newly acquired companies are reported from the first full month after the acquisition date. The Safety, Health (People), Environment (Planet) and Brighter Living Solutions data for newly acquired companies are reported at the latest in the year following the first full year after acquisition, because these companies' reporting procedures first have to be aligned with those of DSM. In the case of divestments, safety data are consolidated until the moment of divestment, People data to the end of the month of divestment, and Planet data are reported to the last full year at DSM.

Planet methodology

Our progress on the key environmental performance indicators is re-evaluated annually. Data on these indicators are collected twice a year for all DSM sites. The data are based on these sites' own measurements and calculations, which in turn are founded on definitions, methods and procedures established at corporate level. The site managers of reporting units are responsible for the quality of the data. Data are collected using measurements and calculations in the production processes, information from external parties (e.g., on waste and external energy) and estimates based on expert knowledge.

Reporting units have direct insight into their performance compared to previous years and are required to provide justifications for any deviations above the threshold. For most parameters, the threshold is set at 10%. The year-on-year comparability of the data can be affected by changes in our portfolio as well as by improvements to measurement and recording systems at the various sites. Whenever impact is relevant, this is stated in the Report. Details for the regions, as well as the methodology and calculations, are published on the company website, together with an explanation of the definitions used.

People methodology

People data are collected per business group and consolidated at corporate level.

Brighter Living Solutions

For a definition of Brighter Living Solutions, see the Planet section in 'Explanation of some concepts and ratios' on page 249. We report twice a year the percentage of Brighter Living Solutions within the running business portfolio.

The sustainability assessments to support the qualification for Brighter Living Solutions are required to be made by internal Life Cycle Assessment (LCA) experts and reviewed using the four-eyes principle with at least one internal, independent senior LCA consultant. The financial data are validated with the Corporate Sustainability department and consolidated as DSM Brighter Living Solutions KPI performance and reviewed by Group Control & Accounting.

Corporate governance and risk management

Introduction

Koninklijke DSM N.V. (Royal DSM) is a company limited by shares listed on Euronext Amsterdam. It is managed by a Managing Board together with an Executive Committee and an independent Supervisory Board. Members of the Managing Board and the Supervisory Board are appointed (and, if necessary, dismissed) by the General Meeting of Shareholders.

The company is governed by Dutch law and by its Articles of Association, which can be consulted on the company website. The General Meeting of Shareholders decides on any amendment to the Articles of Association by an absolute majority of the votes cast. A decision to amend the Articles of Association may only be taken at the proposal of the Managing Board, subject to the approval of the Supervisory Board.

At DSM, we fully inform our stakeholders about our corporate objectives, the way our company is managed, and our company's performance. In doing so, we aim to pursue an open dialogue with our shareholders and other stakeholders.

Our company has an organizational structure built around business groups that are empowered to perform all short- and long-term business functions. In this they are assisted by support and corporate functions, as well as by regional organizations.

Managing Board and Executive Committee

The Executive Committee was installed to enable faster strategic alignment and operational execution by increasing our focus on the development of our business, innovation and people.

The Executive Committee comprises the Managing Board members as well as four senior executives with responsibility respectively for DSM Nutritional Products (Chris Goppelsroeder), DSM Food Specialties and Corporate Strategy & Acquisitions (Philip Eykerman), the DSM Innovation Center (Patricia Malarkey), and Group People & Organization (Judith Wiese). The latter four people are appointed by the Chairman of the Managing Board after consultation with the Supervisory Board. The Executive Committee focuses on topics such as our company's overall strategy and direction, review of business results, functional and regional strategies, budget-setting, and people and organization. The statutory responsibilities of the Managing Board remain unchanged.

The Managing Board is ultimately responsible for our company's strategy, portfolio management, the deployment of human capital and financial capital resources, the risk management system, financial performance, and performance in the area of sustainability. The Managing Board is thus also accountable to the Supervisory Board for our strategy and management. Notwithstanding that accountability, the full Executive Committee attends the Supervisory Board meetings.

The Managing Board consists of two or more members, to be determined by the Supervisory Board. The current composition of the Managing Board can be found in the chapter 'Supervisory Board and Managing Board Royal DSM'. Since the introduction of the Dutch Corporate Governance Code in 2004, members of the Managing Board have been appointed for a period of four years.

The members of the Managing Board are collectively responsible for the management of DSM. In addition to this collective responsibility, Managing Board members have individual responsibility for certain tasks, business clusters, functional areas and regions. The distribution of these tasks is published on the company website.

The remuneration of Managing Board members is determined by the Supervisory Board based on the remuneration policy approved by the General Meeting of Shareholders. The remuneration policy for the Managing Board can be found on the company website.

The functioning of and decision-making within the Managing Board and the Executive Committee are governed by the Regulations of the Managing Board, which are in accordance with the Dutch Corporate Governance Code and can be found on the company website.

In 2019, the Managing Board and Executive Committee had 45 formal meetings, some of these by teleconference. No Managing Board member had to be excused from meetings during the year. One Executive Committee member was excused once on account of another commitment and in this case the Executive Committee member gave advance input. The Executive Committee and Managing Board take the time for an evaluation at the end of every meeting they have. This evaluation can be about topics that have been discussed during that meeting, but may also reflect on meeting dynamics and individual or collective performance. Furthermore, there are several informal moments, such as a collective dinner at the end of a full-day meeting, built into the meeting schedule. Once a year, the Executive Committee and Managing Board take the time to get together and discuss their performance as a team.

Supervisory Board

The Supervisory Board comprises at least five members. Its current composition can be found in the chapter 'Supervisory Board and Managing Board Royal DSM' on page 142. Supervisory Board members are appointed for a period of four years, after which they may be reappointed for a further four years. A Supervisory Board member may subsequently be reappointed for a period of two years, and this appointment may be extended by at most two years. For reappointments after an eight-year period, reasons must be provided in the report of the Supervisory Board.

All current members of the Supervisory Board are independent in accordance with the Dutch Corporate Governance Code. The remuneration of Supervisory Board members is determined by the General Meeting of Shareholders. The functioning of and decision-making within the Supervisory Board are governed by the Regulations of the Supervisory Board, which are in accordance with the Dutch Corporate Governance Code and can be found on the company website.

The Supervisory Board supervises the policy pursued by the Managing Board, the Managing Board's performance of its managerial duties, and the company's general course of affairs, taking the interests of all the company's stakeholders into account. When the Executive Committee was established, the Supervisory Board also took on responsibility for ensuring that the checks and balances that are part of the two-tier system are still given due consideration, paying specific attention to the dynamics between Managing Board and Executive Committee. The Supervisory Board is enabled to do so through the information provided by the Managing Board.

The annual financial statements are approved by the Supervisory Board and then submitted to the Annual General Meeting of Shareholders (AGM) for adoption, accompanied by an explanation from the Supervisory Board as to how it carried out its supervisory duties during the year under review.

In line with the Dutch Corporate Governance Code, the Supervisory Board has established from among its members an Audit Committee, a Nomination Committee and a Remuneration Committee, besides which there is also a Sustainability Committee.

The task of these committees is to prepare the decision-making of the Supervisory Board. These committees are governed by charters drawn up in line with the Dutch Corporate Governance Code. They can be found on the company website.

Diversity

At DSM, we strongly value diversity, and we endeavor to reflect this in our Board memberships. The Supervisory Board has drafted diversity policies for the Supervisory Board, the Managing Board and the Executive Committee. These policies seek a balanced composition of the respective body, taking into account gender, age, knowledge, experience, and nationality / cultural background. In addition, for the composition of the Supervisory Board, the board tenure is taken into account.

In terms of gender diversity, we aim for at least 30% of the positions in our Supervisory Board, Managing Board and Executive Committee to be held by women and at least 30% by men — percentages which reflect Dutch legislation. To ensure a balanced composition in terms of nationality / cultural background, our aim is not to have more than 50% of the members of our Supervisory Board or Executive Committee drawn from a single nationality. While a diverse composition in terms of nationality / cultural background is also taken into account in the composition of the Managing Board, no quantitative target is set here, given the relatively small number of Managing Board members.

Our diversity policies are implemented by applying them to nominations for (re)appointments of Supervisory Board and Managing Board members as well as to appointments of Executive Committee members. At the 2019 Annual General Meeting, Pauline van der Meer Mohr was reappointed on the basis of her broad experience in human resources management, corporate governance and international business and her extensive experience and qualities as a Supervisory Board member — as demonstrated during her tenure as a member of the Supervisory Board and most recently as its Deputy Chair. Erica Mann was appointed as member of the Supervisory Board on the basis of her long experience in (infant) nutrition, consumer-packaged goods (CPG) / fast-moving consumer goods (FMCG) and pharma in science-based businesses, as well as her international experience, including her experience with emerging markets.

Both our Supervisory Board and our Managing Board were well balanced in 2019 in terms of gender, comprising 50% and 33% women respectively, which is in line with Dutch legislation and with the company's own diversity policy. The gender diversity levels of 50% women within our Supervisory Board and 43% women within our Executive Committee exceed our target for at least 30% of these positions to be held by women and at least 30% by men. As of 15 February 2020, the percentage of women in our Executive Committee, Managing Board and Supervisory Board is 50%. Furthermore, in the Supervisory Board of DSM Nederland B.V., a subsidiary of Royal DSM, one of the three members is female (33%).

The composition of both our Supervisory Board and our Executive Committee are in line with our target of not having more than 50% of the members drawn from a single nationality.

General Meeting of Shareholders

The main powers of the General Meeting of Shareholders relate to:

- The appointment, suspension and dismissal of members of the Managing Board and the Supervisory Board
- Approval of the remuneration policy of the Managing Board
- Approval of the remuneration of the Supervisory Board
- The adoption of the annual financial statements and declaration of dividends on ordinary shares
- Release from liability of the members of the Managing Board and the Supervisory Board
- Issuance of shares or rights to shares, restriction or exclusion of pre-emptive rights of shareholders and repurchase or cancellation of shares
- Amendments to the Articles of Association
- Decisions of the Managing Board that would entail a significant change to the identity or character of DSM or its business

The Annual General Meeting (AGM) is held within six months of the end of the financial year in order to discuss and, if applicable, adopt the Annual Report, the annual accounts, any appointments of members of the Managing Board and the Supervisory Board, and any of the other topics mentioned above.

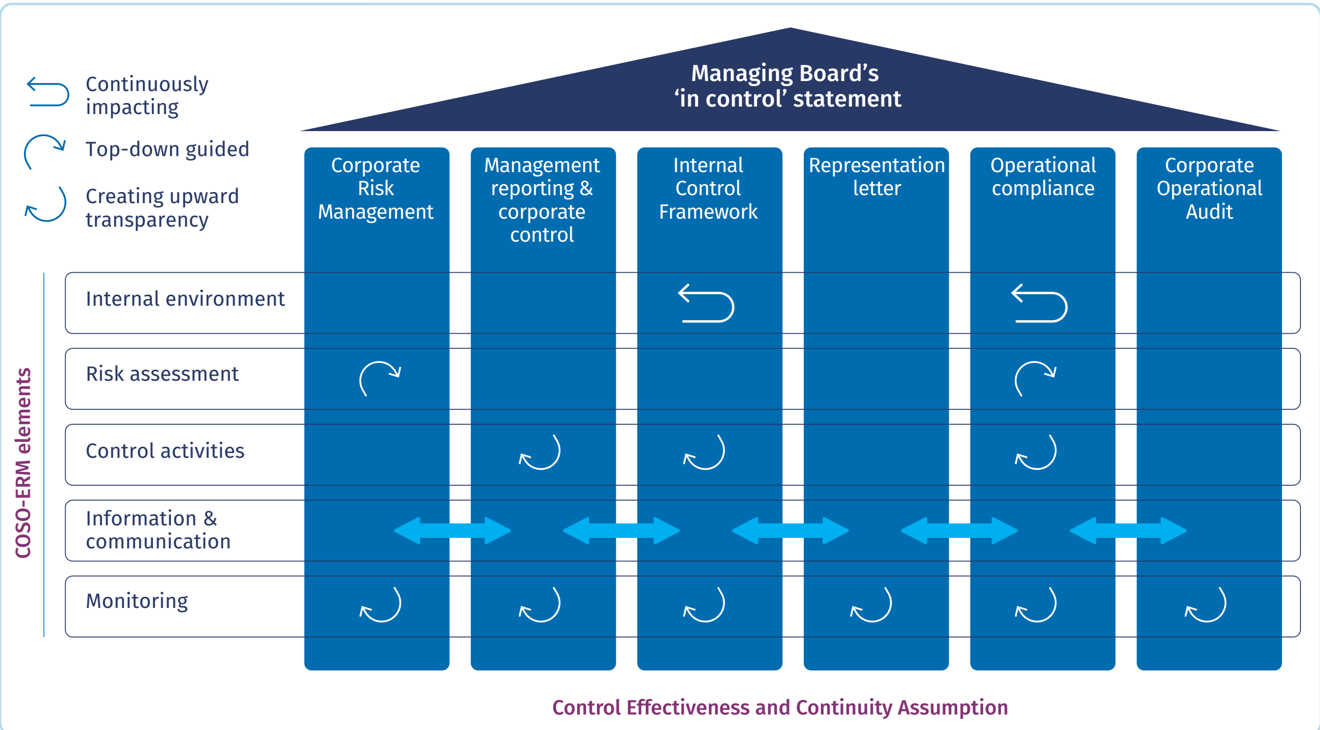
The AGM and, if necessary, other General Meetings of Shareholders are called by the Managing Board or the Supervisory Board. The agenda and explanatory notes are published on the company website.

According to the Articles of Association, shareholders who, individually or jointly, represent at least 1% of the issued capital have the right to request the Managing Board or the Supervisory Board to put items on the agenda. Such requests need to be received in writing by the Chairman of the Managing Board or the Chair of the Supervisory Board at least 60 days before the date of the General Meeting of Shareholders.

The AGM was held on 8 May 2019. The agenda was essentially similar to that of previous years. Additional topics were the proposed amendment of the remuneration policy for the Managing Board, the remuneration policy for the Supervisory Board, the reappointment of Pauline van der Meer Mohr as a member of the Supervisory Board and the appointment of Erica Mann as a member of the Supervisory Board. All topics were adopted by the General Meeting of Shareholders.

Control effectiveness and continuity assumption

The Statements of the Managing Board are reported on page 121. These conform with the Dutch Corporate Governance Code best practice 1.4.3 on 'Board Statements'.



At DSM, we visualize our control environment as a 'house' that includes the internal control process areas with control measures related to strategic, operational, compliance and reporting risks. The elements of COSO (the Committee of Sponsoring Organizations of the Treadway Commission) provide a framework for identifying company activities that are carried out to ensure that the control environment is adequately structured. Finally, to make sure that full use is made of learning opportunities, monitoring activities include the sharing of findings and experiences as well as the application of control measures across the supporting pillars.

DSM's structure for managing risks involves three lines of defense (see also 'Risk management' on page 116). Line management within the units is responsible for the first line of defense. Risk management forms the second line of defense, assessing the effectiveness of risk management and internal control at both unit and corporate level. Corporate Operational Audit (COA) is the third line of defense. The scope and frequency of COA audits is determined by ranking the auditable units according to the scale of their risk exposure, using a set of defined characteristics.

COA assesses the operation of risk management activities by the units, as well as the design of the risk management and internal control systems, by performing risk-based audits. These examine the key processes and activities for the specific units. By means of these audits, COA closes the risk management cycle and provides additional assurance to the Managing Board as to the effectiveness of the design and operation of the risk management and internal control systems.

COA reports its audit results to the Managing Board and Executive Committee twice a year. COA also shares an overview with the Audit Committee of the Supervisory Board and communicates the executive summary of each audit report to the CFO and CEO.

In 2019, COA carried out 50 audits. In general, audit findings are considered opportunities for improvement as part of a healthy learning culture. In approximately 7% of the audited areas (e.g., operations, finance, SHE, commercial) significant management attention was required to achieve the DSM standard. In the rare event of insufficient follow-up on a finding, the Director of COA escalates that finding to the CEO.

Dutch Corporate Governance Code

DSM supports the Dutch Corporate Governance Code, which was most recently amended in 2016 and has been in force since the financial year 2017. We ensure our continued compliance with the Dutch Corporate Governance Code.

The Dutch Corporate Governance Code can be found on www.mccg.nl.

Long-term value creation is embedded in both our company Strategy 2021: *Growth & Value - Purpose led, Performance driven* and our company culture: Our purpose is to create brighter lives for all. Sustainability is central to how we fulfill that mission, and to achieve this, we consider People, Planet and Profit in all we do. We apply our company strategy to drive our business and innovation strategies, which address the challenges of Nutrition & Health, Climate & Energy, and Resources & Circularity. More information on how long-term value creation is fundamental to our strategy and culture can be found in the Strategy 2021 and People sections of this Report, as well as in 'How we create value for our stakeholders' on page 30 and in 'DSM and the Sustainable Development Goals' on page 8.

Regarding the appointment of members of the Managing Board for a period of at most four years (Principle 2.2 of the Dutch Corporate Governance Code), it should be noted that we have adhered to this principle since the introduction of the Dutch Corporate Governance Code in 2004. Since we respect agreements made before the introduction of the said code, the Chairman of the Managing Board in 2019 was still appointed for an indefinite period. On 2 December 2019, it was announced that Feike Sijbesma would hand over to Geraldine Matchett and Dimitri de Vreeze on 15 February 2020. As a result of this handover, the indefinite period of tenure is no longer applicable.

Any proposed substantial change to our corporate governance structure and compliance with the Dutch Corporate Governance Code should be submitted to the General Meeting of Shareholders for discussion under a separate agenda item.

All documents related to the implementation of the Dutch Corporate Governance Code at DSM can be found in the 'Corporate Governance' section of the company website.

Governance framework

Organizational & operating model

Our business groups are the main building-blocks of the company's organization. They have integral long-term and short-term responsibility for business and have at their disposal all functions that are crucial to their business success. As the company's primary organizational and entrepreneurial building-blocks, our business groups focus on four primary business functions: Innovation and R&D, Direct Sourcing, Manufacturing & Operations, and Marketing & Sales. Intra-company product supplies are contracted by the business groups on an arm's-length basis.

The business groups are organized into clusters, thus ensuring coherence of operations and the leveraging of resources within each cluster. The clusters are the main organizational entities for external strategic and financial reporting. This structure ensures flexibility, efficiency and speed of response to market changes. In order to ensure sufficient independence regarding financial management, the CFO has no business groups reporting to her.

Our business groups receive services from global support functions and functional excellence departments and are supported by the regional organizations. This set-up enables us to create a global, high-performing organization focused on meeting its targets and achieving its ambitions. The support functions and functional excellence departments are paid for their services by the users — the business groups and, to a lesser extent, other DSM units. Corporate departments are paid from a corporate budget.

Support functions provide those services that can be delivered more efficiently (in terms of total cost of ownership) by leveraging them across the company, thus capturing scale benefits and delivering higher quality at lower cost, rather than having them arranged in each business group separately.

Within support functions, centers of expertise provide specialist support, while shared service centers provide standard transactional support. Business partnering is the concept that acts as the interface between the business groups and the support functions. Business partners consequently have a second reporting line in the business. In order to ensure that the functional policies sufficiently reflect regional requirements, the support functions work closely with the regional organizations and integrate their advice.

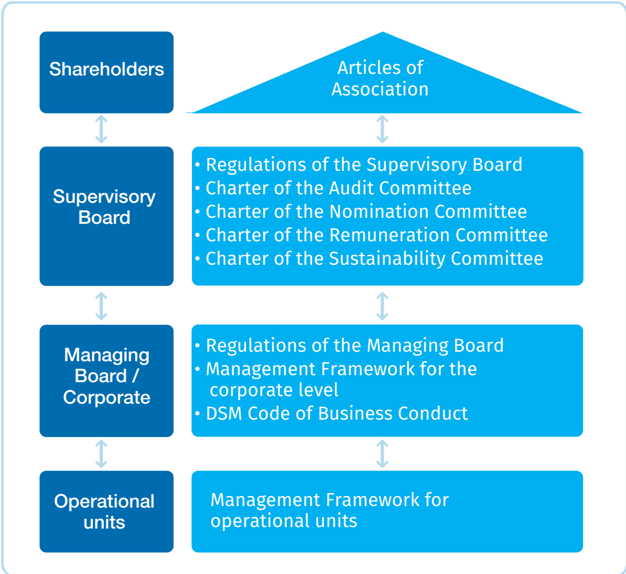
Each support function reports to a Managing Board member. There are support functions in the areas of Finance, People & Organization, Legal, Indirect Sourcing, Communications and ICT.

Corporate functions (small, high-level groups) supporting the Managing Board and Executive Committee are also seen as support functions. The corporate departments are: Corporate Strategy & Acquisitions, Corporate Operational Audit, Group Risk Management, Corporate Sustainability, Corporate Investor Relations and Corporate Affairs.

Functional excellence departments are mandated by the Managing Board to help the businesses achieve excellence in their respective fields. They cover the areas of Operations & Responsible Care, Marketing & Sales and Science & Technology. Functional excellence departments support our businesses in improving their performance. They also provide guidance in setting aspiration levels and targets.

Governance framework

The following figure depicts our company's overall governance framework and the most important governance elements and regulations at each level.



For the sake of clarity, a short summary of the main aspects of the framework at Managing Board / corporate level and operational level is given here. The Managing Board and Executive Committee adhere to the Regulations of the Managing Board. The Managing Board and Executive Committee work according to the Management Framework for the corporate level. This implies, among other things, that they adhere to the DSM Code of Business Conduct and applicable corporate policies and requirements. The Management Framework for the corporate level further provides a description of the most important (decision-making) processes, responsibilities and 'rules of the game' at Managing Board, Executive Committee, functional and regional levels, and includes governance relations with the immediately superior levels (Supervisory Board and shareholders) and the operational units.

The company's strategic direction and objectives are set by means of a Corporate Strategy Dialogue. In June 2018, DSM presented its updated Strategy 2021: *Growth & Value - Purpose led, Performance driven*, which is described in more detail on page 16.

The operational units conduct their business within the parameters of the Management Framework for operational units. This implies, among other things, that they:

- Comply with the DSM Code of Business Conduct, Corporate Requirements and Directives
- Establish the strategy, objectives and operational targets of their business according to the Business Strategy Dialogue, in alignment with the Corporate Strategy Dialogue, in which various scenarios and related risk

profiles are investigated, and report on the achievement of these
- Implement risk management actions according to an Annual Risk Management Plan and in line with corporate policies
- Execute company-wide standards for support functions (systems, processes, vendors, etc.)
- Implement annual functional improvement plans, monitor the effectiveness of the risk management and internal control system by means of process risk assessments and internal audits, and regularly discuss the findings with the Executive Committee member responsible

Independent audits for all operational units are conducted by the Corporate Operational Audit (COA) department. The Director of COA reports to the CFO and has access to the Chairman of the Managing Board, the external auditor and the Audit Committee of the Supervisory Board. Furthermore, the Director of COA acts as the compliance officer regarding inside information and is also the secretary of the Disclosure Committee, as well as being chair of the DSM Alert Committee, which is responsible for our whistleblower policy, systems and processes.

Chaired by the CFO, the Disclosure Committee ensures the timely and accurate disclosure of share-price-sensitive information related to the company and is responsible for the implementation of company rules on the holding and execution of transactions in the company's financial instruments, among other things.

A third committee at corporate level is the Fraud Committee, which was installed to ensure structural follow-up of fraud cases with the aim of reducing fraud exposure. Relevant corporate functions participate in the Fraud Committee, which is chaired by the CFO.

Sustainability Governance Framework

Managing Board

Sustainability falls under the responsibility of the Managing Board. While CEO/Chairman of the Managing Board Feike Sijbesma is the primary point of contact, other members also chair sustainability topics and initiatives. In addition, the specific actions in our climate action agenda are owned by members of the Managing Board and Executive Committee.

In 2019, Mr. Sijbesma oversaw sustainability as a key responsibility and company value as well as a driver of business growth. He also oversaw our engagement with organizations including the United Nations and the World Bank, our strategic partnership with the World Economic Forum, and our nutrition-related initiatives, including the WFP partnership. Within the climate action agenda, he was responsible for our product portfolio impact measurement upgrade and climate advocacy efforts, and for upgrading our emissions reduction targets together with Dimitri de Vreeze.

Our CFO, Geraldine Matchett, integrated sustainability into financial decision-making and represented DSM in the Accounting for Sustainability (A4S) CFO Leadership Network. She also oversaw our efforts and commitment toward the Taskforce for Climate-related Financial Disclosures (TCFD) recommendations, and chaired the Inclusion & Diversity Council. Within the climate action agenda, she was responsible for integrating climate risks into our risk management process, TCFD, carbon pricing and developing our engagement with climate-focused investors.

Mr. de Vreeze was responsible for Safety, Health and Environment (SHE) and also oversaw our Sustainable Procurement Program and the sourcing of electricity from renewable sources in his responsibility for the Sourcing function. Within the climate action agenda, he was responsible for upgrading our emissions reduction targets in line with a 1.5°C ambition together with Mr. Sijbesma.

Supervisory Board

Our Supervisory Board has its own Sustainability Committee to oversee progress against targets and to report on the embedding of sustainability across the organization. For more details, see 'Supervisory Board Report' on page 123.

External Sustainability Advisory Board

Comprising a diverse international group of thought leaders, DSM's Sustainability Advisory Board acts as a sparring partner for the Managing Board and senior executives, to help sharpen their focus on strategic issues, deepen their understanding of external stakeholder needs, conduct advocacy and handle dilemmas. This board met once in 2019 together with the Managing Board and a number of senior executives. Subjects addressed included business updates, climate change and market disruption, carbon avoidance or capture, and Purpose-led Innovation. The board also participated as table hosts during our multi-stakeholder event 'It's no longer business as usual', held at the New York Public Library (New York, USA) exploring the role of business in society, adjacent to the UN General Assembly and the Climate Action Summit. There were no changes to the composition of this board in 2019. The board maintains a good balance of knowledge across our three focus domains and a diverse composition in terms of gender and nationality.

Sustainability Advisory Board

Member	Background
Robin Chase (f)	Co-founder and former CEO of Zipcar, co-founder of Veniam and the New Urban Mobility Alliance, board member of the World Resources Institute, and Tucows, and serves as an informal advisor to many cities, national governments, and transport agencies on the transition to shared automated vehicles. Nationality: American.
Ertharin Cousin (f)	Distinguished Fellow with The Chicago Council on Global Affairs, visiting scholar at Stanford University and Trustee on the UK based Power of Nutrition Board of Directors. She served as the twelfth Executive Director of the United Nations World Food Programme from 2012 to 2017. Nationality: American.
Paul Gilding (m)	Social entrepreneur, author and corporate strategy advisor. Fellow at the University of Cambridge Institute for Sustainability Leadership (UK). Author of *The Great Disruption* (Bloomsbury, London, 2011). Executive director of Greenpeace International during the 1990s. Nationality: Australian.
David King (m)	Senior Strategic Adviser to the President of Rwanda since May 2018. Partner at SYSTEMIQ since 2017. Special representative for climate change of the UK government from 2013 to 2017. From 2008 to 2012, served as the founding director of the Smith School of Enterprise and the Environment at the University of Oxford (UK). Chief Scientific Advisor to the UK government 2000–2007. Nationality: British.
Ndidi Nwuneli (f)	Social entrepreneur and Founder of LEAP Africa and co-founder of AACE Food Processing & Distribution Ltd. (AACE Foods), an indigenous agro-processing company in Nigeria. She is also the managing partner of Sahel Consulting Agriculture & Nutrition, which works across Africa, transforming the nutrition and agriculture landscapes, via innovative ecosystem solutions. Nationality: Nigerian.
Ye Qi (m)	Director of the Institute for Public Policy at Hong Kong University of Science and Technology, and Cheung Kong Professor of Environmental Policy at Tsinghua University in Beijing (China). Before joining Tsinghua, he taught at Beijing Normal University, and the University of California at Berkeley (California, USA). Nationality: American.

Global network

At a corporate level, sustainability is steered by our Sustainability Leadership Team, a group of senior executives representing the business groups and contributing corporate functions, which is chaired by the Vice President Sustainability. He leads the Corporate Sustainability department and reports directly to Mr. Sijbesma. The Corporate Sustainability staff function as a business-oriented center of excellence and partner on sustainability, internally and externally.

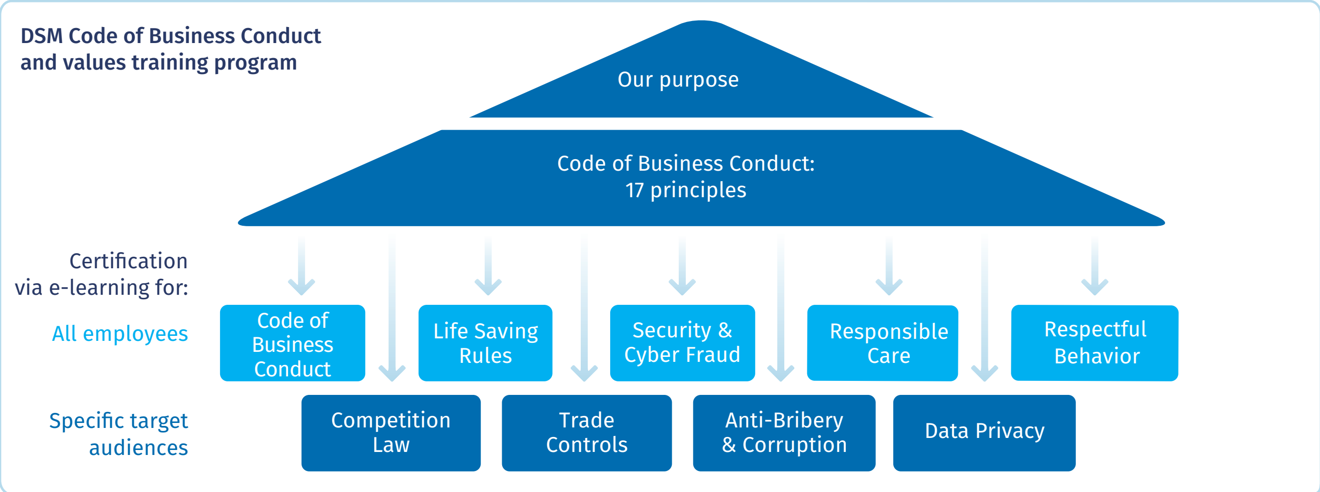
The Sustainability Leadership Team meets quarterly to monitor the progress of sustainability across the company, with particular emphasis on steering our business and innovation portfolio in relation to key drivers. Regional operational sustainability networks are in place in China, India, Latin America and North America.

DSM Operations & Responsible Care has responsibility for all corporate issues related to SHE. The Senior Vice President DSM Operations & Responsible Care reports directly to the Managing Board. SHE managers provide support at business group level. Our SHE Council, which includes all business group SHE managers, is instrumental in sharing experiences and developing best practices and communications on SHE issues.

Ms. Matchett has appointed a finance executive to lead a taskforce addressing the recommendations of the Taskforce on Climate-related Financial Disclosures (TCFD). The taskforce, comprising representatives from finance, risk management, sustainability, and investor relations, works with functions such as strategy, operations and procurement, to define what is needed to meet our TCFD commitments. This Taskforce convened in 2019 to define our approach to scenario analysis. It considered distinct approaches for physical and transition risks, as well as how we can further integrate climate-related risks into the risk management process. For more information, see 'Sustainability statements — TCFD' on page 162.

DSM Code of Business Conduct

The DSM Code of Business Conduct ('the Code') serves as an umbrella for several other DSM regulations and forms the basis for our company's ethical business behavior. Our purpose, core values, ways of working and business principles are an integral part of the Code. The business principles translate our purpose into important do's and don'ts to guide our business operations in daily practice. All DSM employees are expected to follow the Code, which is available in seven languages. The full text also appears on the company website. The Managing Board holds DSM's unit management accountable for compliance.



Training and awareness

The DSM values training program contains several e-learning courses to explain the Code and a number of its business principles in more detail. These courses are aimed at raising awareness for ethical business behavior and are assigned to all employees or, for certain subject matter, to specific target audiences. When DSM acquires a business, integration and compliance plans are rolled out to make sure new employees are trained.

A review team, chaired by the Vice President Group Risk Management, monitors the internal and external developments around corporate ethics to promote and safeguard the company's values and reputation. The review team also monitors implementation of the DSM values training program (see table Implementation of the DSM values below). At year-end, most employees had completed or refreshed their training (excluding employees of some recently acquired businesses). Our learning management system also has an external portal to enable relevant contractors and other third parties to follow courses of the DSM values training program.

The DSM values training program covers the three dimensions of People, Planet and Profit. An overview of the courses and the changes in 2019 is listed here, as well as a number of important implementation measures.

People
The Life Saving Rules specify the 12 most important rules that must be followed by all employees to prevent incidents. In the revision of the Life Saving Rules, improved standards for warehouse safety and hot work have been included. The corresponding e-learning course was completely revised and relaunched in 2019.

The Unlawful Harassment Prevention e-learning was succeeded by the new Respectful Behavior e-learning in 2019. This course emphasizes the importance of diversity and inclusiveness, and promotes respectful behavior as well as active bystander behavior to foster effective employee relations, communications, and non-discriminatory practices. The course is available in seven languages and is mandatory for all our employees. The Unlawful Harassment Prevention e-learning remains available for specific target groups.

The DSM Privacy Codes prescribe mandatory training for Privacy Officers, P&O employees, legal counsels and employees who regularly work with personal data. This is provided in the Data Privacy Knowledge course, which is available in English. In addition to this, concise e-learnings are in place to train all our employees on the consequences of the new European General Data Protection Regulation. These short courses are available in seven languages.

Planet
The Basic Course Responsible Care addresses the elements of the Responsible Care Program: Safety, Health, and Environment; Product Stewardship; Security; and Sustainability. The course is available in seven languages.

Profit
The course for Global Competition Law Principles and Practices addresses the main principles of anti-trust legislation and is available in six languages. Employees for whom competition laws are most relevant must also follow the Competition Law classroom training (available in six languages) and annually confirm their compliance with the rules via a Competition Law Compliance Statement. In this statement, they confirm that they are not aware of any violation of competition laws by DSM. Alleged breaches are reported to, and discussed with, Group Legal Affairs. In 2019, no breaches were reported.

The course for Global Trade Controls (available in English) explains the most important aspects of international trade legislation. Compliance with trade controls is embedded in our systems and processes. Company master data is screened to check customers and suppliers against embargoes and lists of sanctioned parties.

The DSM Anti-Bribery and Corruption (ABC) e-learning provides training on the most important features of bribery and corrupt behavior and is available in six languages. In addition, the DSM ABC Policy and Compliance Manual (available in English and Chinese) is shared with selected employees in commercial and business roles, who must also follow ABC classroom training (integrated into the Competition Law classroom program, available in six languages). The ABC due diligence program for DSM agents and distributors was further implemented during 2019.

The Security e-learning covers our seven Key Security Behaviors. To complete this e-learning, employees are required to read and sign off on the DSM Code of Conduct for Information Security. The Cyber Fraud Awareness e-learning, introduced in 2018, is an additional training to increase awareness among all employees regarding prevalent types of cybercrime. Both courses are available in seven languages. Furthermore, phishing tests are regularly carried out to ensure that our people stay alert.

We also have rules to prevent misuse of inside information on the holding of or trading in DSM financial instruments, such as shares and other securities, and where applicable the holding of or trading in financial instruments of other companies. These rules apply to all relevant employees, including the Executive Committee, the Managing Board, and the Supervisory Board. A new system was implemented in 2019, that enables us to secure compliance with Market Abuse Regulations in a more efficient way.

Value chain

The business principles most relevant to our supply chain are brought together in the Supplier Code of Conduct and are also structured along the three dimensions of People, Planet and Profit. The Supplier Code of Conduct, available in eight languages on the company website, is signed off by suppliers in framework contracts, confirming their commitment to sustainability, among other things.

For our distributor and agent framework contracts, the ABC Policy is translated into terms and conditions to ensure ethical business conduct when these parties act on behalf of DSM or deal with DSM products further down the value chain.

Consequence management

We apply zero-tolerance consequence management to violations of the Code. Under our whistleblower procedure (DSM Alert), most (potential) violations are reported to and dealt with by local line management. Where this is not considered appropriate, complaints are made directly to the DSM Alert Officer. In both cases, consequence management practices (e.g., official warning, temporary suspension, dismissal) are in place for substantiated violations to support compliance with the Code. The DSM Alert Officer reports to the Managing Board and also reports independently to the Audit Committee of the Supervisory Board twice a year. Any individual not employed by DSM who might wish to voice a concern regarding violations of the Code may also contact the DSM Alert Officer via the company website.

In 2019, 26 Alert cases (reports of potential violations of the Code) were received by the DSM Alert Officer, two of which were reported by an external party. This is at the same level as in previous years. Three of these were potential bribery and corruption cases. After investigation, two Alert cases were substantiated and consequence management was applied.

The table below gives an overview of all reported substantiated violations of the Code (including Alert cases), with a breakdown by Triple P dimension and region. Proven violations result in dismissal or other forms of consequence management. In line with this policy, 42 employees were dismissed in 2019 because of breaches of the Code, legal or local company regulations. In addition, 119 employees received another form of consequence management (official warning or suspension). Over the years, the number of dismissal cases has remained about the same, whereas there is an increase of other kinds of consequence management cases being reported.

People: Most of the cases in the People dimension relate to violations of the Life Saving Rules. Inappropriate behavior that does not contribute to a safe and healthy working environment (discrimination, sexual and other kinds of harassment) is also reported in this dimension. Health and safety are priorities for the company and incident-reporting channels are well known.

Planet: There were three violations of the Code reported in the Planet dimension in 2019 due to irresponsible behavior on the part of an employee. Two cases led to a minor environmental incident, the third did not.

Profit: Most of the cases in the Profit dimension relate to fraudulent expense claims and incorrect registration of working hours.

Implementation of the DSM values

	2019	2018
Training and awareness e-learning: % of targeted employees trained		
General		
- Code of Business Conduct	94%	90%
People		
- Life Saving Rules	95%	95%
- Unlawful Harassment Prevention (up and until Q3 2019)	95%	97%
- Respectful Behavior (as of Q4 2019)	-	-
- Data Privacy Knowledge	95%	93%
Planet		
- Basic Course Responsible Care	97%	95%
Profit		
- Global Trade Controls	95%	96%
- Anti-Bribery and Corruption	96%	95%
- Security	97%	94%
- Cyber Fraud Awareness	96%	93%
Competition Law: % of targeted employees having signed		
- DSM Annual Competition Law Compliance Statement	100%	100%
Violations of the Code:	**161**	**154**
Number of dismissals / other consequence management		
Triple P breakdown		
- People	27/104	22/90
- Planet	1/2	0/1
- Profit	14/13	20/21
Regional breakdown		
- Europe & Africa	13/53	14/45
- Americas	22/61	20/48
- Asia–Pacific	7/5	8/19
Total	**42/119**	**42/112**
Alert cases (whistleblower procedure):	**26**	**28**
Number substantiated / not substantiated / under investigation		
Triple P breakdown		
- People	6/14/1	2/10/2
- Planet	0/0/0	0/0/0
- Profit	2/2/1	7/5/2
Regional breakdown		
- Europe & Africa	1/5/0	2/4/1
- Americas	5/6/0	1/4/2
- Asia–Pacific	2/5/2	6/7/1
Total	**8/16/2**	**9/15/4**[1]

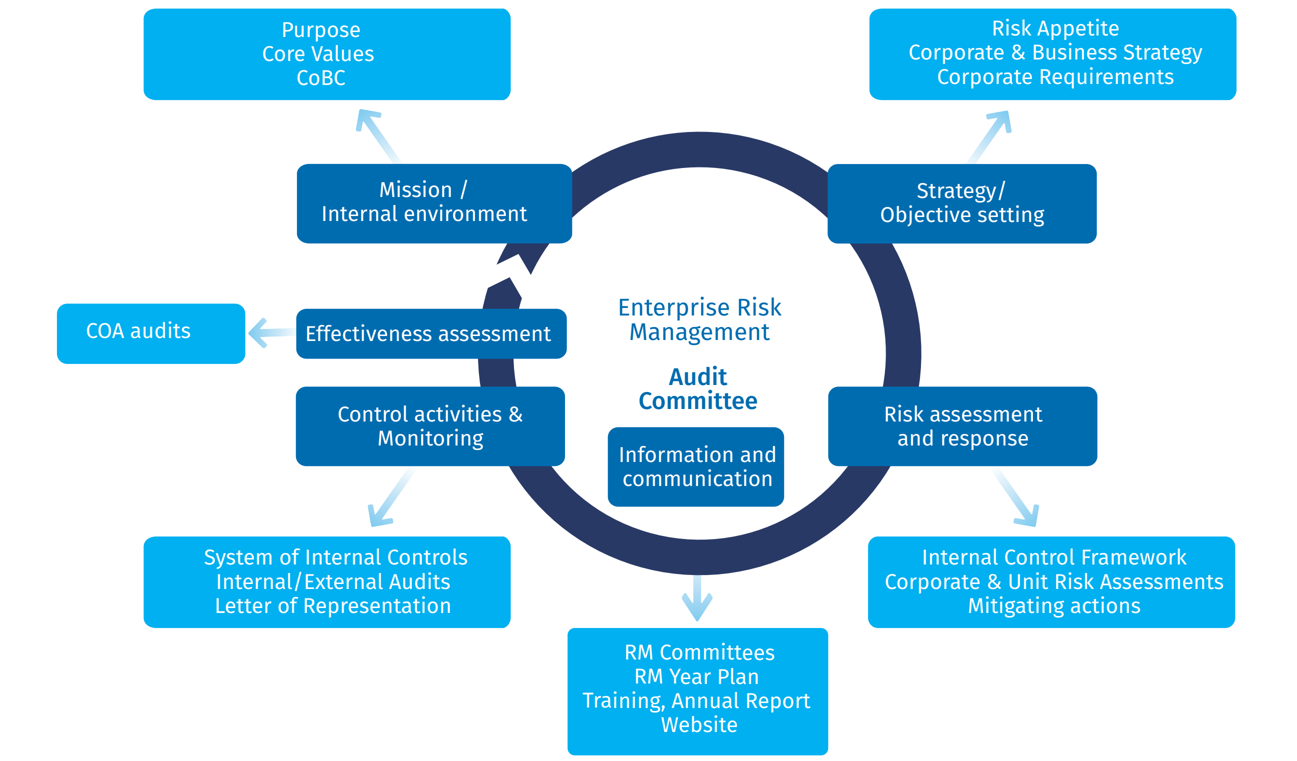
1 The four Alert cases 'under investigation' in 2018 were resolved in 2019: one was substantiated, three were not.

Risk management

The Managing Board is accountable for the management of all risks associated with our company's strategy and activities. To this end, appropriate risk management and internal control systems are in place. The responsibility for identifying and managing risks lies with DSM's individual units.

The units are supported by the Group Risk Management (GRM) department and are regularly assessed by the Corporate Operational Audit (COA) department. Both GRM and COA report directly to the CFO, and COA has direct access to the CEO as well as to the Audit Committee of the Supervisory Board.

DSM Risk Management Cycle



A well-embedded risk management and internal control system and accompanying organization are in place in all units. This approach is based on the COSO-ERM[1] framework. This chapter is structured accordingly (see 'DSM Risk Management Cycle' above).

It is the responsibility of the business groups, support functions, functional excellence departments and regions within DSM (the units) to set up, operate, maintain and monitor an appropriate risk management and internal control system within their area of responsibility. This responsibility includes the identification and management of risks. The units are supported in this by risk managers. GRM performs independent reviews based on a set of defined key controls. COA closes the loop through regular assessments of the design and operational effectiveness of the risk management and internal control system.

Mission / Internal environment

Our purpose, core values and business principles are key elements of the internal environment for risk management and form the starting point of the risk management cycle. Our core values are directly related to our purpose of creating brighter lives for all. All our employees receive regular training on values and business principles in line with the Code of Business Conduct.

Strategy / Objective setting

Following the establishment of the corporate strategy, the Executive Committee decides on the risk appetite, which is reviewed annually. In 2019, our risk appetite regarding 'Generic/strategic' risks shifted slightly to 'Open/Hungry' (see figure below).

[1] Committee of Sponsoring Organizations of the Treadway Commission — Enterprise Risk Management.

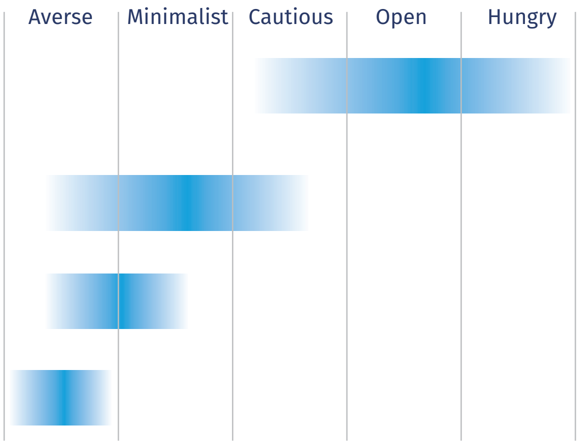
DSM's risk appetite

Generic/strategic
(e.g., Innovation, People/organization/culture, Intellectual property, Raw materials/energy, Price/availability, Acquisitions and partnerships, Divestments, Brand)

Operational
(e.g., Reputation, Customer, Project management, Production process, (Information-) Security, Business continuity, Product liability, Safety, Health and Environment)

Financial and reporting
(e.g., Liquidity and market, Reporting integrity, Pensions, Financial risks e.g., credit, tax)

Legal and compliance
(e.g., Legal non-compliance, Non-compliance with DSM Requirements)



In line with the corporate strategy, the corporate requirements are defined and maintained. The corporate requirements provide:

- Risk-based guidance for managing common business and process risks
- Standards to increase the efficiency of our main processes

Risk assessment and response

Risk assessments are carried out at various levels in the organization. We take a standard but flexible, seven-step approach to risk assessments:

- Risk assessment planning
- Preparation
- Risk identification and clustering
- Risk rating
- Evaluation and risk response
- Reporting
- Periodic monitoring and reviewing

Both short-term risks (up to and including three years) and emerging risks (3–30 years) in the risk areas Generic/strategic, Operational, Financial and reporting and Legal and compliance are the focus of our risk assessments. To continuously improve the effectiveness of our risk assessment process, a Risk Assessment Manual is made available and a risk assessment training program for the facilitation and execution of risk assessments is rolled out.

Corporate Risk Assessment
We periodically conduct a Corporate Risk Assessment (CRA), which is the responsibility of the Managing Board. As part of this assessment, the Executive Committee (EC) reviews and agrees on the short-term top risks as well as emerging risks. The EC also agrees on how to mitigate and monitor these. The outcome of the CRA is reported to, and discussed with, the Audit Committee of the Supervisory Board annually, see 'Top risks' table on page 120.

Unit Risk Assessments
The DSM units (the business groups, support functions, functional excellence departments and regions) also conduct various types of risk assessments. Most risk assessments are carried out by cross-functional teams. These teams include experienced facilitators as well as experts who can challenge assumptions in order to help improve the quality of these risk assessments.

Business Risk Assessments focus on risks that could jeopardize the attainment of our strategic goals.

Process Risk Assessments are intended to make our processes as robust and fraud-proof as possible.

Project Risk Assessments focus on specific projects and are updated throughout project execution to secure successful delivery of project objectives and value creation for the company.

Complementing the above, additional specific risk assessments may be performed for areas such as Safety, Health, Environment, Climate, Security and topics such as complex organizational changes.

Control activities

Control activities are performed at all levels of the company, at various stages within the business processes. They are preventive or investigative in nature and may encompass a range of manual and (semi-) automated controls such as policies, procedures, authorizations, verifications and business performance reviews. These controls also help us to avoid fraud and reputational damage and support the statements of the Managing Board.

We apply a standard approach for monitoring Enterprise Resource Planning (ERP) system access controls, user provisioning, privileged user management and Segregation of Duties for the majority of our units.

Monitoring activities

At different levels and within different functions in the organization monitoring activities are performed, such as:

- The execution of the standard key controls as included in our Internal Control Framework (ICF) is monitored by unit management. Group Risk Management (GRM) additionally provides independent testing of the effectiveness of those key controls, and evaluates the impact of control deficiencies
- Total risk overview is reported by the units via the Letter of Representation (LoR) process. The units report on compliance with applicable laws and regulations, our Code of Business Conduct, corporate policies and corporate requirements and related risks, besides more generic/strategic risks. The review also tracks progress in the implementation of defined mitigation actions as well as monitoring incidents that occurred during the year
- Tracking of timely completion of DSM values training
- Review of incidents, fraud cases, Alert cases, results from phishing tests and the cybersecurity dashboard
- Peer audits on specific topics, such as the Purchase to Pay process and SHE
- Audits by customers, suppliers, or other external audits

The outcome of the monitoring activities is regularly discussed in unit risk management committees and the Audit Committee of the Supervisory Board to evaluate and manage the risk profile of the units and of the company as a whole.

Information and communication

We strive for an open communication culture and have various channels for communicating risk data and information both internally and externally. These channels enable our organization to provide relevant information for decision-making, such as the status of the risk profile and the effectiveness of the risk management system.

Discussions of risks are integrated into normal business discussions, as these are an intrinsic part of doing business. However, certain specific structures are in place to ensure that special attention is paid to parts of the risk management cycle:

- The risk management committees of the units
- The global fraud committee
- The global issue committee
- The Alert procedure
- Dedicated discussions with the EC on the CRA and the outcome of the LoR process
- The Audit Committee of the Supervisory Board

Effectiveness assessment

We use a three-lines-of-defense model to manage risks effectively.

First line: the responsibility for identifying and managing risks, including all internal controls activities, lies with the individual units.

Second line: GRM designs, implements and maintains the overall risk management framework for the company. GRM assesses the overall effectiveness of the risk management and internal control activities and provides insight into the overall risk profile of the company. GRM also supports the first line of defense in risk identification and management by designing and developing standards, systems and tools. Besides GRM, there are also other departments acting as a second line of defense, for instance, DSM Operations & Responsible Care (Manufacturing, SHE & Security), and Group Control & Accounting.

Third line: COA conducts independent audits/reviews, some of these being unannounced. The scope and frequency of COA audits is set according to the ranking of the auditable units in terms of the magnitude of risk, based on a limited number of defined characteristics. This program is agreed by the EC and the Audit Committee of the Supervisory Board.

Enhancement of the risk management system

During 2019, the following main improvements were made to our risk management framework:

- We further strengthened the ICF with the support of all business groups, GRM and all support functions. The maturity of both the activities of the first and second line of defense was increased. Additionally, more legal entities adopted ICF standards
- A new values training was launched on 'Respectful Behavior', which is mandatory for all employees
- Due to the addition of two new Life Saving Rules (LSR), 'Transport and Warehouse Safety' and 'Hot Work', the LSR training was updated accordingly
- GRM and COA expanded their review of fraud cases, incidents, COA findings, and Alert cases to also identify trends, underline root causes and define mitigating actions
- We improved the LoR process by giving more guidance on the reporting and the description of short-term risks and emerging risks

DSM risk profile

The risk management activities as performed by the first line of defense as well as the reviews/audits conducted by the second and third line of defense in 2019 did not indicate any material failings in the design and effectiveness of our risk management and internal control system.

The consolidated overview of all the aforementioned is the basis for the 'Statements of the Managing Board' at the end of this risk management section.

Top risks

The table below shows the four most important risks that might prevent us from achieving the targets defined in Strategy 2021, including the actions that we are taking to reduce our exposure further. These risks are labeled as Top risks as the exposure on DSM's EBITDA is an indicative € 30 million or more, or because they have a major non-financial impact such as on reputation.

Emerging risks

The following emerging risks have been identified by the Executive Committee. Where relevant, actions have been defined to anticipate them in a timely manner.

Emerging risk 1: Our Nutrition and Materials markets may be disrupted by longer-term changes driven by:

- New food preferences / food systems
- Climate transition risks impacting our end-markets, such as animal protein
- Innovations such as 3D printing
- New mobility and transport options

This could create a risk if the speed of change in the world is higher than our speed of adaptation to it.

Emerging risk 2: We may not be able to adjust our own operations and supply chain fast enough to deal with environmental and climate risks (both physical and transition risks).

Emerging risk 3: Risk of increasing polarization in the world. This could lead to new legislation and new regulations having a negative impact for DSM (such as increasing taxation, trade barriers, and labor costs).

At the same time, these emerging risks will also offer new opportunities for our Brighter Living Solutions.

Other important risks

Besides the top risks and the emerging risks, there are also specific market-related risks. For example, our Animal Health & Nutrition business was impacted by outbreaks of livestock diseases in 2019. Although our market position and product portfolio allow us to take advantage of opportunities arising in other geographical areas as well as from other species, the impact might not fully be offset.

There are also more generic business risks, such as business continuity, sourcing, product liability, intellectual property, tax and digitalization risks. Our risk management and internal control system is setup to adequately monitor and respond to these risks.

We did not identify any significant company-specific risks associated with Brexit and the ongoing trade war between the US and China, other than the general uncertainties around, for example, currency and other economic developments.

Top risks, status and related mitigating actions in progress

People, organization and culture

There is a risk that we might not be able to attract, retain and develop the workforce required to deliver on our strategy, to deliver above-market growth and retain strong operational efficiency. Progress has been made to create a more international and diverse workforce and steps have been taken to build more inclusive, agile and high-performing teams. In the current labor market, attracting and retaining talents with the right level of expertise, background and mindset requires constant attention and efforts and therefore we still consider this a top risk.

Further mitigations: All business groups have customer-centricity programs running, including upgrading the sales force and evolving to become a more agile organization. We are building competences to improve our understanding of (local) markets — for example, through setting up specialist functions in Animal Nutrition & Health to address a wider range of species and to pursue new health solutions.

Product portfolio and purpose-driven growth

There is a risk that we might not be able to deliver above-average organic growth aligned to our strategic targets. We are continuously investing in our existing product portfolio and in large innovation projects, and focus on growth opportunities in the domains Nutrition & Health, Climate & Energy and Resources & Circularity. Top innovation projects are closely monitored, with a well-established stage-gate approach and regular status reviews with the Executive Committee. Despite the processes in place, time-to-market remains uncertain. We also aim to execute value-creating M&A, predominantly in nutrition, to further develop our portfolio. All M&A activities are managed centrally, and staffing is available to support flawless integration. However, as distraction from the running business cannot fully be prevented and as the time-to-market remains uncertain, especially for large innovation projects, this is still a top risk for us.

Further mitigations: Where possible, the success rate and time-to-market of running innovation projects is improved via customer and/or innovation alliances. To support our innovation efforts, projects are running to increase the efficiency and effectiveness of our R&D activities by applying digital technologies.

Market environment and competitive position

There is a risk that we might not meet our strategic targets due to increasing competition, especially from low-cost/margin players. Therefore, we have created a streamlined and simplified business portfolio and a good platform for growth. As a result of continued investments in innovation and acquisitions, our product and service portfolio has broadened, which allows us to serve a broader customer base better and to differentiate ourselves from our competition.

To maintain our cost position, we continue to take inefficiencies out of the value chain by applying the DSM Integral Continuous Improvement (DICI) approach. We have expanded different capacities in a cost-effective way, for example, the vitamin E capacity added through our joint venture with Nenter. Nonetheless, the risk remains of facing increased competition for some product-market combinations.

Further mitigations: To differentiate ourselves from our competitors, we continue to expand our product portfolios so as to address emerging market needs, such as bio-based materials and plant-based nutritional products. Customer excellence projects will be set up to improve the end-to-end experience for our customers.

Operating in a digital world

There is a risk that we might be negatively impacted by cybercrime, and therefore we continued to strengthen our cybersecurity in 2019. Following risk assessments, a multi-year program is being rolled out focusing on improving our cybersecurity capabilities in three areas: information technology, operations technology, and R&D laboratory systems. The program is addressing cyber security by looking at risk identification, protection, detection, response and recovery taking account of people, technology and process dimensions.

As cyberthreats continue to develop and become more sophisticated, and with the increase of the number of digital initiatives within DSM, the risk remains despite the progress made in this area.

Further mitigations: We will continue the implementation of our multi-year cybersecurity program. In parallel, additional projects are planned for 2020, including a new cybersecurity awareness campaign, and putting improved monitoring and reporting in place.

Statements of the Managing Board

The Managing Board is responsible for the design and operation of the internal risk management and control systems. In discharging this responsibility, the Managing Board has made a systematic assessment of the effectiveness of the design and operation of the internal control and risk management systems.

On the basis of this report and in accordance with best practice 1.4.3 of the Dutch Corporate Governance Code of December 2016, and Article 5:25c of the Financial Supervision Act, the aforementioned assessment and the current state of affairs, to the best of its knowledge and belief, the Managing Board confirms that:

- The internal risk management and control systems of the company provide reasonable assurance that financial reporting does not contain any material inaccuracies
- There have been no material failings in the effectiveness of the internal risk management and control systems of the company
- There are no material risks or uncertainties that could reasonably be expected to have a material adverse effect on the continuity of DSM's operations in the coming twelve months
- There is a reasonable expectation that DSM will be able to continue its operations and meet its liabilities for at least twelve months, therefore it is appropriate to adopt the going concern basis in preparing the financial reporting

It should be noted that the above does not imply that these systems and procedures provide absolute assurance as to the realization of operational and strategic business objectives, or that they can prevent all misstatements, inaccuracies, errors, fraud and non-compliances with legislation, rules and regulations. Nor can they provide certainty that we will achieve our objectives.

In view of all of the above, the Managing Board confirms that, to the best of its knowledge and belief, the financial statements give a true and fair view of the assets, liabilities, financial position and profit or loss of the company, and that the management report includes a fair review of the position at the balance sheet date and the development and performance of the business during the financial year, together with a description of the principal risks and uncertainties that the company faces.

Heerlen, 26 February 2020

The Managing Board
Geraldine Matchett, Co-CEO
Dimitri de Vreeze, Co-CEO

Report by the Supervisory Board

Introduction by the Chair

"We are very grateful for Feike's tremendous contribution to DSM. He has demonstrated that a company can deliver financial and sustainability returns while creating value and purpose for all its stakeholders."

Rob Routs, Chair of the Supervisory Board

Dear reader,

The year 2019 was a special one for my colleagues and me on the Supervisory Board. With Feike indicating, after 20 years on the Managing Board and almost 13 years as CEO, that he intended to step down, we went through the process of identifying and announcing his successor. While we were in this process, DSM delivered a good financial performance in 2019, while also engaging in quite some M&A activity. All in all, it was an intense year, as indicated by our increased meeting frequency, and we are proud of how our company navigated all of this.

Under Feike's visionary leadership, we have gone through a significant transformation, from a bulk chemicals company into one focused on Nutrition, Health and Sustainable Living, generating a Total Shareholder Return of about 400%. During the course of more than a decade we have significantly expanded our nutrition business, divested our non-core bulk chemical activities, and upgraded our Materials portfolio. Our company transformed itself into a financially healthy, high-performing, sustainable, and innovative company. Today, DSM is a truly global company with a diverse and engaged employee and leadership base, creating value for all our stakeholders. We are very grateful for Feike's tremendous contribution to DSM. He has demonstrated that a company can deliver financial and sustainability returns while creating value and purpose for all stakeholders. We all wish him the very best for the future.

After a thorough process and external benchmarking, including the advice and input of an international search firm, we concluded that we had the very best candidates in-house. The Supervisory Board therefore decided to appoint both Geraldine and Dimitri, Feike's two Managing Board colleagues, in a joint leadership as Co-CEOs. Together with Feike, they have driven the transformation and successes of the business in a highly collaborative and effective way, creating considerable value for all stakeholders. Together, they will maintain the focus on business performance, financial discipline, innovation, sustainability, and people, as DSM continues its journey. This joint leadership structure is rooted in the long history of their collaboration, which we have keenly observed over the years, and is expected to create a strong basis for continued profitable growth. In conjunction with their Co-CEO role, Geraldine Matchett will retain her responsibilities as CFO and Dimitri de Vreeze will hold the COO responsibilities.

DSM reported a good financial performance in 2019, and achieved key milestones in the first year of Strategy 2021. Besides organic growth, part of Strategy 2021 is inorganic growth, predominantly in Nutrition. As a Supervisory Board, we spent a considerable amount of time discussing M&A strategy, developments in our sectors and opportunities. We are pleased with the additions to the company we were able to make this year: the expansion of our share in Andre Pectin, the creation of a 75:25 partnership with Nenter, and the acquisitions of AVA, Royal CSK and SRF. We look forward to next steps in this area.

As this Report also shows, DSM wants to deliver on People, Planet and Profit. In all areas, great strides were again made in 2019 as described throughout this Report. Within People, there is one topic that always has our close attention, which is Safety. This is a core value at DSM and very close to our hearts as a Supervisory Board. We discussed the safety performance at each and every meeting in 2019, trying to help the Executive Committee with our own experiences and best practices, and understanding the trends in the indicators. Although every incident in 2019 was still one too many, as a Supervisory Board we are very happy to see an improved safety performance in 2019. As Board members, we will continue to focus on safety going forward, as this is a topic that requires continuous commitment every day.

Looking back at 2019, we are again grateful to all the employees and the leadership of the company for what they have delivered and how they have delivered it. It was again a good year for DSM, and our gratitude also goes to the many stakeholders who continue to place their trust in our company. DSM's businesses are well positioned to capitalize on many strong fundamental growth drivers related to the world's most pressing challenges, and DSM expects its large innovation programs to begin to contribute in 2020, and to further expand during 2021 and beyond.

Supervisory Board Report

This Report provides further information on the way the Supervisory Board performed its duties in 2019. This concerns supervising the policy pursued by the Managing Board, the Managing Board's performance of its managerial duties, and the general course of affairs within our company and its businesses, as well as assisting the Managing Board with advice, either upon request or proactively. Finally, these duties also include assessing the Managing Board's performance and ensuring that their remuneration is in line with that performance and that it provides the appropriate incentives. Since the inception of an Executive Committee, the Supervisory Board has also been responsible for ensuring that the checks and balances that are part of the two-tier governance system are still taken into account, paying specific attention to the dynamics between the Managing Board and the Executive Committee.

The responsibility of supervising the policy pursued by the Managing Board includes evaluating the way the Managing Board implements DSM's strategy for long-term value creation and promotes a culture aimed at that value. Since the company's mission is to create brighter lives for all, long-term value creation is embedded both in Strategy 2021: *Growth & Value - Purpose led, Performance driven* and in our company culture. This is described in the chapters 'Strategy 2021' on page 16, 'People' on page 40 and 'Corporate governance and risk management' on page 106.

Composition of the Supervisory Board

The composition of DSM's Supervisory Board is diverse in gender, nationality, background, knowledge and experience. The Board comprises four men and four women. Two members are Dutch, two American, one Dutch-American, one British, one Singaporean and one Australian. The Board's current members are Rob Routs (Chair), Pauline van der Meer Mohr (Deputy Chair), Victoria Haynes, Eileen Kennedy, Frits van Paasschen, Pradeep Pant, John Ramsay and Erica Mann. For detailed information on their backgrounds, see the company website and 'Supervisory Board and Managing Board Royal DSM' on page 142 of this Report.

Following best practice 2.1.10 of the Dutch Corporate Governance Code, the Supervisory Board establishes that its members are able to act critically and independently of one another, the Managing Board and any particular interests involved. To safeguard this, the Supervisory Board is composed in such a way that all its members are independent in the meaning of best practice 2.1.8 of the Dutch Corporate Governance Code.

The targeted profile of the Supervisory Board is reflected in its regulations, which are published on the company website under 'Corporate Governance'. The Supervisory Board has four committees to cover key areas in greater detail: auditing, nominations (to the Supervisory Board and Managing Board), remuneration (of the Supervisory Board and Managing Board), and sustainability. Information on these committees is given elsewhere in this chapter. The charters of the committees are published on the company website under 'Corporate Governance'.

Relationship and stakeholder management

In performing its duties, the Supervisory Board acts in accordance with the interests of the company and the business connected with it, taking into consideration the interests of the company's stakeholders. The Chair of the Supervisory Board is in regular close contact with the (Co-)CEO(s)/Chairman of the Managing Board, as is the Chair of the Audit Committee with the CFO.

Furthermore, the Supervisory Board regularly interacts with members of the Executive Committee who attend Supervisory Board meetings and participate in the yearly site visit of the Supervisory Board.

The Supervisory Board interacts with our employees on various occasions and in various contexts. The Supervisory Board regularly receives information on relevant topics from senior leaders and experts in the company during committee meetings, full Supervisory Board meetings, annual site visits, and also as part of their ongoing professional education. In 2019, this was the case with respect to merger and acquisition opportunities; innovation in general and large innovation projects like Project Clean Cow, Veramaris®, Niaga® and fermentative Stevia; and digital and cybersecurity. During its annual site visit, the Supervisory Board actively takes the opportunity to interact with employees at different levels, from the shop floor to senior leadership, thus collecting valuable information and insights from various sources across the company.

Direct, one-on-one contact between Supervisory Board members and Managing Board and Executive Committee members generally follows naturally from topics discussed in the meetings of the Supervisory Board. These discussions draw on the expertise of individual Supervisory Board members, whose advice is sought on a wide range of specialist topics as required. Supervisory Board members also have direct contact with other employees in the course of site visits and specifically arranged meetings. In 2019, John Ramsay visited our Global Service Center in Hyderabad (India) where — given his extensive knowledge and experience in the field of finance and accounting — he reviewed various aspects of the captive center's performance, plans and strategies. Frits van Paasschen attended an afternoon session with our Chief Digital Officer and reviewed — in line with his broad experience as a global business leader in both consumer markets and the service industry in various parts of the world — our approach to digital transformation, as well as giving advice on building an external ecosystem of digital advisors. Pradeep Pant, who is based in Singapore and has extensive knowledge of and experience with Asian markets, continued to be in regular contact with our senior management in that region.

The Supervisory Board takes an active interest in maintaining a good understanding of our stakeholders and their positions on various topics related to the company's areas of business. This includes the perceptions of our shareholders. The Supervisory Board is informed of the position of other DSM stakeholders by the Managing Board. In addition, the Supervisory Board collects such information through its own network.

DSM Supervisory Board: key data and attendance records

	Rob Routs (C)	Pauline van der Meer Mohr (DC)	Eileen Kennedy	Victoria Haynes	Pradeep Pant	John Ramsay	Frits van Paasschen	Erica Mann
Diversity								
Year of birth	1946	1960	1947	1947	1953	1957	1961	1958
Gender	Male	Female	Female	Female	Male	Male	Male	Female
Geography	Europe	Europe	North America	North America	Asia	Europe	Europe / North America	Oceania
Tenure								
Initial appointment	2010	2011	2012	2012	2016	2017	2017	2019
Latest reappointment	2018	2019	2016	2016	n.a.	n.a.	n.a.	n.a.
End of current term	2020	2021	2020	2020	2020	2021	2021	2023
Reappointment possible?	Y	Y	Y	Y	Y	Y	Y	Y
Attendance								
Committee memberships	NomCo (C) RemCo	RemCo (C) NomCo	SustCo (C) NomCo	AC RemCo	AC SustCo	AC (C) RemCo	AC SustCo	AC SustCo
Attendance SB meetings[1]	100%	92%[4]	100%	100%	92%[2]	100%	100%	100%
Attendance Committee meetings	NomCo 100% RemCo 75%[3]	NomCo 67% RemCo 100%[4]	NomCo 100% SustCo 100%	AC 100% RemCo 100%	AC 100% SustCo 100%	AC 100% RemCo 100%	AC 100% SustCo 100%	AC 75% SustCo 50%[5]

1 Attendance is reflected for the six Supervisory Board (SB) meetings and seven conference calls held in 2019. In addition to the seven conference calls there were also two SB calls in 2019 for which the decision-making had been mandated by the SB to the Chair of the Board and the Chair of the Audit Committee, who both attended these calls.
2 Pradeep Pant missed an extra SB call planned at short notice to discuss a project update. Pradeep Pant was updated a day later by the Chair.
3 Due to a misunderstanding regarding timings, Rob Routs did not dial in for one of the Remuneration Committee meetings.
4 Pauline van der Meer Mohr missed the Nomination Committee meeting on 3 December and the SB meeting on 4 December due to a prior commitment.
5 Erica Mann became member of the Supervisory Board following her appointment at the 2019 General Meeting of Shareholders. Erica Mann was unable to participate in the Audit Committee call on 4 November and the Sustainability Committee of 3 December due to prior commitments.

DSM Supervisory Board: key competences

	Rob Routs (C)	Pauline van der Meer Mohr (DC)	Eileen Kennedy	Victoria Haynes	Pradeep Pant	John Ramsay	Frits van Paasschen	Erica Mann
Competences								
General management	x	x	x	x	x	x	x	x
Finance/ accounting/ auditing	x					x		
Strategy	x	x	x	x	x	x	x	x
Risk	x	x				x		
Marketing & Sales					x		x	x
Operations & manufacturing	x			x				x
R&D/ Innovation/ Technology	x		x	x				
Safety	x	x						
Sustainability & environment	x	x	x				x	
Emerging economies					x	x	x	x
People & Organization	x	x			x			x
IT/digital							x	
Governance/ compliance/ legal affairs	x	x	x			x		x
Public affairs		x						x
DSM's businesses	x	x	x	x	x			x

Supervision and advice

The Supervisory Board performs its duties of supervising and advising the Managing Board with respect both to recurring standard agenda items for Supervisory Board meetings and to specific topics that become relevant at any given point in time.

The most prominent regular agenda item is an update on business performance, financials and treasury topics. As part of this agenda item, the Supervisory Board tracks the company's financial performance, approves the annual Finance and Capital Expenditure Plan, and deliberates on any additional treasury topics as needed. In 2019, the Supervisory Board discussed and approved the € 1 billion share buy-back program, reflecting the company's strong balance sheet and resilient business, as well as the usual share buy-back programs to cover commitments under share-based compensation plans and the stock dividend.

In line with Strategy 2021, the Supervisory Board regularly discussed our M&A strategy and relevant developments within our sectors. The Supervisory Board was actively involved in the process of reviewing several potential M&A targets. This eventually led to the expansion of our share in Andre Pectin, the creation of a 75:25 partnership with Nenter, and the acquisitions of AVA, Royal CSK and SRF.

At the Board's request, the Supervisory Board was updated on the company's insurances, global manufacturing status, quality control and quality management, among other subjects. Digital aiming points and a digital organization are being rolled out throughout the company, contributing to digital transformation. Given the importance of digitalization, the Supervisory Board did a deep dive on digital. In addition, the Supervisory Board was updated and involved in DSM's Innovation projects, such as Project Clean Cow, Veramaris®, Niaga® and fermentative Stevia. A continuous education session was dedicated to updating the Supervisory Board on cybersecurity risks, learning from experiences of other companies. Closing the loop on last year's visit to India and the Supervisory Board's feedback following that visit, an updated strategy for DSM in India was presented.

DSM Supervisory Board (from left to right): John Ramsay, Erica Mann, Frits van Paasschen, Eileen Kennedy, Pauline van der Meer Mohr (Deputy Chair), Victoria Haynes, Rob Routs (Chair) and Pradeep Pant.

Site visits

Every year, the Supervisory Board visits DSM sites in a particular region. This fosters interaction with employees across different areas of the company and provides Supervisory Board members with opportunities for continuing education. This year's visit took the Supervisory Board to Singapore.

The visit provided an overview of the company's presence in Singapore and the broader South-East Asian (SEA) region. Drawing on the insights of the internal and external speakers, the Board was updated on the economic situation in the region and the opportunities it has to offer. The visit deepened the Board's understanding of DSM's presence and business in Singapore and SEA.

The Singapore visit began with a general overview of the region by a specialist in international relations and an introduction to the company's activities in Singapore and SEA. An event was organized for the Supervisory Board members to meet the company's customers and stakeholders. The evening included a dialogue on sustainability and leadership between Feike Sijbesma and Sunny Verghese (CEO of OLAM International and Chair of the World Business Council for Sustainable Development).

The Board also visited our Singaporean sites (DSM Dyneema and DSM Nutritional Products, Human Nutrition & Health). To stress the importance of customer-centricity and innovation, the Supervisory Board aims to meet customers and other stakeholders during each site visit. In Singapore, the Board visited Schneider's Innovation Hub, the Unilever Foundry and the headquarters of OLAM International (a leading food and agro business company). The Board also met with officials from the Government of Singapore and the Singapore Economic Development Board, as well as with A*STAR (the Agency for Science and Technology and Research).

The visit included a townhall meeting that was audiocast across our sites in SEA, Japan and Korea.

At the end of the visit, time was taken to reflect on the site visit with the participating Executive Committee members. Supervisory Board members shared their impressions and offered specific advice about doing business in SEA. Both the Supervisory Board and the Executive Committee concurred on the relevance of SEA for the company and the importance of continuing to strengthen our presence there.

Supervisory Board meetings and performance evaluation

In 2019, the Supervisory Board held its five regular meetings and one regular call in the presence of the Managing Board, as well as one additional meeting and six additional calls, partly in the presence of the Managing Board. The additional meetings and calls were needed to discuss possible acquisitions and the CEO succession. Information on attendance of Board and Committee meetings can be found in this 'Supervisory Board Report' on page 124.

The Supervisory Board also convenes in the absence of the Managing Board, which usually happens before each meeting.

An evaluation of the Supervisory Board is performed once every three years by an external advisor; this was the case in 2019. In the other two years, the evaluation of the Supervisory Board is performed by means of a self-assessment consisting of a written questionnaire, followed by in-depth, one-on-one interviews between the Chair and individual Supervisory Board members.

While the Managing Board's performance is (indirectly) also assessed as part of the evaluation, this happens throughout the year as part of the discussions on succession planning in the Nomination Committee, and particularly when the performance appraisals of Managing Board members are discussed, as well as their performance versus their individual targets in the Remuneration Committee. The Nomination and Remuneration Committees report back on these discussions to the Supervisory Board.

The overall feedback from the evaluation in 2019 was positive. The Supervisory Board used an external firm that conducts multiple board evaluations and could therefore benchmark the Board's evaluation against that of other Boards. It was pleasing to note that DSM's Supervisory Board was among the highest scoring Boards of the 100 most recently conducted board evaluations. Some points for improvement were noted, although none of a fundamental nature. The evaluation delivered the following highlights and recommendations. All members strongly value the composition of the Supervisory Board in all its dimensions. Size and (gender) diversity are to be maintained, as well as the strong link to Dutch corporate governance. There is a sense of collegiality and mutual trust, disagreement is constructive and respectful, and there is preparedness to challenge, where appropriate, both within the Board and with management. While the strategic discussions (and the quality of their preparation) are highly appreciated, there might be an opportunity to carve out some more time for 'holistic' reflection. Finally, given the global nature of the Board, the timing of meetings and calls will benefit from as much time zone alignment as possible.

Committees

The Supervisory Board has four committees to cover key areas in greater detail: nominations, remuneration, sustainability and auditing. These are described in more detail below.

Board nominations

The Nomination Committee comprises Rob Routs (Chair), Eileen Kennedy and Pauline van der Meer Mohr. Feike Sijbesma and Judith Wiese, Executive Vice President Group People & Organization, were also involved in this Committee's discussions. The Committee met three times in 2019. The recommendations and minutes of all Nomination Committee meetings were shared with the entire Supervisory Board. This feedback included advice and recommendations regarding topics to be approved by the full Supervisory Board. The Supervisory Board also has access to all the meeting materials posted for the Nomination Committee meetings.

In 2019, nomination discussions focused on succession planning for both the Managing Board and the Supervisory Board. With respect to the Managing Board, the discussions focused on the talent pipeline available for the succession of Managing Board members, especially in view of the CEO succession. Given the importance of the decision on CEO succession, these discussions were mainly conducted in the full Supervisory Board. Some preparatory discussions took place in the Nomination Committee, including seeking the advice and input of an international search firm. The Nomination Committee discussions eventually led to the recommendation to the Board that the company had the best succession candidates in-house. As of that moment, discussions about the CEO succession were held in the full Supervisory Board.

As in other years, the Supervisory Board established that the composition of the Managing Board is and will stay diverse in nationality, gender, background, expertise and experience, and that it provides a good foundation to support all clusters and business groups in achieving their targets and thus contributing to the company strategy. For detailed background information on all Managing Board members, see the company website under 'Corporate Governance' and in the 'Managing Board' section on page 143 of this Report.

Taking into account the Supervisory Board profile as laid down in the Supervisory Board regulations, the Nomination Committee continued discussions on the overall composition of the Supervisory Board and discussed succession planning for the Supervisory Board. In order to maintain a strong profile in international business experience and executive leadership, the Supervisory Board decided to nominate Thomas Leysen for appointment at the 2020 Annual General Meeting of Shareholders. Mr. Leysen also brings extensive experience in making businesses more sustainable. To facilitate a smooth transfer and continuity in view of the CEO change, the Supervisory Board also decided to propose the reappointment of Rob Routs for a two-year term. Other proposed reappointments at the 2020 Annual General Meeting of Shareholders include Eileen Kennedy (for a two-year term) and Pradeep Pant (for a four-year term). Victoria Haynes is not available for reappointment. Both Eileen Kennedy and Pradeep Pant help maintain the Board's strong profile in the area of nutrition, from an academic as well as an FMCG perspective. Furthermore, Pradeep Pant brings many years of experience in operating in Asian markets.

Board remuneration

The Remuneration Committee had four meetings in 2019. Pauline van der Meer Mohr (Chair), Victoria Haynes, Rob Routs and John Ramsay are members of this committee. Recommendations and minutes of the Remuneration Committee meetings were shared with the full Supervisory Board and were used to determine the final remuneration of the members of the Managing Board. The Supervisory Board also has access to all the meeting materials provided for the Remuneration Committee meetings. For more information on the remuneration policy, see the company website. For the implementation of that policy in 2019, see the 'Remuneration report 2019' on page 130.

Discussions focused on the performance and the related remuneration of the members of the Managing Board, in respect of both company and individual performance. In 2019, time was spent on remuneration topics related to the CEO succession, on the implications of the European Shareholder Directive and on equal pay. For the latter, see 'People — Equal pay / Gender pay gap' on page 43. The performance and remuneration of the Executive Committee members were also shared with the Remuneration Committee. Feike Sijbesma and Judith Wiese were also partly involved in these discussions.

Sustainability

The Sustainability Committee prepares the Supervisory Board's discussions on sustainability topics. The Sustainability Committee met three times in 2019. This Committee comprises Eileen Kennedy (Chair), Pradeep Pant, Frits van Paasschen and Erica Mann. The Chair of the Supervisory Board has a standing invitation and participated in all meetings. The recommendations and minutes of these meetings were shared and discussed with the entire Supervisory Board during its meetings with the Managing Board. The Supervisory Board also has access to all the meeting materials provided for the Sustainability Committee meetings. The feedback from the Committee to the full Board included advice and recommendations regarding topics to be approved by the Supervisory Board, in particular the sustainability reporting in this Report. Taking into consideration the Assurance report of the independent auditor on the sustainability information by KPMG on page 242 of this Report, the full Supervisory Board approved the reporting in these sections on 27 February 2020. The Sustainability Information complies with the Standards of the Global Reporting Initiative and our internal reporting criteria, which are included in this Report, and is also aligned with the international Integrated Reporting Council <IR> Framework where possible.

During the year, recurring topics were the company's performance against its People and Planet aspirations, with a focus on safety, Brighter Living Solutions (including design and testing of new metrics to measure our Sustainability Portfolio), the company's Materiality matrix, and 'Inclusion & Diversity'. Through these discussions, the Sustainability Committee followed up on the progress made with the implementation of the sustainability and safety aspirations set as part of Strategy 2021. Deep dives were made into several topics. One was healthy diets, following among others the publication of the 2019 EAT-Lancet report. The Committee also discussed the update of DSM's Responsible Care plan, more details of which can be found in 'Planet' on page 51. In terms of Inclusion & Diversity, the Committee discussed gender diversity and diversity through internationalizing roles and bringing in employees with international experience. It also discussed equal pay, see also 'People' on page 43.

Financials and auditing

The activities of the Supervisory Board in the area of financials and auditing are prepared by the Audit Committee. The Audit Committee met six times in 2019, three of these via conference call. John Ramsay (Chair), Victoria Haynes, Pradeep Pant, Frits van Paasschen and Erica Mann are members of the Audit Committee. The Chair of the Supervisory Board participated in all meetings and calls. All Supervisory Board members have a standing invitation to attend Audit Committee meetings; in 2019, most of them used this standing invitation for the two conference calls in which the financial developments and interim results for the first and third quarter were discussed, as these are not followed by a full Board meeting. The highlights and the minutes of all Audit Committee meetings were shared with the full Supervisory Board. This feedback included advice and recommendations regarding topics to be approved by the full Supervisory Board. In 2019, these included the approval of the 2020 COA Audit plan, the proposed reappointment of the external auditor (approved by the 2019 Annual General Meeting of Shareholders), and the proposed investments to further strengthen the cybersecurity of the company's operational technology. All Supervisory Board members also have access to all the meeting materials posted for the Audit Committee meetings.

Our external auditor KPMG and the CFO participated in the Audit Committee's meetings and calls. The CEO participated in the Audit Committee meetings and the call in which the half-year results were discussed. The managers responsible for corporate control, internal audit, risk management and compliance also participated in these two meetings and this call. The manager responsible for corporate control also participated in the two calls in which the financial developments and interim results for the first and third quarter were discussed. At least once a year, the Audit Committee meets with the external auditor without the Managing Board being present. Four such meetings took place in 2019.

The Committee had in-depth discussions on the company's financials; the Finance plan; the Capital Expenditure plan; dividend proposals; the financial statements and accounting policy changes. The € 1 billion share buy-back program was also part of those discussions. The discussions on internal risk management and control systems included the internal control framework, compliance with recommendations and observations made by internal and external auditors, and the role and functioning of COA, including the endorsement of its proposed audit plan for 2020, which was subsequently approved by the full Board, as well as the COA Vision 2021 document. As part of the Corporate Risk Assessment, the company's main risks and their mitigation were discussed. The Committee also discussed and evaluated cases submitted under the company whistleblower policy (DSM Alert), fraud cases, and on-going litigation. All these discussions included mitigating actions to prevent recurrence. Another recurring topic is our cybersecurity resilience, about which the Audit Committee is informed through a dashboard. A specific topic for the company's cybersecurity resilience has been the investments needed to keep the operational technology's cybersecurity fully up to standard.

Discussions were held with KPMG about the audit plan, management letter, audit report and financial statements for 2019, including management's judgments and key accounting estimates. In its management letter KPMG shared the outcome of its evaluation of the company's procedures and system of internal controls to the extent necessary within the scope of the audit of the financial statements. The observations of KPMG were presented along the pillars that support our in-control statement (for the 'Statements of the Managing Board' on page 121, and for a visualization of our control environment see 'Corporate governance — Introduction' on page 106). The management letter contained constructive recommendations for further strengthening of our internal controls. The most important element was KPMG's encouragement to continue the development of the pillar 'Internal Control Framework', including embedding robots, taking it to a higher level of maturity. With respect to robots, the company has already made good progress in Finance. Another observation by KPMG is that there has been progress in the domain of shared services in India, but that harmonizing processes remains an area for attention. In addition, we held discussions with KPMG about the topic of cybersecurity. In line with our own assessment, no material weaknesses were reported by KPMG.

Finally, in 2019, the Audit Committee formally evaluated the external auditor, and discussed the reappointment of KPMG, as well as the succession of the current lead external audit partner whose maximum five-year term will end after the completion of the 2019 audit. The proposal to reappoint KPMG is based on the Audit Committee's own assessment of KPMG, among others through discussions with KPMG in the absence of management, as well as the outcome of an evaluation among DSM executives. The Audit Committee conducts a more in-depth evaluation once every three years; in the two other years, a lighter evaluation is performed. For 2019, the lighter evaluation was performed. The auditor evaluations in prior years were positive and the outcome of the 2019 evaluation was positive as well.

Financial statements 2019

The Report by the Managing Board and the financial statements for 2019 were submitted by the Managing Board to the Supervisory Board, in accordance with the provisions of Article 30 of the Articles of Association, and were subsequently approved by the Supervisory Board on 26 February 2020. The financial statements were audited by KPMG, who issued an unqualified opinion (see the 'Independent auditor's report' on page 236). The Supervisory Board established that the external auditor was independent of DSM.

The Supervisory Board will submit the 2019 financial statements to the 2020 Annual General Meeting of Shareholders, and will propose that the shareholders adopt them and release the Managing Board from all liability in respect of its managerial activities and release the Supervisory Board from all liability in respect of its supervision of the Managing Board. The profit appropriation as proposed by the Managing Board and approved by the Supervisory Board is presented in the Profit section of this Report on page 58.

Remuneration report 2019

Introduction by the Chair of the Remuneration Committee

In 2019, DSM put forward a revised remuneration policy Managing Board and Supervisory Board Koninklijke DSM N.V. to the Annual General Meeting (AGM). We highly appreciated the dialogue with a number of our shareholders and representatives of institutional investors and the virtually unanimous support of the AGM (over 97% votes in favor). This first Remuneration report is in line with adjusted legislation and EU-guidelines based on the EU Shareholders' Rights Directive, and explains the application of the respective policies in 2019.

DSM is recognized as a purpose-led company, creating long-term value for all its stakeholders and society at large across the three dimensions of People, Planet and Profit. Our scientific expertise and innovation capabilities help us to find answers to some of the world's biggest challenges and to grow our business at the same time. The deployment of our Strategy 2021: *Growth & value – Purpose led, Performance driven* is supported by our remuneration policy. The design of our short and long-term incentive plans emphasizes long-term growth opportunities in the domains of Health, Nutrition and Sustainable Living. Targets on energy efficiency and greenhouse gas reduction, as well as a shift in portfolio toward Brighter Living Solutions, underpin our commitment to sustainability while ensuring financial performance in line with our key strategic goals (Adjusted EBITDA and Adjusted net operating free cash flow). Obviously, our remuneration policy is designed to attract and retain the talent we require to achieve our Strategy 2021 and sustainable success in the long term.

In 2019, DSM continued to deliver improvements in customer-centricity, large innovation projects, as well as cost control and operational excellence, resulting in sound results and reflected in remuneration as presented in this report.

This Remuneration report provides a summary of the remuneration policy Managing Board Koninklijke DSM N.V. and the Supervisory Board Koninklijke DSM N.V. respectively as well as an overview of the remuneration of the members of the Managing Board and the Supervisory Board in the financial year 2019. The full, legally superseding remuneration policy as approved by the AGM is published on our website. This report is prepared in accordance with the relevant parts of Section 135 Book 2 of the Dutch Civil Code.

Pauline van der Meer Mohr
Chair Remuneration Committee

Remuneration Managing Board Koninklijke DSM N.V. 2019

Summary remuneration policy Managing Board Koninklijke DSM N.V.

The remuneration policy Managing Board Koninklijke DSM N.V. (as approved by the 2019 AGM; 97.48% in favor) is designed to engage qualified leaders driving our purpose, enabling DSM to engage our people and other stakeholders and ultimately to achieve results – by putting customers first and by delivering on our promises. The policy provides a clear focus to improve company performance and to enhance purpose-led long-term value creation across multiple dimensions (profit: economical/financial, planet: ecological/sustainability and people: including societal) while acknowledging the societal context and recognizing the interests of all our stakeholders (especially our customers, employees, shareholders, as well as society at large).

The remuneration is linked to company and individual performance. Based on the short and long-term strategic objectives as well as our business drivers, results are measured on the basis of specified targets, balancing short- and long-term outcomes, serving the interests of all our stakeholders. In order to be competitive and to ensure alignment internally, Total Direct Remuneration offered by DSM approaches the median — from below — of a predefined peer group. Reward levels are benchmarked to the Dutch/European (no US companies) labor market peer group, while plan design of various reward components is reviewed against (the broader perspective of) best market practices.

Labor market peer group

European industry peers:	Dutch — AEX listed peers:
Clariant	Ahold Delhaize
Covestro	AkzoNobel
Evonik Industries	ASML
Givaudan	Heineken
Johnson Matthey	KPN
LANXESS	Philips
Lonza	Randstad
Solvay	Wolters Kluwer

The full version of the remuneration policy Managing Board Koninklijke DSM N.V., as approved by the 2019 AGM, is available on the company website. The following table specifies the elements of the remuneration policy describing purpose, design and link to our company strategy as well as their (potential) value.

PURPOSE	DESIGN AND LINK TO STRATEGY	VALUE
Goal The goal of DSM's remuneration policy Managing Board Koninklijke DSM N.V. is to offer an on target total remuneration package approaching the median — from below — of the labor market peer group.		
Total Direct Compensation Is the basis for benchmark efforts, i.e., the reference to the labor market peer group.	Includes base salary and variable income. Variable income concerns the performance-related Short-Term Incentive (STI) and the STI deferral & matching plan, as well as the Long-Term Incentive plan (LTI). In addition, Managing Board members are entitled to certain benefits.	Value of each respective item is included hereafter.
Base salary Basic pay for doing the job.	Aims to provide a fair and competitive basis for the total pay level to attract and retain qualified leaders. Annual review based on the market movement for executives based in the Netherlands and peer companies. In depth benchmark every three years.	Base salaries at DSM approach the median — from below — of the labor market peer group.
Short-Term Incentive (STI) Incentive aligning short-term business objectives and business drivers toward strategic company objectives. Driving pay for performance.	The Supervisory Board sets goals and targets for the respective performance year and determines the extent to which they have been achieved. By ensuring that strategic objectives are properly reflected in stretched yet achievable targets, the realization of strategic business objectives is addressed. Half of the at-target STI is linked to financial objectives; the other half is tied to sustainability aspirations and individual goals.	On-target performance: 50% of annual base salary. Maximum opportunity capped at 100%. Threshold: no STI pay-out in case the target on Adjusted EBITDA is not achieved for at least 75%.
STI deferral & matching Ensures that longer term considerations are sufficiently taken into account in pursuing short-term objectives.	Conversion of STI into shares, with a 1:1 company match delivered in Performance Share Units (PSUs). The PSUs vest upon the realization of predefined goals (same as LTI program), observing a three-year vesting period. By linking the vesting of the PSUs to the targets of the LTI program, it is ensured that decisions regarding short-term results are aligned with long-term value creation.	Mandatory conversion: 25% of STI achieved; voluntary conversion: 0–25%, with incremental steps of 5%. Maximum number of matching PSUs to vest, equal to number granted.
Long-Term Incentive (LTI) Focus on long-term value creation. Designed to ensure that decisions made are in the long-term interest of all stakeholders and to safeguard that interests of the Managing Board and the company stakeholders are aligned.	PSUs are awarded every year, to be converted into shares upon realization of predefined targets, observing a three-year vesting period. A five-year holding period (starting at grant date) applies. Performance goals are based on company strategy, driving long-term value creation. Half of the target LTI is linked to financial goals; the other half is linked to sustainability aspirations. Performance is measured over three financial years, starting with the year of grant.	The at-target grant equals 100% of base salary. Maximum vesting opportunity is 150% of the number of PSUs granted.[1]
Shareholding requirement Aligning reward to the interests of stakeholders, and emphasizing confidence in performance and strategy.	Managing Board members are expected to build up a shareholding in the company; the minimum shareholding requirement must be accrued in four years. Considered are shares privately purchased and vested shares granted under DSM share-based compensation plans.	The minimum share-holding requirement is 300% of annual base salary for the CEO and 200% for other MB-members.
Pension and other benefits Post-retirement remuneration contributing to the competitiveness of the overall package. Together with other benefits, creates alignment with market practice.	Mandatory enrollment in basic pension plan as applicable to all DSM employees in the Netherlands (Collective Defined Contribution). In addition, a company-paid contribution to allow participation in the so-called Net Pension Plan under conditions as applicable to Netherlands-based employees (Individual Defined Contribution). Other benefits include sick pay (aligned with Netherlands-based employees) and a company car.	Pension scheme aligned with plans in place for employees in the Netherlands. Other benefits aligned with market practice.
Goal setting Goal setting is key to driving pay for performance aligned with Company strategy and to ensure that decisions made and results delivered are aligned with the interests of DSM's stakeholders.	Supervisory Board sets goals, their respective weight and targets (i.e., metric) for the respective performance year under the STI and LTI scheme, considering: - Company strategy - Focus on long-term value creation - Historical performance, business outlook, and circumstances and priorities - Stakeholder expectations At target level, there is a 50:50 split between financial goals and sustainability/individual goals.	Goals must be stretching yet achievable.

1 At face value, the at target LTI grant equals 100% of annual base salary. Applying a discounted fair value approach, the grant value represents approximately 50% of annual base salary.

Total remuneration Managing Board 2019

Actual remuneration 2019 is fully aligned with the remuneration policy which complies with EU requirements and Dutch legislation. Mr. Sijbesma's term as CEO and Chairman of the Managing Board / Executive Committee Koninklijke DSM N.V. and as member of the Managing Board, i.e., as Managing Director under the Articles of Association of the Company, expired as of 15 February 2020. In view of a proper handover to his successors and to finish certain projects, Mr. Sijbesma remains employed until 1 May 2020, observing the terms and conditions of the employment agreement. The terms and conditions of Mr. Sijbesma's leaving as part of a planned succession process are in line with DSM policies and practices. Mr. Sijbesma will not receive any severance payment and/or transitional compensation. Details reported here for Mr. Sijbesma concern the full calendar year 2019.

Base salary

Considering the general increase or market movement for DSM executives in the Netherlands and adjustments made by peer-group companies, base salaries have been adjusted; on average the adjustment amounts to 2.2% (CEO 1.9% and other members of the Managing Board 2.4%).

Fixed annual base salary

in €	**1 July 2019**	1 July 2018
Feike Sijbesma	960,000	942,500
Geraldine Matchett	637,500	622,500
Dimitri de Vreeze	637,500	622,500

As of 15 February 2020, the annual base salary of Geraldine Matchett and Dimitri de Vreeze amounts to € 925,000 in view of their appointment as Co-CEO as per the same date.

Short-Term Incentive (STI)

This report includes the STI achievement 2019, payable in March 2020. Targets were set ahead of the STI cycle, in accordance with the remuneration policy and budgeted results for the current year, ensuring that achievement of threshold, target or maximum payout are challenging. A scenario analysis was conducted prior to final approval of the targets by the Supervisory Board.

Definitions goals set for 2019 STI (total 50% weight)

- **Adjusted EBITDA (weighting 12.5%)**: Sum of the operating profit plus depreciation and amortization, adjusted for material items of profit/loss following acquisitions/divestments, restructurings and other circumstances deemed necessary
- **Adjusted net operating free cash flow (10%)**: Cash flow from operating activities, corrected for the cash flow of the APM adjustments, minus the cash flow of Capital expenditures and drawing rights
- **Net sales growth (2.5%):** Net organic sales growth

- **Brighter Living Solutions (5%)**: Products and services that, considering the whole product life cycle, offer an environmental benefit (ECO+) and/or social benefit (People+) compared to mainstream reference solutions. DSM uses a standard approach to measure the impact of portfolio changes (for ECO+ the Eco Life Cycle Assessment, using the WBCSD Chemical sector approach whereas People+ qualifications are made using DSM's People LCA method)
- **Safety (5%)**: Based on Frequency Index for recordable injuries
- **Employee engagement (5%)**: Based on the High-Performance Norm in industry

- **Individual goals (10%)**: Individual objectives to be achieved by the respective Managing Board member

The company does not disclose the exact actual targets, as these qualify as commercially sensitive information, though the targets set are fully in line with the published strategic, financial and sustainability goals of the company. The overall average achievement of the Managing Board members for performance year 2019 amounts to 54% (2018: 80%) of annual base salary. The realization of the financial targets has been assessed by KPMG. In addition, KPMG assessed the validation process for non-financial targets.

In view of transparency, we categorize our target realization as follows: zero pay-out, below target, at target, above target or maximum pay-out. In 2019, the target achievement of the Adjusted EBITDA performance was below target. The achievement on Adjusted net operating free cash flow was above target. The target regarding Net sales growth was not achieved (zero pay-out). The many efforts to improve our Safety performance resulted in an above-target realization. Although the overall engagement score over 2019 was comparable to 2018, the target realization dropped to at target level, since the target was raised. Performance regarding portfolio management measured by Brighter Living Solutions, remained at target.

The combined realization resulted in a 2019 STI pay-out as included in the overview below.

Short-Term Incentive

in €	**2019**	2018
Feike Sijbesma	541,261	756,641
Geraldine Matchett	326,970	498,672
Dimitri de Vreeze	342,720	483,328

Short-Term Incentive deferral & matching (STI)
In addition to the mandatory deferral (25% of STI achieved), the Managing Board members decided to convert an additional 25% (maximum possible) of the STI achieved in 2019 into shares. This means that all Managing Board members converted 50% of their STI (100% of the cash after tax) into this long-term incentive, representing their trust and focus on the long term. A 1:1 grant of PSUs was implemented, amounting to 8,898 PSUs in total (2018: 9,864), the following table provides an overview. For more information see the section on 'Equity based compensation' in this Remuneration report.

Grant of PSUs under the short-term deferral & matching scheme

Number of PSUs granted	**2019 grant (vesting 2022)**	2018 grant (vesting 2021)
Feike Sijbesma	3,872	4,264
Geraldine Matchett	2,552	2,800
Dimitri de Vreeze	2,474	2,800

Long-Term Incentive (LTI)

2019 and 2020 grant
In 2019, 18,500 Performance Shares Units (PSUs) (2018: 17,000) were granted to the CEO. The 2019 grant to the other Managing Board members amounted to 12,500 PSUs (2018: 11,000).
The 2020 grant equals 12,500 PSUs for each Co-CEO, Geraldine Matchett and Dimitri de Vreeze. Feike Sijbesma is not eligible for a grant in 2020. Any grant equals the maximum number of PSUs that may vest.

Goal setting and vesting scheme
Targets were set ahead of the LTI cycle, in accordance with the remuneration policy, ensuring that achievement of threshold, target or maximum vesting are challenging. A scenario analysis was conducted.

Definition goals set for LTI grants
1. **Total Shareholder Return — TSR (weighting 25%)**: Sum of capital gain and dividends paid, representing the total return to shareholders. The relative ranking (within the peer group) reflects the market perception of overall performance relative to our peers.
2. **Return on Capital Employed — ROCE (25%)**: Operating profit as percentage of weighted average capital employed.
3. **Energy Efficiency Improvement — EEI (25%)**: The reduction of the amount of energy used per unit product (known as energy efficiency) on a three-year rolling average basis.
4. **Greenhouse Gas Emissions — GHGE (25%)**: As of the 2019 grant: absolute reduction of greenhouse gas emissions in kilotons over performance. Up to and including the 2018 grant, the target is based on the reduction of greenhouse gas emissions per unit of product.

Vesting 2016 grant
The performance period of the PSUs granted in 2016 was completed by year-end 2018: the actual vesting was on 31 March 2019. This concerns the PSUs granted under the Long-Term Incentive plan as well as the PSUs granted under the STI deferral & matching plan. Since all targets were achieved at maximum, all PSUs granted also vested (maximum vesting). The following vesting schemes applied (given its business-sensitive nature, the ROCE-vesting scheme is not disclosed).

TSR vesting scheme[1]		EEI vesting scheme		GHGE Efficiency improvement vesting scheme[2]	
Rank	% of PSUs granted that vest	DSM EEI% (over a 3-year period)	% of PSUs granted that vest	DSM GHGE Efficiency improvement % (over a 3-year period)	% of PSUs granted that vest
1	100	≥ 4.00	100	≥ 8.25	100
2	97	3.25 - < 4.00	83	7.75 - < 8.25	83
3	93	2.75 - < 3.25	67	7.25 - < 7.75	67
4	87	2.50 - < 2.75	50	6.75 - < 7.25	50
5	80	2.25 - < 2.50	33	6.25 - < 6.75	33
6	73	2.00 - < 2.25	17	5.75 - < 6.25	17
7	67	< 2.00	0	< 5.75	0
8	50				
9	33				
10-15	0				

1 Peer group 2016 grant includes AkzoNobel, Arkema, BASF, Chr. Hanssen, Clariant, Croda International, DuPont, Evonik, Givaudan, Kerry, LANXESS, Lonza, Novozymes, Solvay.
2 As of the 2019 grant, the target is based on an absolute reduction of greenhouse gas emissions.

The table provides an overview of the number of PSUs granted in 2016 that vested (i.e., converted to unconditional shares) in 2019.

PSUs granted in 2016 vested in 2019

Number of PSUs vested[1]	LTI	STI deferral & matching scheme
Feike Sijbesma	31,000	5,350
Geraldine Matchett	20,500	3,506
Dimitri de Vreeze	20,500	3,505

1 At vesting, a sell-to-cover applied: out of the vested shares, a number of shares are sold at vesting date to cover taxes due.

Pension and other benefits
Participation in the basic pension plan provided by the Dutch pension fund (*Stichting Pensioenfonds DSM Nederland* — PDN) to all DSM employees in the Netherlands is mandatory for the Managing Board. Regarding pensionable salary not covered by the basic pension plan, a company-paid pension contribution as determined by the Supervisory Board applies. This contribution can be used by Managing Board members to participate in the so-called Net Pension Plan under conditions as applicable to all participating DSM employees.
The company provides an accident insurance, a company car and a fixed representation allowance in line with market practice.

Total remuneration
Actual remuneration 2019 is fully aligned with the remuneration policy. The latest benchmark conducted, demonstrated that DSM lags the median of the labor market peer group, also considering the pay-out scenarios of the incentive schemes. For the CEO, the total remuneration is in the lowest quartile of our own — Dutch/European — benchmark. For the other Managing Board members, it is in the second quartile but below the median. The difference would become even bigger if the benchmark comparison were made with a global peer group (i.e., including US-based peers).

The table provides an overview of the total remuneration expense for the Managing Board (the cost reported for DSM, are not in all cases the compensation paid nor the cash outflows for DSM).

DSM's remuneration expense for the Managing Board (the costs reported here for DSM, according to IFRS definitions, are not in all cases the compensation paid, nor the cash outflows for DSM)

x € thousand	Fixed		Variable compensation				Fixed		Fixed		Total		Proportion fixed / variable compensation	
	Base Salary / Fees		Short-Term Incentive		Share-based Compensation[1]		Pension expenditure[2]		Other items[3]					
	2019	2018	**2019**	2018	2019[4]	2018[4]	**2019**	2018	**2019**	2018	**2019**	2018	**2019**	2018
Feike Sijbesma, CEO	951	931	541	757	1,563	1,415	234	218	59	58	3,348	3,379	37:63	36:64
Geraldine Matchett, CFO	630	614	327	499	1,030	933	109	107	86	116	2,182	2,269	38:62	37:63
Dimitri de Vreeze, member	630	614	343	483	1,029	922	126	123	47	46	2,175	2,188	37:63	36:64
Total Managing Board	**2,211**	**2,159**	**1,211**	**1,739**	**3,622**	**3,270**	**469**	**448**	**192**	**220**	**7,705**	**7,836**	**37:63**	**36:64**

1 Share-based compensation represents the non-cash cost for DSM of Performance Share Units (PSUs) awarded. These costs are recognized over the vesting period and therefore cover several years. The higher number for 2019 compared to 2018 mainly results from the fact that the 2019 calculations include series initially granted at a higher share price, while the vesting percentage in 2019 was higher compared to 2018. The percentage of vesting will determine the final income. Against the opening price at vesting date, the 2019 vesting (all Managing Board members together) represents a value of € 8 million, subject to a sell-to-cover.
2 Increase in the pension costs of Mr. Sijbesma based on design of the contribution table: since he turned 60 in 2019, the pension contribution automatically increased.
3 Fringe benefits, like company car and allowances.
4 Share-based compensation 2018 concerns the grants in 2015 (partial), 2016, 2017 and 2018 (partial); share-based compensation 2019 concerns the grants in 2016 (partial), 2017, 2018 and 2019 (partial).

Equity-based compensation

Overview of outstanding equity compensation

The table below provides an overview of outstanding PSUs (granted under the LTI and STI deferral & matching scheme respectively). The main conditions of the share-based compensation are:

Vehicle	Performance Share Units (PSUs), converted to shares at vesting
Grant date	Last trading day in March
Vesting period	Three years, starting at grant date
Vesting conditions	- Realization of predefined performance goals - In service at vesting date
Performance period	Three performance years, starting 1 January of the year of grant
Holding period	Five years, starting at grant date
Lock-up period	Blocking period chosen by incumbent, may result in tax discount

Outstanding Performance Share Units

	Year of issue	Outstanding at 31 Dec. 2018	In 2019 Granted	Vested	Forfeited / expired	Outstanding at 31 Dec. 2019	Share price at date of grant (€)
Feike Sijbesma	2016	36,350	-	(36,350)	-	-	48.79
	2017	29,333	-	-	-	29,333	63.65
	2018	21,264	-	-	-	21,264	80.04
	2019	-	22,372	-	-	22,372	97.74
	Total	**86,947**	**22,372**	**(36,350)**	**-**	**72,969**	
	Retained shares originated from PSUs					116,402	
Geraldine Matchett	2016	24,006	-	(24,006)	-	-	48.79
	2017	19,092	-	-	-	19,092	63.65
	2018	13,800	-	-	-	13,800	80.04
	2019	-	15,052	-	-	15,052	97.74
	Total	**56,898**	**15,052**	**(24,006)**	**-**	**47,944**	
	Retained shares originated from PSUs					33,631	
Dimitri de Vreeze	2016	24,005	-	(24,005)	-	-	48.79
	2017	19,092	-	-	-	19,092	63.65
	2018	13,800	-	-	-	13,800	80.04
	2019	-	14,974	-	-	14,974	97.74
	Total	**56,897**	**14,974**	**(24,005)**	**-**	**47,866**	
	Retained shares originated from PSUs					27,587	

The table below provides an overview of stock options held by members of the Managing Board. Mr. de Vreeze received these stock options prior to his first appointment as a Managing Board member. During 2019, he exercised 18,000 stock options; the shares were sold for an average share price of € 94.44.

Outstanding stock options

	Year of issue	Outstanding at 31 Dec. 2018	In 2019 Exercised	Forfeited / expired	Outstanding at 31 Dec. 2019[1]	Average share price at exercise (€)	Exercise price (€)	Expiry date
Dimitri de Vreeze	2011	18,000	(18,000)	-	-	94.44	46.20	2 May 2019
	2012	12,000	-	-	12,000		40.90	15 May 2020
	2013	12,000	-	-	12,000		48.91	7 May 2021
	Total	**42,000**	**(18,000)**	**-**	**24,000**			
	Of which vested	42,000			24,000			

1 The other members of the Managing Board do not hold any stock options.

For employee information, as required by section 383d Book 2 of the Dutch Civil Code, reference is made to Note 27, 'Share-based compensation' on page 223. As at 31 December 2019, 3,020,830 (2018: 5,616,235) of the total number of treasury shares outstanding were held for servicing management, personnel share option rights and performance share unit plans.

Shareholding obligation
In addition to the performance shares held on the basis of vested grants under the DSM Stock Incentive Plan, all members of the Managing Board have invested in DSM shares, emphasizing their confidence in the company and its strategy. These shares were bought through private transactions with private funds (including shares purchased through STI deferral). The table provides an overview of the number of shares held at year-end.

Managing Board holdings of DSM shares

	31 December 2019			31 December 2018		
	Ordinary shares purchased with private money	Holdings from vested PSUs	Total holdings	Ordinary shares purchased with private money	Holdings from vested PSUs	Total holdings
Feike Sijbesma	72,345	116,402	188,747	68,473	97,125	165,598
Geraldine Matchett	13,328	33,631	46,959	10,776	17,638	28,414
Dimitri de Vreeze	22,357	27,587	49,944	19,883	14,858	34,741
Total holdings	**108,030**	**177,620**	**285,650**	**99,132**	**129,621**	**228,753**

All Managing Board members significantly exceed the shareholding obligation (300% of base salary for the CEO; 200% of base salary for other Managing Board members).

Company performance versus remuneration over time

Five-year review of company performance and Managing Board remuneration
The following table provides an overview of the development of the remuneration of the members of the Managing Board over the past five years, the development of company performance and the average remuneration of other employees (excluding the Managing Board members and discontinued operations). Total remuneration for Managing Board members are the remuneration expenses calculated in accordance with IFRS as included in the annual reports of the relevant years. The table provides an overview of company performance based on Adjusted EBITDA, share price (year average) and the reduction of greenhouse gas emissions.

Typically, the share of total remuneration that is at risk varies for different employee segments and geographies, due to the impact of incentive schemes. Whereas the percentage of variable pay as a percentage of total remuneration is highest for the CEO/Managing Board (at target 150%), it may be limited or nil for other employee segments or in certain countries (also as a result of CLA negotiations). Based on performance, the results of the respective incentive schemes (and therefore the impact on total remuneration) varies over time. The average remuneration of all other employees (excluding the Managing Board) is not only influenced by factors such as differences in the pay mix (as mentioned above), or changes in exchange rates, but also factors related to the composition of the employee polulation such as the impact of acquisitions and divestments, restructuring, in- and outflow of personnel.

5-year Overview remuneration and company performance (unless mentioned otherwise, year-on-year change)

		2015	2016	2017	2018	2019	Average[1]
Managing Board remuneration							
Feike Sijbesma	Base salary	0.8%	3.4%	1.1%	2.3%	2.1%	1.9%
	Total remuneration	18.9%	14.5%	-0.1%	24.8%	-0.9%	11.4%
Geraldine Matchett[2]	Base salary		3.5%	1.4%	2.7%	2.6%	2.6%
	Total remuneration		27.3%	12.0%	22.3%	-3.8%	14.5%
Dimitri de Vreeze[3]	Base salary		3.5%	1.4%	2.7%	2.6%	2.6%
	Total remuneration		15.5%	3.9%	25.1%	-0.6%	11.0%
Company performance							
Adjusted EBITDA underlying business[4]		3.6%	17.4%	14.5%	6.0%	9.9%	10.3%
Year-average share price		-2.7%	9.1%	24.4%	25.8%	23.1%	15.9%
GHGE Efficiency improvement in the respective year		4.7%	4.2%	4.1%	9.3%	12.7%	7.0%
Development of average employee remuneration							
Base salary employees Netherlands			4.2%	4.3%	3.3%	3.4%	3.8%
Average remuneration cost of employees (globally)		6.8%	4.2%	0.9%	-1.6%	-0.2%	2.0%

1 Average calculated over the years, a change on year-on-year basis is provided.
2 Appointed as member of the Managing Board with effect from 1 August 2014, % change calculated as of 2016.
3 Appointed as member of the Managing Board with effect from 1 September 2013, % change calculated as of 2016.
4 Based on DSM figures : five-year summary, see table on page 246.

DSM's performance in terms of (profit) growth, share price increase and greenhouse gas emissions reduction has been very good over the last five years, as shown in the above table. The Managing Board's total remuneration expenses (including the achievements on short and long-term incentive schemes as well as pension expenditures), developed in line with the improving performance of the company. The year-on-year change in base salary of the CEO and Managing Board members remains below the year-on-year change in the average base salary of the employees in the Netherlands. Average total remuneration cost of other employees (globally) concern all employee cost as included in Note 5 of the Consolidated Financial Statements. The flattening of the change in the last three years is to a large extent caused by M&A activities and restructuring of our operations, while the adjustments of exchange rates also had an impact. The year-on-year change of the average base salary in the Netherlands, as well as average employee cost globally, are influenced by the fact that the composition of the underlying employee population changes from year to year as a consequence of among others retirements, new hires, restructurings, and M&A activities.

Pay ratio

Under the Dutch Corporate Governance Code companies are required to publish a pay ratio. As the Code does not provide a definition of the pay ratio, the calculation method applied will vary per company, which will make the pay ratio data incomparable. The pay ratio per company will also differ year on year, since the variable pay (as a percentage of annual base salary) of the CEO/Managing Board is typically much higher (150% at target) than the variable pay of the comparable average employee group (limited or no variable pay component), and this variable pay will fluctuate with business results. On top of that, different regions of the world have different pay structures, so acquisitions/ divestments, growth in certain areas and foreign exchange rates will equally influence the pay ratio. DSM complies with the Dutch Corporate Governance Code in providing a pay ratio, as measured per 31 December 2019.

The pay ratio calculated versus the Dutch employee remuneration average was 25:1 (2018: 26:1) (compared to CEO remuneration) or 19:1 (2018: 20:1) (compared to average Managing Board remuneration). This is based on total cost of € 530 million in the Netherlands (which includes the remuneration of the Managing Board and has been deducted in the ratio calculation) and a headcount in the Netherlands of 3,960 as at 31 December 2019.

The ratio of total remuneration, including annual base salary, STI, LTI and other benefits such as pension (as reported in this Remuneration report) versus the average of total global employee (i.e., including Dutch) remuneration, is for the CEO 41:1 (2018: 40:1). The pay ratio of the average Managing Board total remuneration versus the average of total global employee remuneration is 32:1 (2018: 31:1). The increase is due to the higher number of shares that now vested (so a lower number of shares that were forfeited over the period 2016-2018) of the total number of shares that were granted in 2016, due to the good performance of the company.

However, if the pay ratio is calculated on the basis of the estimated vesting percentage, so without the additional non-cash vesting of shares for the series 2016–2018, the pay ratio compared to the Dutch employee average for the CEO would be 20:1 (2018: 22:1) and for the average of the Managing Board remuneration 15:1 (2018: 17:1). Compared to the total global employee remuneration, these would be 33:1 (2018: 34:1) for the CEO and 25:1 (2018: 26:1) for the average of the Managing Board.

Underlying data for the pay ratio calculation can be retrieved from the table 'DSM's remuneration expense for the Managing Board' (including table notes) in the section 'Total remuneration' of this Remuneration report, as well as from the table 'Geographical information' on page 185 in Note 4, and Note 5, 'Net sales and costs' on page 188. Data for the Netherlands are explicitly mentioned as they are not directly retrievable.

Remuneration Supervisory Board Koninklijke DSM N.V. 2019

Summary of the remuneration policy Supervisory Board Koninklijke DSM N.V.

The remuneration policy is designed to engage qualified leaders with the right balance of personal skills, competences and experience required to oversee (the execution of) the company's strategy, its performance and long-term value creation, recognizing the interests of all stakeholders. In line with the Dutch Corporate Governance Code, the remuneration is not linked to company and individual performance. As a reference, the remuneration of the Supervisory Board is benchmarked to market practice, predominantly against AEX companies, given the company's country of domicile. The total fixed remuneration should approach the median of the reference market. The full version of the remuneration policy Supervisory Board Koninklijke DSM N.V. as approved by the 2019 AGM is available on the company website.

The table below summarizes the key elements of the remuneration policy, describing purpose, design and (potential) value.

PURPOSE	DESIGN	VALUE
Fixed fee Basic pay for doing the job	Reward and incentivize Supervisory Board members to utilize their skills and competences to the maximum extent possible in executing their tasks. The reward reflects the nature of responsibilities and time spent. Aims to provide a fair and competitive pay level to engage qualified leaders. Review: in principal every three years, based on in-depth benchmarking.	Approaching the median of the market reference (predominantly AEX companies). Position and fee - Chair € 105,000 - Deputy Chair € 75,000 - Member € 70,000 - Chair Audit Committee € 18,500 - Member Audit Committee € 12,000 - Chair other Committees € 14,000 - Member other Committees € 8,500
Intercontinental travel fee	Fixed amount representing time commitment related to intercontinental travel.	€ 5,000 for each time it is required to travel outside the continent of residence.
Expenses	Expenses incurred in fulfilling duties are reimbursed. To be paid upon submission of a statement of expenses, partially covered by a fixed allowance.	Depending on level of expenses. Fixed per annum: € 1,250.
Shareholding requirement	In line with Dutch Corporate Governance Code no mandatory shareholding requirement. Supervisory Board members are encouraged to invest in privately owned DSM shares.	Not applicable.
Benefits and loans	Supervisory Board members are not entitled to participate in any benefits program offered to employees. Loans will not be provided.	Not applicable.

Total remuneration 2019

Committee overview
The Supervisory Board members are assigned to the various committees.

Committee overview	Audit	Nomination	Remuneration	Sustainability
Rob Routs (Chair)		Chair	Member	
Pauline van der Meer Mohr (Deputy Chair)		Member	Chair	
Victoria Haynes	Member		Member	
Eileen Kennedy		Member		Chair
Erica Mann (as of 8 May 2019)	Member			Member
Frits van Paasschen	Member			Member
Pradeep Pant	Member			Member
John Ramsay	Chair		Member	

Total Remuneration
The table provides an overview of total remuneration provided in 2019; as of 8 May 2019, the revised policy as approved by the 2019 AGM applies.

Remuneration Supervisory Board Members

in €	Fixed						Total remuneration		Proportion fixed/ variable compensation	
	Annual fee		Committee fee		Other costs[1]					
	2019	2018	2019	2018	2019	2018	2019	2018	2019	2018
Rob Routs, Chair	96,667	85,000	20,208	17,000	6,250	5,250	123,125	107,250	100:0	100:0
Pauline van der Meer Mohr, Dep. Chair	68,750	60,000	20,208	17,000	6,250	5,250	95,208	82,250	100:0	100:0
Tom de Swaan, Dep. Chair (until 9 May 2018)	-	30,000	-	8,800	-	625	-	39,425	-	100:0
Victoria Haynes, Member	65,833	60,000	19,042	17,000	24,250	17,250	109,125	94,250	100:0	100:0
Eileen Kennedy, Member	65,833	60,000	20,209	17,000	24,250	13,250	110,292	90,250	100:0	100:0
Erica Mann, Member (as of 8 May 2019)	40,833	-	11,958	-	14,730	-	67,521	-	100:0	-
Frits van Paasschen, Member	65,833	60,000	19,042	17,000	29,250	25,250	114,125	102,250	100:0	100:0
Pradeep Pant, Member	65,833	60,000	19,042	17,000	24,250	21,250	109,125	98,250	100:0	100:0
John Ramsay, Member	65,833	60,000	24,917	17,200	6,250	5,250	97,000	82,450	100:0	100:0
Total	535,415	475,000	154,626	128,000	135,480	93,375	825,521	696,375	100:0	100:0

1 Involves International travel fee, expenses allowance and expenses exceeding expenses allowance

In line with the remuneration policy, no variable compensation applies, and Supervisory Board members do not participate in any pension scheme. No extraordinary items apply. The total spent in 2019 was higher compared to 2018. This is based on an extension of the Supervisory Board in view of succession planning and the renewal of the remuneration policy that allows for an adjustment of the annual fixed fees by an average of 20% (note that the last adjustment of fees took place in 2016).

Benefits and loans
Members of the Supervisory Board are not eligible for any benefit programs offered by the company (or any beneficiary) to its employees, neither have any loans been provided.

Equity based compensation

As confirmed in the remuneration policy, Supervisory Board members do not receive any equity-based compensation. They are, however, encouraged to hold privately owned shares. At year-end 2019, Pauline van der Meer Mohr held 1,529 shares (2018: 1,529); Victoria Haynes held 300 shares (2018: 300) and John Ramsay held 1,057 shares (2018: 1,057). No other member of the Supervisory Board held shares in the company during 2019.

Remuneration over time

The table provides an overview of the total remuneration of the Supervisory Board members over a five-year period. A comparison of the development of total remuneration compared to company performance is not provided, as the Supervisory Board's total remuneration is not linked to company performance (Dutch Corporate Governance Code and remuneration policy Supervisory Board Koninklijke DSM N.V.).

5-year Remuneration overview Supervisory Board

	2015	2016	2017	2018	2019	5-year average
Rob Routs - Chair	-3.5%	15.5%	10.9%	0.0%	14.8%	7.5%
Pauline van der Meer Mohr - Dep. Chair	-5.4%	14.9%	10.2%	0.0%	15.8%	7.1%
Victoria Haynes - Member	3.9%	10.5%	7.6%	0.0%	15.8%	7.6%
Eileen Kennedy - Member	4.2%	26.5%	0.4%	-4.2%	22.2%	9.8%
Erica Mann - Member (as of 8 May 2019)						
Frits van Paasschen - Member (as of 3 May 2017)					11.6%	
Pradeep Pant - Member (as of 29 April 2016)				-3.9%	11.1%	
John Ramsay - Member (as of 3 May 2017)					17.6%	

Closing remarks and shareholder vote

The company did not provide any loans to any member of the Supervisory or Managing Board. The company website contains an overview of the main terms and conditions of employment of both Co-CEOs.

The 2019 AGM approved the remuneration policy Supervisory Board Koninklijke DSM N.V. (98.45% in favor) as well as the remuneration policy Managing Board Koninklijke DSM N.V. (97.48% in favor). The total remuneration delivered in 2019 is aligned with the respective remuneration policies: no deviations or derogations applied. As in 2018, no revision or claw-back of any incentives occurred in 2019.

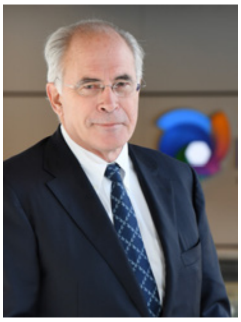
The remuneration for the financial year 2019, as described in this report, is subject to an advisory vote at the 2020 AGM. Questions raised in the 2019 AGM regarding remuneration items have been addressed in the respective meeting, reference is made to the minutes of the meeting, posted on the company website. As a result, there were no specifics raised that needed to be addressed in this Remuneration report.

Heerlen, 26 February 2020

The Supervisory Board
Rob Routs, Chair
Pauline van der Meer Mohr, Deputy Chair
Victoria Haynes
Eileen Kennedy
Erica Mann
Frits van Paasschen
Pradeep Pant
John Ramsay

Supervisory Board and Managing Board Royal DSM

Supervisory Board

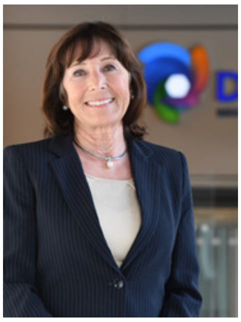


Rob Routs (1946, m), Chair

First appointed: 2010. End of current term: 2020. Nationality: Dutch. Nomination Committee (Chair), Remuneration Committee (member). Last executive position held: Executive Director Downstream and member of the Board of Royal Dutch Shell plc. Supervisory directorships/other positions: member of the Board of Directors of AECOM; member of the Board of Directors of ATCO Group Ltd.; and member of the Board of Directors of Maersk Drilling.

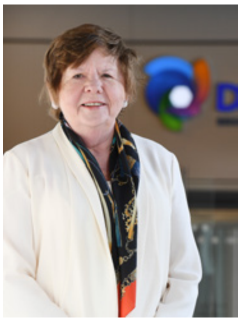
Pauline van der Meer Mohr (1960, f), Deputy Chair

First appointed: 2011. End of current term: 2021. Nationality: Dutch. Remuneration Committee (Chair), Nomination Committee (member). Last executive position held: President Executive Board Erasmus University Rotterdam. Supervisory directorships/other positions: non-executive Director HSBC Holdings plc., non-executive director of the Board of Mylan N.V.; Chair, Supervisory Board EY Netherlands; Chair, Board of Trustees Nederlands Danstheater; Chair of the Dutch Corporate Governance Code Monitoring Committee.



Victoria Haynes (1947, f)

First appointed: 2012. End of current term: 2020. Nationality: American. Audit Committee (member), Remuneration Committee (member). Last executive position held: President and CEO of the Research Triangle Institute International. Supervisory directorships/other positions: member of the Board of Directors of PPG.



Eileen Kennedy (1947, f)

First appointed: 2012. End of current term: 2020. Nationality: American. Sustainability Committee (Chair), Nomination Committee (member). Position: Professor Nutrition Friedman School of Nutrition Science and Policy at Tufts University in Boston (USA); Supervisory directorships/other positions: Member of High Level Panel of Experts on Food Security and Nutrition of the UN Committee on World Food Security; Chair of the Sight and Life Foundation.

Erica Mann (1958, f)

First appointed: 2019. End of current term: 2023. Nationality: Australian. Sustainability Committee (member), Audit Committee (member). Last executive position held: Member of the Board of Management of the Bayer Group and Global President of Bayer's Consumer Health Division. Supervisory directorships and other positions: Non-executive member of the Boards of Perrigo and Kellogg Company.

Frits Dirk van Paasschen (1961, m)

First appointed: 2017. End of current term: 2021. Nationality: Dutch and American. Audit Committee (member), Sustainability Committee (member). Last position held: CEO Starwood Hotels and Resorts. Supervisory directorships/other positions: non-executive board member Williams Sonoma (USA); Chairman Board of Convene; Board member of CitizenM Hotels (NL); Advisor to private equity firm TPG, three tech companies and CEO practice at Russell Reynolds; member of the cross country industry advisory council of RBC (CA); and CEO and Founder of The Disruptor's Feast Advisory.

Pradeep Pant (1953, m)

First appointed: 2016. End of current term: 2020. Nationality: Singaporean. Audit Committee (member), Sustainability Committee (member). Last executive position held: EVP and President APAC and EMEA of Mondelez International. Supervisory directorships/other positions: Honorary Council Member Food Industry Asia; non-executive Director Max BUPA Health Insurance Co Ltd. and of MAX Life Insurance Co Ltd. (India), non-executive Director Antara Senior Living Ltd. (India); advisor to Aptar Group Inc (USA) and President Pant Consulting Pte. Ltd.

John Ramsay (1957, m)

First appointed: 2017. End of current term: 2021. Nationality: British. Audit Committee (Chair), Remuneration Committee (member). Last position held: Chief Financial Officer (CFO) and interim CEO of Syngenta AG. Supervisory directorships/other positions: non-executive director of RHI Magnesita NV, non-executive director of G4S plc. and non-executive director of Croda International (as of 1 January 2020).

Managing Board

Feike Sijbesma (1959, m), CEO/Chairman

Position: CEO/Chairman, Managing Board since May 2007; member, Managing Board since July 2000. Honorary Chairman Royal DSM after the handover of the CEO role to his successors in the first quarter of 2020.
Nationality: Dutch.
Supervisory directorships/other positions held: Non-executive Director of Unilever; Member Supervisory Board Dutch Central Bank (DNB); Member Global CEO Council (GCC) Chinese People's Association for Friendship with Foreign Countries (CPAFFC); Climate Leader for the World Bank Group, and Chair of the High-Level Leadership Forum on Competitiveness and Carbon Pricing, convened by the World Bank Group; Member of Board of Trustees of the World Economic Forum since August 2019;
e-mail: feike.sijbesma@dsm.com

Geraldine Matchett (1972, f), Co-CEO

Position: member, Managing Board since August 2014, CFO since December 2014.
End of current term: 2022.
Nationality: British, French, Swiss.
Supervisory directorships/other positions held: Non-Executive Director of ABB; Board member of Catalyst Europe; Co-Chair of HRH Prince of Wales' A4S (Accounting 4 Sustainability) CFO Leadership Network; Board member of FCLTGlobal.
e-mail: geraldine.matchett@dsm.com

Dimitri de Vreeze (1967, m), Co-CEO

Position: member, Managing Board since September 2013.
End of current term: 2021.
Nationality: Dutch.
Supervisory directorships/other positions held: Chairman Supervisory Board DSM Netherlands; Board member of CEFIC (European Chemical Industry Council) and chair Sustainability Advisory Forum; Board member ChemicaInvest; Chairman 'Fonds voor de topsport' (NOC*NSF; Dutch Olympic Committee Fund for top sport); member Supervisory Board Sanquin; member Advisory Board ECP (Electronic Commerce Platform Netherlands); Board member Young Captain Foundation.
e-mail: dimitri.vreeze-de@dsm.com

What still went wrong in 2019

We are always trying to improve, but sometimes things still go wrong. Here we share the most significant incidents of 2019 across all three dimensions of People, Planet and Profit. This includes health, safety, environment, and security incidents (including fraud) as well as what we have learned from our businesses that has not developed as planned.

Preventing repeat problems requires us to understand each incident to the best of our ability. When an accident occurs, the first priority is to take care of any injuries and repair any damage. We investigate every recordable incident using a fixed root cause analysis method. We also trigger an improvement cycle, see 'Safety, Health & well-being' on page 41. This includes investigating root causes and trying to eliminate them. We put new requirements or operating procedures in place as needed.

We apply zero tolerance to violations of the 'DSM Code of Business Conduct' on page 113. We do not disclose any personal details in cases involving individuals.

In line with our reporting policy, this overview includes not only incidents but also some serious near-misses. Near-misses are cases that did not result in injury, illness or damage but which could have done so. Even when a crisis is averted, it is our responsibility to learn from it and do better the next time. We have a process in place to collect the information about incidents and some serious near-misses as presented in this overview, using various sources including our internal Letter of Representation, see 'Monitoring activities' on page 118 and our reporting system for SHE and Security incidents.

People

Incidents involving falls

At DSM Nutritional Products in Grenzach (Germany), a contractor fell from a scaffold while the scaffolding was being erected. He suffered multiple fractures to his body. To prevent similar incidents, very strict scaffolding standards as well as contractor requirements have been issued company-wide.

At DSM Nutritional Products in Grenzach (Germany), an employee slipped on an icy zebra crossing when walking from the parking lot to the office buildings and sustained a broken arm.

While on a business trip, an employee of DSM Engineering Plastics in Geleen (Netherlands) slipped on the icy surface of the parking lot of his hotel and tore his knee ligaments.

In response to the latter two incidents, a campaign on preparing for winter was initiated and new safety standards were set.

At DSM Nutritional Products in Dalry (United Kingdom), an employee fractured his knee after tripping over incorrectly stored scaffolding material.

Logistical incidents

At DSM Resins and Functional Materials in Pingtung (Taiwan), an employee hit a beam of the building with the mast of the electrical pallet truck he was operating. The mast got stuck and could not be freed. The employee tried lowering the forks of the truck a couple of times, when suddenly the forks fell onto his left foot. The foot was broken where it was not protected by the steel of his safety boot.

Other health and safety incidents

At DSM Nutritional Products in Shanghai (Zhejiang Province, China), a flash fire occurred during the removal of packing materials from a distillation column. A contractor sustained second-degree burns to large parts of his body.

At DSM Nutritional Products in Buk (Poland), a contractor was hit in the eye by a webbing cable and sustained an eye injury.

At DSM Nutritional Products in Dalry (United Kingdom), an employee accidentally opened a valve of a hot water drain, the open end of which was not properly secured. Hot water poured over his shoe, scalding his foot.

At DSM Nutritional Products in Jiangshan (Jiangsu Province, China), the voluntary fire brigade carried out a fire drill. While handling a fire hose, an employee lost his balance, fell to the ground and broke his thigh.

During an occupational health check, an employee from DSM Nutritional Products in Jiangshan (Jiangsu Province, China) was diagnosed to have sustained limited hearing loss resulting from a longer-term noise exposure and was transferred to another working environment.

At DSM Nutritional Products in Mexico, a truck carrying DSM products was forced to stop on the highway. The two drivers were threatened with firearms and had to hand over the truck and cargo. Later on, the truck was retrieved but all the cargo had disappeared. Fortunately, no personal injuries were sustained.

During a business trip in South Africa, two employees from DSM Food Specialties in Delft (Netherlands) were threatened by three robbers armed with knives and robbed of their mobile phones. Fortunately, they did not sustain any physical injury.

Planet

In the context of Chemelot, DSM Netherlands (Geleen) was mentioned in the media in relation to several years of incorrect reporting of nitrous oxide (N_2O) emissions. Although DSM itself did not have the responsibility for reporting these emissions, looking back, we feel that DSM could have pointed out to the other parties involved the obligation to include the N_2O emissions in their environmental reporting to the authorities. DSM regrets this.

At DSM Nutritional Products in Dalry (United Kingdom), a storage vessel partly imploded shortly after being filled up with new stock material. Fortunately, there were no personal injuries, nor was there any loss of containment.

Profit

DSM Nutritional Products in Fort Worth (Texas, USA) is involved in the recall of canned dog food initiated by a customer, as a consequence of the allegedly incorrect composition of a vitamin premix provided to that customer. The matter is ongoing at the time of publication of this Report.

At DSM Nutritional Products in Mexico, non-conformities in product registration resulted in a loss of sales.

At DSM Nutritional Products in Russia, the renewal of product certification was delayed. The sales of a number of products from Switzerland to Russia had to be put on hold and alternative supply had to be set up, leading to a loss of margin.

At DSM China, a call was received by the customer helpdesk in connection with a product allegedly manufactured by DSM. After checking with all business groups, it turned out that DSM had never produced this type of product. The product in question appeared to be a counterfeit product that was being sold online.

After the resignation of an employee of DSM Nutritional Products (Americas), it appeared that the employee had misused a company credit card to make personal and other expenditures prohibited.

An employee from DSM Food Specialties (Europe) made false business travel expense claims, thus violating the company's business travel policy.

At DSM Engineering Plastics in Emmen (Netherlands), a faulty filter allowed granulate to enter the demineralized water system, causing the machinery to break down and putting a production line out of operation for several days.

At DSM Nutritional Products in the US, operational delays in meeting production demand at a number of premix sites led to a loss of business.

At DSM Nutritional Products in Sisseln (Switzerland), an interruption in the nitrogen supply resulted in a loss of production.

Information on the DSM share

Shares and listings

Ordinary shares in Koninklijke DSM N.V. are listed on the Euronext stock exchange in Amsterdam (Netherlands) (Stock code 00982, ISIN code NL0000009827). Options on ordinary DSM shares are traded on the European Option Exchange in Amsterdam (Euronext.liffe). In the US, a sponsored unlisted American Depositary Receipts (ADR) program is offered by Deutsche Bank Trust Co. Americas (DR ISIN US7802491081), with four ADRs representing the value of one ordinary DSM share.

Besides the ordinary shares, 44.04 million cumulative preference shares A (cumprefs A) are in issue, which are not listed on the stock exchange; these have been placed with institutional investors. The cumprefs A have the same voting rights as ordinary shares, as their nominal value of € 1.50 per share is equal to the nominal value of the ordinary shares.

The dividend percentage of the cumprefs A is based upon the dividend yield of the ordinary shares (dividend as a percentage of the average share price). This percentage may be increased or decreased by a markup or discount of no more than one hundred (100) basis points, to be determined by the Managing Board in consultation with the Supervisory Board. The basis of computation of the dividend on the Preference Shares is € 5.2942.

Transfer of the cumprefs A requires the approval of the Managing Board, unless the shareholder is obliged by law to transfer his shares to a previous shareholder.

The average number of ordinary shares outstanding in 2019 was 175,730,949. All shares in issue are fully paid. On 31 December 2019, the company had 172,448,755 ordinary shares outstanding.

Issue of shares

The issue of shares takes place by a decision of the Managing Board. The decision is subject to the approval of the Supervisory Board. The scope of this power of the Managing Board shall be determined by a resolution of the General Meeting of Shareholders and shall relate to at most all unissued shares of the authorized capital, as applicable now or at any time in the future. In the Annual General Meeting of Shareholders of 8 May 2019 this power was extended up to and including 8 November 2020, on the understanding that this authorization of the Managing Board is limited to a number of ordinary shares with a nominal value amounting to 10% of the issued capital at the time of issue, and to an additional 10% of the issued capital at the time of issue if the issue takes place within the context of a merger or acquisition within the scope of DSM's strategy as published on the company website. The issue price will be determined by the Managing Board and shall as much as possible be calculated on the basis of the trading prices of ordinary shares on the Euronext Amsterdam Stock Exchange.

Distribution of shares

Under the Dutch Financial Markets Supervision Act, shareholdings of 3% or more in any Dutch company must be disclosed to the Netherlands Authority for the Financial Markets (AFM). According to the register kept by the AFM, the following shareholders had disclosed that they have a direct or indirect (potential) interest between 3% and 10% in DSM's total share capital on 31 December 2019:

- ASR Nederland N.V.
- BlackRock, Inc.
- Capital Research and Management Company, Capital Group International Inc. and EuroPacific Growth Fund
- NN Group N.V.
- Rabo Participaties B.V.

Repurchase of own shares

The company may acquire paid-up own shares by virtue of a decision of the Managing Board, provided that the par value of the acquired shares in its capital amounts to no more than one tenth of the issued capital. Such a decision is subject to the approval of the Supervisory Board. In the Annual General Meeting of Shareholders of 8 May 2019, the Managing Board was authorized to acquire own shares for a period of 18 months from said date (i.e., up to and including 8 November 2020), up to a maximum of 10% of the issued capital, provided that the company will hold no more shares in stock than at maximum 10% of the issued capital.

In 2019, DSM announced a share buyback program with an aggregate market value of € 1 billion starting in the second quarter of 2019, with the intention to reduce its issued capital. This program was in addition to the usual repurchase programs which DSM executes from time to time to cover commitments under share-based compensation plans and the stock dividend. In 2019, DSM repurchased 5,362,936 of its own shares for a consideration of € 600 million.

In 2019, DSM repurchased 2,600,000 shares for a total consideration of € 268 million for the purpose of covering the company's commitments under existing management and employee share plans and stock dividend. This program included share-based compensation plans (800,000 shares) and stock dividend as part of the final dividend 2019 (1,800,000 shares).

In total, DSM repurchased 7,962,936 of its own shares for a combined consideration of € 869 million.

Development of the number of ordinary DSM shares

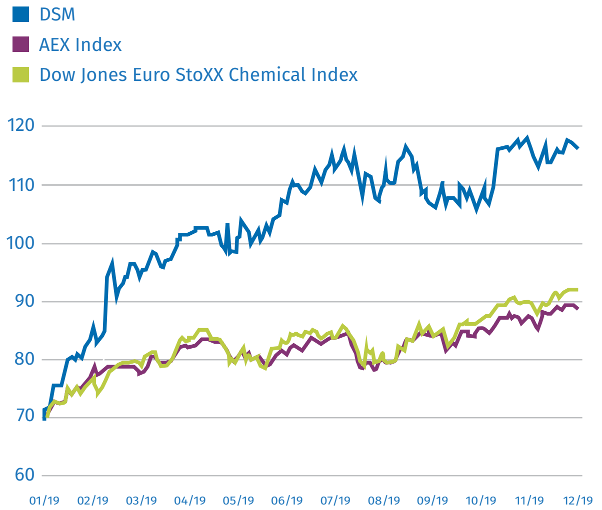
	2019			2018
	Issued	Repurchased	Outstanding	Outstanding
Balance at 1 January	**181,425,000**	**5,774,425**	**175,650,575**	174,643,475
Changes:				
Reissue of shares in connection with share-based payment plans	-	(3,395,405)	3,395,405	2,090,107
Repurchase of shares	-	7,962,936	(7,962,936)	(2,700,000)
Dividend in the form of ordinary shares	-	(1,365,711)	1,365,711	1,616,993
Balance at 31 December	**181,425,000**	**8,976,245**	**172,448,755**	175,650,575
DSM share prices on Euronext Amsterdam (€ per ordinary share):				
Highest closing price			117.90	92.98
Lowest closing price			69.54	68.98
At 31 December			116.10	71.44
Market capitalization at 31 December (€ million)[1]			21,063	12,961

1 Source: Bloomberg.

Geographical spread of DSM shares outstanding

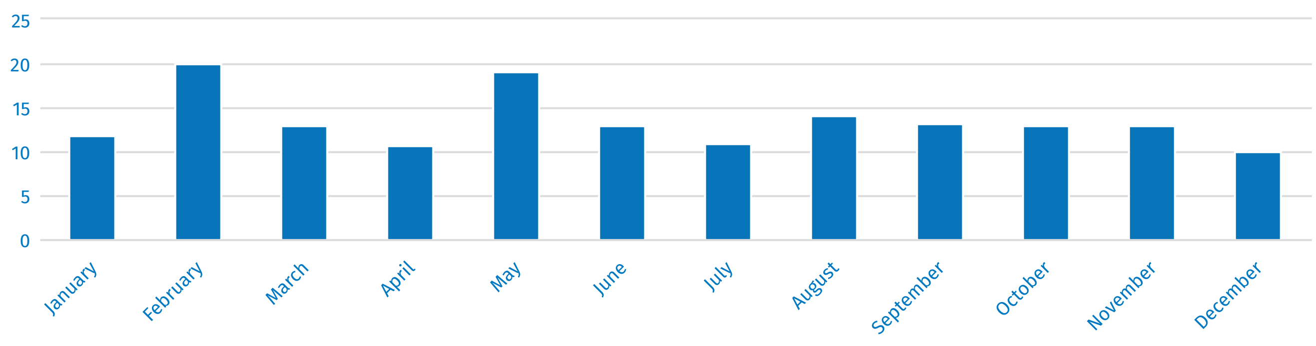
in % (excl. cumprefs A)	**2019**	2018
North America	39	38
United Kingdom	17	16
Netherlands	12	14
France	11	11
Germany	4	5
Switzerland	4	4
Asia–Pacific	4	5
Other countries	9	7

DSM share price development versus AEX and Dow Jones Euro StoXX Chemical Index
(rebased versus DSM share price)
(x €)



Trading volume ordinary DSM shares 2019

x million shares as reported by Euronext Amsterdam



Article 10 of Directive 2004/25

With regard to the information referred to in the Resolution of article 10 of the EC Directive pertaining to a takeover bid which is required to be provided according to Dutch law, the following can be reported:

- Information on major shareholdings can be found above (Distribution of shares)
- There are no special statutory rights attached to the shares of the company
- There are no restrictions on the voting rights of the company's shares. When convening a General Meeting of Shareholders, the Managing Board is entitled to determine a registration date in accordance with the relevant provisions of the Dutch Civil Code
- The applicable provisions regarding the appointment and dismissal of members of the Managing Board and the Supervisory Board and amendments to the Articles of Association can be found in the chapter 'Corporate governance and risk management' on page 106
- The powers of the Managing Board regarding the issue and repurchase of shares in the company can be found in the sections Issue of shares and Repurchase of own shares above
- Other information can be found in the 'Notes to the consolidated financial statements' (16 'Equity', 19 'Borrowings', 27 'Share-based compensation')

Dividend on ordinary shares

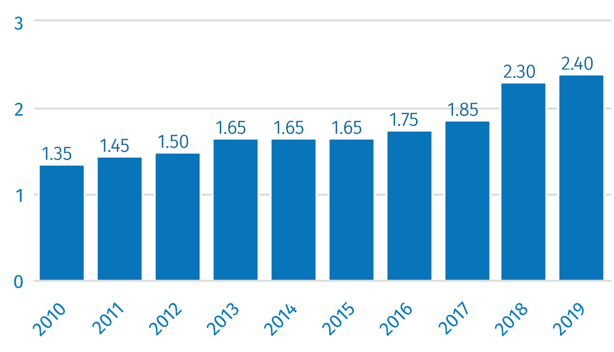
DSM's dividend policy is to provide a stable and preferably rising dividend. DSM proposes to increase the dividend by about 4.3% to € 2.40 per ordinary share for 2019, reflecting our confidence in expected future earnings and cash generation.

This will be proposed to the Annual General Meeting of Shareholders to be held on 8 May 2020. An interim dividend of € 0.77 per ordinary share having been paid in August 2019, the final dividend would then amount to € 1.63 per ordinary share.

The dividend will be payable in cash or in the form of ordinary shares at the option of the shareholder, with a maximum of 40% of the dividend amount available for stock dividend. If more than 40% of the total dividend is requested by the shareholders to be paid out in shares, those shareholders who have chosen to receive their dividend in shares will receive their stock dividend on a pro-rata basis, the remainder being paid out in cash. Dividend in cash will be paid after deduction of 15% Dutch dividend withholding tax. The ex-dividend date is 12 May 2020.

Dividend per ordinary DSM share in €

2019 dividend subject to approval by Annual General Meeting of Shareholders



Dividend on Cumulative Preference Shares A

DSM will pay a dividend of € 0.17 per share for 2019, identical to the dividend on the Cumulative Preference Shares A (cumprefs A) for 2018.

The dividend on the cumprefs A is based on the dividend yield of the ordinary shares, being about 2.31% for 2019. The Managing Board in consultation with the Supervisory

Board decided to use their discretionary power to increase this percentage of about 95 bps to 3.26%. Where the proposed dividend for the ordinary shareholders will increase by about 4.3% versus 2018, the Managing Board felt it appropriate to keep the dividend on the cumprefs A equal to 2018.

Bearer shares

On 27 April 2006, all bearer shares ('*aandelen aan toonder*') in DSM's issued share capital were converted into registered shares ('*aandelen op naam*') (pursuant to an amendment of the Articles of Association made at the time). In order to exercise the rights vested in the shares, holders of former bearer shares were required to hand in their bearer share certificates ('*aandeelbewijzen*') to DSM.

Pursuant to an amendment of Section 2:82 of the Dutch Civil Code (DCC) in 2019, DSM shareholders who still have not handed in their bearer share certificates will lose any entitlement to exchange their bearer share certificates for a replacement share as per 2 January 2026.

In accordance with Section 2:391(2) DCC, DSM hereby gives notice of the following:

(i) A shareholder may not exercise the rights vested in a share until after he/she has handed in his/her bearer share certificates to DSM.

(ii) A bearer share certificate which has not been handed in to DSM on or before 31 December 2020 shall become void and the share represented by the bearer share certificate shall be acquired by DSM for no consideration, irrespective of whether DSM's Articles of Association allow the acquisition of its own shares. Section 2:98a (3) DCC does not apply to this acquisition. DSM shall be registered as the shareholder thereof in DSM's shareholders register. DSM shall hold the shares until the end of the period mentioned in (iii) below.

(iii) A shareholder who hands in a bearer share certificate to DSM no later than five years after the acquisition mentioned in (ii) above, therefore no later than 1 January 2026, is entitled to receive from DSM a replacement registered share provided that this share is registered in DSM’s shareholders register in the name of a central securities depository, and DSM will instruct the shareholder’s bank to credit the share in a securities account in the name of holder of the bearer share certificate.

The procedure described above follows from Section 2:82(3) up to and including (9) DCC, whose provisions apply.

Sustainability statements

Sustainability statements – People

	2019	2018	2017	2016	2015
Total workforce	22,174	20,977	21,054	20,786	20,796
Female:male ratio	28:72	28:72	27:73	27:73	28:72
% by age category[1]					
<26 years[2]	5	5	6	6	5
26–35 years	26	25	26	25	26
36–45 years	29	30	28	28	30
46–55 years	25	26	25	27	27
>55	15	14	15	14	12
% under-represented nationalities[1]					
Executives (non-European)	31	31	-	-	-
Executives (non-Dutch)	62	60	56	53	49
Management (non-European)	44	43	-	-	-
Other (non-European)	59	59	-	-	-
% female[1]					
Executives	20	19	17	15	15
Management	29	28	27	26	27
Other	28	28	28	29	29
% executive hires[1]					
Non-European	55	61	-	-	-
Female	32[3]	61	43	13	38
Non-Dutch	86	83	95	88	79
% new hires by region[1]					
Netherlands	11	13	11	5	11
Rest of Europe	24	22	26	23	22
North America	22	25	20	27	16
China	18	16	16	20	18
Rest of Asia–Pacific	12	9	11	8	13
Rest of the world	13	15	15	17	22
Total number new hires (excluding acquisitions)	2,372	3,005	2,203	1,730	2,171
Acquisitions	1,161	80	247	46	1810
Outflow of employees [1]					
Voluntary resignations	1,118	1,098	766	585	1,153
Total outflow (excluding divestments)	2,352	2,868	1,943	1,729	2,212
Divestments	0	357	42	57	2,324
Voluntary resignations (% total workforce)[1]	5.4	5.3	4.1	2.8	5.5
Total turnover (% total workforce)[1]	11.2	13.9	10.2	8.3	10.6
Development training in hours per employee	8.1	6[4]			
Net sales per employee (x € 1,000)	421	429[5]	420	386	374
Safety					
Frequency Index of Recordable Injuries (per 100 DSM employees and contractor employees)	0.28	0.33	0.36	0.33	0.41

1 For the indexes based on age, nationalities, gender, inflow and outflow, the companies that are not integrated into the HR systems (approximately 6% of the total workforce) are not taken into account.
2 We do not employ people younger than 15 under DSM contract. We require our suppliers to not use forced labor or child labor according to our Supplier Code of Conduct.
3 The decrease in 2019 is due to the relatively low number of executives onboarded in 2019, with a number of female executives who were recruited in 2019 expected to be onboarded in 2020
4 In 2018, development training hours per employee were measured using a new standard with stricter definitions. Figures of previous years cannot be recalculated according to the new definitions, which means there are no relevant figures available for previous years.
5 Excluding the temporary vitamin effect in 2018, see table on page 65.

Sustainability statements – Brighter Living Solutions

	2019	2018	2017	2016	2015
Brighter Living Solutions sales as % of net sales (underlying business)	63[1]	62[2]	62	63[3]	-

1 For a small percentage of sales (approximately 2%) classified as BLS, the environmental impact is considered 'best in class' together with other solutions.
2 Excluding the temporary vitamin effect in 2018, see table on page 65.
3 2016 was the first year of reporting; consequently, there are no comparative figures for the previous years.

Sustainability statements – Planet

	2019	2018	2017	2016	2015
Energy and greenhouse gas					
Primary energy use (in PJ)	21.2	20.8	23.6	22.6	20.9
Energy efficiency improvement (year-on-year)	2.3	1.4	0.7	2[1]	-
Greenhouse gas emissions scope 1 + 2, market-based (in CO_2 equivalents x million tons)	1.17	1.23[2]	1.50	1.57[1]	-
Electricity purchased from renewable resources (%)	50	41	21	8	-
Total purchased renewable electricity (GWh)	632	446	229	79	-
Emissions to air					
Volatile Organic Compounds (x 1,000 tons)	2.7	4.9	6.6	8.9	3.1
Nitrogen oxide (NO_x) (x 1,000 tons)	0.4	0.5	0.7	0.8	0.4
Sulfur dioxide (SO_2) (x 1,000 tons)	0.06	0.09	0.28	0.33	0.04
Discharges to water and landfill					
Chemical Oxygen Demand discharges to surface waters (x 1,000 tons)	2.1	2.2	2.5	2.4	2.1
Waste recycled (in %)	88	83	84	83[1]	-
(Landfilling) Non-hazardous waste (x 1,000 tons)	15	18	16	17.5	12.9
Total process-related waste (x 1,000 tons)	222	177	-	-	-
Water					
Water consumption (x million m^3)	23	22	23	22[1]	-
Water use (x million m^3)	111	114	114	104	101
Raw materials					
Renewable raw materials (in %)	14.7	14.3	15.4	16.5	16
Biodiversity					
Sites in or adjacent to protected areas (in %)	25	66	61	60	58
Fines (in €)	115,100	23,500	128,400	27,900	35,600
Non-monetary sanctions	2	6	4	2	5
Environmental incidents	60	71	101	109[3]	257
Environmental complaints	58	53	35	21	31

1 The baseline emissions for 2016 were recalculated due to the inclusion of nine acquired sites in the reporting scope.
2 Including a one-time effect of large plant shutdowns, estimated at roughly 150 kt. These effects did not occur in 2019.
3 As of 2016, the Loss of Primary Containment on non-hazardous substances is no longer included in this number.

Stakeholder engagement

In the following pages, we present some examples of how we engage with external stakeholders, including the partners in our value chain. For an overview of all our stakeholders, see 'Stakeholders' on page 32. For information on how we engage with our employees, see 'People' on page 40.

Customers

Implementing our Strategy 2021 throughout our businesses where we enable, innovate and advocate on the three domains — Nutrition & Health, Climate & Energy and Resources & Circularity — has allowed us to strengthen our relationship with our customers and increase our impact on the total eco-system. Our customers are key stakeholders, and understanding their role in the total eco-system and their stakeholders is of utmost importance.

Customer loyalty and satisfaction

Customer loyalty and satisfaction starts with understanding our customers, their needs and their journey when interacting with us. In addition to daily connections with our customers, we worked in 2019 to understand better how they relate to us, both via digital channels and offline. Customer loyalty and satisfaction are measured through the Net Promoter Score (NPS) methodology and via Customer Journey mapping. These enable us to track results of the ongoing customer relationship improvement activities in all of our business groups. Longer-term customer loyalty and satisfaction are measured at fixed time intervals via a uniform system of online customer satisfaction research, followed by personal interviews with individual customers to better understand what lies behind customer feedback.

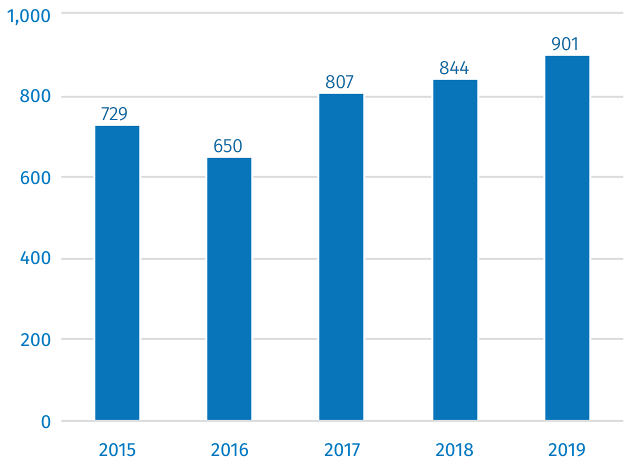
In 2019, our NPS score was 41 (2018: 40). With this improvement, we have seen an increase of our overall NPS score for four consecutive years (2016: 38). Additionally, several business groups have implemented an automated survey process to continuously measure customer satisfaction during specific interactions throughout the year. This provides instant performance feedback and new customer insights. Results are taken up in cross-functional meetings to drive the immediate optimization of processes and frontline staff interaction. Learnings from these initiatives are currently being applied to other business groups and will help us to further improve the overall customer experience with DSM.

Lead generation and lead management are one of the crucial roles that our marketing and sales professionals perform in the company. In addition, we know from our NPS methodology that customers expect a high ease of doing business along the full journey of considering, buying, applying and paying for our solutions. Digital technologies and capability development of our commercial employees are important investments that enable us to deliver a modern customer experience. This includes improving the digital expertise of our people, and amplifying the importance of being curious, empathic and agile. This also enables us to bring the voice of the customer to our functional areas such as innovation, procurement and finance.

Brand Value

Our brand is an important business asset. We are a purpose-led, performance-driven company that aspires to provide innovative products and solutions that support our purpose to create brighter lives for all. In 2019, our brand value continued to grow. Brand Finance attributed this growth to improved revenue expectations and a slightly lower risk profile.

DSM Brand Value[1]
(x € million)



1 As measured by the Brand Finance valuation methodology.

Customer Value Propositions

We continuously sharpen our understanding of our customers' needs and build them into our value propositions. We emphasize why our solutions enable our customers to satisfy the needs of the consumers they serve as well as enable them to succeed in the market, ensuring we match the evolving customer needs and customer value drivers. Our value propositions clarify what the benefits are for our customers and for others in the ecosystems that might benefit from our solutions. The value propositions also highlight how these solutions fit our purpose-led, performance-driven portfolio.

Suppliers

DSM Sustainable Procurement Program

Procurement is essential to enabling our sustainable growth ambitions. Sustainable procurement is the process of making balanced purchasing decisions in such a way that they benefit not only our business, but society as a whole, while minimizing our impact on the environment. In a joint effort with our suppliers, we take responsibility to grow in an environmentally sustainable, economically viable and socially desirable way. We engage with approximately 32,000 suppliers across our company.

DSM's Sustainable Procurement Program (SPP) is instrumental in ensuring that we deliver on our promise to reduce our environmental footprint and improve the lives for people today and generations to come through our activities, products and innovations. Collaboration and innovation with our suppliers are important for sharing best practices and finding new sustainable solutions. Our commitment to sustainability is at the heart of everything we do.

Our Supplier Procurement Program comprises three elements: scope 2 greenhouse gas (GHG) emissions (from purchased electricity), scope 3 GHG emissions (throughout our value chain) and supplier development and evaluation. For more information on scope 2, see 'Scope 1+ 2 GHG emissions' on page 52, and on scope 3, see 'Scope 3 GHG emissions' on page 53. As part of our supplier development and evaluation program, we focus on assessing, auditing and further improving our suppliers' sustainability performance by actively developing and following up on corrective actions.

Internal skills and capabilities

Internal capability-building focused on supplier sustainability continued in 2019. We shifted the focus from delivering training toward providing hands-on support and promoting peer learning. Peer learning offers practical experience and knowledge-sharing about integrating sustainability into the daily work of sourcing professionals.

In 2019, we developed the Procurement Vision 2021 to align with Strategy 2021. Five strategic choices were identified in the Procurement Vision: Customer-Centricity, World-Class Procurement, Value Creation, Sustainability Leadership and Innovation. Within the Sustainability Leadership stream, a new tool to assess Sustainability Maturity was developed. In 2019, all procurement groups within DSM performed a baseline assessment of their maturity, giving us insight into their current status and enabling us to set priorities for improvement and development in 2020. Three priorities were set for 2020: sustainable tenders, incorporating sustainability in category strategies, and key supplier management. Our Procurement Vision provides a framework against which we deliver our Sustainable Procurement Program.

Every year, our procurement community awards teams who have developed successful sourcing projects, including those with significant sustainability benefits. The Global Procurement Award recognizes and celebrates those committed to excellence in the procurement profession.

Collaboration

We work with external partners to enhance collaboration with our suppliers in the supply chain such as the Roundtable for Sustainable Palm Oil (RSPO), Friends of the Sea, the Marine Stewardship Council, and Together for Sustainability (TfS).

We use a limited amount of palm oil when making certain nutritional products. DSM Nutritional Products is a member of RSPO to mitigate the potential risks to the environment, human rights issues and labor practices in the palm oil supply chain. DSM Food Specialties sources RSPO 'Mass Balance' certified palm-derived glycerin in Asia. Our objective is to use 100% RSPO-certified sustainable palm oil and palm-derivative products using RSPO 'Mass Balance' supply chain models by 2020. Going forward, we aim to have all the production sites that use palm oil or palm oil derivative products RSPO-certified. For more information on palm oil, see the company website.

Protecting our marine environment is important to us as a company. We are committed to the responsible and sustainable use of natural marine resources. We have 'Friends of the Sea' certification for all our fish oil purchases. This certification helps ensure that the fisheries involved in providing fish oil for the production of our omega-3 product range are sustainable. Furthermore, we are currently in the deployment phase to have all our tuna oil suppliers Marine Stewardship Council (MSC) certified in 2020. We are proud to partner with the MSC, the global gold standard for certification and eco-labeling of seafood, to offer MEG-3® tuna DHA oils and powders that are MSC Chain of Custody (CoC) certified. This certification guarantees 'ocean-to-purchase' traceability throughout the entire supply chain, providing assurance that our tuna DHA products can be easily traced to certified fisheries.

Supplier Sustainability Evaluation

Sustainable Procurement Program results

	2019	2018
Spend coverage SCoC	95%	95%
EcoVadis assessments	322	237
Together for Sustainability audits	15	14

Our approach to compliance is defined by our Supplier Code of Conduct (SCoC). In 2019, 95% of our supplier spend was covered by the SCoC versus our target level of 95%. Through assessments and audits, we check that suppliers act in compliance with our norms and values. When suppliers cannot meet our expectations we will work with them to define and execute an improvement plan.

Since 2015, we have been a member of Together for Sustainability (TfS), a joint initiative of 23 chemical companies. Founded in 2011, TfS has developed and implemented a global assessment and audit program to improve sustainability practices within the chemical industry's supply chain. Through this initiative, TfS members can share all assessments and audit reports, which allows us to screen and address sustainability performance and risks for a high number of our suppliers.

To ensure a consistent and reliable supplier assessment approach, TfS selected EcoVadis as its partner and service provider. The objective of the EcoVadis methodology is to measure the quality of a company's sustainability system by checking its policies, actions and results. The assessment focuses on 21 criteria grouped in four themes: Environment, Labor & Human Rights, Ethics and Sustainable Procurement.

In 2019, TfS changed its metrics to increase the impact on sustainability for all its members. The revised focus is on enlarging the number of assessed and re-assessed suppliers, and at the same time driving improvements to support sustainability development in the value chain. In previous years, TfS' metrics focused on suppliers invited for an assessment by the individual member, whereas as of 2019, its metrics focused on the relevant supplier pool for each member, independent of the fact that our company or another TfS member initiated the assessment or re-assessment.

Through TfS, we assessed 322 suppliers in 2019, of which 295 were re-assessments. Of the re-assessed suppliers, 57% received an improved sustainability score. Moreover, the average EcoVadis assessment score of our suppliers was 52 in 2019 compared to 50 in 2018. The average of the supplier performance level indicates that our suppliers are further engaging in sustainability.

Supplier Projects

As part of our drive to foster better business through our supplier projects, our procurement organization engages in proactive dialogue with suppliers in order to move the business agenda forward in our focus domains of Nutrition & Health, Climate & Energy and Resources & Circularity.

As part of our scope 2 program, we remain committed to further increase the amount of purchased electricity from renewable resources for commercial production sites. For more information on our commitment to responsible and efficient use of energy, see 'Renewable energy' on page 53.

CO2REDUCE is our supplier engagement program covering scope 3. It focuses on understanding our run on suppliers' performance in reducing GHG emissions and developing reduction roadmaps in close cooperation with our suppliers. For more information on CO2REDUCE, see 'Scope 3 GHG emissions' on page 53.

The Global Logistics and Packaging (GL&P) team continued its journey on driving sustainability with its suppliers and set the ambition to reduce 20% CO_2 emissions by 2025 (compared to 2016). Via the CO_2 Emission Reduction Initiative, the GL&P team investigated suppliers' footprints not only in road, marine and air transportation, but also in various packaging categories. The successful achievement can be attributed to joint initiatives with suppliers that led to environmental benefits in the value chain. Projects such as stimulating shipment consolidation and optimizing and redesigning packaging products resulted in significant reductions in CO_2 emissions.

The GL&P team has also developed a 'Purpose Led Wooden Pallet Sourcing Strategy', whereby we influence our contracted suppliers in Europe to purchase sustainably harvested wood. At the same time, the GL&P team established a unique collaboration with the European wood and pallet industry whereby we commonly drive the industry toward using only sustainably sourced wood to make pallets and packaging crates.

Investors

We value the essential role of our capital providers for the success and prosperity of the company, allowing us to pursue a long-term oriented, value-creating strategy. This should also lead to a continuous increase of the company's valuation for the benefit of its shareholders and provide a low risk profile for our debt holders.

We ensure that accurate financial and relevant non-financial information is communicated to the financial markets in a transparent and simultaneous way. All information is made easily accessible to the public via the company website. Next to the Annual General Meeting of Shareholders, we also reach out to the financial markets through events like the Capital Markets Day, participation in investor conferences, and by organizing roadshows. We also actively seek engagement with financial advisors who cover DSM on behalf of their financial market clients, such as brokers, credit rating agencies, proxy advisors, shareholder representative organizations, and ESG (Environment, Social, Governance) rating agencies.

We actively seek feedback from the financial markets, which is periodically discussed and assessed by the Managing Board and the Supervisory Board. We highly value the insights gained through these engagements.

We engage with our investors and their representatives on topics such as the SDGs, climate change, governance, sustainability in supply chain management, natural and social capital, and responsible taxation.

Our Strategy 2021: *Growth & Value - Purpose led, Performance driven* was launched in 2018, where we presented how we will capture growth opportunities offered by global megatrends and the UN SDGs, and disclosed our targets for profit growth and cash generation, as well as our clear step-up in sustainability aspirations. During 2019, we continued to update the market on our progress against our strategic targets as well as the sustainability ambitions and our progress with the large sustainability-driven innovation projects. We provided updates through quarterly conference calls and at various roadshows covering all large investor cities, as well as in conferences, visits from investors and by many telephone and video calls.

Purpose and profit go hand in hand at DSM, which has been demonstrated by a continuing strong performance on both financial and non-financial metrics. In 2019, DSM actively advocated purpose-driven entrepreneurship among our shareholders. We engaged with investors, including pension funds, to discuss their responsibility in long-term value creation for their customers, but also for the society and the environment their participants live in. We actively participated in various impact investment initiatives including De Nederlandsche Bank (DNB) working group on SDG Impact Measurement and the WBCSD Chemical sector TCFD Preparer Forum on climate-related risks.

We engaged with FCLT (Focusing Capital to the Long Term), which works to encourage a longer-term focus in business and investment decision-making and whose mission is to motivate business leaders to actively combat short-termism in our financial markets. Our engagement with FCLT emphasizes the need for including non-financial long-term metrics (environmental, societal and governance related) in the investment decisions of investors. In particular, we emphasize the need to make the metrics uniform, comparable and auditable.

We further stepped up our engagement with leading ESG advisors to the financial sector, including Sustainalytics, MSCI, Vigeo-Eiris and ISS-ESG. For more information, see 'ESG Ratings and Benchmarks' on page 39.

We also saw the number of direct engagements between investors and DSM on ESG topics including SDG impact, substantially increase in 2019. Being recognized as a leader in sustainability and at the same time showing continued good financial progress, we were frequently invited for in-depth engagement calls and meetings on how to include — and compare — important non-financial parameters in their investment processes.

Society

We engage with society at multiple levels – from local community initiatives to collaborations with universities and research institutes. We work with NGOs and civil society to develop solutions for societal issues, and advocate with governments and society on important issues relating to the Sustainable Development Goals and the Paris Agreement. We also engage in philanthropic and sponsorship activities to the average yearly amount of approximately € 6 million. Here we share some examples of our collaborations with society.

In Brazil, we continued our support of a number of educational initiatives. These included the Agrinho Program (providing teaching materials and teacher training), CEAP (Vocational Educational Center, providing disadvantaged youths with educative and vocational training) and the Young Professional Project (hosting discussions for students on education, career development and the labor market).

In China, we collaborated with universities and institutes on research projects, such as with Beijing University on polymer physics, Shanghai Jiao Tong University on composite processing, the Institute of Chinese Academy of Science on application formulations for vitamins and Wuhan University of Science and Technology on additional application possibilities. We also participated in the 12th annual Bright Experience Hunger Walk in support of the UN World Food Programme and the China Foundation for Poverty Alleviation.

In India, we partnered with CII (Confederation of Indian Industries) to institute CAP 2.0°, a unique Climate Action Program to recognize industry best practices and innovation on climate action, as well as to enable capacity-building for corporates. CAP 2.0° helps companies seek expert intervention on climate action, with assistance throughout the process, and a gap/feedback report at the end of the cycle. In addition, the program provides certified training for selected professionals on the assessment methodology.

In Japan, the Oranda-Jima House, donated by the Oranda-Jima Foundation, celebrated its fifth anniversary in 2019. We provided in-kind and financial support for the construction of the House to support children in the region recovering from the East Japan earthquake and tsunami in 2011. The President of DSM Japan, who is Representative Director of the Foundation, made a congratulatory speech at the anniversary celebrations and expressed his hopes for the continued good use of the House.

In the Netherlands, we celebrated 150 years of biotechnology in Delft. To mark this occasion, we presented, together with ARTIS-Micropia, the ARTIS-Micropedia Experience titled '*Small Life, Major Impact: Microbes determine our world*'. For more information, see 'Enabling DSM's Bright Science' on page 95. We also joined forces with three companies and eight knowledge institutes in a consortium for a project called 'Soft Advanced Materials'. For more information, see 'Innovation Partnerships' on page 99. We also extended our co-operation with The Ocean Cleanup design team, where ropes with Dyneema® are used as towlines to support the net that catches plastic in the Great Pacific Garbage Patch.

In Switzerland, DSM Nutritional Products participated in EXPO 19, a regional trade show. Our participation supported engagement with the local Rhine Valley community and helped showcase our science and expertise. Participants also had the opportunity to learn more about the role of UV filters in sun-creams, how to measure anti-oxidants through a vitality check, and how consumer preferences differ between countries regarding color and pigmentation in eggs.

In the US, we continued our support of the Union County College Foundation Close the Gap initiative that provides scholarships to African American students. We also continued to underwrite the costs of two Fellows with the Global Health Corps.

The Oranda-Jima House in Yamada, Japan.

Management approach for material topics

In the following tables, we elaborate on the material topics defined in the Materiality matrix, see 'Materiality' on page 33 and describe how we manage these topics.

Environment

Climate & Energy	Management approach	Relevant references
This topic addresses our climate impacts in terms of greenhouse gas emissions, as well as developing and providing sustainable solutions that help other avoid emissions.	Climate & Energy is a focus domain of DSM, and we manage this topic by improving our own carbon footprint, enabling our customers through innovative solutions and advocating actions toward a low-carbon future. This supports our efforts to manage the physical and transitional opportunities and risks relating to climate change mitigation and adaptation. We publicly disclose our impact and strategy via this Report, CDP and others.	DSM & the Sustainable Development Goals Strategy 2021 Stakeholders — Collaborative platforms & networks Planet Review of business

Resources & Circularity	Management approach	Relevant references
Resources & Circularity refers to the efficient use of natural resources in order to minimize stress on the environment. A transition to a circular economy, addressing closed-loop solutions and renewable materials, is key to meeting the needs of current and future generations.	Resources & Circularity is a focus domain of DSM, and we manage this topic by improving the value extracted from the limited resources that are available, enabling the transition to a circular and bio-based economy through our solutions and advocating a shift away from a linear to a circular and bio-based economy.	DSM & the Sustainable Development Goals Strategy 2021 Stakeholders — Collaborative platforms & networks Planet Review of business

Water security	Management approach	Relevant references
Water is essential to life and all ecosystems. As water is becoming a scarcer resource, both the quality and quantity of available water constitute a global issue that has local consequences, from water scarcity to floods and storms.	We are committed to the responsible use of water. Our approach is defined in the new DSM Responsible Care Plan. We believe that water risks are local by nature, so we focus on local water risk assessments and thorough follow-up on these. We are a signatory to the UN Global Compact CEO Water Mandate and disclose our water management and strategy via CDP.	Planet

Biodiversity	Management approach	Relevant references
Biodiversity refers to the variety and variability of life on earth and is an important condition for a sustainable planet. Biodiversity supports relevant ecosystem services that we require, such as food, water and clean air.	Biodiversity is a locally relevant issue that potentially impacts our operational locations. The DSM Responsible Care Plan defines how we monitor and assess the impact of our operations on these locations. We support the ambitions of the Convention on Biological Diversity and we continue to explore the role the Natural Capital Protocol can play in supporting our decision making. Our position paper on Biodiversity can be found on the company website.	Planet Biodiversity position paper

Social

Nutrition & Health	Management approach	Relevant references
This topic refers to the transition to sustainable food systems within planetary boundaries that is needed to secure the future availability of food. An increasing global population and the impact of climate change will put greater strain on our ability to provide sufficient food that is also nutritionally complete — addressing issues including malnutrition, non-communicable diseases and obesity.	Nutrition & Health is a focus domain of DSM, and we manage this topic by improving the health of our own workforce, enabling healthy food systems through our Nutrition businesses targeting health and well-being and our Biomedical business improving health and the quality of life for surgical patients. We advocate for a change in food systems within planetary boundaries.	Strategy 2021 Stakeholders — Collaborative platforms & networks Review of business

Occupational health & safety	Management approach	Relevant references
Occupational health & safety addresses the company's ability to create and maintain a safe and healthy workplace environment that is free of injuries, fatalities, and illness (both chronic and acute).	The occupational health and safety of all our employees and contractors is our highest priority. Our approach to safety is defined in the DSM Responsible Care Plan and is spearheaded by our Life Saving Rules. We apply an occupational health model based on prevention, primary care and promotion to support employee health.	People

Labor practices & human rights	Management approach	Relevant references
This topic encompasses decent working conditions for DSM employees, suppliers and other partners across the value chain. It addresses, among others, freedom of association, non-discrimination, the prohibition of child labor and forced labor, and fair compensation.	DSM has installed a cross-functional human rights steering committee and working group to manage our approach toward human rights which is defined in our position paper. Our whistleblower policy (DSM Alert) is available for employees and external stakeholders to report potential violations of human rights.	People DSM Code of Business Conduct Sustainability Statements — Suppliers Human Rights position paper Whistleblower policy – DSM Alert

Leadership & development	Management approach	Relevant references
This topic refers to the continuous development of employees' skills through training and development programs, and the company's ability to generate commitment among employees to the organization and its goals.	Leadership & development fuels the growth of our employees and leaders, which in turn should enable our overall growth as an organization. The DSM Leadership Model provides the common vision and language for leadership at DSM. Our People & Organization strategy shapes our engagement with our employees.	People

Internationalization & diversity	Management approach	Relevant references
This topic revolves around equal opportunities in the workforce, and ensuring that company culture and hiring and promotion practices embrace the building of a diverse and inclusive workforce that reflects the makeup of local talent pools and our customer base.	We focus our activities on increasing the representation of women and the nationality diversity of our executive population and management pipeline. Through our Women's Inspired Network activities and training opportunities, we address gender diversity and bias.	People

Business & Governance

Business ethics & transparency	Management approach	Relevant references
This topic addresses the company's approach to and public disclosure on ethical and fair business conduct, corporate governance and compliance. This includes taxation, privacy, bioethics, fraud, bribery & corruption and fiduciary responsibilities.	We take our responsibilities as a business seriously. Our approach to ethics and transparency is led by the DSM Code of Business Conduct and our Supplier Code of Conduct. DSM's tax position is consistent with the normal course of our business operations and reflects the corporate strategy as well as the geographic spread of our activities. It is available through our position paper. We transparently report on our business through this Report and our public statements.	DSM Code of Business Conduct Corporate governance and risk management Taxation position paper

Geopolitical shifts & (trade) dynamics	Management approach	Relevant references
This topic refers to geopolitical shifts and dynamics such as political tensions and inequalities. It also includes the impact of trade policies and barriers.	Through our partnerships and stakeholder engagement activities, we monitor topics relevant to our business. We identify risks and mitigating actions through our risk management approach, and apply standard business processes and practices to manage trade control compliance.	Stakeholders — Collaborative platforms & networks DSM Code of Business Conduct Risk management

Innovation	Management approach	Relevant references
This topic refers to the company's technology capabilities and research & development investments to develop innovative, sustainable solutions.	Our innovation and research & development capabilities support us in achieving our growth targets. Through collaborations with our value chain partners, we bring new thinking and new solutions into the company. Through our venturing activities, we invest in emerging innovative companies around the world.	Review of business — Innovation Center

Advocacy, engagement & partnering	Management approach	Relevant references
When companies engage with stakeholders, they become aware of the relevant issues that arise from business activities. Multi-stakeholder collaboration may support the achievement of the Sustainable Development Goals, in particular in developing countries through the development of suitable products and processes.	We engage with our stakeholders to help define the topics that are material to our business and our reporting. We collaborate in platforms and networks that contribute to our purpose and align with our focus domains of Nutrition & Health, Climate & Energy and Resources & Circularity.	Stakeholders

Product stewardship	Management approach	Relevant references
Product stewardship addresses the incorporation of sustainability factors in characteristics of products provided by the company. It covers managing the lifecycle impacts of products along the value chain, such as sourcing, packaging, distribution, use-phase resource efficiency, and other environmental and social externalities.	Our product stewardship statement describes our approach on this topic. We assess our products and will have an action plan in place for substances of very high concern. We take a risk-based approach to product stewardship and will use alternatives where feasible, and always where required. We also see the opportunities for safer products with fewer or no hazardous properties in the circular economy.	Planet Product stewardship on the company website

Digital transformation	Management approach	Relevant references
Digital transformation refers to the application of digital technologies to all aspects of business and society.	Our Data Analytics Center of Excellence and Digital Acceleration Group will support us in the acceleration of digital insights and solutions. Digital solutions also support and strengthen our customer relationships. We monitor and mitigate potential risks relating to digital through Group Risk Management. Our Information Security Office and Privacy Policy guide our approach toward the security of information assets.	People Risk management Sustainability Statements — Customers

Taskforce for Climate-related Financial Disclosures (TCFD)

The Taskforce for Climate-related Financial Disclosures (TCFD) recommendations are a set of voluntary, climate-related financial disclosures for use by companies to provide information to their stakeholders. In 2017, we were among the first companies to commit to implementing, as fully as practicable, these recommendations over the following three years as outlined in the TCFD's implementation path. The recommendations are structured around four elements — Governance, Strategy, Risk Management, and Metrics and Targets. This Report includes various disclosures relevant for the TCFD recommendations. To highlight this, for each TCFD theme reference is made to relevant sections.

Core Element	References
Governance Sustainability, including climate-related risks & opportunities, is a direct responsibility of the Managing Board. The Managing Board is supported in this by advice from our external Sustainability Advisory Board and reports on progress to the Supervisory Board, via its Sustainability Committee. Our approach toward assessing and managing climate-related risks and opportunities is steered by our climate action agenda, containing key actions and deliverables that are owned by members of the Managing Board and Executive Committee. The DSM Responsible Care Plan and our greenhouse gas (GHG) reduction program translate the climate action agenda into concrete operational programs managed by Operations & Responsible Care, Sourcing and business management. All of these are regularly discussed and reviewed during the MB/EC meetings.	Planet Sustainability Governance Framework Supervisory Board — committees
Strategy DSM has recognized climate change as a global megatrend for more than a decade. Climate change will impact our company directly, and indirectly via shifts in our value chains and end-markets. This poses a risk to our current business while providing ample opportunities for growth. Our portfolio and innovations seek to offer solutions to address changes coming from the shift to a low-carbon society. For example, in our nutrition business, we address transition risks through innovations, such as Project Clean Cow which reduces methane emissions from current animal (ruminant) protein production, as well as through plant-based proteins like CanolaPRO®. We are reducing our exposure to transition risks like carbon pricing and changing legislation through actively reducing GHG emissions from our own operations and in our value chain. Projects to underpin our related GHG targets for 2030 and 2050 are ongoing. We believe that the implementation of our business strategy and delivery upon our GHG targets provide some resilience toward transition risks, but more extensive risk assessments will provide further insight into additional transition risks. We believe that our exposure to short-term physical risks in our direct operations is limited, however we are still assessing the medium- and long-term impact on our operational footprint and total value chain.	Strategy 2021 Purpose Planet Review of business Innovation
Risk Management The management of climate-related risks is fully integrated into our regular risk management cycles. Climate-related risk is identified in the Corporate Risk Assessment in 'Emerging risk 1' (end-markets) and 'Emerging risk 2' (supply chain and own operations), with mitigating actions defined where appropriate. As with all risks, the responsibility for identifying and managing climate risks is with the management of the units, supported by Group Risk Management and assessed by Corporate Operational Audit. To support management, we have started a project to develop heatmaps for physical climate risks. These will provide more detailed insights into physical (acute and chronic) risks linked to climate change based on two different climate scenarios.	Planet Risk management
Targets and Metrics We report our climate-related metrics and targets via this Report and the company website. Our Science Based Targets are our key environmental targets within the DSM Responsible Care Plan, supported by supplementary targets and programs. Furthermore, we also report on avoided emissions, water, waste and other emissions. We apply a carbon price of € 50/t CO_2eq in our large investment decisions and in the Profit & Loss statements of the business groups for internal management reporting. Building on this, we now require all business growth projects to be carbon neutral, or else compensated for in the same business. Climate-related metrics form part of the Long-Term Incentives of the Managing Board and executives.	Strategy 2021 Planet Managing Board Remuneration report Note 27 to the Financial statements

Consolidated financial statements

Summary of significant accounting policies

Basis of preparation

DSM's consolidated financial statements have been prepared in accordance with International Financial Reporting Standards (IFRS) as adopted by the European Union and the provisions of section 362-8 of Book 2 of the Dutch Civil Code. The accounting policies applied by DSM comply with IFRS and the pronouncements of the International Financial Reporting Interpretation Committee (IFRIC) effective at 31 December 2019.

Impact of new accounting standards adopted in 2019

The International Accounting Standards Board (IASB) and IFRIC have issued IFRS 16, which became effective as of 1 January 2019. DSM's accounting policies were updated to reflect the changes driven by the implementation of this standard. For completeness, a summary of the impact on the accounting policies is provided below as well.

IFRS 16 Leases

With effect from 1 January 2019, DSM has adopted IFRS 16 Leases. IFRS 16 replaces IAS 17 Leases and establishes a new model for lessee accounting that requires a lessee to recognize lease liabilities and corresponding right-of-use assets, reflecting the future commitments and rights created by lease contracts. The introduction of IFRS 16 primarily affects the accounting for leases that were previously accounted for as operating leases. IFRS 16 replaces the straight-line operating lease expenses with a depreciation charge for right-of-use assets and interest expense on lease liabilities. In addition, operating lease cash flows that were previously presented as operating cash flows are reported as financing cash flows under IFRS 16.

At the date of adoption, DSM applied IFRS 16 using the modified retrospective approach under which the right-of-use asset is measured at an amount equal to the lease liability, adjusted for any prepayments or accruals. Accordingly, the comparative information presented for 2018 has not been restated.

Impact on transition

At the transition date, DSM recognized lease liabilities and corresponding right-of-use assets for contracts that were previously classified as operating leases and that met the definition of a lease under IFRS 16. The lease liabilities were measured at the present value of the remaining lease payments, discounted using DSM's incremental borrowing rate at 1 January 2019 applicable to the respective lease object. The weighted-average rate applied is 3.2%. The lease liabilities and right-of-use assets related to leases that were previously classified as finance leases are recognized at their respective carrying amounts immediately before transition upon the transition date. The following table summarizes the impact of the transition to IFRS 16 on the lease liability:

	1 January 2019
Operating Lease commitments under IAS 17 (31 December 2018)	**240**
Operating lease commitments related to contracts that do not meet the definition of lease under IFRS 16 at 31 December 2018	(4)
Operating lease commitments under IFRS 16 (31 December 2018)	236
Discounted using the incremental borrowing rate (1 January 2019)	**215**
Finance lease liabilities recognized at 31 December 2018	21
Lease liabilities recognized at 1 January 2019	**236**

Impact for the period

In addition to the balance sheet impact, the nature of expenses related to leases changed as IFRS 16 replaces the operating lease expense with a straight-line depreciation charge for right-of-use assets, and interest expense on lease liabilities. The following table summarizes the impact of IFRS 16 on the consolidated income statement, consolidated cash flow statement, and main performance measures in 2019.

Impact of IFRS 16

	Reported 2019	IFRS 16 impact	Excluding IFRS 16 impact
EBITDA	1,586	52	1,534
Depreciation, amortization and impairments (see Note 5 'Net sales and costs')	632	49	583
Operating profit	954	3	951
Financial income and expense (see Note 6 'Financial income and expense')	(92)	(6)	(86)
Profit for the year	764	(3)	767
Net earnings per ordinary share (in €)	4.27	(0.02)	4.29
Adjusted EBITDA	1,684	52	1,632
- Nutrition	1,250	30	1,220
- Materials	509	7	502
- Innovation	22	2	20
- Corporate Activities	(97)	13	(110)
Adjusted operating profit	1,075	3	1,072
Capital employed (see Note 2 'Alternative performance measures')	9,311	213	9,098
Average capital employed (see Note 2 'Alternative performance measures')	8,936	209	8,727
ROCE in %	12.0	(0.3)	12.3
Net debt (see Note 25 'Net debt')	1,144	217	927
Cash flow (see Consolidated cash flow statement on page 175)			
- Operating cash flow	1,385	52	1,333
- Payment of lease liabilities in financing activities	(53)	(52)	(1)

New IFRIC interpretations are not expected to have a material effect on the financial statements of DSM.

Consolidation

The consolidated financial statements comprise the financial statements of Royal DSM and its subsidiaries (together 'DSM' or 'group'). As a parent company, DSM is exposed, or has right to, the variable returns from its involvement with its subsidiaries and has the ability to affect the returns through its power over the subsidiary. The financial data of subsidiaries are fully consolidated. Non-controlling interests in the group's equity and profit and loss are stated separately. A joint arrangement is an entity in which DSM holds an interest and which is jointly controlled by DSM and one or more other venturers under a contractual arrangement. A joint arrangement can either be a joint venture where DSM and the other partner(s) have rights to the net assets of the arrangement or a joint operation where DSM and the partner(s) have rights to the assets, and obligations for the liabilities of the arrangement. For joint ventures, the investment in the net assets is recognized and accounted for in accordance with the equity method. For a joint operation, assets, liabilities, revenues and expenses are recognized in the financial statements of DSM in accordance with the contractual entitlement or obligations of DSM.

Subsidiaries are consolidated from the acquisition date until the date on which DSM ceases to have control. From the acquisition date onwards, all intra-group balances and transactions and unrealized profits or losses from intra-group transactions are eliminated, with one exception: unrealized losses are not eliminated if there is evidence of an impairment of the asset transferred. In such cases, an impairment of the asset is recognized.

Business combinations

Business combinations are accounted for using the acquisition method. The cost of an acquisition is measured as the aggregate of the consideration transferred, including liabilities incurred, measured at acquisition date fair value, and the amount of any non-controlling interest in the acquiree. Acquisition costs incurred are expensed.

As of the acquisition date, identifiable assets acquired, liabilities assumed and any non-controlling interest in the acquiree are recognized separately from goodwill. Identifiable assets acquired and the liabilities assumed are measured at acquisition date fair value. For each business combination, DSM elects whether it measures the non-controlling interest in the acquiree at fair value or at the proportionate share of the acquiree's identifiable net assets. Any contingent consideration payable is measured at fair value at the acquisition date.

Segmentation

Segment information is presented in respect of the group's operating segments, about which separate financial information is available that is regularly evaluated by the chief operating decision maker. DSM has determined that Nutrition, Materials and the Innovation Center represent reportable segments in addition to Corporate Activities. The Managing Board decides how to allocate resources and assesses the performance of the clusters. Cluster performance is reported and reviewed down to the level of Adjusted EBITDA. The clusters are organized in accordance with the type of products produced and the nature of the markets served. The same accounting policies that are applied for the consolidated financial statements of DSM are also applied for the operating segments. Prices for transactions between segments are determined on an arm's length basis. Segment results, assets and liabilities include items directly attributable to a segment as well as those that can reasonably and consistently be allocated. Selected information on a country and regional basis is provided in addition to the information about operating segments.

Foreign currency translation

The presentation currency of the group is the euro.

Each entity of the group records transactions and balance sheet items in its functional currency. Transactions denominated in a currency other than the functional currency are recorded at the spot exchange rates prevailing at the date of the transactions. Monetary assets and liabilities denominated in a currency other than the functional currency of the entity are translated at the closing rates. Exchange differences resulting from the settlement of these transactions and from the translation of monetary items are recognized in the income statement.

Non-monetary assets that are measured on the basis of historical costs denominated in a currency other than the functional currency continue to be translated against the rate at initial recognition and will not result in exchange differences.

On consolidation, the balance sheets of subsidiaries that do not have the euro as their functional currency are translated into euros at the closing rate. The income statements of these entities are translated into euros at the average rates for the relevant period. Goodwill paid on acquisition is recorded in the functional currency of the acquired entity. Exchange differences arising from the translation of the net investment in entities with a functional currency other than the euro are recorded in Other comprehensive income. The same applies to exchange differences arising from borrowings and other financial instruments insofar as those instruments hedge the currency risk related to the net investment. On disposal of an entity with a functional currency other than the euro, the cumulative exchange differences relating to the translation of the net investment are recognized in profit or loss.

Distinction between current and non-current

An asset (liability) is classified as current when it is expected to be realized (settled) within 12 months after the balance sheet date.

Offsetting

Financial assets and financial liabilities are offset and the net amount is presented in the balance sheet when DSM has a legal right to offset the amounts and intends either to settle them on a net basis or to realize the asset and settle the liability simultaneously.

Intangible assets

Goodwill represents the excess of the cost of an acquisition over DSM's share in the net fair value of the identifiable assets and liabilities of an acquired subsidiary, joint venture or associate. Goodwill paid on acquisition of subsidiaries is included in intangible assets. Goodwill paid on acquisition of joint ventures or associates is included in the carrying amount of these entities. Goodwill recognized as an intangible asset is not amortized but tested for impairment annually and when there are indications that the carrying amount may exceed the recoverable amount. A gain or loss on the disposal of an entity includes the carrying amount of goodwill relating to the entity sold.

Intangible assets acquired in a business combination are recognized at fair value on the date of acquisition and subsequently amortized over their expected useful lives, which vary from 4 to 20 years.

Separately acquired licenses, patents, drawing rights and application software are carried at historical cost less straight-line amortization and less any impairment losses. The expected useful lives vary from 4 to 15 years. Costs of software maintenance are expensed when incurred. Capital expenditure that is directly related to the development of application software is recognized as an intangible asset and amortized over its estimated useful life (5 to 8 years).

Research costs are expensed when incurred. Development expenditure is capitalized if the recognition criteria are met and if it is demonstrated that it is technically feasible to complete the asset; that the entity intends to complete the asset; that the entity is able to sell the asset; that the asset is capable of generating future economic benefits; that adequate resources are available to complete the asset; and that the expenditure attributable to the asset can be reliably measured. Development expenditure is amortized over the asset's useful life. Development projects under construction are included under 'Development projects'.

Property, plant and equipment

Property, plant and equipment are measured at cost less depreciation calculated on a straight-line basis and less any impairment losses. Interest during construction is capitalized when it meets the criteria of a qualifying asset. Expenditures relating to major scheduled turnarounds are capitalized and depreciated over the period up to the next turnaround.

Property, plant and equipment are systematically depreciated over their estimated useful lives. The estimated remaining lives of assets are reviewed every year, taking account of commercial and technological obsolescence as well as normal wear and tear. The initially assumed expected useful lives are in principle as follows: for buildings 10–50 years; for plant and machinery 5–15 years; for other equipment 4–10 years. Land is not depreciated.

An item of property, plant and equipment is derecognized upon disposal or when no future economic benefits are expected to arise from the continued use or the sale of the asset. Any gain or loss arising on derecognition of the asset is recorded in profit or loss.

Leases

DSM's lease portfolio mainly includes lease contracts for buildings and vehicles.

DSM recognizes a lease liability and a corresponding right-of-use asset at the commencement date of a lease. Under IFRS 16, a lease is a contract — or part of a contract — that conveys a right to control the use of an identified asset for a period of time in exchange for consideration. In general, DSM splits the contractual consideration into a lease and a non-lease component based on their relative stand-alone prices. For vehicle leases, however, DSM applies the practical expedient not to make this split but rather accounts for the fixed consideration as a single lease component. In addition, payments related to short-term leases (leases with a term shorter than 12 months) are recognized on a straight-line basis in profit or loss.

The right-of-use assets are measured at cost, initially at an amount equal to the lease liability, adjusted for any prepayments or accruals. Subsequently, the right-of-use assets are depreciated on a straight-line basis over the expected lease term and adjusted for any impairment losses or remeasurements of the lease liability. In line with the initially assumed expected useful life of the corresponding asset class within Property, plant and equipment, the minimum expected lease term for building leases is in principle 10 years. However, the contractual terms or specific circumstances could require applying the shorter non-cancellable period in determining the expected lease term. For vehicle leases, the expected lease term is set equal to the contractual term (4–5 years).

The lease liability is initially measured at the present value of the remaining lease payments that are not paid at the commencement date. If an implicit interest rate can readily be determined for a lease contract, this rate is used to discount the future payments. If this rate is not available, DSM uses the applicable incremental borrowing rate as the discount rate. In determining the incremental borrowing rate, DSM applies the practical expedient to use a single discount rate to portfolios of leases with reasonably similar characteristics.

Concerning the subsequent measurement, the lease liability is increased by the interest expense related to the unwinding of the lease liability over time and decreased by the lease payments made. The lease liability is remeasured when DSM reassesses or modifies the contractual terms and conditions. These remeasurements include the indexation of lease payments based on a variable index, the reassessment of the likelihood of available extension or termination options, changes in the lease term due to contract renegotiations, or early terminations.

Associates and joint ventures

An associate is an entity over which DSM has significant influence but no control or joint control, usually evidenced by a shareholding that entitles DSM to between 20% and 50% of the voting rights. A joint venture is an entity over which DSM has joint control and is entitled to its share of the net assets and liabilities. Investments in associates and joint ventures are accounted for by the equity method, which involves recognition in the income statement of DSM's share of the associate's or joint venture's profit or loss for the year determined in accordance with the accounting policies of DSM. Any other results at DSM in relation to associated companies are recognized under Other results related to associates and joint ventures. DSM's interest in an associate or joint venture is carried in the balance sheet at its share in the net assets of the associate or joint venture together with goodwill paid on acquisition, less any impairment loss.

When DSM's share in the loss of an associate or joint venture exceeds the carrying amount of that entity, the carrying amount is reduced to zero. No further losses are recognized, unless DSM has responsibility for obligations relating to the entity.

Financial instruments

Financial instruments are contractually agreed rights and obligations resulting in an inflow or outflow of financial assets or the issue of equity instruments. They are initially measured at fair value plus any directly attributable transaction costs. Transaction costs for financial instruments assigned to the category at fair value through profit and loss are recognized directly in the income statement. Subsequent measurement is based on the classification of financial instruments defined in IFRS 9.

Non-derivative financial instruments

DSM initially recognizes loans and receivables and debt securities on the date when they are originated. All other financial assets and financial liabilities are initially recognized on the date when DSM becomes a party to the contractual provisions of the instrument. DSM derecognizes a financial asset when the contractual rights to the cash flows from the asset expire, or when it transfers the rights to receive the contractual cash flows in a transaction in which substantially all the risks and rewards of ownership of the financial asset are transferred, or when DSM neither transfers nor retains substantially all of the risks and rewards of ownership and does not retain control over the transferred asset. DSM derecognizes a financial liability when its contractual obligations are discharged or cancelled, or expire.

Other financial assets

Other financial assets comprise loans to associates and joint ventures, other participating interests, other receivables and other deferred items.

DSM's business model objective for loans is to hold-to-collect contractual cash flows only. Loans and long-term receivables, for which the contractual cash flows consist solely of principal and interest, are measured at amortized cost, using the effective interest method, which generally corresponds to nominal value, less an adjustment for expected credit loss. The proceeds from these assets and the gain or loss upon their disposal are recognized in profit or loss.

Other receivables, for which the contractual cash flows are not solely principal and interest, are recognized at fair value, with changes in fair value recognized in profit or loss.

Other participating interests comprise equity interests in entities in which DSM has no significant influence; these are accounted for as assets at fair value through profit or loss, or else DSM uses the irrevocable election to present the fair value changes in other comprehensive income (Fair value reserve) instead of profit or loss. Fair value changes in OCI will not be recycled through profit and loss upon disposal of the asset. All dividends received will be presented in profit or loss.

Impairment of non-financial assets

When there are indications that the carrying amount of a non-financial asset (an intangible asset or an item of property, plant and equipment) may exceed the estimated recoverable amount (the higher of its value in use and fair value less costs to sell), the possible existence of an impairment loss is investigated. If an asset does not generate largely independent cash flows, the recoverable amount is determined for the cash generating unit (CGU) to which the asset belongs. In assessing the value in use, the estimated future cash flows are discounted to their present value using a pre-tax discount rate that reflects current market interest rates and the risks specific to the asset.

When the recoverable amount of a non-financial asset is less than its carrying amount, the carrying amount is impaired to its recoverable amount and an impairment charge is recognized in profit or loss. An impairment loss is reversed when there has been a change in estimate that is relevant for the determination of the asset's recoverable amount since the last impairment loss was recognized. Impairment losses for goodwill are never reversed.

Expected credit loss

All financial assets measured at amortized cost and fair value through other comprehensive income include an expected credit loss as of the date of initial recognition of the asset. Credit losses are measured as the present value of the difference between the cash flows due to DSM, and the cash flows that DSM expects to receive. Expected credit losses are recognized in the income statement. Loss allowances for trade receivables are always measured at lifetime expected credit loss.

Inventories

Inventories are stated at the lower of cost and net realizable value. The first in, first out (FIFO) method of valuation is used unless the nature of the inventories requires the use of a different cost formula, in which case the weighted average cost method is used. The cost of intermediates and finished goods includes directly attributable costs and related production overhead expenses. Net realizable value is determined as the estimated selling price in the ordinary course of business, less the estimated costs of completion and the estimated costs necessary to make the sale. Products whose manufacturing cost cannot be calculated because of joint cost components are stated at net realizable value after deduction of a margin for selling and distribution efforts.

Current receivables

Current receivables for which the contractual cash flows are solely principal and interest are initially recognized at fair value plus any directly attributable transaction costs. Subsequent to initial recognition, they are measured at amortized cost using the effective interest method, which generally corresponds to nominal value, less an adjustment for expected credit loss.

Current investments

Current investments are initially recognized at fair value plus any directly attributable transaction costs. Subsequent to initial recognition, they are measured at amortized cost using the effective interest method. Deposits with banks with a maturity between 3 and 12 months are classified as current investments.

Cash and cash equivalents

Cash and cash equivalents comprise cash at banks and in hand and deposits held at call with banks with a maturity of less than three months at inception. Bank overdrafts are included in current liabilities. Included in cash and cash equivalents are investments in money market funds that do not meet the SPPI (Solely Payments of Principal & Interest) criterion but are held to meet short-term cash demand. Cash and cash equivalents are measured at fair value through profit and loss, or amortized cost.

Non-current assets and disposal groups held for sale

Non-current assets and disposal groups (assets and liabilities relating to an activity that is to be sold) are classified as 'held for sale' if their carrying amount is to be recovered principally through a sales transaction rather than through continuing use. The reclassification takes place when the assets are available for immediate sale and the sale is highly probable. These conditions are usually met as from the date on which a letter of intent or agreement to sell is ready for signing. Non-current assets held for sale and disposal groups are measured at the lower of carrying amount and fair value less costs to sell. Non-current assets held for sale are not depreciated or amortized. For transparency, non-current assets and disposal groups that will contribute to joint ventures are reported separately from other assets and liabilities held for sale.

Discontinued operations

Discontinued operations comprise those activities that were disposed of during the period or which were classified as held for sale at the end of the period and represent a separate major line of business or geographical area that can be clearly distinguished for operational and financial reporting purposes.

Royal DSM Shareholders' equity

DSM's ordinary shares and cumulative preference shares are classified as Royal DSM Shareholders' equity. This is the case for the latter, as there is no mandatory redemption, and distributions to the shareholders are at the discretion of DSM. The price paid for repurchased DSM shares (treasury shares) is deducted from Royal DSM Shareholders' equity until the shares are cancelled or reissued. Treasury shares are presented in the treasury share reserve. When treasury shares are sold or reissued, the amount received is recognized as an increase in equity. Dividend to be distributed to holders of cumulative preference shares is recognized as a liability when the Supervisory Board approves the proposal for profit distribution. Dividend to be distributed to holders of ordinary shares is recognized as a liability when the Annual General Meeting of Shareholders approves the profit appropriation.

Provisions

Provisions are recognized when all of the following conditions are met: (1) there is a present legal or constructive obligation as a result of past events, (2) it is probable that a transfer of economic benefits will settle the obligation, and (3) a reliable estimate can be made of the amount of the obligation.

The probable amount required to settle long-term obligations is discounted if the effect of discounting is material. Where discounting is used, the increase in the provision due to the passage of time is recognized as interest costs.

Borrowings

Borrowings are not held for trading and are initially recognized at fair value of the proceeds received, net of transaction costs. Subsequently, borrowings are stated at amortized cost using the effective interest method. Measurement at amortized cost includes any discount or premium on the borrowing. Interest expenses are recorded in profit or loss.

Where the interest rate risk relating to a long-term borrowing is hedged through a fair value hedge, and the hedge is effective, the carrying amount of the long-term loan is adjusted for changes in fair value of the interest component of the hedged loan.

Other current liabilities

Other current liabilities are measured at amortized cost, which generally corresponds to the nominal value.

Revenue for contracts with customers

Revenues from contracts with customers are recognized by identifying the contract and its performance obligations as well as determination and allocation of the transaction price to these performance obligations. At DSM, revenue related to the sale of goods is recognized in the income statement when the performance obligation is satisfied. This is at the point in time when transfer of control of the goods passes to the buyer. Revenue is measured at the fair value of the transaction price received.

Income coming from the rendering of services is recognized when the service, i.e., the performance obligation, has been performed. The revenue is measured at the fair value of the transaction price received.

Net sales represent the invoice value less estimated rebates, cash discounts, and indirect taxes.

Income related to the sale or licensing of technologies or technological expertise is recognized in the income statement either at a point in time or over time, depending on when the contractually identified performance obligations are satisfied. Performance obligations related to license income include the transfer of rights and obligations associated with those technologies.

License income is reported in Net sales when the income is part of the ordinary and recurring activities of the business and, if not, in Other operating income.

Interest income is recognized on a time-proportionate basis using the effective interest method.

Dividend income is recognized when the right to receive payment is established.

Government grants

Government grants are recognized at their fair value if there is reasonable assurance that the grant will be received and all related conditions will be complied with. Cost grants are recognized as income over the periods necessary to match the grant on a systematic basis to the cost that it is intended to compensate. If the grant is an investment grant, its fair value is initially recognized as deferred income in Other non-current liabilities and then released to profit or loss over the expected useful life of the relevant asset.

Share-based compensation

The costs of option plans are measured by reference to the fair value of the options on the date on which the options are granted. The fair value is determined using the Black-Scholes model, taking into account market conditions linked to the price of the DSM share. The costs of these options are recognized in profit or loss (Employee benefit costs) during the vesting period, together with a corresponding increase in Equity in the case of equity-settled options or Other non-current liabilities in the case of cash-settled options (Share Appreciation Rights). No expense is recognized for options that do not ultimately vest, except for options where vesting is conditional upon a market condition, which are treated as vesting, irrespective of whether or not the market condition is satisfied, provided that all other performance conditions are met.

Performance shares and restricted share units are granted free of charge and vest after three years on the achievement of previously determined targets. The cost of performance shares and restricted share units is measured by reference to the fair value of the DSM shares on the date on which the performance shares and restricted share units were granted and is recognized in profit or loss (Employee benefit costs) during the vesting period, together with a corresponding increase in equity.

Emission rights

DSM is subject to legislation encouraging reductions in greenhouse gas emissions and has been awarded emission rights (principally CO_2 emission rights) in a number of jurisdictions. Emission rights are reserved for meeting delivery obligations and are recognized at cost (usually zero). Revenue is recognized when surplus emission rights are sold to third parties. When actual emissions exceed the emission rights available to DSM, a liability is recognized for the expected additional costs.

Alternative performance measures (APMs)

DSM uses Alternative performance measures to present and discuss DSM's financial results. To arrive at these APMs, adjustments are made to material items of income and expense arising from circumstances such as Acquisitions/ divestments, Restructuring, Impairments and Other.

'Other' APM adjustments include site closure costs, environmental cleaning, litigation settlements or other non-operational (contractual) arrangements. Other than items related to acquisition and integration costs incurred in the first year from the acquisition date (including non-recurring inventory value adjustments) as well as adjustments due to previously recognized APM adjusting events, the threshold is € 10 million.

Income tax

Income tax expense is recognized in the income statement except to the extent that it relates to an item recognized directly in Other comprehensive income or Shareholders' equity.

Current tax is the expected tax payable or receivable on the taxable income for the year, using tax rates enacted at the balance sheet date, and any adjustment to tax payable with respect to previous years, and reflects uncertainty related to income taxes, if any. Deferred tax assets and liabilities are recognized for the expected tax consequences of temporary differences between the carrying amount of assets and liabilities and their tax base. Deferred tax assets and liabilities are measured at the tax rates that have been enacted or substantially enacted at the balance sheet date, and reflect uncertainty related to income taxes, if any. They are expected to apply when the related deferred tax assets are realized or the deferred tax liabilities are settled. Deferred tax assets, including assets arising from losses carried forward and tax credits, are recognized to the extent that it is probable that future taxable profits will be available against which the deductible temporary differences and unused tax losses can be utilized. Deferred tax assets and liabilities are stated at nominal value.

Deferred taxes are not provided for the following temporary differences: the initial recognition of goodwill, the initial recognition of assets or liabilities that affect neither accounting nor taxable profit, and differences relating to investments in subsidiaries to the extent that they will probably not reverse in the foreseeable future. Deferred tax assets and deferred tax liabilities are offset and presented net when there is a legally enforceable right to offset, and the assets and liabilities relate to income taxes levied by the same taxation authority.

Derivatives
Derivatives are initially measured at fair value. Subsequent to initial recognition, derivatives are measured at fair value, and changes therein are generally recognized in profit or loss, unless hedge accounting is applied.

Financial derivatives and hedging
Financial derivatives are recognized on the day of trading at fair value, with changes recognized in profit or loss. The group uses financial derivatives such as foreign currency forward contracts and interest rate swaps to hedge risks associated with foreign currency and interest rate fluctuations. Financial derivatives are initially recognized in the balance sheet at fair value. Subsequently, financial derivatives, bank balances and deposits in foreign currency are valued using the rates applicable on the balance sheet closing date. Changes in fair value are recognized in profit or loss unless cash flow hedge accounting or net investment hedge accounting is applied. For the measurement basis, see 'Fair value of financial instruments'.

Changes in the fair value of financial derivatives designated and qualifying as cash flow hedges are recognized in Other comprehensive income (Hedging reserve) to the extent that the hedge is effective. Upon recognition of the related asset or liability, the cumulative gain or loss is transferred from the hedging reserve and included in the carrying amount of the hedged item if it is a non-financial asset or liability. Any ineffective portion of the changes of the fair value of the derivative is recognized immediately in profit and loss. If the forecast transaction is no longer expected to occur, the hedge no longer meets the criteria for hedge accounting, the hedging instrument expires or is sold, terminated or exercised, or the designation is revoked, then hedge accounting is discontinued prospectively. If the forecast transaction is no longer expected to occur, then the amount accumulated in equity is reclassified to profit or loss. If the hedged item is a financial asset or liability, the gain or loss is transferred to profit or loss. Changes in the fair value of financial derivatives designated and qualifying as net investment hedges are recognized in Other comprehensive income (Translation reserve) to the extent that the hedge is effective and the change in fair value is caused by changes in currency exchange rates. Accumulated gains and losses are released from Other comprehensive income and are included in profit or loss when the net investment is disposed of. Changes in the fair value of financial derivatives designated and qualifying as fair value hedges are immediately recognized in the income statement, together with any changes in the fair value of the hedged assets or liabilities attributable to the hedged risk.

Pensions and other post-employment benefits
DSM has both defined contribution plans and defined benefit plans. In the case of defined contribution plans, obligations are limited to the payment of contributions, which are recognized as Employee benefit costs. In the case of defined benefit plans, the aggregate of the value of the defined benefit obligation and the fair value of plan assets for each plan is recognized as a net defined benefit liability or asset. Defined benefit obligations are determined using the projected unit credit method. Plan assets are recognized at fair value. If the fair value of plan assets exceeds the present value of the defined benefit obligation, a net asset is only recognized to the extent that the asset is available for refunds to the employer or for reductions in future contributions to the plan. Defined benefit pension costs consist of three elements: service costs, net interest, and remeasurements. Service costs are part of Employee benefit costs and consist of current service costs. Past service costs and results of plan settlements are included in Other operating income or expense. Net interest is part of Financial income and expense and is determined on the basis of the value of the net defined benefit asset or liability at the start of the year, and on the interest on high-quality corporate bonds. Remeasurements are actuarial gains and losses, the return (or interest cost) on net plan assets (or liabilities) excluding amounts included in net interest and changes in the effect of the asset ceiling. These remeasurements are recognized in Other comprehensive income as they occur and are not recycled through profit or loss at a later stage.

Consolidated financial statements

Consolidated income statement

x € million	Notes	2019	2018
Net sales	5	9,010	9,267
Cost of sales	5	(5,957)	(5,862)
Gross margin		**3,053**	**3,405**
Marketing and sales		(1,263)	(1,303)
Research and development		(349)	(348)
General and administrative		(525)	(530)
Other operating income		146	104
Other operating expense		(108)	(83)
	5	**(2,099)**	**(2,160)**
Operating profit		**954**	**1,245**
Financial income	6	30	18
Financial expense	6	(122)	(119)
Profit before income tax expense		862	1,144
Income tax expense	7	(152)	(194)
Share of the profit of associates and joint ventures	10	(9)	11
Other results related to associates and joint ventures	10	63	118
Profit for the year		**764**	**1,079**
Of which:			
Profit attributable to non-controlling interests	17	6	2
Net profit attributable to equity holders of Koninklijke DSM N.V.		**758**	**1,077**
Dividend on cumulative preference shares		(8)	(8)
Net profit available to holders of ordinary shares		**750**	**1,069**
Earnings per share (EPS) (in €):			
- Net basic EPS	2	4.27	6.10
- Net diluted EPS	2	4.24	6.06

See Note 2 'Alternative performance measures' for the reconciliation to Adjusted EBITDA of € 1,684 million (2018: € 1,822 million) and other adjusted IFRS performance measures.

Consolidated statement of comprehensive income

x € million	2019	2018
Items that will not be reclassified to profit or loss		
Remeasurements of defined benefit pension plans	(24)	(77)
Fair value changes in Other participating interests	(21)	16
Transfer of fair value of other participating interests to retained earnings	4	-
Exchange differences on translation of foreign operations relating to the non-controlling interests	2	(1)
Items that may subsequently be reclassified to profit or loss		
Exchange differences on translation of foreign operations		
- Change for the year	134	129
- Reclassification adjustment to the income statement	(9)	14
Hedging reserve		
- Change for the year	(18)	(44)
- Reclassification adjustment to the income statement	66	22
Equity accounted investees — share of Other comprehensive income	1	(4)
Other comprehensive income, before tax	**135**	**55**
Income tax (expense)/income relating to:		
- Remeasurements of defined benefit plans	9	11
- Exchange differences on translation of foreign operations	-	2
- Hedging reserve	(4)	7
Total income tax (expense) / income	5	20
Other comprehensive income, net of tax	**140**	**75**
Profit for the year	764	1,079
Total comprehensive income	**904**	**1,154**
Of which:		
- Attributable to non-controlling interests	8	1
- Attributable to equity holders of Koninklijke DSM N.V.	896	1,153

Consolidated balance sheet at 31 December

x € million	Notes	2019	2018
Assets			
Non-current assets			
Intangible assets	8	3,515	3,090
Property, plant and equipment	9	4,040	3,511
Deferred tax assets	7	217	248
Share in associates and joint ventures	10	155	205
Financial derivatives	23	27	14
Other financial assets	11	265	263
		8,219	**7,331**
Current assets			
Inventories	12	2,019	1,993
Trade receivables	13	1,592	1,575
Income tax receivables	13	61	83
Other current receivables	13	45	80
Financial derivatives	23	19	21
Current investments	14	688	1,277
Cash and cash equivalents	15	800	1,281
		5,224	**6,310**
Total		**13,443**	**13,641**
Equity and liabilities			
Equity	16		
Shareholders' equity		7,731	7,782
Non-controlling interests	17	104	33
		7,835	**7,815**
Non-current liabilities			
Deferred tax liabilities	7	296	254
Employee benefit liabilities	24	413	413
Provisions	18	120	116
Borrowings	19	2,464	2,272
Financial derivatives	23	7	3
Other non-current liabilities	20	145	197
		3,445	**3,255**
Current liabilities			
Employee benefit liabilities	24	43	46
Provisions	18	48	37
Borrowings	19	189	380
Financial derivatives	23	18	51
Trade payables	21	1,345	1,430
Income tax payables	21	42	100
Other current liabilities	21	478	527
		2,163	**2,571**
Total		**13,443**	**13,641**

Consolidated statement of changes in equity (Note 16)

x € million	Share capital	Share premium	Treasury shares	Other reserves	Retained earnings	Total	Non-controlling interests	Total equity
Balance at 1 January 2018	**338**	**489**	**(398)**	**(199)**	**6,732**	**6,962**	**103**	**7,065**
Dividend	-	-	-	-	(365)	(365)	(3)	(368)
Options / performance shares granted	-	-	-	25	-	25	-	25
Options / performance shares exercised / canceled	-	-	-	(23)	23	-	-	-
Reissued shares	-	-	263	-	(21)	242	-	242
Acquisition (divestment) of subsidiary with NCI	-	-	-	-	-	-	(67)	(67)
Repurchase of shares	-	-	(236)	-	-	(236)	-	(236)
Other	-	-	-	-	1	1	(1)	-
Total comprehensive income	-	-	-	142	1,011	1,153	1	1,154
Balance at 31 December 2018	**338**	**489**	**(371)**	**(55)**	**7,381**	**7,782**	**33**	**7,815**
Dividend	-	-	-	-	(414)	(414)	(4)	(418)
Options / performance shares granted	-	-	-	34	-	34	-	34
Options / performance shares exercised / canceled	-	-	-	(36)	36	-	-	-
Reissued shares	-	-	335	-	(11)	324	-	324
Acquistion of NCI without a change in control	-	-	-	-	(13)	(13)	9	(4)
Acquisition (divestment) of subsidiary with NCI	-	-	-	-	-	-	57	57
Repurchase of shares	-	-	(869)	-	-	(869)	-	(869)
Other	-	-	-	1	(10)	(9)	1	(8)
Total comprehensive income	-	-	-	152	744	896	8	904
Balance at 31 December 2019	**338**	**489**	**(905)**	**96**	**7,713**	**7,731**	**104**	**7,835**

Consolidated cash flow statement (Note 26)

x € million		**2019**		2018
Operating activities				
Profit for the year		764		1,079
Share of the profit of associates and joint ventures		(54)		(129)
Income tax		152		194
Profit before income tax expense		862		1,144
Financial income and expense		92		101
Operating profit[1]		954		1,245
Depreciation, amortization and impairments		632		509
Earnings before interest, tax, depreciation and amortization (EBITDA)[1]		1,586		1,754
Adjustments for:				
- (Gain) or loss from disposals	(4)		(22)	
- Acquisition/divestment related in EBITDA	13		16	
- Change in provisions	26		(41)	
- Defined benefit plans	(39)		(25)	
	(4)		(72)	
Income tax received	9		15	
Income tax paid	(149)		(122)	
Share-based compensation	34		25	
Contract settlements and other non-cash items	(70)		29	
Other	(8)		-	
Changes, excluding working capital		(188)		(125)
Operating cash flow before changes in working capital		**1,398**		**1,629**
Changes in operating working capital:				
- Inventories	114		(166)	
- Trade receivables	59		(74)	
- Trade payables	(121)		(6)	
	52		(246)	
Changes in other working capital	(65)		8	
Changes in working capital		(13)		(238)
Cash provided by operating activities		**1,385**		**1,391**

1 See Note 2 'Alternative performance measures' for the reconciliation to Adjusted EBITDA of € 1,684 million (2018: € 1,822 million) and other adjusted IFRS performance measures.

Consolidated cash flow statement (Note 26) continued

x € million	2019	2018
Cash provided by operating activities	**1,385**	**1,391**
Investing activities		
Capital expenditure for:[1]		
- Intangible assets	(107)	(108)
- Property, plant and equipment	(520)	(565)
Payments regarding drawing rights	(14)	(20)
Proceeds from disposal of property, plant and equipment	6	18
Acquisition of subsidiaries and associates	(556)	(22)
Disposal of subsidiaries, businesses and associates	37	316
Additions to fixed-term deposits	(1,195)	(1,544)
Withdrawal from fixed-term deposits	1,783	1,222
Interest received	10	20
Other financial assets:		
- Capital payments and acquisitions	(53)	(77)
- Dividends received	75	2
- Additions to loans granted	(17)	(4)
- Repayment of loans granted	25	156
- Proceeds from disposals	1	1
Cash from/(used in) investing activities	**(525)**	**(605)**
Financing activities		
Settlement derivatives from internal loans	(5)	1
Capital payments from/to non-controlling interests	1	-
Loans taken up	7	25
Repayment of loans	(302)	(12)
Payments of lease liabilities	(53)	(1)
Change in debt to credit institutions	57	9
Dividend paid	(291)	(225)
Interest paid	(57)	(59)
Proceeds from reissued treasury shares	180	97
Repurchase of shares	(869)	(236)
Cash (used in)/from financing activities	**(1,332)**	**(401)**
Change in cash and cash equivalents	**(472)**	**385**
Cash and cash equivalents at 1 January	**1,281**	**899**
Exchange differences relating to cash held	(9)	(3)
Cash and cash equivalents at 31 December	**800**	**1,281**

1 An amount of € 18 million included in capital expenditure was funded by customers (2018: € 9 million) and in 2018 € 18 million via financial lease (in 2019 all lease payments are recognized as cash used in financing activities).

Notes to the consolidated financial statements of Royal DSM

1 General information

Unless stated otherwise, all amounts are in € million.

A list of DSM participations has been filed with the Chamber of Commerce (Netherlands) and is available from the company upon request. The list can also be downloaded from the company website.

The preparation of financial statements requires estimates and judgments that affect the reported amounts of assets and liabilities, revenues and expenses, and related disclosure of contingent assets and liabilities at the date of the financial statements. The policies that management considers to be the most important for the presentation of the financial condition and results of operations are discussed in the relevant Notes. The same holds for the issues that require management judgments or estimates about matters that are inherently uncertain. Management cautions that future events often vary from forecasts and that estimates routinely require adjustment. Areas of judgment that have the most significant effect on the amounts recognized in the financial statements relate to the categorization of certain items as 'APM adjustments' relating to the alternative performance measures and the identification of cash generating units (CGUs).

Key assumptions and estimates that need to be made by management relate to the useful lives of non-current assets (Notes 8 and 9), the establishment of provisions for restructuring costs, environmental costs (Note 18) and retirement and other post-employment benefits (Note 24), the recognition and measurement of income taxes (Note 7), the determination of fair values for financial instruments (Note 23) and for share-based compensation (Note 27). The uncertainty concerning the actual outflows of provisions relates to both the amounts and the timing of potential future events.

Furthermore, impairment testing mainly of goodwill and development projects requires judgments by management, among other things with respect to the determination of CGUs, the estimation of future cashflows, growth rates and discount rates to apply (Notes 2, 8, 9 and 10). Significant judgment is also required for the determination of the fair value of assets acquired and liabilities assumed in business combinations (Note 3) and for the valuation of drawing rights (Note 8). For drawing rights, the most important judgments relate to the estimation of the required maintenance and replacement outlays. Estimates are based on historical quoted market prices, experience and assumptions that are considered reasonable under the circumstances.

For lease contracts under IFRS 16 that include renewal options, determining the lease term involves judgment based on the underlying asset class, past practices and current business outlooks. The assessment of these renewal options affects the lease term of these contracts and, in turn, the recognized lease liabilities and the corresponding right-of-use assets.

Exchange rates

The currency exchange rates that were used in preparing the consolidated financial statements are listed below for the most important currencies.

1 euro =	Exchange rate at balance sheet date		Average exchange rate	
	2019	2018	**2019**	2018
US dollar	1.12	1.15	1.12	1.18
Swiss franc	1.09	1.13	1.11	1.16
Brazilian real	4.52	4.44	4.41	4.31
Chinese renminbi	7.82	7.88	7.73	7.81

Presentation of consolidated income statement

DSM presents expenses in the consolidated income statement in accordance with their function. This allows the presentation of gross margin on the face of the income statement, which is a widely used performance measure in the industry. The composition of the costs allocated to the individual functions is explained below.

Cost of sales encompasses all manufacturing costs (including raw materials, employee benefits, and depreciation and amortization) related to goods and services captured in net sales. These are measured at their actual cost based on FIFO, or weighted average cost.

Marketing and sales relates to the selling and marketing of goods and services, and also includes all costs that are directly related to the sale of goods, but are not originated by the manufacturing of the goods (e.g., outbound freight).

Research and development consists of:

- Research, which is defined as original and planned investigation undertaken with the prospect of gaining new scientific or technical knowledge and understanding
- Development, which is defined as the application of research findings or other knowledge to a plan or design for the production of new or substantially improved materials, devices, products, processes, systems or services before the start of commercial production or use

General and administrative relates to the strategic and governance role of the general management of the company as well as the representation of DSM as a whole in the financial, political or business community. It also relates to business support activities of staff departments that are not directly related to the other functional areas.

2 Alternative performance measures

In presenting and discussing DSM's financial position, operating results and net results, management uses certain Alternative performance measures not defined by IFRS. These Alternative performance measures (APMs) should not be viewed in isolation as alternatives to the equivalent IFRS measures and should be used as supplementary information in conjunction with the most directly comparable IFRS measures. Alternative performance measures do not have standardized meaning under IFRS and therefore may not be comparable to similar measures presented by other companies.

To provide clear reporting on the developments of the business, APM adjustments are made that impact the EBIT(DA), net profit, ROCE and the EPS. A reconciliation of these Alternative performance measures to the most directly comparable IFRS measures can be found in the table Alternative performance measures.

The APM adjustments to net profit, as included in the APMs, can be specified as follows:

	2019	2018
APM adjustments:		
- Acquisitions/divestments	13	-
- Other consolidation changes	-	(11)
- Restructuring	68	68
- Other	17	11
- Impairments of PPE and intangible assets	23	32
- Income tax related to adjustments	(27)	(23)
- Adjustments to result in associates and joint ventures	(28)	(122)
Total APM adjustments (income)/expense	**66**	**(45)**

2019

The APM adjustments in 2019 are listed below:

- Acquisition and divestment costs of € 13 million relate mainly to the acquisition of Yimante, Andre Pectin and Royal CSK
- Restructuring costs of € 68 million relate to project costs of the restructuring projects together with the redundancy schemes associated with the dismissal of employees and costs of termination of contracts
- The other APM adjustment of € 17 million relates to the provision for soil cleaning within Corporate Activities
- Impairments of property, plant and equipment (PPE) and intangible assets of € 23 million relate mainly to a development project of DSM Nutritional Products and the impairment of an investment project within DSM Food Specialties
- APM adjustments to the result from associates and joint ventures of € 28 million mainly relate to the step-up to the fair value of the associate Andre Pectin prior to the acquisition

2018

The APM adjustments in 2018 are listed below:

- Restructuring costs of € 68 million relate to project costs of the restructuring projects together with the redundancy schemes associated with the dismissal of employees and costs of termination of contracts
- The other consolidation change relates to the deconsolidation of Yantai Andre Pectin, which led to an accounting profit of € 11 million
- The other APM adjustments of € 11 million relate to a changed and remeasured earn-out arrangement with Amyris Brasil
- Impairments of property, plant and equipment (PPE) and intangible assets of € 32 million relate mainly to an R&D building of DSM Nutritional Products in Switzerland and the impairment of a development project within DSM Food Specialties
- APM adjustments to the result from associates and joint ventures mainly relate to the gain on the sale of the 50% share in DSM Sinochem Pharmaceuticals (DSP) of € 109 million and the gain on the sale of the shares in Essential Medical of € 13 million

Alternative performance measures

	2019	2018
Operating profit	954	1,245
Depreciation, amortization and impairments	632	509
EBITDA	**1,586**	**1,754**
APM adjustments to EBITDA:		
- Acquisitions/divestments	13	-
- Other consolidation changes	-	(11)
- Restructuring	68	68
- Other	17	11
Total APM adjustments	98	68
Adjusted EBITDA	**1,684**	**1,822**
Operating profit	**954**	**1,245**
APM adjustments to Operating profit:		
- APM adjustments to EBITDA	98	68
- Impairments of PPE and intangible assets	23	32
Total APM adjustments	121	100
Adjusted operating profit	**1,075**	**1,345**
Profit for the year	**764**	**1,079**
APM adjustments to:		
- Operating profit	121	100
- Result relating to associates/joint ventures	(28)	(122)
Income tax related to APM adjustments	(27)	(23)
Total APM adjustments	66	(45)
Adjusted net profit	**830**	**1,034**
Profit attributable to non-controlling interests	(7)	(2)
Dividend on cumulative preference shares	(8)	(8)
Adjusted net profit available to holders of ordinary shares	**815**	**1,024**
Earnings per share		
Average number of ordinary shares outstanding (x 1,000)	175,731	175,323
Effect of dilution due to share options (x 1,000)	1,088	1,000
Adjusted average number of ordinary shares outstanding (x 1,000)	176,819	176,323
Earnings per share (EPS) (in €):		
- Net basic EPS	4.27	6.10
- Net diluted EPS	4.24	6.06
- Adjusted net basic EPS	4.64	5.84
- Adjusted net diluted EPS	4.61	5.81

Alternative performance measures

	2019	2018
Capital employed		
Intangible assets	3,515	3,090
Property, plant and equipment	4,040	3,511
Investment grants / drawing rights	(96)	(94)
Inventories	2,019	1,993
Current receivables	1,698	1,738
Current liabilities	(1,865)	(2,057)
Capital employed at 31 December	**9,311**	**8,181**
Average capital employed		
Capital employed at 1 January	8,396[1]	7,766
Capital employed at 31 March	8,907	7,740
Capital employed at 30 June	8,735	8,115
Capital employed at 30 September	9,330	8,220
Capital employed at 31 December	9,311	8,181
Average capital employed	**8,936**	**8,004**
Adjusted operating profit	1,075	1,345
ROCE in %	12.0	16.8
Cash provided by operating activities	**1,385**	**1,391**
Cash impact APM adjustments	57	94
Capital expenditure	(627)	(673)
Payments regarding drawing rights	(14)	(20)
Financial lease IAS 17 (2018)	-	18
Adjusted net operating free cash flow	**801**	**810**

1 Increased by € 215 million compared to 31 December 2018 due to the adoption of IFRS 16.

3 Change in the scope of the consolidation

Acquisitions

In 2019, DSM acquired businesses for a total consideration of € 585 million.

On 14 March 2019, DSM Hydrocolloids purchased an additional 46.05% stake in Andre Pectin (Yantai, China) for a cash consideration of € 159 million, leading to a total shareholding of 75% and full control in Andre Pectin. The remaining 25% of the shares in Andre Pectin continues to be held by the Shandong Andre Group Co., Ltd., which supplies raw materials and utilities. Based on the contractual agreement in the Sales and purchase agreement, the company was consolidated as of 1 January 2019. In accordance with IFRS 3, the purchase price was allocated to identifiable assets and liabilities acquired, resulting in a goodwill amount of € 134 million. The acquisition of Andre Pectin contributed € 58 million to net sales and € 25 million to Adjusted EBITDA in 2019.

On 31 July 2019, DSM Engineering Plastics acquired the specialty materials business of SRF Ltd. (Pantnagar, India) for a cash consideration of € 41 million. The acquisition will further cement DSM Materials' position in India as the leading player in, among other industrial sectors, engineering plastics in this fast-growing economy, and fits with its strategic aim of generating leading positions in fast-growing economies. In accordance with IFRS 3, the purchase price was allocated to identifiable assets and liabilities acquired, resulting in a goodwill amount of € 13 million. The acquisition of SRF's specialty materials business contributed € 10 million to net sales and € 1 million to Adjusted EBITDA in 2019. If the acquisition had occurred on 1 January 2019, the contribution to net sales would have been approximately € 27 million and Adjusted EBITDA € 3 million.

On 27 August 2019, DSM Nutritional Products acquired the vitamin E business of Nenter & Co., Inc., with Nenter keeping a 25% non-controlling interest, via a newly created company, Yimante Health Ingredients (Jingzhou) Company Ltd. By this transaction, DSM acquired all Nenter's Jingzhou vitamin E production and related assets and now owns and will operate the vitamin E production facilities in Jingzhou (Hubei Province, China). Yimante has a minority shareholding of 33% in Nenter's Shishou facility (Hubei Province, China), where an intermediate for vitamin E is produced. The company will produce vitamin E exclusively for DSM. DSM immediately started implementing the anticipated upgrading and refurbishment activities to secure a high-quality and sustainable supply of vitamin E that complies with DSM's safety, health and environmental standards, and therefore stopped production. In accordance with IFRS 3, the purchase price amounting to € 139 million was provisionally allocated to identifiable assets and liabilities acquired, pending completion of an independent valuation process. Due to the shutdown as from the transaction date, the acquisition of Nenter's vitamin E business did not contribute to net sales and Adjusted EBITDA in 2019.

On 27 December 2019, DSM Food Specialties acquired a 100% interest in specialty dairy solutions provider Koninklijke CSK Food Enrichment C.V. (Royal CSK) (Wageningen, Netherlands) for a cash consideration of € 160 million. With the acquisition of Royal CSK, DSM will further strengthen its product portfolio and application know-how and expertise in food & beverage. In accordance with IFRS 3, the purchase price was provisionally allocated to identifiable assets and liabilities acquired, pending completion of an independent valuation process. The acquisition did not yet contribute to net sales and Adjusted EBITDA in 2019. If the acquisition had occurred on 1 January 2019, additional net sales would have been approximately € 65 million and Adjusted EBITDA € 11 million.

Together, the acquisitions in 2019 contributed € 68 million to net sales and € 26 million to Adjusted EBITDA. If all acquisitions had occurred on 1 January 2019, additional net sales would have been approximately € 150 million and Adjusted EBITDA € 39 million.

The goodwill recognized for these acquisitions is in general not deductible for corporate income tax with the exception of SRF.

The main impact of a Purchase Price Allocation is the recognition of intangible assets. The valuation techniques DSM used for measuring the fair value of these intangible assets were as follows:

- Technology: was valued by applying the relief-from-royalty method, an income approach whereby the value of an asset is estimated by capitalizing the royalties saved as a result of owning the asset; and by applying the multi-period excess earnings method (MEEM) considering the present value of net cash flows expected to be generated by the customer relationships
- Customer relationships: the fair values were determined by applying the MEEM and via the cost approach based on historic market and sales expenses of the business
- Supplier relationships: were valued using the discounted cash flow (DCF) method, based on discounting the cash flows that can be attributed to the supplier relationships and after taking into account the contribution of other assets to the cash flow of these intangible assets

The impact of the acquisitions on DSM's consolidated balance sheet (measured at the date of acquisition) is shown in the following table.

Acquisitions 2019	Andre Pectin		Yimante (provisional)		Royal CSK (provisional)		SRF		Other		Total	
	Book value	**Fair value**	Book value	**Fair value**	Book value	**Fair value**	Book value	**Fair value**	Book value	**Fair value**	Book value	**Fair value**
Assets												
Intangible assets	3	76	10	28	-	-	-	18	-	3	13	**125**
Property, plant and equipment	33	43	63	55	42	42	6	7	-	-	144	**147**
Other non-current assets	-	-	22	22	-	-	-	-	-	-	22	**22**
Inventories	27	29	28	29	12	12	3	3	-	-	70	**73**
Receivables	23	23	13	13	10	10	4	3	-	-	50	**49**
Cash and cash equivalents	10	10	2	2	5	5	-	-	1	1	18	**18**
Total assets	**96**	**181**	**138**	**149**	**69**	**69**	**13**	**31**	**1**	**4**	**317**	**434**
Non-controlling interests and liabilities												
Non-controlling interests	-	32	23	25	-	-	-	-	-	-	23	**57**
Non-current liabilities	-	16	21	24	9	9	-	-	-	1	30	**50**
Current liabilities	17	38	25	25	14	14	3	3	-	-	59	**80**
Total non-controlling interests and liabilities	**17**	**86**	**69**	**74**	**23**	**23**	**3**	**3**	**-**	**1**	**112**	**187**
Net assets	**79**	**95**	**69**	**75**	**46**	**46**	**10**	**28**	**1**	**3**	**205**	**247**
Acquisition price (in cash)		159		125		160		41		15		**500**
Fair value of associate contributed		66		-		-		-		-		**66**
Acquisition price (payable)		4		14		-		-		1		**19**
Consideration		**229**		**139**		**160**		**41**		**16**		**585**
Goodwill		**134**		**64**		**114**		**13**		**13**		**338**
Acquisition costs recognized in APM adjustments		3		4		1		1		-		**9**

4 Segment information

DSM's operating segments are Nutrition, Materials and the Innovation Center. DSM has segmented its operations by business activity from which revenues are earned and expenses incurred. These operating results are regularly reviewed by the entity's chief operating decision maker (CODM) to make decisions about resources to be allocated to the segment and assess its performance. DSM uses Adjusted EBITDA as the main indicator to evaluate the consolidated performance as well as the performance per segment. Discrete financial information is available for each identified segment. The accounting policies of the operating segments are the same as those described in the Summary of significant accounting policies. Transactions between segments are generally executed at market-based prices. Interest income, interest expense, and income tax expense or income are not allocated to segments as these amounts are not included in the measure of segment profit or loss reviewed by the CODM, or otherwise regularly provided to the CODM.

Nutrition serves the global industries for animal feed, food & beverages, pharmaceuticals, infant nutrition, dietary supplements, and personal care. It does so by the production of pure active ingredients, their incorporation into sophisticated forms, and the provision of tailored premixes and forward solutions.

Materials is a global player in specialty plastics, which are used in components for the electrical and electronics, automotive, flexible food-packaging, and consumer goods industries. Furthermore, Materials is a global player in providing innovative, sustainable resins solutions for paints and industrial and optical fiber coatings, as well as the fiber Dyneema®.

The Innovation Center focuses on innovation and the growth of DSM's existing core business through adjacent technologies via its Corporate Research Program as well as through the company's venturing and licensing activities. Additionally, it identifies and invests in new and innovative growth options. The Innovation Center is responsible for developing and extracting value from DSM's Emerging Business Areas.

Any consolidated activities outside the three reported segments are reported as 'Corporate Activities'. These mainly comprise operating and service activities as well as several costs that cannot be allocated to the clusters.

DSM does not have a single external customer that represents 10% or more of total sales.

Geographical information

2018	Netherlands	Rest of Western Europe	Eastern Europe	North America	Latin America	China	India	Japan	Rest of Asia	Rest of the world	Total
Net sales by origin											
In € million	2,299	3,301	195	1,403	574	938	95	113	264	85	9,267
In %	25	36	2	15	6	10	1	1	3	1	100
Net sales by destination											
In € million	405	2,229	597	2,070	1,081	1,131	233	322	906	293	9,267
In %	4	24	7	22	12	12	3	3	10	3	100
Workforce at year-end (headcount)	3,827	5,069	523	3,281	2,214	4,104	556	204	904	295	20,977
Average workforce (FTE)	3,644	4,851	511	3,258	2,139	4,335	545	199	884	284	20,650
Intangible assets and Property, plant and equipment											
Capital expenditure	150	208	7	121	36	116	3	3	6	3	653
Carrying amount	1,678	1,961	33	1,823	362	568	19	41	93	23	6,601
Total assets (total DSM)	5,094	2,732	143	2,778	939	1,064	132	170	482	107	13,641
2019											
Net sales by origin											
In € million	2,173	2,667	197	1,568	722	976	97	136	370	104	9,010
In %	24	30	2	17	8	11	1	2	4	1	100
Net sales by destination											
In € million	351	2,088	591	2,046	1,116	1,098	236	301	898	285	9,010
In %	4	23	7	23	12	12	3	3	10	3	100
Workforce at year-end (headcount)	3,960	5,133	575	3,346	2,134	4,960	681	205	888	292	22,174
Average workforce (FTE)	3,785	5,004	534	3,336	2,232	4,515	558	209	924	293	21,390
Intangible assets and Property, plant and equipment											
Capital expenditure	164	210	10	125	22	76	1	3	9	3	623
Carrying amount	2,052	2,071	44	1,946	380	822	56	50	102	32	7,555
Total assets (total DSM)	4,111	3,109	156	2,874	944	1,406	165	148	419	111	13,443

Business segments

2019	Nutrition	Materials	Innovation Center	Corporate Activities	Elimina-tions	Total
Financial performance						
Net sales	6,028	2,746	194	42	-	9,010
Supplies to other clusters	50	11	19	-	(80)	-
Supplies	6,078	2,757	213	42	(80)	9,010
Adjusted EBITDA[1]	1,250	509	22	(97)	-	1,684
EBITDA	1,224	493	18	(149)	-	1,586
Adjusted operating profit[1]	881	363	(19)	(150)	-	1,075
Operating profit	832	347	(23)	(202)	-	954
Depreciation and amortization	350	144	37	41	-	572
Impairments	42	2	4	12	-	60
- of which included in APM adjustments	23	-	-	-	-	23
Additions to provisions	8	11	2	50	-	71
Result related to associates and joint ventures	7	-	(2)	49	-	54
R&D costs[2]	148	106	63	32	-	349
Employee benefit costs	1,062	373	90	286	-	1,811
Financial position						
Total assets	8,324	2,238	776	2,105	-	13,443
Total liabilities	2,119	628	57	2,804	-	5,608
Capital employed at year-end	6,731	1,927	616	37	-	9,311
Capital expenditure	420	139	34	30	-	623
Share in equity of associates and joint ventures	29	3	74	49	-	155
Adjusted EBITDA margin (in %)	20.7	18.5				18.7
Workforce						
Average in FTE	13,874	4,767	707	2,042	-	21,390
Year-end (headcount)	14,599	4,762	726	2,087	-	22,174

1 See Note 2 'Alternative performance measures' for the reconciliation to Adjusted EBITDA of € 1,684 million (2018: € 1,822 million) and other IFRS performance measures.
2 R&D costs relate to the functional area Research and development and exclude R&D costs included in the functional areas Cost of sales and Marketing and sales as well as R&D expenditure capitalized.

Business segments

2018	Nutrition	Materials	Innovation Center	Corporate Activities	Elimina-tions	Total
Financial performance						
Net sales	6,137	2,913	172	45	-	9,267
Supplies to other clusters	46	9	19	-	(74)	-
Supplies	6,183	2,922	191	45	(74)	9,267
Adjusted EBITDA	1,407	512	8	(105)	-	1,822
EBITDA	1,379	490	7	(122)	-	1,754
Adjusted operating profit	1,111	383	(14)	(135)	-	1,345
Operating profit	1,050	362	(15)	(152)	-	1,245
Depreciation and amortization	291	128	22	28	-	469
Impairments	38	-	-	2	-	40
- of which included in APM adjustments	33	(1)	-	-	-	32
Additions to provisions	8	11	2	14	-	35
Result related to associates and joint ventures	3	-	(2)	128	-	129
R&D costs[1]	153	114	50	31	-	348
Employee benefit costs	1,023	361	79	290	-	1,753
Financial position						
Total assets	7,201	2,293	735	3,412	-	13,641
Total liabilities	2,011	729	59	3,027	-	5,826
Capital employed at year-end	5,683	1,878	597	23	-	8,181
Capital expenditure	463	132	32	26	-	653
Share in equity of associates and joint ventures	54	3	71	77	-	205
Adjusted EBITDA margin (in %)	22.9	17.6				19.7
Workforce						
Average in FTE	13,432	4,566	681	1,971	-	20,650
Year-end (headcount)	13,628	4,643	701	2,005	-	20,977

1 R&D costs relate to the functional area Research and development and exclude R&D costs included in the functional areas Cost of sales and Marketing and sales as well as R&D expenditure capitalized.

5 Net sales and costs

Net sales

	2019	2018
Goods sold	8,833	9,091
Services rendered	159	164
Royalties	18	12
Total	**9,010**	**9,267**

Fulfillment of the performance obligations related to goods sold is measured using the commercial shipment terms as an indicator for the transfer of control. Fulfillment of the performance obligations for services rendered is identified according to the individual contract. The payment terms are determined per business segment on a customer basis. DSM has neither specific obligations for returns or refunds, nor specific warranties or other related obligations.

Disaggregation of net sales

	2019	2018
Nutrition		
DSM Nutritional Products:		
- Animal Nutrition & Health	2,892	3,134
- Human Nutrition & Health	2,046	2,019
- Personal Care & Aroma Ingredients	425	382
- Other	93	112
	5,456	5,647
DSM Food Specialties	572	490
Total	**6,028**	**6,137**
Materials		
DSM Engineering Plastics	1,406	1,516
DSM Dyneema	338	344
DSM Resins & Functional Materials	1,002	1,053
Total	**2,746**	**2,913**
Innovation Center	194	172
Corporate Activities	42	45
Total	**9,010**	**9,267**

Total costs

In 2019, total operating costs amounted to € 8.1 billion, € 0.1 billion higher than in 2018, when these costs stood at € 8.0 billion. Total operating costs in 2019 included Cost of sales amounting to € 6.0 billion (2018: € 5.9 billion); gross margin as a percentage of net sales stood at 34% (2018: 37%).

Employee benefit costs

	2019	2018
Wages and salaries	1,474	1,433
Social security costs	187	185
Pension costs (see also Note 24)	116	110
Share-based compensation (see also Note 27)	34	25
Total	**1,811**	**1,753**

Depreciation, amortization and impairments

	2019	2018
Amortization of intangible assets	175	149
Depreciation of property, plant and equipment	347	320
Depreciation of right-of-use assets	50	-
Impairment losses	60	40
Total	**632**	**509**

Other operating income

	2019	2018
Release of provisions	6	8
Gain on sale of assets and activities	7	25
Insurance benefits	16	18
Amendments/settlements to pension plans	16	11
Earn-out payments and other settlements	48	10
Release translation reserve	11	-
Legal settlements	8	2
Sundry	34	30
Total	**146**	**104**

Other operating expense

	2019	2018
Additions to provisions	67	36
Exchange differences	10	7
Acquisitions/Disposals	11	7
Earn-out Amyris Brasil	-	11
Sundry	20	22
Total	**108**	**83**

6 Financial income and expense

	2019	2018
Financial income		
Interest income	9	13
Fair value change in derivatives	20	-
Unwinding of discounted receivables	1	5
Total financial income	**30**	**18**
Financial expense		
Interest expense	(92)	(102)
Interest relating to lease liabilities	(7)	-
Interest relating to defined benefit plans	(7)	(6)
Capitalized interest during construction	3	5
Exchange differences	(2)	(3)
Unwinding of discounted payables	(8)	(12)
Sundry	(9)	(1)
Total financial expense	**(122)**	**(119)**
Financial income and expense	**(92)**	**(101)**

In 2019, the interest rate applied in the capitalization of interest during construction was 3% (2018: 4%).

7 Income tax

The income tax expense on the total result was € 152 million, which represents an effective income tax rate of 17.6% (2018: € 194 million, representing an effective income tax rate of 17.0%) and can be broken down as follows:

	2019	2018
Current tax expense:		
- Current year	(89)	(162)
- Prior-year adjustments	(4)	3
- Tax credits compensated	3	4
- Non-recoverable withholding tax	(1)	(1)
	(91)	**(156)**
Deferred tax expense:		
- Originating from temporary differences and their reversal	(12)	23
- Tax benefit from innovation facilities	14	-
- Prior-year adjustments	6	4
- Change in tax rate	(26)	(8)
- Changes arising from (reversal of) write-down of deferred tax assets	(3)	(8)
- Other changes in tax losses and tax credits	(40)	(49)
	(61)	**(38)**
Total	**(152)**	**(194)**
Of which related to:		
- Adjusted taxable result	(179)	(217)
- APM adjustments	27	23

The effective tax rate in 2019 was negatively impacted by the change in tax rate of -€ 26 million (mainly an increase in the tax rate in Switzerland with effect from 1 January 2020, impacting the deferred tax position as at 31 December 2019), which was partly compensated for by the tax benefit from innovation facilities of € 14 million.

The effective tax rate on the Adjusted taxable result was 18.2% in 2019 (2018: 17.4%). The change in tax rates primarily relates to the increase in the tax rate in Switzerland with effect from 1 January 2020, impacting the deferred tax position as at 31 December 2019.

Within other effects, the impact of the tax benefits for innovation facilities previous years was included with an impact of -1.5%.

The relationship between the income tax rate in the Netherlands and the effective tax rate on the result is as follows:

Effective tax rate

in %	**2019**	2018
Domestic income tax rate	25.0	25.0
Tax effects of:		
- Deviating rates	(6.9)	(8.0)
- Change in tax rates	2.6	0.7
- Tax-exempt income and non-deductible expense	(1.5)	(0.9)
- Other effects	(1.0)	0.6
Effective tax rate adjusted result	**18.2**	**17.4**
APM adjustments (see Note 2)	(0.6)	(0.4)
Total effective tax rate	**17.6**	**17.0**

The balance of deferred tax assets and deferred tax liabilities increased by € 73 million owing to the changes presented in the following table:

Deferred tax assets and liabilities

	2019	2018
Balance at 1 January		
Deferred tax assets	248	281
Deferred tax liabilities	(254)	(259)
Total	**(6)**	**22**
Changes:		
- Income tax income/(expense) in income statement	(35)	(30)
- Income tax: change in tax percentage	(26)	(8)
Total income statement	(61)	(38)
- Income tax expense in OCI	5	20
- Acquisitions and disposals	(20)	(17)
- Other consolidation changes	-	3
- Exchange differences	(6)	-
- Transfer	9	4
Balance at 31 December	**(79)**	**(6)**
Of which:		
- Deferred tax assets	217	248
- Deferred tax liabilities	(296)	(254)

In various countries, DSM has taken standpoints regarding its tax position which may at any time be challenged, or have already been challenged, by the tax authorities, because the authorities in question interpret the law differently. These uncertainties are taken into account in determining the probability of realization of deferred tax assets and liabilities.

The deferred tax assets and liabilities relate to the following balance sheet items:

Deferred tax assets and liabilities by balance sheet item

		2019		2018
	Deferred tax assets	Deferred tax liabilities	Deferred tax assets	Deferred tax liabilities
Intangible assets	8	(184)	12	(161)
Property, plant and equipment	27	(182)	21	(166)
Right-of-use assets	3	(47)	-	-
Financial assets	7	(10)	3	(10)
Inventories	44	(40)	64	(34)
Receivables	8	(21)	8	(14)
Equity	-	-	1	(1)
Lease liabilities non-current	36	(1)	-	-
Other non-current liabilities	9	(2)	14	(3)
Non-current provisions	100	(5)	77	(2)
Other current liabilities	86	(4)	87	(5)
Lease liabilities current	11	-	-	-
	339	**(496)**	**287**	**(396)**
Tax losses carried forward	78		103	-
Set-off	(200)	200	(142)	142
Total	**217**	**(296)**	**248**	**(254)**

No deferred tax assets were recognized for loss carryforwards amounting to € 273 million (2018: € 237 million). Unrecognized loss carryforwards amounting to € 104 million will expire in the years up to and including 2024 (2018: € 58 million up to and including 2023), € 87 million between 2025 and 2029 (2018: € 112 million between 2024 and 2028) and the remaining € 82 million in 2030 and beyond (2018: € 67 million between 2029 and beyond).

The valuation of deferred tax assets depends on the probability of the reversal of temporary differences and the utilization of tax loss carryforwards, tax credits and withholding tax. Deferred tax assets are recognized for future tax benefits arising from temporary differences and for tax loss carryforwards to the extent that the tax benefits are likely to be realized. In the Netherlands, tax losses may be carried forward for six years. DSM has to assess the likelihood that deferred tax assets will be recovered from future taxable profits. Deferred tax assets are reduced if, and to the extent that, it is not probable that all or some portion of the deferred tax assets will be realized. In the event that actual future results differ from estimates, and depending on tax strategies that DSM may be able to implement, changes to the measurement of deferred taxes could be required, which could impact on the company's financial position and profit for the year.

8 Intangible assets

	Goodwill	Licenses and patents	Under construction	Development projects	Other	Total
Balance at 1 January 2018						
Cost	1,950	225	66	215	1,657	4,113
Amortization and impairment losses	17	100	-	33	905	1,055
Carrying amount	**1,933**	**125**	**66**	**182**	**752**	**3,058**
Changes in carrying amount:						
- Capital expenditure	-	-	38	70	-	108
- Put into operation	-	7	(31)	-	24	-
- Acquisitions	(53)	18	-	-	98	63
- Deconsolidation	(1)	(19)	-	-	(3)	(23)
- Amortization	-	(11)	-	(11)	(127)	(149)
- Impairment losses	-	(1)	-	(14)	(2)	(17)
- Exchange differences	30	-	1	3	14	48
- Other reclassifications	-	(12)	(24)	23	15	2
	(24)	**(18)**	**(16)**	**71**	**19**	**32**
Balance at 31 December 2018						
Cost	1,927	206	50	296	1,776	4,255
Amortization and impairment losses	18	99	-	43	1,005	1,165
Carrying amount	**1,909**	**107**	**50**	**253**	**771**	**3,090**
Changes in carrying amount:						
- Capital expenditure	-	1	50	51	8	110
- Put into operation	-	4	(26)	-	22	-
- Acquisitions	338	1	-	-	124	463
- Amortization	-	(13)	-	(26)	(136)	(175)
- Impairment losses	-	(2)	-	(21)	(8)	(31)
- Exchange differences	36	2	1	4	12	55
- Other	-	-	(4)	6	1	3
	374	**(7)**	**21**	**14**	**23**	**425**
Balance at 31 December 2019						
Cost	2,301	216	71	338	1,966	4,892
Amortization and impairment losses	18	116	-	71	1,172	1,377
Carrying amount	**2,283**	**100**	**71**	**267**	**794**	**3,515**

The amortization of intangible assets is included in Cost of sales, Marketing and sales, Research and development and General and administrative expenses.

Over the past few years, DSM has acquired several entities in business combinations that have been accounted for by the acquisition method, resulting in recognition of goodwill and other intangible assets. The amounts assigned to the acquired assets and liabilities are based on assumptions and estimates about their fair values. In making these estimates, management consults independent, qualified appraisers if appropriate. A change in assumptions and estimates could change the values allocated to certain assets and their estimated useful lives, which could affect the amount or timing of charges to the income statement, such as amortization of intangible assets. The impairments of € 31 million mainly relate to several development projects. See also Note 2 'Alternative performance measures'.

The breakdown of the carrying amount of goodwill at year-end 2019 is as follows:

Goodwill per acquisition

Acquisition	**2019**	2018	Cash generating unit	Functional currency	Year of acquisition
Martek	413	406	DSM Nutritional Products	USD	2011
NeoResins	358	358	DSM Resins & Functional Materials	EUR	2005
Fortitech	310	304	DSM Nutritional Products	USD	2012
Ocean Nutrition Canada	204	191	DSM Nutritional Products	CAD	2012
Kensey Nash	144	141	DSM Biomedical	USD	2012
Andre Pectin	135	-	DSM Hydrocolloids	CNY	2019
Royal CSK[1]	114	-	DSM Food Specialties	EUR	2019
Tortuga	89	90	DSM Nutritional Products	BRL	2013
The Polymer Technology Group	78	76	DSM Biomedical	USD	2008
Yimante[1]	65	-	DSM Nutritional Products	CNY	2019
Other acquisitions	373	343			
Total	**2,283**	**1,909**			

1 Based on provisional PPA, see Note 3 'Change in the scope of the consolidation'.

Goodwill per Cash generating unit

Cash generating unit	**2019**	2018
DSM Nutritional Products	1,260[1]	1,155
DSM Resins & Functional Materials	384	384
DSM Biomedical	222	218
DSM Food Specialties	164[1]	22
DSM Hydrocolloids	157	49
DSM Dyneema	42	40
DSM Engineering Plastics	29	16
DSM Advanced Solar	16	16
DSM Bio-based Products & Services	9	9
Total	**2,283**	**1,909**

1 Contains provisional PPA, see Note 3 'Change in the scope of the consolidation'.

The annual impairment tests of goodwill are performed in the fourth quarter. The recoverable amount of the Cash generating units (CGUs) concerned is based on a value-in-use calculation. DSM Nutritional Products, DSM Resins & Functional Materials and DSM Biomedical are the three CGUs to which significant amounts of (provisional) goodwill are allocated.

The cash flow projections are derived from DSM's business plan (Corporate Strategy Dialogue) as adopted by the Managing Board and updated on a yearly basis. Mature businesses come to a terminal value after five years. The terminal value growth rate is determined with the assumption of limited inflationary growth. For emerging businesses, an explicit forecast period of ten years is used with the same assumption for growth in the terminal value. The key assumptions in the cash flow projections relate to the market growth for the CGUs and the related revenue projections, EBITDA developments, and the rates used for discounting cash flows.

Key assumptions for goodwill impairment tests

	2019	2018
Forecast period (years)		
- Mature business	5	5
- Emerging business	10	10
Terminal value growth	1%	1%
Pre-tax discount rate		
- DSM Nutritional Products	8.1%	7.9%
- DSM Resins & Functional Materials	10.2%	9.7%
- DSM Biomedical	10.2%	9.8%
Organic Sales growth		
DSM Nutritional Products		
- Year 1–5	2-6%	3-8%
DSM Resins & Functional Materials		
- Year 1–5	3-9%	3-9%
DSM Biomedical		
- Year 1–10	8%	8%

For DSM Nutritional Products the growth assumptions are based on the growth of the global food and feed markets, for DSM Resins & Functional Materials on the demand for advanced coating resins (influenced by growth in building and construction markets), for DSM Biomedical on the growth of the market for medical devices.

A sensitivity test was performed on the impairment tests of the CGUs and showed that the conclusions of these tests would not have been different if reasonable possible adverse change in key parameters had been assumed.

The market capitalization of DSM at 31 December 2019 amounted to € 21,063 million (31 December 2018: € 12,961 million) and was clearly above the carrying amount of net assets, thus providing an additional indication that goodwill was not impaired.

Development costs

The carrying amount of development costs at 31 December 2019 included € 125 million (2018: € 224 million) mainly relating to strategic projects which are not being amortized yet. The recoverable amount of these CGUs was estimated based on the present value of the future cash flows expected to be derived from the CGUs (value-in-use).

Other intangible assets

	2019				2018
	Cost	Amortization	Carrying amount	Of which acquisition-related	Of which acquisition-related
Application software	288	(235)	**53**	2	3
Marketing-related	126	(45)	**81**	71	77
Customer-related	675	(365)	**310**	279	283
Technology-based	506	(397)	**109**	82	48
Drawing rights	244	(78)	**166**	-	-
Other	127	(52)	**75**	50	15
Total	**1,966**	**(1,172)**	**794**	**484**	**426**
Total 2018	1,776	(1,005)	771	426	396

Other intangible assets include drawing rights contracts with Fibrant. Fibrant will continue to supply at least 80% of DSM Engineering Plastics' caprolactam needs in Europe and North America for 15 years (2015–2030) via a drawing rights contract, effectively maintaining DSM Engineering Plastics' backward integration. Initially the fair value of this contract has been recognized as an intangible asset by DSM Engineering Plastics; for subsequent measurement, the initial fair value is the deemed cost of the asset, which is subject to straight-line amortization. At the end of 2019, it had a carrying amount of € 167 million (2018: € 184 million), a remaining useful life of 11 years, and an amount of € 44 million was still payable to Fibrant for the acquisition of the drawing rights (2018: € 57 million).

Other intangible assets also include the customer relationships that were part of the Fortitech acquisition in 2012, with a carrying amount at the end of 2019 of € 88 million (2018: € 94 million). Furthermore, acquisition-related intangibles are included in the annual goodwill impairment test previously discussed in this section. These intangible assets are amortized on a straight-line basis. There are no intangible assets with an indefinite useful life (same as in 2018).

9 Property, plant and equipment

'Property, plant and equipment' includes both owned and right-of-use assets.

Composition of Property, plant and equipment

	31 December 2019	1 January 2019	31 December 2018
Property, plant and equipment owned	**3,808**	3,490	3,490
Right-of-use assets	**232**	236	21
Total	**4,040**	**3,726**	**3,511**

Property, plant and equipment owned

	Land and buildings	Plant and machinery	Other equipment	Under construction	Not used for operating activities	Total
Balance at 1 January 2018						
Cost	2,070	4,177	219	613	14	7,093
Depreciation and impairments	889	2,726	157	-	8	3,780
Carrying amount	**1,181**	**1,451**	**62**	**613**	**6**	**3,313**
Changes in carrying amount:						
- Capital expenditure	8	38	21	478	-	545
- Put into operation	53	340	13	(406)	-	-
- Acquisitions	-	(1)	-	-	-	(1)
- Disposals	(7)	(1)	-	-	-	(8)
- Deconsolidation	(11)	(15)	-	-	-	(26)
- Depreciation	(72)	(230)	(18)	-	-	(320)
- Impairment losses	(17)	(8)	-	-	-	(25)
- Impairment reversals	2	-	-	-	-	2
- Exchange differences	12	16	-	5	-	33
- Other changes	3	(2)	(1)	(2)	-	(2)
	(29)	**137**	**15**	**75**	**-**	**198**
Balance at 31 December 2018						
Cost	2,104	4,618	247	689	12	7,670
Depreciation and impairments	952	3,030	170	1	6	4,159
Carrying amount at 31 December 2018	**1,152**	**1,588**	**77**	**688**	**6**	**3,511**
Transfer finance leases to Right-of-use assets	-	-	(21)	-	-	(21)
Carrying amount at 1 January 2019	**1,152**	**1,588**	**56**	**688**	**6**	**3,490**
Changes in carrying amount:						
- Capital expenditure	7	45	4	457	-	513
- Put into operation	82	401	15	(498)	-	-
- Acquisitions	48	77	2	12	-	139
- Disposals	(3)	-	-	-	-	(3)
- Depreciation	(75)	(255)	(17)	-	-	(347)
- Impairment losses	(18)	(10)	(1)	-	-	(29)
- Exchange differences	18	22	1	12	-	53
- Other changes	-	-	-	(8)	-	(8)
	59	**280**	**4**	**(25)**	**-**	**318**
Balance at 31 December 2019						
Cost	2,232	5,019	235	664	12	8,162
Depreciation and impairments	1,021	3,151	175	1	6	4,354
Carrying amount	**1,211**	**1,868**	**60**	**663**	**6**	**3,808**

In 2019, impairment losses of € 29 million (2018: € 25 million) were recognized on Property, plant and equipment. See also Note 2 'Alternative performance measures'.

Right-of-use assets

	Land and Buildings	Plant and Machinery	Other Equipment	Vehicles	Other	Total
Balance at 31 December 2018	**-**	**-**	**-**	**-**	**-**	**-**
Opening balance (adoption of IFRS 16)	170	10	-	31	4	215
Transfer finance leases (from owned PPE)	-	-	21	-	-	21
Balance at 1 January 2019	**170**	**10**	**21**	**31**	**4**	**236**
Changes in carrying amount:						
New leases / terminations	12	-	15	13	(1)	39
Remeasurements	1	-	-	(2)	-	(1)
Acquisitions	7	-	-	1	-	8
Depreciation	(30)	(2)	(3)	(14)	(1)	(50)
	(10)	**(2)**	**12**	**(2)**	**(2)**	**(4)**
Balance at 31 December 2019						
Cost	189	9	35	42	3	278
Depreciation and impairment losses	(29)	(1)	(2)	(13)	(1)	(46)
Carrying amount	**160**	**8**	**33**	**29**	**2**	**232**

For the disclosures on the lease liabilities that correspond with the right-of-use assets, see Note 19 'Borrowings'.

10 Associates and joint arrangements

Associates and joint ventures

The following table analyses, in aggregate, the carrying amount and share of profit and other results of associates and joint ventures.

	2019			2018
	Associates	Joint Ventures	Total	Total
Balance at 1 January	**139**	**66**	**205**	**227**
- Share of the profit of associates and joint ventures	8	(20)	(12)	5
- Other results related to associates and joint ventures	35	-	35	31
- Other comprehensive income	1	1	2	3
- Capital payments	3	27	30	54
- Dividends received	(73)	-	(73)	(1)
- Acquisitions	22	-	22	-
- Fair value step-up[1]	26	-	26	-
- Consolidation changes	(66)	-	(66)	43
- Disposals	(14)	-	(14)	(146)
- Transfers	15	-	15	(3)
- Other	(14)	(1)	(15)	(8)
Balance at 31 December	**82**	**73**	**155**	**205**

1 In the 'Consolidated income statement' included in 'Other results related to associates and joint ventures'.

The joint venture POET-DSM Advanced Biofuels has decided to pause production of cellulosic biofuels and shift its activities to R&D. These activities will focus on improving operational efficiency to create licensing technology which supports the use of low-carbon fuels from crop residue and other biomass products. This strategic reorientation is mainly driven by the stalling of developments in US environmental policies.

Other results related to associates and joint ventures includes the excess part of dividend received from an associate beyond its investment amount. As DSM holds no obligation to fund beyond its original investment, no provision should be recognized and the excess part of € 28 million is recognized in the income statement.

With the acquisition of Yimante Health Ingredients (Jingzhou) Company Ltd. in 2019 (see Note 3 'Change in the scope of the consolidation'), DSM also indirectly acquired 25% of the shares of Nenter & Co., Inc. (Shishou). The initial value of this investment amounts to € 22 million and has been recognized under 'Acquisitions'.

The fair value step-up of € 26 million and the consolidation changes of -€ 66 million both relate to the acquisition of Andre Pectin (increase in share from 29% to 75%). Prior to the acquisition, the value of the associate was increased by € 26 million to reflect the fair value. The fair value of € 66 million was brought in as part of the consideration of the 75% share in Andre Pectin. See also Note 3 'Change in the scope of the consolidation'.

Transfers includes the change of an Other participating interest to an associate, due to an increase of DSM's share in the company. See Note 11 'Other financial assets'.

Joint operations

In 2017, DSM and Evonik established Veramaris, a joint operation for omega-3 fatty acid products from natural marine algae for animal nutrition. DSM Nutritional Products and Evonik Nutrition & Care each hold a 50% share in the joint operation. In 2019, the commercial-scale USD 200 million facility located in Blair (Nebraska, USA) opened. The joint operation is headquartered in Delft (Netherlands).

In 2019, DSM and Cargill established Avansya V.O.F., a joint operation in which DSM and Cargill each hold a 50% share. Avansya started production at the first commercial-scale fermentation facility for stevia sweeteners in the US. The facility produces EverSweet™, a non-artificial, zero-calorie stevia sweetener. The USD 50 million fermentation facility is located in Blair (Nebraska, USA) and is operated by Cargill. The joint operation is headquartered at the Biotech Campus Delft (Netherlands).

DSM accounts for the assets, liabilities, revenues and expenses relating to Veramaris and Avansya V.O.F. in accordance with IFRS 11 for joint operations.

11 Other financial assets

	Loans associates and joint ventures	Other participating interests	Other receivables	Other deferred items	Total
Balance at 1 January 2018	**193**	**89**	**177**	**16**	**475**
Changes:					
- Charged to the income statement	-	-	(29)	(5)	(34)
- Acquisitions	-	-	(13)	(1)	(14)
- Capital payments	-	22	-	-	22
- Loans granted / prepayments	8	-	2	-	10
- Repayments	(175)	-	(29)	5	(199)
- Other consolidation changes	-	-	-	(6)	(6)
- Exchange differences	-	-	(1)	-	(1)
- Transfers	(24)	-	(18)	-	(42)
- Changes in fair value	-	16	-	-	16
- Other	-	37	(1)	-	36
Balance at 31 December 2018	**2**	**164**	**88**	**9**	**263**
Changes:					
- Charged to the income statement	-	-	9	(2)	7
- Acquisitions	-	-	-	1	1
- Capital payments	-	23	-	-	23
- Loans granted / prepayments	4	-	9	-	13
- Repayments	(2)	-	(5)	-	(7)
- Exchange differences	-	-	1	-	1
- Transfers	(1)	(15)	3	-	(13)
- Changes in fair value	-	(21)	-	-	(21)
- Other	-	(1)	-	(1)	(2)
Balance at 31 December 2019	**3**	**150**	**105**	**7**	**265**

'Transfers' includes the change of an Other participating interest to an associate, due to an increase of DSM's share in the company. See Note 10 'Associates and joint arrangements'.

12 Inventories

	2019	2018
Raw materials and consumables	524	509
Intermediates and finished goods	1,576	1,574
	2,100	**2,083**
Adjustments to lower net realizable value	(81)	(90)
Total	**2,019**	**1,993**

The carrying amount of inventories adjusted to net realizable value was € 272 million (2018: € 271 million).

Changes in the adjustment to net realizable value

	2019	2018
Balance at 1 January	**(90)**	**(61)**
Additions charged to income statement	(66)	(97)
Utilization/reversals	76	69
Exchange differences	(1)	(1)
Balance at 31 December	**(81)**	**(90)**

13 Current receivables

Information about the expected credit loss that relates to trade accounts receivable resulting in a value adjustment is included under 'Credit risk' in Note 23.

Deferred items comprised € 45 million (2018: € 40 million) in prepaid expenses that will impact profit or loss in future periods.

Current receivables

	2019	2018
Trade receivables		
Trade accounts receivable	1,354	1,395
Other trade receivables	202	174
Deferred items	43	39
Receivables from associates	10	2
	1,609	**1,610**
Value adjustment	(17)	(35)
Total Trade receivables	**1,592**	**1,575**
Income tax receivable	**61**	**83**
Other current receivables		
Other taxes and social security contributions	31	20
Employee-related receivables	5	7
Acquisition-/disposal-related receivables	3	26
Loans	-	24
Other receivables	4	2
Deferred items	2	1
Total Other current receivables	**45**	**80**
Total current receivables	**1,698**	**1,738**

14 Current investments

	2019	2018
Fixed term deposits	688	1,277
Total	**688**	**1,277**

All fixed-term deposits have been placed with institutions with a high credit rating in line with the policy as outlined in Note 23 'Financial instruments and risks'. The purpose of the deposits is either to meet short-term cash commitments, or to manage liquidity to such extent that yields are optimized while allowing DSM sufficient freedom in fulfilling its (strategic) goals.

15 Cash and cash equivalents

	2019	2018
Deposits	104	245
Money market funds	45	340
Cash at bank and in hand	605	683
Payments in transit	44	11
Bills of exchange	2	2
Total	**800**	**1,281**

Deposits will be classified as 'cash equivalent' if held at banks with a maturity of less than three months at inception. Deposits will be classified as 'current investments' if the maturity is more than three months but less than or equal to one year. The purpose of the deposits is either to meet short-term cash commitments, or to manage liquidity to such extent, that yields are optimized, while allowing DSM sufficient freedom in fulfilling its (strategic) goals.

Cash at year-end 2019 was not being used as collateral and therefore was not restricted (same as in 2018).

In a few countries, DSM faces cross-border foreign exchange controls and/or other legal restrictions that limit its ability to make these balances available at short notice for general use by the group. The amount of cash held in these countries was € 185 million (2018: € 104 million). The cash will generally be invested or held in the relevant country and, given the other liquidity resources available to the group, does not significantly affect the ability of the group to meet its cash obligations.

16 Equity

	2019	2018
Balance at 1 January	**7,815**	**7,065**
Net profit	764	1,079
Other comprehensive income	140	75
Options / performance shares granted	34	25
Dividend	(418)	(368)
Proceeds from reissue of ordinary shares	324	242
Acquisition of NCI without a change in control	(4)	-
Acquisition (divestment) of subsidiary with NCI	57	(67)
Repurchase of shares	(869)	(236)
Other changes	(8)	-
Balance at 31 December	**7,835**	**7,815**

'Acquisition of subsidiary with NCI' relates to the acquisitions of Andre Pectin and Yimante. See Note 17 'Non-controlling interests'.

Other changes of -€ 8 million mainly relates to transactions with minority shareholders, together with a transfer of the fair value reserve to retained earnings.

In 2019, the following dividends were proposed by the Managing Board:

Dividend

	2019	2018
Per cumulative preference share A: € 0.17 (2018: € 0.17)	8	8
Per ordinary share: € 2.40 (2018: € 2.30)	417	404
Total	**425**	**412**

The proposed final dividend on ordinary shares is subject to approval by the Annual General Meeting of Shareholders and has not been deducted from Equity.

For a description of the rules of profit appropriation and of the statutory rights attached to preference shares B, see Note 7 'Shareholders' equity'.

Share capital

On 31 December 2019, the authorized capital amounted to € 1,125 million (2018: € 1,125 million), distributed over 330,960,000 ordinary shares, 44,040,000 cumulative preference shares A and 375,000,000 cumulative preference shares B. All shares have a nominal value of € 1.50 each.

The changes in the number of issued and outstanding shares in 2018 and 2019 are shown in the following table.

Overview of shares

	Issued shares		Treasury shares
	Ordinary	Cumprefs A	Ordinary
Balance at 1 January 2018	**181,425,000**	**44,040,000**	6,781,525
Reissue of shares in connection with share-based payments			(2,090,107)
Repurchase of shares			2,700,000
Dividend in the form of ordinary shares			(1,616,993)
Balance at 31 December 2018	181,425,000	44,040,000	5,774,425
Number of treasury shares at 31 December 2018	(5,774,425)		
Number of shares outstanding at 31 December 2018	**175,650,575**	**44,040,000**	
Balance at 1 January 2019	**181,425,000**	**44,040,000**	5,774,425
Reissue of shares in connection with share-based payments			(3,395,405)
Repurchase of shares			7,962,936
Dividend in the form of ordinary shares			(1,365,711)
Balance at 31 December 2019	181,425,000	44,040,000	8,976,245
Number of treasury shares at 31 December 2019	(8,976,245)		
Number of shares outstanding at 31 December 2019	**172,448,755**	**44,040,000**	

The average number of ordinary shares outstanding in 2019 was 175,730,949 (2018: 175,322,889). All shares issued are fully paid.

The cumulative preference shares A have been classified as equity, because there is no mandatory redemption and distributions to the shareholders are at the discretion of DSM.

On 31 December 2019, no cumulative preference shares B were outstanding (same as 2018).

Share premium

Of the total share premium of € 489 million (2018: € 489 million), an amount of € 93 million (2018: € 99 million) can be regarded as entirely free of tax.

Treasury shares

On 1 April 2019, DSM started a € 1 billion share buy-back program with the intention to reduce its issued capital. In the reporting year, € 601 million was realized, being 5.4 million shares.

At 31 December 2019, DSM possessed 8,976,245 (2018: 5,774,425) ordinary shares with a nominal value of € 13 million, or 3.98% (2018: 2.56%) of the share capital. The average purchase price of the ordinary treasury shares as at 31 December 2019 was € 100.78 (2018: € 64.22). At 31 December 2019, 3,020,830 (2018: 5,616,235) of the total number of treasury shares outstanding were held for servicing share-option rights and share plans, 592,479 (2018: 158,190) shares for stock dividend, and 5,362,936 (2018: 0) shares earmarked for capital reduction.

Other reserves in Shareholders' equity

	Translation reserve	Hedging reserve	Reserve for share-based compensation	Fair value reserve	Total
Balance at 1 January 2018	**(107)**	**(148)**	**51**	**5**	**(199)**
Changes:					
Fair-value changes of derivatives	-	(44)	-	-	(44)
Release to income statement	14	22	-	-	36
Fair-value changes of other financial assets	-	-	-	16	16
Exchange differences	129	-	-	-	129
Options and performance shares granted	-	-	25	-	25
Options and performance shares exercised/canceled	-	-	(23)	-	(23)
Changes in joint ventures and associates	(1)	(3)	-	-	(4)
Income tax	2	7	-	-	9
Total changes	144	(18)	2	16	144
Balance at 31 December 2018	**37**	**(166)**	**53**	**21**	**(55)**
Changes:					
Fair-value changes of derivatives	-	(18)	-	-	(18)
Release to income statement	(9)	66	-	-	57
Fair-value changes of other financial assets	-	-	-	(21)	(21)
Exchange differences	134	-	-	-	134
Options and performance shares granted	-	-	34	-	34
Options and performance shares exercised/canceled	-	-	(36)	-	(36)
Transfer to retained earnings	-	-	-	4	4
Changes in joint ventures and associates	-	-	-	1	1
Income tax	-	(4)	-	-	(4)
Total changes	125	44	(2)	(16)	151
Balance at 31 December 2019	**162**	**(122)**	**51**	**5**	**96**

The increase in the Translation reserve in 2019 is mainly caused by a weakening of the euro against the US dollar and Swiss franc, partly offset by a strengthening against the Brazilian real. As a consequence, the total value of the subsidiaries increased, which led to a positive exchange difference of € 134 million. In addition, there was a € 9 million release of the cumulative translation reserve to the income statement.

The Translation reserve, Hedging reserve and the Fair value reserve are legal reserves in accordance with Dutch law and cannot be distributed to shareholders. Additional information is provided in Note 7 to the 'Parent company financial statements'.

17 Non-controlling interests

	2019				2018
	Andre Pectin	Yimante	Other	Total	Total
% of non-controlling interest	25%	25%			
Balance at 1 January	**-**	**-**	**33**	**33**	**103**
Changes:					
- Share of profit/charged to income statement	2	-	4	6	2
- Acquisitions	32	25	-	57	(1)
- Other consolidation changes	-	-	9	9	(67)
- Capital payments	1	-	-	1	-
- Dividend paid	-	-	(4)	(4)	(3)
- Exchange differences	-	-	2	2	(1)
Total changes	35	25	11	71	(70)
Balance at 31 December	**35**	**25**	**44**	**104**	**33**

Acquisitions are related to the consolidation of Andre Pectin, due to the acquisition of an additional 46.05% of the shares and gain of control on 1 January 2019, and the acquisition of 75% of Yimante Health Ingredients (the vitamin E business of Nenter). See also Note 3 'Change in the scope of the consolidation'.
'Other consolidation changes' relates to the increase of DSM's share in DSM-NIAGA from 51% to 100%.

Not fully-owned subsidiaries on a 100% basis

	2019				2018
	Andre Pectin	Yimante	Other	**Total**	
Assets					
Intangible assets	70	28	32	130	34
Property, plant and equipment	48	57	178	283	173
Other non-current assets	-	22	35	57	27
Inventories	34	15	27	76	27
Receivables	16	31	52	99	60
Cash and cash equivalents	5	1	35	41	20
Total assets	**173**	**154**	**359**	**686**	**341**
Liabilities					
Provisions (non-current)	15	2	2	19	2
Borrowings (non-current)	1	38	25	64	14
Other non-current liabilities	-	2	17	19	20
Borrowings and financial derivatives (current)	3	-	72	75	79
Other current liabilities	13	11	107	131	90
Total liabilities	**32**	**53**	**223**	**308**	**205**
Net assets (100% basis)	**141**	**101**	**136**	**378**	**136**
Net sales	58	-	162	220	157
Profit for the year	9	(1)	8	16	7
Operating cash flows	(4)	(16)	(35)	(55)	86

18 Provisions

	Restructuring costs and termination benefits	Environ-mental costs	Other long-term employee benefits	Other provisions	Total
Balance at 1 January 2018	**39**	**70**	**42**	**53**	**204**
Of which current	31	10	3	9	53
Changes in 2018					
- Additions	33	1	2	2	38
- Releases	(2)	(9)	(3)	(2)	(16)
- Uses	(53)	(4)	(2)	(11)	(70)
- Other change	-	-	-	(3)	(3)
Total changes	(22)	(12)	(3)	(14)	(51)
Balance at 31 December 2018	**17**	**58**	**39**	**39**	**153**
Of which current	12	10	3	12	37
Changes in 2019					
- Additions	43	19	4	5	71
- Releases	(3)	(13)	-	(3)	(19)
- Uses	(26)	(5)	(3)	(5)	(39)
- Other change	-	-	1	1	2
Total changes	14	1	2	(2)	15
Balance at 31 December 2019	**31**	**59**	**41**	**37**	**168**
Of which current	21	13	4	10	48

In cases where the effect of the time value of money is material, provisions are measured at the present value of the expenditures expected to be required to settle the obligation. The discount rate used decreased from 1.8% to 1.2%. The balance of provisions measured at present value increased by € 0.3 million in 2019 in view of the passage of time (2018: increase of € 0.6 million).

The provisions for restructuring costs and termination benefits mainly relate to the costs of redundancy schemes connected to the dismissal of employees and costs of termination of contracts. These provisions have an average life of 1 to 3 years.

The provisions for environmental costs relate to soil clean-up obligations, among other things. These provisions have an average life of around 10 years.

The provisions for other long-term employee benefits mainly relate to length-of-service and end-of-service payments. The average life of this provision is estimated to be between 10 and 12 years.

Several items have been combined under Other provisions, for example demolition costs, onerous contracts and legal risks. These provisions have an average life of 1 to 3 years.

The additions to the provisions for restructuring costs and termination benefits in 2019 mainly relate to the various restructuring projects (same as in 2018).

19 Borrowings

	2019		2018	
	Total	Of which current	Total	Of which current
Debenture loans	2,244	-	2,543	300
Private loans	41	8	16	7
Lease liabilities	236	49	21	1
Credit institutions	132	132	72	72
Total	**2,653**	**189**	**2,652**	**380**

In agreements governing loans with a residual amount at year-end 2019 of € 2,244 million (31 December 2018: € 2,543 million, of which € 300 million was of a short-term nature), negative pledge clauses have been included that restrict the provision of security.

The documentation of the € 500 million bond issued in March 2014, the € 500 million bond issued in April 2015, the € 500 million bond issued in September 2015 and the € 750 million bond issued in September 2016 include a change-of-control clause. This clause allows the bond investors to request repayment at par if 50% or more of the DSM shares are controlled by a third party and if the company is downgraded below investment grade (< BBB-). In August 2019, Moody's confirmed DSM's credit rating of 'A3' with a stable outlook. Standard & Poor's confirmed DSM's credit rating of 'A-' with a stable outlook in September 2019. At 31 December 2019, there was € 1,840 million in borrowings outstanding with a remaining term of more than 5 years (at 31 December 2018, there was € 1,756 million in borrowings outstanding with a remaining term of more than 5 years).

The schedule of repayment of borrowings is as follows:

Borrowings by maturity

	2019	2018
2019	-	380
2020	189	10
2021	41	1
2022	37	503
2023 and 2024	546	505
After 2024	1,840	1,253
Total	**2,653**	**2,652**

A breakdown of the borrowings by currency is given in the following table:

Borrowings by currency

	2019	2018
EUR	2,413	2,566
USD	101	25
CNY	74	21
TWD	6	17
BRL	15	19
Other	44	4
Total	**2,653**	**2,652**

On balance, total borrowings increased by € 1 million due to the following changes:

Movements of borrowings

	2019	2018
Balance at 1 January	**2,652**	**2,628**
Opening balance lease liabilities (adoption IFRS 16)	215	-
Loans taken up	7	7
Repayments	(302)	(12)
Unwinding (interest)	8	-
Acquisitions/consolidation changes	29	10
Changes in debt to credit institutions	57	3
New lease arrangements (incl. remeasurements)	39	18
Payment of lease liabilities	(53)	(1)
Exchange differences	1	(1)
Balance at 31 December	**2,653**	**2,652**

The average effective interest rate on the portfolio of borrowings outstanding in 2019, including hedge instruments related to these borrowings, amounted to 2.31% (2018: 2.24%).

A breakdown of debenture loans is given below:

Debenture loans

		Nom. amt.	**2019**	2018
EUR loan 1.75%	2013—2019	300	-	300
EUR loan 2.38%	2014—2024	500	499	498
EUR loan 1.00%	2015—2025	500	498	498
EUR loan 1.38%	2015—2022	500	499	499
EUR loan 0.75%	2016—2026	750	748	748
Total		**2,550**	**2,244**	**2,543**

All debenture loans have a fixed interest rate and are listed on the AEX.

The 2.375% EUR bond 2014–2024 of € 500 million was pre-hedged by means of forward starting swaps, resulting in an effective interest rate for this bond of 3.97%, including the settlement of the pre-hedge.

The 1% EUR bond 2015–2025 of € 500 million was pre-hedged by means of forward starting swaps, resulting in an effective interest rate for this bond at 3.65%, including the settlement of the pre-hedge.

The 1.375% EUR bond 2015–2022 of € 500 million has an effective interest rate of 1.40%.

The 0.75% EUR bond 2016–2026 of € 750 million was pre-hedged by means of a collar resulting in an effective interest rate for this bond of 1.08%, including the settlement of the pre-hedge.

A breakdown of private loans is given below:

Private loans

	2019	2018
CNY loan	40	15
Other loans	1	1
Total	**41**	**16**

A breakdown of the lease liabilities is given below:

Lease liabilities by maturity

	2019	2018 Operating lease commitments
2019	-	49
2020	49	39
2021	40	30
2022	33	25
2023	27	21
2024	24	20
After 2024	83	56
Total undiscounted lease liabilities at 31 December	256	240
Lease liabilities included in the balance sheet at 31 December	**236**	-
Current	49	-
Non-current	187	-

In addition to the contractual lease commitments, DSM has identified explicit renewal options available to DSM, which are currently not reasonably certain to be exercised and are therefore not included in the measurement of the lease. The associated future lease payments which are uncommitted and optional for DSM, are estimated around € 76 million (undiscounted).

The interest expense on the lease liabilities was € 7 million and the total repayments of the lease liabilities amounted to € 53 million in 2019. These cash flows are reported as financing cash flows.

DSM's policy regarding financial-risk management is described in Note 23.

20 Other non-current liabilities

	2019	2018
Investment grants	65	42
Deferred items	28	17
Drawing rights	31	52
Other non-current liabilities	21	86
Total	**145**	**197**

The decrease in the other non-current liabilities relates mainly to the settlement of the earn-out agreements regarding the acquisition of Amyris Brasil.

21 Current liabilities

	2019	2018
Trade payables		
Received in advance	7	5
Trade accounts payable	1,330	1,405
Notes and cheques due	1	3
Owing to associates and joint ventures	7	17
Total Trade payables	**1,345**	**1,430**
Income tax payable	**42**	**100**
Other current liabilities		
Other taxes and social security contributions	46	58
Interest	19	21
Pensions	-	3
Investment creditors	115	109
Employee-related liabilities	268	293
Payables associates and joint ventures relating to cash facility	5	5
Other liabilities	25	36
Deferred items	-	2
Total Other current liabilities	**478**	**527**
Total current liabilities	**1,865**	**2,057**

Included in trade accounts payable are amounts due to suppliers which could be part of a supply chain finance arrangement between the supplier and a third-party bank. DSM suppliers have the option to enter into such supply chain finance arrangements with third party banks, which provides them with the option of earlier payment based on terms linked to DSM's investment grade credit rating. If a supplier chooses to participate in such an arrangement, this does not impact the classification of the trade payable for DSM as these supply chain finance arrangements are concluded between the banks and the suppliers and do not alter the payment conditions between the supplier and DSM. Therefore, these amounts remain classified as trade payables.

22 Contingent liabilities and other financial obligations

The contingent liabilities and other financial obligations in the following table are not recognized in the balance sheet.

	2019	2018
Operating leases and rents under IAS 17	-	240
Guarantee obligations on behalf of associates and third parties	182	167
Outstanding orders for projects under construction	8	8
Other	61	42
Total	**251**	**457**

Guarantee obligations are principally related to VAT and duties on the one hand and to financing obligations of associated companies on the other. Guarantee obligations will only lead to a cash outflow when called upon. At year-end, no obligations had been called upon. Most of the outstanding orders for projects under construction will be completed in 2020.

Litigation

DSM has a process in place to monitor legal claims periodically and systematically.

DSM is involved in several legal proceedings, most of which are related to the ordinary course of business. DSM does not expect these proceedings to result in liabilities that have a material effect on the company's financial position. In cases where it is probable that the outcome of the proceedings will be unfavorable, and the financial outcome can be measured reliably, a provision has been recognized in the financial statements and disclosed in Note 18 'Provisions'.

In 2015, an award was issued against DSM Sinochem Pharmaceuticals India Private Ltd. (DSP India) in a protracted arbitration case in India going back to 2004 involving a joint venture that DSP India had formed with Hindustan Antibiotics Ltd., which suspended its operations in 2003. DSP India (renamed to Centrient Pharmaceuticals after divestment by DSM in 2018) is covered by an indemnity from Koninklijke DSM N.V. for this case. In 2015, DSP India made an application with the Civil Court in Pune (India) to set aside the arbitral award. The award amounts to INR 127.5 crore (approximately € 16 million as at year-end 2019) excluding interest of 12% per year as of 2004. In 2019, DSM provided the Bombay High Court a bank guarantee of INR 150 crore (approximately € 19 million). At the end of 2019, the application proceedings were still pending. DSM has always viewed this case as unfounded and is of the opinion that the likelihood of the award being ultimately set aside is high. Therefore, no liability is recognized in respect of this case.

In 2019, Brazilian tax authorities disagreed with certain tax treatment as applied by the company in 2014–2016, which would have an effect on such prior year income tax returns of around BRL 65 million (approximately € 15 million as at year-end 2019), including penalties and interest. DSM views this case as unfounded and considers that the possibility of winning this case is high, as confirmed by external legal counsel. Therefore no liability relating to this case is recognized.

23 Financial instruments and risks

Policies on financial risks

General

As an international company, DSM is exposed to financial risks in the normal course of business. A major objective of our group policy is to minimize the impact of market, liquidity and credit risk on the value of the company and its profitability. In order to achieve this, a systematic financial and risk management system has been established. For the purpose of securing compliance with the risk management policies, an internal control framework has been implemented, and the controls are monitored and tested periodically.

The financial derivatives contracts used by DSM are entered into exclusively in connection with the corresponding underlying transaction (hedged item) relating to normal operating business. The instruments used are customary products, such as currency swaps, cross-currency interest rate swaps, collars, forward exchange contracts and interest rate swaps.

An important element of DSM's financial policy and capital management is the allocation of cash flow. DSM primarily allocates cash flow to investments aimed at strengthening its business positions and securing the dividend payment to its shareholders. The remaining cash flow is further used for acquisitions and partnerships that strengthen DSM's competences and market positions. The net debt to equity ratio (gearing) is 12.7 (2018: 1.4), see also Note 25 'Net debt'.

Liquidity risk

Liquidity risk is the financial risk due to uncertain development of liquidity. An entity may not get access to sufficient liquidity if its credit rating falls, when it experiences sudden unexpected cash outflows or an unexpected drop in cash inflows, or some other event causes counterparties to avoid trading with or lending to the institution. A company is also exposed to liquidity risk if financial markets on which it depends are subject to loss of liquidity.

The primary objective of liquidity management is to optimize the corporate cash position, among other things, by securing availability of sufficient liquidity for execution of payments by DSM entities, at the right time and the right place.

At December 2019, DSM had cash and cash equivalents of € 800 million (2018: € 1,281 million).

At the end of 2019, DSM had one committed credit facility of € 1.0 billion, after the first extension maturing on 29 May 2024. The agreement for the committed credit facility has neither financial covenants nor material adverse changes clauses. The committed credit facility links the interest rate to DSM's greenhouse gas (GHG) emission reduction. At year-end 2019, no loans had been taken up under the committed credit facility.

Furthermore, DSM has a commercial paper program amounting to € 1,500 million (2018: € 1,500 million). The company will use the commercial paper program to a total of not more than €1,000 million (2018: € 1,000 million). At 31 December 2019, € 0 million had been issued as commercial paper (2018: € 0 million). DSM has no derivative contracts to manage currency risk or interest rate risk outstanding under which margin calls by the counterparty would be permitted.

Floating-rate and fixed-rate borrowings and monetary liabilities analyzed by maturity are summarized in the following table. Borrowings excluding credit institutions are shown after taking into account related interest rate derivatives in designated hedging relationships. DSM manages financial liabilities and related derivative contracts on the basis of the remaining contractual maturities of these instruments. The remaining maturities presented in the following table provide an overview of the timing of the cash flows related to these instruments. Financial assets are not linked to financial liabilities in order to meet cash outflows on these liabilities.

Financial liabilities

	Carrying amount	Within 1 year	1 to 2 years	2 to 3 years	3 to 4 years	4 to 5 years	After 5 years
2018							
Borrowings	2,652	380	10	1	504	1	1,756
Monetary liabilities	2,267	2,129	41	9	7	9	72
Guarantees	167	-	-	-	-	-	167
Derivatives	54	51	-	2	1	-	-
Interest payments	184	35	29	29	29	23	39
Cash at redemption[1]	89	5	18	14	14	12	26
Total	**5,413**	**2,600**	**98**	**55**	**555**	**45**	**2,060**
2019							
Borrowings	2,653	189	41	37	524	22	1,840
Monetary liabilities	2,049	1,997	17	3	2	3	27
Guarantees	182	-	-	-	-	-	182
Derivatives	25	18	3	1	3	-	-
Interest payments	183	33	30	30	30	22	38
Cash at redemption[1]	26	5	4	4	3	3	7
Total	**5,118**	**2,242**	**95**	**75**	**562**	**50**	**2,094**

1 Difference between nominal redemption and amortized costs.

The following table reflects the exposure of the financial derivatives to liquidity risk.

The table contains the cash flows from derivatives with positive fair values and from derivatives with negative fair values to have a complete overview of the financial derivatives related cash flows. The amounts are gross and undiscounted.

Financial derivatives cash flow

	2019	2020	2021	2022	2023	2024	Total
2018							
Inflow	3,157	42	38	22	56		3,315
Outflow	(3,181)	(41)	(39)	(22)	(55)		(3,338)
2019							
Inflow		1,690	38	37	56	19	1,840
Outflow		(1,688)	(38)	(37)	(58)	(19)	(1,840)

Market risk

Market risk can be subdivided into interest rate risk, currency risk and price risk.

Interest rate risk

Interest rate risk is the risk that adverse movements of interest rates lead to high costs on interest-bearing debt or assets, which negatively impact the company's capability to honor its commitments. DSM's interest rate risk policy is aimed at minimizing the interest rate risks associated with the financing of the company and thus at the same time optimizing the net interest costs. This policy translates into a certain desired profile of fixed-interest and floating-interest positions, including cash and cash equivalents, with the floating-interest position not exceeding 60% of net debt.

At 31 December 2019, there was a CNY 255 million credit facility held by DSM Inner Mongolia Rainbow, based on floating rate SHIBOR (2018: same).
There were no outstanding fixed-floating interest rate swaps (end of 2018 none).

The following analysis of the sensitivity of borrowings, assets and related financial derivatives to interest rate movements assumes an instantaneous 1% change in interest rates for all maturities from their level on 31 December 2019, with all other variables held constant. A 1% reduction in interest rates would result in a € 8 million pre-tax loss in the income statement and equity on the basis of the composition of financial instruments on 31 December 2019, as floating-rate borrowings are more than compensated for by floating-rate assets (mainly cash). The opposite applies in the case of a 1% increase in interest rates. The sensitivity of financial instruments with a floating interest rate on 31 December 2019 to changes in interest rates is set out in the following table:

Sensitivity to change in interest rate

	2019			2018		
	Carrying amount	Sensitivity		Carrying amount	Sensitivity	
		+1%	(1%)		+1%	(1%)
Loans to associates and joint ventures	3	-	-	26	-	-
Current investments	688	7	(7)	1,277	13	(13)
Cash and cash equivalents	800	8	(8)	1,281	13	(13)
Short-term borrowings	(189)	(2)	2	(380)	(1)	1
Long-term borrowings	(2,464)	(2)	2	(2,272)	-	-

Currency risk

Currency risk is the risk that adverse movements of foreign currencies negatively impact the results of operations and the financial condition of the company, for example due to losses on assets or liabilities in foreign currencies. It is DSM's policy to hedge 100% of the currency risks resulting from sales and purchases at the moment of recognition of the receivables and payables. This is realized by transferring at spot rates the respective exposures to the group, which are, consequently (on a netted basis), hedged externally. In addition, operating companies may — under strict conditions — opt for hedging currency risks from firm commitments and forecast transactions. The currencies giving rise to these risks are primarily USD, CHF, GBP and JPY. The risks arising from currency exposures are regularly reviewed and hedged when appropriate. DSM uses currency forward contracts, spot contracts, and average-rate currency options to hedge the exposure to fluctuations in foreign exchange rates. At year-end, these instruments had remaining maturities of less than one year. For the hedging of currency risks from firm commitments and forecast transaction cash flows, hedge accounting is applied. Hedge accounting is not applied for hedges of recognized trade receivables and trade payables hedged with short-term derivatives.

To hedge intercompany loans, receivables and payables denominated in currencies other than the functional currency of the subsidiaries, DSM uses currency swaps or forward contracts.

The following analysis of the sensitivity of net borrowings and derivative financial instruments to currency movements against the euro assumes a 10% change in all foreign currency rates against the euro from their level on 31 December 2019, with all other variables held constant. A +10% change indicates a strengthening of the foreign currencies against the euro. A -10% change represents a weakening of the foreign currencies against the euro.

Sensitivity to change in exchange rate

	2019			2018		
	Carrying amount	Sensitivity		Carrying amount	Sensitivity	
		+10%	(10%)		+10%	(10%)
Loans to associates and joint ventures	3	-	-	26	-	-
Current investments	688	1	(1)	1,277	1	(1)
Cash and cash equivalents	800	37	(37)	1,281	26	(26)
Short-term borrowings	(140)	(4)	4	(380)	(7)	7
Long-term borrowings	(2,277)	(3)	3	(2,272)	(1)	1
Lease liabilities	(236)	(17)	17	-	-	-
Currency forward contracts	(8)	23	(23)	1	35	(35)
Currency forwards related to net investments in foreign entities[1]	(1)	(9)	9	(5)	(42)	42
Average-rate forwards used for economic hedging[2]	(2)	(38)	38	(22)	(68)	68
Other derivatives	26	3	(3)	7	1	(1)

1 Fair-value change reported in Translation reserve.
2 Fair-value change reported in Hedging reserve.

Sensitivity changes on these positions will generally be recognized in profit or loss or in the translation reserve in equity, with the exception of the instruments for which cash flow hedge accounting or net-investment hedge accounting is applied.

In case of a strengthening or weakening of the euro against USD, CHF and CNY (being the key currencies), this would affect the translation of financial instruments denominated in these currencies, assuming all other variables being constant.

	Profit or loss		Equity	
	Strengthening	Weakening	Strengthening	Weakening
EUR				
USD (10% movement)	(126)	126	(247)	247
CHF (10% movement)	24	(24)	(264)	264
CNY (10% movement)	(24)	24	(63)	63

Price risk
Financial instruments that are subject to changes in stock exchange prices or indexes are subject to a price risk. At year-end 2019, price risks related to investments in securities were limited.

Credit risk
Credit risk is the risk that a (commercial or financial) counterparty may not be able to honor a financial commitment according to the contractual agreement with DSM. The company manages the credit risk to which it is exposed by applying credit limits per institution and by dealing exclusively with institutions that have a high credit rating.

At the balance sheet date, there were no significant concentrations of credit risks.

In line with IFRS 9 standard 'Financial Instruments', the estimation of the value adjustment for doubtful accounts receivable is now based on an expected credit loss (ECL) model. DSM uses an allowance matrix to measure the ECL for trade receivables. The loss rates depend among other things on the specified aging categories and are based on historical write-off percentages, taking market developments into account.

The ECL is based on the allocation of a credit risk grade which is based on data that is determined to be predictive of the risk of loss (including but not limited to external ratings, audited financial statements, management accounts and cash flow projections and available press information about customers) and applying experienced credit judgement. Credit risk grades are defined using qualitative and quantitative factors that are indicative of the risk of default and are aligned to external credit rating definitions from Moody's.

The loss allowance on non-current financial assets that has been taken into consideration at the end of 2019 was € 1 million.

With regard to treasury activities (for example cash, cash equivalents and financial derivatives held with banks or financial institutions) it is ensured that financial transactions are only concluded with counterparties that have at least a Moody's credit rating of A3 for long-term instruments. At business group level, outstanding receivables are continuously monitored by management. Appropriate allowances are made for any credit risks that have been identified in line with the expected credit loss policy.

The table below provides information about the credit risk exposure per aging category and the ECL for trade accounts receivable of € 17 million at 31 December 2019, see Note 13 'Current receivables'.

	Weighted average loss rate	Gross carrying amount	Loss Allowance
Neither past due nor impaired	0.1%	1,055	(1)
1–29 days overdue	0.3%	199	(1)
30–89 days overdue	2.3%	77	(2)
90 days or more overdue	60.5%	23	(14)
Total		**1,354**	**(17)**

The changes in the loss allowance for trade accounts receivable are as follows:

	2019	2018
Balance at 1 January	**(35)**	**(21)**
Net remeasurement of loss allowance	14	(19)
Deductions	4	5
Balance at 31 December	**(17)**	**(35)**

The maximum exposure to credit risk is represented by the carrying amounts of financial assets that are recognized in the balance sheet, including derivative financial instruments. DSM has International Swaps and Derivatives Association (ISDA) agreements in place with its financial counterparties that allow for the netting of exposures in case of a default of either party. No significant agreements or financial instruments were available at the reporting date that would reduce the maximum exposure to credit risk.

Exposure to credit risk related to derivatives

	2019	2018
Receivables from derivatives	40	18
Liabilities from derivatives	(19)	(36)
Net amount	**21**	(18)

Information about financial assets is presented in Note 10 'Associates and joint arrangements', Note 11 'Other financial assets', Note 13 'Current receivables', Note 14 'Current investments', Note 15 'Cash and cash equivalents' and Note 23 'Financial instruments and risks'. Information about material impairments is presented in Note 2 'Alternative performance measures'.

DSM's policy is to grant corporate guarantees for credit support of subsidiaries and associates, to get access to credit facilities which are necessary for their operating working capital needs and which cannot be funded by the corporate cash pools and/or for bank guarantees needed for local governmental requirements. Information on guarantees is presented in Note 22 'Contingent liabilities and other financial obligations'.

Hedge accounting

DSM uses derivative financial instruments to manage financial risks relating to business operations and does not enter into speculative derivative positions. The purpose of cash flow hedges is to minimize the risk of volatility of future cash flows. These may result from a recognized asset or liability or a forecast transaction that is considered highly probable (firm commitment). The hedge ratio is dependent on the risk analysis related to the specific cash flow, and can vary from 50 to 100%. Changes in fair value are recognized in Other comprehensive income (Hedging reserve), and material ineffectiveness (mainly as a result of changes in timing of the hedged transactions) will be recognized in the income statement. As soon as the forecast transaction is realized (the underlying hedged item materializes), the amount recognized in the Other comprehensive income will be reclassified to the income statement. In case the hedged future transaction is a non-financial asset or liability, the gain or loss recognized in Other comprehensive income will be included in the cost of acquisition of the asset or liability.

The purpose of a hedge of a net investment is to reduce the foreign currency risk of an investment in a company whose functional currency is not the euro. Changes in fair value are recognized in Other comprehensive income

(Translation reserve), and material ineffectiveness will be recognized in the income statement. The amount recognized in the Other comprehensive income will be reclassified to the income statement, upon divestment of the respective foreign subsidiary.

The purpose of a fair value hedge is to hedge the fair value of assets or liabilities reflected on the balance sheet. Changes of fair value in hedging instruments, as well as hedged items, will be recognized in the income statement.

Cash flow hedges

In 2019, DSM hedged USD 712 million (2018: USD 654 million) of its 2020 projected net cash flow in USD against the EUR by means of average-rate currency forward contracts at an average exchange rate of USD 1.15 per EUR for the four quarters of 2020. Each quarter, the relevant hedges for that quarter will be settled and recognized in the income statement. In 2019, DSM also hedged JPY 7,453 million (2018: JPY 6,550 million) of its 2020 projected net cash flow in JPY against the EUR by means of average-rate currency forward contracts at an average exchange rate of JPY 122 per EUR for the four quarters of 2020. DSM also hedged the projected CHF obligations against the EUR, namely CHF 304 million at an average exchange rate of CHF 1.11 per EUR. These hedges have fixed the exchange rate for part of the USD and JPY receipts and CHF payments in 2020. Cash flow hedge accounting is applied for these hedges. As a result of similar hedges concluded in 2018 for the year 2019, € 43 million negative (2018: € 1 million positive) was recognized in the 2019 operating profit of the segments involved in accordance with the realization of the expected cash flows. There was no material ineffectiveness in relation to these hedges.

Net investment hedges

The partial hedging of the currency risk associated with the translation of DSM's CHF-denominated investments was continued for an amount of CHF 100 million (2018: CHF 474 million). There was no material ineffectiveness in relation to these hedges.

Fair value hedges

There were no fair value hedges.

	Cash flow hedges		**Net investment hedges**	
	Foreign currency risk		Foreign exchange – denominated debt (CHF currency)	
	Inventory purchases	Other[1]	Assets	Liabilities
2018				
Nominal amount hedged item	30	359	-	416
Carrying amount assets	-	-	-	-
Carrying amount liabilities	6	22	-	5
Line item balance sheet	Financial derivatives	Financial derivatives	Financial derivatives	Financial derivatives
Change in the value of the hedging instrument	(16)	(34)	-	(5)
Costs of hedging recognized in OCI	(10)	(33)	-	(5)
Reclassified from hedging reserve to income statement	(6)	(1)	-	-
Line item income statement	Cost of sales	Sales	Finex[2]	Finex[2]
2019				
Nominal amount hedged item	31	406	-	92
Carrying amount assets	-	-	-	-
Carrying amount liabilities	1	2	-	1
Line item balance sheet	Financial derivatives	Financial derivatives	Financial derivatives	Financial derivatives
Change in the value of the hedging instrument	5	20	-	4
Costs of hedging recognized in OCI	5	(23)	-	6
Reclassified from hedging reserve to income statement	(1)	43	-	-
Line item income statement	Cost of sales	Sales	Finex[2]	Finex[2]

1 Forward contracts, sales, receivables and borrowings.
2 Financial income and expense.

For movements in Hedging or Translation reserve, see also Note 16 'Equity'.

Fair value of financial instruments

The following methods and assumptions were used to determine the fair value of financial instruments: cash, current investments, current receivables, current borrowings (excluding current portion of long-term instruments) and other current liabilities are stated at carrying amount, which approximates fair value in view of the short maturity of these instruments. The fair value of derivatives and long-term instruments are based on calculations, quoted market prices or quotes obtained from intermediaries.

The portfolio of financial derivatives consists of average-rate forward contracts that are valued against average foreign exchange forward rates obtained from Bloomberg and other derivatives that are valued using a discounted cash flow model, applicable market yield curves and foreign exchange spot rates. Inputs for the fair value calculations represent observable market data that are obtained from external sources that are deemed to be independent and reliable.

DSM uses the following hierarchy for determining the fair value of financial instruments:

- Level 1: quoted prices in active markets for identical assets or liabilities
- Level 2: other techniques for which all inputs that have a significant effect on the fair value are observable, either directly or indirectly
- Level 3: techniques that use inputs that have a significant effect on the fair value that are not based on observable market data

The following table shows the carrying amounts and fair values of financial assets and financial liabilities, including their levels in the fair value hierarchy.

Fair value of financial instruments

	Carrying amount					Fair Value			
	Amort. Cost	Fair value hedging instr.	FVTPL	FVOCI	**Total**	Level 1	Level 2	Level 3	**Total**
Assets 2018									
Non-current financial derivatives	-	1	13	-	**14**	-	14	-	**14**
Other participating interests	-	-	-	164	**164**	63	33	68	**164**
Non-current loans to associates and JVs	2	-	-	-	**2**	-	2	-	**2**
Other non-current receivables	88	-	-	-	**88**	-	-	88	**88**
Other non-current deferred items	9	-	-	-	**9**	-	-	9	**9**
Trade receivables	1,575	-	-	-	**1,575**	-	-	1,575	**1,575**
Current loans to associates and JVs	24	-	-	-	**24**	-	26	-	**26**
Other current receivables	80	-	-	-	**80**	-	-	80	**80**
Current financial derivatives	-	21	-	-	**21**	-	21	-	**21**
Current investments	1,277	-	-	-	**1,277**	-	-	1,277	**1,277**
Cash and cash equivalents	941	-	340	-	**1,281**	340	-	941	**1,281**
Liabilities 2018									
Non-current borrowings	(2,272)	-	-	-	**(2,272)**	(2,321)	-	-	**(2,321)**
Non-current financial derivatives	-	(3)	-	-	**(3)**	-	(3)	-	**(3)**
Other non-current liabilities	(197)	-	-	-	**(197)**	(117)	-	(80)	**(197)**
Current borrowings	(380)	-	-	-	**(380)**	(384)	-	-	**(384)**
Current financial derivatives	-	(51)	-	-	**(51)**	-	(51)	-	**(51)**
Trade payables	(1,430)	-	-	-	**(1,430)**	-	-	(1,430)	**(1,430)**
Other current liabilities	(527)	-	-	-	**(527)**	-	-	(527)	**(527)**
Assets 2019									
Non-current financial derivatives	-	-	27	-	**27**	-	27	-	**27**
Other participating interests	-	-	-	150	150	44	40	66	150
Non-current loans to associates and JVs	3	-	-	-	**3**	-	3	-	**3**
Other non-current receivables	105	-	-	-	**105**	-	-	105	**105**
Other non-current deferred items	7	-	-	-	**7**	-	-	7	**7**
Trade receivables	1,592	-	-	-	**1,592**	-	-	1,592	**1,592**
Other current receivables	45	-	-	-	**45**	-		45	**45**
Current financial derivatives		19	-	-	**19**	-	19	-	**19**
Current investments	688	-	-	-	**688**	-	-	688	**688**
Cash and cash equivalents	755	-	45	-	**800**	45	-	755	**800**
Liabilities 2019									
Non-current borrowings	(2,464)	-	-	-	**(2,464)**	(2,397)	-	(187)	**(2,584)**
Non-current financial derivatives	-	(7)	-	-	**(7)**	-	(7)	-	**(7)**
Other non-current liabilities	(145)	-	-	-	**(145)**	(126)	-	(19)	**(145)**
Current borrowings	(189)	-	-	-	**(189)**	(140)	-	(49)	**(189)**
Current financial derivatives	-	(18)	-	-	**(18)**	-	(18)	-	**(18)**
Trade payables	(1,345)	-	-	-	**(1,345)**	-	-	(1,345)	**(1,345)**
Other current liabilities	(478)	-	-	-	**(478)**	-	-	(478)	**(478)**

During the year there were no material transfers between individual levels of the fair value hierarchy.

Notional value of derivative financial instruments

	2019			2018		
	Non-current	Current	Total	Non-current	Current	Total
Cross-currency interest rate swaps	(200)	(163)	**(363)**	(157)	(195)	(352)
Forward exchange contracts, currency options, currency swaps	-	(1,629)	**(1,629)**	-	(2,986)	(2,986)
Other derivatives	27	(31)	**(4)**	13	(30)	(17)
Total	**(173)**	**(1,823)**	**(1,996)**	**(144)**	**(3,211)**	**(3,355)**

For interest rate swaps, the notional value is the principal on which the swap agreement is based. For cross-currency interest rate swaps, forward exchange contracts, currency options and currency swaps, the notional value is the hedged foreign exchange amount converted into euros. The notional value of the Other derivatives is the hedged procurement cost translated into euros.

24 Post-employment benefits

The group operates a number of defined benefit plans and defined contribution plans throughout the world, the assets of which are generally held in separately administered funds. The pension plans are generally funded by payments from employees and from the relevant group companies. The group also provides certain additional healthcare benefits to retired employees in the US.

Post-employment benefits relate to obligations that will be settled in the future and require assumptions to project benefit obligations. Post-employment benefit accounting is intended to reflect the recognition of post-employment benefits over the employee's approximate service period, based on the terms of the plans and the investment and funding. The accounting requires management to make assumptions regarding variables such as discount rate, future salary increases, life expectancy, and future healthcare costs. Management consults with external actuaries regarding these assumptions at least annually for significant plans.

Changes in these key assumptions can have a significant impact on the projected defined benefit obligations, funding requirements and periodic costs incurred.

The charges for pension costs recognized in the income statement (Note 5) relate to the following:

Pension costs

	2019	2018
Defined benefit plans:		
- Current service costs pension plans	29	27
- Other post-employment benefits	2	2
Defined contribution plans	85	81
Total pension costs included in employee benefit costs	**116**	**110**
- Pension costs included in Other operating (income) / expense	(16)	(10)
Total in operating profit	**100**	**100**
Pension costs included in financial income and expense	7	6
Total	**107**	**106**
Of which:		
- Defined contribution plans	85	81
- Defined benefit plans	22	25

For 2020, costs for the defined benefit plans relating to pensions are expected to be € 43 million (2019: € 38 million).

Changes in Employee benefit net liabilities recognized in the balance sheet are shown in the following overview:

Employee benefit net liabilities

	2019	2018
Balance at 1 January	**458**	**394**
Changes:		
- Balance of actuarial (gains)/losses	24	77
- Employee benefit costs	21	24
- Contributions by employer	(54)	(44)
- Acquisitions and disposals	1	-
- Exchange differences	4	4
- Transfers	-	3
Total changes	**(4)**	**64**
Balance at 31 December	**454**	**458**

The Employee benefit net liabilities of € 454 million (2018: € 458 million) consist of € 434 million related to pensions (2018: € 438 million), € 6 million related to healthcare and other costs (2018: € 6 million) and € 14 million related to other post-employment benefits (2018: € 14 million).

Pensions

The DSM group companies have various pension plans, which are geared to the local regulations and practices in the countries in which they operate. As these plans are designed to comply with the statutory framework, tax legislation, local customs and economic situation of the countries concerned, it follows that the nature of the plans varies from country to country. The plans are based on local legal and contractual obligations.

DSM's current policy is to offer defined contribution retirement benefit plans to new employees wherever possible. However, DSM still has a (small) number of defined benefit pension and healthcare schemes from the past or in countries where legislation does not allow us to offer a defined contribution scheme. Generally, these schemes have been funded through external trusts or foundations, where DSM faces the potential risk of funding shortfalls. The most significant defined benefit schemes are:

- Pension Plan at DSM Nutritional Products AG in Switzerland (DNP AG)
- DSM UK Pension Scheme in the UK
- Consolidated Pension Plan of DSM North America, Inc. in the US
- Pension Plan at DSM Nutritional Products GmbH in Germany (DNP GmbH)

For each plan, the following characteristics are relevant:

DNP AG Pension Plan in Switzerland

The DNP AG Pension Plan is a typical Swiss Cash Balance plan. For accounting purposes, this plan is qualified as a defined benefit plan. It is a contribution-based plan. There is no promise of indexation for on-going pensions. The Swiss state minimal requirements for occupational benefit plans have however to be respected; the Minimum Guaranteed Interest Return on the cash balance accounts for 2019 was 1.00% (2018: 1.00%) for the mandatory portion (BVG/LPP). There is also a minimal conversion rate applicable. The weighted average duration of the defined benefit obligation is 16.4 years (2018: 12.4 years) which could be seen as an indication of the maturity profile of the scheme.

The pension plan is managed and controlled by a DSM company pension fund. The Board of Trustees consists of representatives of the employer and the employees who have an independent role. In 2019, the Trustees agreed a package of plan changes. The financial result of these changes is recognized in 2019. The plan assets are collectively invested (no individual investment choice). The current (estimated) funding level, based on local standards, is 119% (2018: 108%), which is above the legally required minimum funding level but below the long-term buffer target.

DSM UK Pension Scheme

The DSM UK Pension Scheme was closed as of 30 September 2016 for all pension accruals. An unconditional indexation policy is applicable for the vested pension rights. The weighted average duration of the defined benefit obligation is 19.4 years (2018: 19.4 years), which could be seen as an indication of the maturity profile of the scheme.

The pension plan is managed and controlled by a DSM company pension fund. The Board of Trustees consists of representatives of the employer and the employees who have an independent role. The 2018 valuation was finalized in 2019 and as a result DSM will continue to pay an annual recovery contribution of GBP 0.9 million into the plan. There are two company guarantees in place: (1) a guarantee from DNP AG (capped at GBP 14 million) related to the 2012 valuation, and (2) a guarantee from Royal DSM (capped at GBP 11 million) related to arrangements with respect to former UK divestments. There is a long-term de-risking strategy for the DSM UK Pension Scheme in place with the objective to align the company's intentions and the Trustees responsibility with respect to this plan. The current funding level, based on local standards, is estimated at 99% (2018: 98%).

Consolidated Plan in the US

The Consolidated Plan in the US has been closed to new entrants since 2014. As of 31 December 2016, the plan was closed for pension accrual of the non-unionized employees.

New accrual is only applicable for a small group of unionized employees. There is no indexation applicable for the vested pension rights. The weighted average duration of the defined obligations is 12.1 years (2018: 11.8 years), which could be seen as an indication of the maturity profile of the scheme.

The pension plan is managed and controlled by a DSM company pension fund. The Board of Trustees consists of representatives of the employer and the employees, who have an independent role.

In 2018, an ALM study was performed which will lead to an adjustment of the investment strategy that was implemented in the course of 2019. The internal funding policy of this plan is based on IFRS valuation. This implies a stricter funding policy than the minimum requirements on local funding. The current IFRS funding level is 99% (2018: 95%), whereas the funding level on local standards (Pension Protection Act) is estimated at 124% (2018: 109%). The minimum required funding level on local standards is 80% on the basis of this Act.

DNP GmbH Pension Plan in Germany
The DNP GmbH Pension Plan in Germany has been closed to new entrants as of 31 December 2008. The accrual is still applicable for employees who have been participating in the plan since 2008. The pension plan is a final-pay pension plan (averaged over the last 12 months prior to retirement) and service-related benefit. In 2019, DSM added a lump-sum pay-out option to the plan. The financial result of this change is recognized in 2019. The liability is on the balance sheet of DSM Nutritional Products GmbH. No assets are allocated to this liability. All reimbursements will be paid out by the local company. The weighted average duration of the defined benefit obligation is 15.2 years (2018: 15.5 years), which could be seen as an indication of the maturity profile of the scheme.

The most important unfunded plans are in Germany, for which the associated liability amounts to € 344 million (2018: € 308 million).

The changes in the present value of the defined benefit obligations and in the fair value of plan assets of the major plans are listed below:

Present value of defined benefit obligations

	2019	2018
Balance at 1 January	**1,808**	**1,675**
Changes:		
- Service costs	33	27
- Interest costs	29	25
- Contributions	15	13
- Actuarial (gains)/losses	216	(17)
- Past service costs	(16)	(10)
- Exchange differences	59	47
- Disbursements	(65)	(45)
- New pension plan Switzerland	-	91
- Other	-	2
Balance at 31 December	**2,079**	**1,808**

Fair value of plan assets

	2019	2018
Balance at 1 January	**1,370**	**1,301**
Changes:		
- Interest income on plan assets	23	19
- Actuarial gains/(losses)	192	(94)
Actual return on plan assets	**215**	**(75)**
- Contributions by employer	42	30
- Contributions by employees	14	13
- Disbursement	(52)	(33)
- Exchange differences	55	43
- New pension plan Switzerland	-	91
Balance at 31 December	**1,644**	**1,370**

The fair value of the plan asset consists of 97% of quoted assets (2018: 98%).

The actuarial gains/losses as included in the previous tables can be specified as follows:

Remeasurement effects as included in Other comprehensive income

	2019	2018
Defined benefit obligation major pension plans		
Actuarial (gain)/loss due to experience	36	35
Actuarial (gain)/loss due to demographic assumption	(4)	-
Actuarial (gain)/loss due to financial assumption changes	184	(52)
Total	216	(17)
Plan assets major pension plans		
Return on plan assets (greater)/less than discount rate	192	(94)
Total	192	(94)
Actuarial (gain)/loss major plans	**24**	**77**
Actuarial (gain)/loss other plans	-	-
Total actuarial (gain)/loss	**24**	**77**

The major categories of pension-plan assets as a percentage of total plan assets are as follows:

Pension-plan assets by category

	2019	2018
Bonds	45%	47%
Equities	30%	29%
Property funds	17%	18%
Other	8%	6%

The pension-plan assets include neither ordinary DSM shares nor property occupied by DSM.

The amounts recognized of these plans in the balance sheet are as follows:

Net assets/liabilities

	2019	2018
Major plans:		
Present value of funded obligations	(1,724)	(1,490)
Fair value of plan assets	1,644	1,370
Net	**(80)**	**(120)**
Present value of unfunded obligations	(354)	(318)
Net (liabilities) / assets major plans	**(434)**	**(438)**
Net (liabilities) / assets other plans	(20)	(20)
Total net (liabilities) assets	**(454)**	**(458)**
Of which:		
- Liabilities (Employee benefit liabilities)	(456)	(459)
- Assets (Prepaid pension costs)	2	1

In 2020, DSM is expected to contribute € 36 million (actual 2019: € 43 million) to its major defined benefit plans.

The main actuarial assumptions for the year (weighted averages) are:

Actuarial assumptions for major plans outside the Netherlands

	2019	2018
Discount rate	0.92%	1.61%
Price inflation	1.44%	1.68%
Salary increase	2.08%	2.31%
Pension increase	0.80-2.25%	0.85-2.10%

Year-end amounts for the current and previous periods are as follows:

Major defined benefit plans per year

	2019	2018	2017	2016	2015
Defined benefit obligations	(2,079)	(1,808)	(1,675)	(1,806)	(1,745)
Plan assets	1,644	1,370	1,301	1,297	1,224
Funded status of asset/(liability)	**(435)**	**(438)**	**(374)**	**(509)**	**(521)**
Experience adjustments on plan assets, gain/(loss)	192	(94)	115	60	(22)
Experience adjustments on plan liabilities, gain/(loss)	(36)	(35)	(24)	15	(39)
Gain/(loss) on liabilities due to changes in assumptions	(180)	52	(21)	(80)	(4)

Sensitivities of significant actuarial assumptions

The discount rate, the future increase in wages and salaries and the pension increase rate were identified as significant actuarial assumptions. The following impacts on the defined benefit obligation are to be expected:

- A 0.25% increase/decrease in the discount rate would lead to a decrease/increase of 3.8% (2018: 3.2%) in the defined benefit obligation
- A 0.25% increase/decrease in the expected increase in salaries/wages would lead to an increase/decrease of 0.3% (2018: 0.3%) in the defined benefit obligation
- A 0.25% increase/decrease in the expected rate of pension increase would lead to an increase/decrease of less than 1.0% (2018: 1.0%) in the defined benefit obligation

The sensitivity analysis is based on realistically possible changes as at the end of the reporting year. Each change in a significant actuarial assumption was analyzed separately as part of the test. Interdependencies were not taken into account.

Healthcare and other costs

In some countries, particularly the US, group companies provide retired employees and their surviving dependents with post-employment benefits other than pensions, mainly allowances for healthcare expenses and life-insurance premiums. Some of these are unfunded; in these cases, approved expense claims are reimbursed out of the financial resources of the group companies concerned. These plans are not sufficiently material to warrant the individual disclosures required by IAS 19.

25 Net debt

The development of the components of net debt is as follows:

	Cash and cash equivalents	Current investments	Non-current borrowings	Current borrowings	Credit institutions	Derivatives	Total
Balance at 1 January 2018	**899**	**954**	**(2,551)**	**(8)**	**(69)**	**33**	**(742)**
Change from operating activities	1,391	-	(1)	-	-	6	1,396
Change from investing activities	(605)	323	-	(10)	3	1	(288)
Reclassification from non-current to current	-	-	304	(304)	-	-	-
Transfers	22	-	(24)	12	(9)	(1)	-
Dividend	(225)	-	-	-	-	-	(225)
Interest	(59)	-	-	-	-	-	(59)
Proceeds from reissued shares	97	-	-	-	-	-	97
Repurchase of shares	(236)	-	-	-	-	-	(236)
Derivatives	-	-	-	-	-	(58)	(58)
Change from financing activities	(401)	-	280	(292)	(9)	(59)	(481)
Exchange differences	(3)	-	-	2	3	-	2
Total changes	382	323	279	(300)	(3)	(52)	629
Balance at 31 December 2018	**1,281**	**1,277**	**(2,272)**	**(308)**	**(72)**	**(19)**	**(113)**
Change from operating activities	1,385	-	(8)	-	-	28	1,405
Change from investing activities	(525)	(589)	(27)	-	(2)	3	(1,140)
Reclassification from non-current to current	-	-	50	(50)	-	-	-
Opening balance lease liabilities (adoption)	-	-	(215)	-	-	-	(215)
Transfers	(290)	-	46	301	(57)	-	-
Dividend	(291)	-	-	-	-	-	(291)
Interest	(62)	-	-	-	-	5	(57)
Proceeds from reissued shares	180	-	-	-	-	-	180
New/unwinding leases	-	-	(39)	-	-	-	(39)
Repurchase of shares	(869)	-	-	-	-	-	(869)
Derivatives	-	-	-	-	-	(6)	(6)
Other	-	-	2	-	-	-	2
Change from financing activities	**(1,332)**	-	**(156)**	**251**	**(57)**	**(1)**	**(1,295)**
Exchange differences	(9)		(1)		(1)	10	(1)
Total changes	(481)	(589)	(192)	251	(60)	40	(1,031)
Balance at 31 December 2019	**800**	**688**	**(2,464)**	**(57)**	**(132)**	**21**	**(1,144)**

In 2019, the gearing (net debt / equity plus net debt) was 12.7% (in 2018: 1.4%). Due to the introduction of IFRS 16, the gearing increased by 2.6% (from 1.4% to 4.0%).

26 Notes to the cash flow statement

The cash flow statement provides an explanation of the changes in cash and cash equivalents. It is prepared on the basis of a comparison of the balance sheets at 1 January and 31 December. Changes that do not involve cash flows, such as changes in exchange rates, amortization, depreciation, impairment losses and transfers to other balance sheet items, are eliminated.

Changes in working capital due to the acquisition or disposal of consolidated companies are included under Investing activities.

Most of the changes in the cash flow statement can be traced back to the detailed statements of changes for the balance sheet items concerned. For those balance sheet items for which no detailed statement of changes is included, the table below shows the link between the change according to the balance sheet and the change according to the cash flow statement:

Change in operating working capital

	2019	2018
Operating working capital		
Balance at 1 January	2,138	1,938
Balance at 31 December	2,266	2,138
Balance sheet change	**128**	**200**
Adjustments:		
- Exchange differences	(52)	(34)
- Changes in consolidation (including acquisitions and disposals)	(67)	34
- Transfers/non-cash value adjustments	(61)	46
Total change in operating working capital according to the cash flow statement	**(52)**	**246**

In 2019, the operating working capital was € 2,266 million (2018: € 2,138 million), which amounts to 26.3% of annualized fourth quarter net sales (2018: 24.2%).

Due to the introduction of IFRS 16, operating lease cash flows amounting to -€ 53 million that were presented as operating cash flows under IAS 17 are now reported as financing cash flows.

27 Share-based compensation

The DSM Stock Incentive Plan provides rules for the grant of Restricted Share Units (RSU) and Performance Share Units (PSU), which have been granted as of 2017 to executives. The grant date of these management share units is the last trading day at the Amsterdam Stock Exchange in March.

The number of management share units to be granted is based on the face value of the DSM share. The grant value (depending on job level) to eligible employees will be divided by the share price at the beginning of the first performance year. As a result, the number of share units to be granted annually will fluctuate with the share price development. The grant concerns the maximum number of Restricted Share Units (RSUs) and Performance Share Units (PSUs) that may vest.

RSUs and PSUs are subject to a vesting period of 3 years starting at the grant date. Vesting of RSUs is subject to continued employment until the vesting date ('time vesting'); vesting of PSUs is additionally subject to the achievement of predetermined performance goals at the end of the vesting period. The PSUs granted in 2019 are subject to the realization of four equally weighted goals:

- Relative Total Shareholder Return (TSR) performance versus a peer group
- Return on Capital Employed (ROCE) growth
- Energy Efficiency Improvement (EEI)
- Greenhouse Gas Emissions (GHGE) Efficiency Improvement

Non-vested share units will be forfeited. If employment is terminated prior to the vesting date, specific rules regarding vesting and forfeitures apply.

Prior to 2017, stock options were granted to eligible staff. Stock options have a term of 8 years and are subject to a vesting period of 3 years. Like RSUs, non-performance related stock options are subject to 'time vesting', whereas the vesting of performance related stock options depends on the realization of the same predefined performance goals as applicable to PSUs. Vested stock options can be exercised during a period of 5 years starting as per vesting date, subject to the plan rules. Unvested stock options will be forfeited. If employment is terminated prior to the vesting date, specific rules regarding vesting and forfeitures apply.

Share units and stock options are settled by delivery of DSM shares.

Overview of stock options [1]

Year of grant	Outstanding at 31 Dec. 2018	In 2019 Exercised	In 2019 Average price (€)	In 2019 Forfeited/ expired	Outstanding at 31 Dec. 2019	Fair value on grant date (€)	Exercise price (€)	Expiry date
2011	112,363	(112,363)	93.67	-	-	9.60	46.20	2 May 2019
2012	120,400	(105,025)	104.99	-	15,375	6.88	40.90	15 May 2020
2013	283,525	(130,175)	98.57	-	153,350	9.23	48.91	7 May 2021
2014	438,330	(223,050)	101.78	-	215,280	10.66	52.00	9 May 2022
2015	1,167,737	(643,512)	98.61	-	524,225	9.89	50.98	5 May 2023
2016	2,127,625	(1,344,475)	103.47	(49,000)	734,150	9.36	52.57	3 May 2024
2019 Total	**4,249,980**	**(2,558,600)**	**101.48**	**(49,000)**	**1,642,380**			
Of which vested	2,250,605				1,642,380			
	at 31 Dec. 2017				at 31 Dec. 2018			
2018 Total	6,211,236	(1,620,206)	87.17	(341,050)	4,249,980			
Of which vested	1,711,536				2,250,605			

1 This table also forms part of the 'Remuneration report' on page 130 as included in the Supervisory Board Report.

Overview of management share units[1]

Year of issue	Outstanding at 31 Dec. 2018	In 2019 Granted	In 2019 Vested	In 2019 Forfeited/ expired[2]	Outstanding at 31 Dec. 2019	Share price at date of grant (€)	Expiry date
2017	377,730	-	(27,417)	(25,313)	325,000	67.33	5 May 2020
2018	274,390	-	(16,870)	(14,110)	243,410	80.04	31 Mar 2021
2019	-	328,088	(6,462)	(4,393)	317,233	97.74	31 Mar 2022
2019 Total	**652,120**	**328,088**	**(50,749)**	**(43,816)**	**885,643**		
	at 31 Dec. 2017				at 31 Dec. 2018		
2018 Total	440,143	292,270	(28,046)	(52,247)	652,120		

1 This table also forms part of the 'Remuneration report' on page 130 as included in the Supervisory Board Report.
2 Restricted and Performance Share Units may partly vest upon termination of employment in connection with, for example, divestments, retirement or early retirement.

DSM granted certain members of senior management share units based on Adjusted EBITDA and ROCE performance measures set for 2018 and 2019. Settlement in shares takes place after this two-year period. If employment is terminated prior to the settlement date, specific rules regarding vesting and forfeitures apply. Under this plan 42,892 shares in total were granted, of which at the end of 2019 39,539 shares were outstanding and 3,539 were forfeited. The fair value of these shares is determined based on the market price at the end of the first quarter of 2019, adjusted for loss of dividend.

Certain employees in the Netherlands are entitled to employee stock options, to be granted on the first day on which the DSM stock is quoted ex-dividend following the Annual General Meeting of Shareholders. The opening price of the DSM stock on that day is the exercise price of such stock options. Employee stock options can immediately be exercised and have a term of five years.

Overview of stock options for employees[1]

Year of grant	Outstanding at 31 Dec. 2018	In 2019				Outstanding at 31 Dec. 2019	Fair value on grant date (€)	Exercise price (€)	Exercise period until
		Granted	Exercised	Average price (€)	Forfeited / expired				
2014	37,435	-	(29,690)	96.16	(7,745)	-	5.68	52.00	May 2019
2015	18,950	-	(9,860)	100.73	(105)	8,985	4.50	50.98	May 2020
2016	100,285	-	(52,405)	101.24	(100)	47,780	4.38	52.57	May 2021
2017	187,370	-	(103,060)	101.37	(1,105)	83,205	6.14	67.33	May 2022
2018	440,955	-	(252,605)	102.13	(6,780)	181,570	8.50	85.00	May 2023
2019	-	482,600	(162,055)	112.73	(4,275)	316,270	8.88	98.00	May 2024
2019 Total	**784,995**	**482,600**	**(609,675)**	**104.43**	**(20,110)**	**637,810**			
2018 Total	553,630	490,820	(240,705)	86.52	(18,750)	784,995			

1 This table also forms part of the 'Remuneration report' on page 130 as included in the Supervisory Board Report.

Measurement of fair value

The costs of management share units are measured by reference to the fair value of the DSM share at the date on which the management share units are granted, ex-dividend as the share units do not accumulate dividend during the three-year vesting period.

The costs of option plans are measured by reference to the fair value of the options at the date on which the options are granted. The fair value is determined using the Black-Scholes model, taking into account market conditions linked to the price of the DSM share. Stock-price volatility is determined on the basis of historical volatilities of the DSM share price measured each month over a period equal to the expected option life. The costs of these options are recognized in the income statement (Employee benefit costs).

Assumptions determining fair value

The following assumptions were used to determine the fair value at grant date:

Plan assumptions

	2019	2018
Management shares		
Risk-free rate	-0.57%	-0.44%
Expected share life in years	3	3
Nominal share life in years	3	3
Share price in €	97.74	80.04
Expected dividend in €	6.90	5.55
Fair value of share unit granted in €	90.84	74.49
Employee options		
Risk-free rate	-0.59%	-0.42%
Expected option life in years	2.5	2.5
Nominal option life in years	5	5
Share price in €	98.00	85.00
Exercise price in €	98.00	85.00
Volatility	20.0%	21.0%
Expected dividend	2.35%	2.18%
Fair value of option granted in €	8.88	8.50

An amount of € 34 million is included in the costs for wages and salaries for share-based compensation (2018: € 25 million). The following table specifies the share-based compensation:

Share-based compensation

	2019	2018
Employee stock options	4	4
Management stock options and share units	22	16
Performance shares	8	5
Total expense	**34**	**25**

28 Related parties

Koninklijke DSM N.V. is the group holding company that is listed on the Euronext Amsterdam stock exchange. The financial statements of the company are included in the chapter 'Parent company financial statements'.

In the ordinary course of business, DSM buys and sells goods and services from/to various related parties in which DSM has significant influence. Transactions are conducted under terms and conditions that are equivalent to those that apply to arm's length transactions.

Transactions and relationships with related parties are reported in the table below.

Transactions with related parties

	Joint ventures		Associates	
	2019	2018	2019	2018
Sales to	1	2	13	6
Purchases from	-	7	52	332
Loans to	-	-	3	26
Receivables from	1	-	42	8
Payables to	-	-	5	23
Interest from	-	-	-	7
Commitments to	-	-	4	4

DSM may issue guarantees as credit enhancement of associates to acquire bank facilities for these associates. DSM has provided guarantees to third parties for debts of associates and to a third party (a former associate) for an amount of € 59 million (2018: € 72 million).

Other related-parties disclosures relate entirely to key management of DSM, being represented by the company's Managing Board, Executive Committee and the Supervisory Board. For further details about their remuneration, see Note 13 to the 'Parent company financial statements'.

29 Service fees paid to external auditors

The service fees recognized in the financial statements 2019 for the services of KPMG amounted to € 5.4 million (2018: € 5.3 million). The amounts per service category are shown in the following table.

	Total service fee		Of which	
	KPMG	KPMG	**KPMG NL**	KPMG NL
	2019	2018	**2019**	2018
Audit of the Group financial statements	4.3	4.4	2.8	3.0
Audit of other (statutory) financial statements	0.5	0.5	0.1	0.1
Other assurance services	0.6	0.4	0.6	0.4
Total assurance services	**5.4**	**5.3**	**3.5**	**3.5**

The services rendered by KPMG NL in 2019 in addition to the statutory audit include assurance engagements on non-financial information, on internal controls of DSM Pension Services, government grants and a regulatory filing, as well as agreed-upon procedures on certain information for the Remuneration Committee of Royal DSM and the pension fund and their external auditor.

30 Events after the balance sheet date

In February 2020, DSM launched a program in DSM Nutritional Products to increase its agility to drive above-market profitable growth. By simplifying the operating model and further improving business steering, the program aims to better serve customers and respond to the differentiated needs of their respective end-markets. At the same time, it creates a more efficient organization. The new operating model will be enabled by a revised organizational structure. The structure is designed to support the more focused business priorities, and to operate with more streamlined central business steering. The new set-up will lead to around 350 redundancies (~3% of total DSM Nutritional Products' workforce and ~1.5% of total DSM's workforce), mainly in central and at managerial levels, affecting mostly DSM Nutritional Products' global HQ in Switzerland and its organization in North America.

DSM announced on 21 February 2020 that it has reached agreement to acquire 100% of the shares of Glycom A/S, the world's leading supplier of Human Milk Oligosaccharides (HMO) for an enterprise value of € 765 million. This transaction represents an EV/EBITDA multiple of 20.6 based on the 2019 reported EBITDA, and roughly 15 based on the estimated 2021 EBITDA. The company achieved around € 74 million of sales in 2019 and has around 150 employees. The transaction is expected to close in Q2 2020.

Parent company financial statements

Balance sheet at 31 December of Koninklijke DSM N.V. before profit appropriation

x € million	Notes	**2019**	2018
Assets			
Non-current assets			
Intangible assets	2	428	431
Property, plant and equipment	3	12	13
Financial assets	4	10,747	10,480
Deferred tax assets	5	71	82
Other deferred items		2	2
		11,260	**11,008**
Current assets			
Receivables	6	101	123
Cash and cash equivalents		1	-
		102	**123**
Total		**11,362**	**11,131**
Shareholders' equity and liabilities			
Shareholders' equity	7		
Share capital		338	338
Share premium		489	489
Treasury shares		(905)	(371)
Other reserves		96	(55)
Retained earnings		6,955	6,304
Profit for the year		758	1,077
		7,731	**7,782**
Non-current liabilities			
Borrowings	8	2,244	2,243
Other non-current liabilities		8	8
		2,252	**2,251**
Current liabilities			
Borrowings	8	-	300
Financial derivatives		1	5
Other current liabilities	9	1,378	793
		1,379	**1,098**
Total		**11,362**	**11,131**

Income statement of Koninklijke DSM N.V.

x € million	Notes	2019	2018
Other income	1	184	167
Cost of outsourced work and other external costs		(88)	(88)
Wages and salaries	11	(70)	(65)
Social security and pension charges		(8)	(7)
Amortization of intangible assets and depreciation of Property, plant and equipment		(10)	(9)
Total operating expenses		(176)	(169)
Operating profit		**8**	**(2)**
Financial expense	12	(79)	(76)
Result before income tax		**(71)**	**(78)**
Income tax	5	23	14
Share of the profit of subsidiaries	4	800	1,054
Result after income tax		**752**	**990**
Share of the profit of associates and joint ventures	4	-	11
Other results related to associates and joint ventures	4	6	76
Net profit attributable to equity holders of Koninklijke DSM N.V.		**758**	**1,077**

Notes to the parent company financial statements

1 Summary of the accounting policies

Unless stated otherwise, all amounts are in € million.

The Parent company financial statements are the financial statements of Koninklijke DSM N.V., which have been prepared in accordance with accounting principles generally accepted in the Netherlands.

The accounting policies used are the same as those used in the consolidated financial statements, in accordance with the provisions of article 362-8 of Book 2 of the Dutch Civil Code. In these separate financial statements, investments in subsidiaries are accounted for using the net asset value. The balance sheet presentation is aligned with the consolidated financial statements in order to enhance transparency and facilitate understanding.

The statutory seat of Koninklijke DSM N.V. is Het Overloon 1, Heerlen (Netherlands). A list of DSM participations has been filed with the Chamber of Commerce (Netherlands) and is available from the company upon request, as well as on the company website. DSM is registered in the Dutch Commercial Register under number 14022069.

Information on the use of financial instruments and on related risks for the group is provided in the 'Notes to the consolidated financial statements of Royal DSM'.

Other income consists mainly of the charged corporate overhead and services to the group companies.

The company forms a fiscal unity for corporate income tax purposes together with the group companies in the Netherlands. Each of the companies recognizes the portion of corporate income tax that the relevant company would owe as an independent tax payer, taking into account the tax liabilities applicable to the company.

2 Intangible assets

The carrying amount of intangible assets mainly comprises goodwill on the acquisition of NeoResins in 2005 (€ 358 million), Crina in 2006 (€ 8 million) and Pentapharm in 2007 (€ 36 million). For further information on these assets including the discussion of the related impairment tests, see Note 8 'Intangible assets' in the 'Notes to the consolidated financial statements of Royal DSM'.

	Goodwill	Under construction	Other	Total
Balance at 1 January 2018				
Cost	399	1	83	483
Amortization and impairment losses	-	-	50	50
Carrying amount	**399**	**1**	**33**	**433**
Change in carrying amount				
- Capital expenditure	-	4	-	4
- Put into operation	-	(1)	1	-
- Exchange difference	1	-	-	1
- Amortization	-	-	(7)	(7)
	1	3	(6)	(2)
Balance at 31 December 2018				
Cost	400	4	85	489
Amortization and impairment losses	-	-	58	58
Carrying amount	**400**	**4**	**27**	**431**
Change in carrying amount				
- Capital expenditure	-	3	-	**3**
- Put into operation	-	(3)	3	-
- Exchange difference	2	-	-	**2**
- Amortization	-	-	(8)	**(8)**
	2	-	(5)	**(3)**
Balance at 31 December 2019				
Cost	402	4	88	**494**
Amortization and impairment losses	-	-	(66)	**(66)**
Carrying amount	**402**	**4**	**22**	**428**

3 Property, plant and equipment

This item mainly relates to land and buildings. Capital expenditure in 2019 was € 0 million (2018: € 2 million), while the depreciation charge in 2019 was € 1 million (2018: € 2 million). The historical cost of Property, plant and equipment at 31 December 2019 was € 63 million (2018: € 63 million); accumulated depreciation amounted to € 51 million (2018: € 50 million).

4 Financial assets

	Subsidiaries		Associates and JVs				
	Share in equity	Loans	Share in equity	Loans	Other participating interests	Receivables	Total
Balance at 1 January 2018	**9,409**	**-**	**140**	**-**	**-**	**91**	**9,640**
Changes:							
- Share in profit	1,054	-	11	-	-	-	1,065
- Charged to income statement	-	-	-	-	-	(33)	(33)
- Dividend received	(198)	-	-	-	-	-	(198)
- Capital payments	49	-	-	-	-	-	49
- Net actuarial gains/(losses)	(66)	-	-	-	-	-	(66)
- Change in Fair value reserve	15	-	-	-	1	-	16
- Change in Hedging reserve	(38)	-	(2)	-	-	-	(40)
- Exchange differences	138	-	-	-	-	-	138
- Disposals	-	-	(144)	-	-	-	(144)
- Others	44	-	(5)	-	36	(22)	53
Balance at 31 December 2018	**10,407**	**-**	**-**	**-**	**37**	**36**	**10,480**
Changes:							
- Share in profit	800	-	-	-	-	-	800
- Charged to income statement	-	-	-	-	-	(9)	(9)
- Dividend received	(877)	-	-	-	-	-	(877)
- Capital payments	254	-	-	-	-	-	254
- Net actuarial gains/(losses)	(16)	-	-	-	-	-	(16)
- Change in Fair value reserve	(19)	-	-	-	(1)	-	(20)
- Change in Hedging reserve	21	-	-	-	-	-	21
- Exchange differences	129	-	-	-	-	-	129
- Other	(13)	-	-	-	-	(2)	(15)
Balance at 31 December 2019	**10,686**	**-**	**-**	**-**	**36**	**25**	**10,747**

For movements in 'Associates and joint arrangements', see Note 10 to the 'Consolidated financial statements'.

Disposals in 2018 relate to the divestment of DSM's share in DSM Sinochem Pharmaceuticals.

5 Deferred tax assets

This item mainly relates to net operating losses in the Dutch fiscal unity. In 2019, a tax income of € 23 million (2018: tax income of € 14 million) was included and other movements (mainly settlements with group companies and utilization of net operating losses) of -€ 34 million (2018: -€ 63 million).

6 Receivables

	2019	2018
Receivables from subsidiaries	94	94
Other receivables / deferred items	7	29
Total	**101**	**123**

7 Shareholders' equity

	2019	2018
Balance at 1 January	**7,782**	**6,962**
Net profit	758	1,077
Exchange differences, net of income tax	125	144
Net actuarial gains/(losses) on defined benefit obligations	(15)	(66)
Dividend	(414)	(365)
Repurchase of shares	(869)	(236)
Proceeds from reissue of ordinary shares	324	242
Other changes	40	24
Balance at 31 December	**7,731**	**7,782**

For details see the consolidated statement of changes in Note 16 'Equity'.

Legal reserve

In Shareholders' equity, an amount of € 162 million (2018: € 37 million) is included for Translation reserve, -€ 122 million (2018: -€ 166 million) for Hedging reserve, € 5 million (2018: € 21 million) for Fair value reserve and € 267 million (2018: € 253 million) for intangible assets related to product development projects. In addition, a legal reserve of € 116 million (2018: € 108 million) is recognized for profits that cannot be distributed and received in the Netherlands.

Profit appropriation

According to article 32 of the Articles of Association of Koninklijke DSM N.V. and with the approval of the Supervisory Board, every year the Managing Board determines the portion of the net profit to be appropriated to the reserves. For the year 2019, the net profit is € 758 million (2018: € 1,077 million) and the amount to be appropriated to the reserves has been established at € 333 million (2018: € 665 million). From the subsequent balance of the net profit of € 425 million (2018: € 412 million), dividend is first distributed on the cumulative preference shares B. At the end of 2019 no cumprefs B were in issue (same as for 2018). Subsequently, a 3.26% (2018: 3.26%) dividend is distributed on the cumulative preference shares A, based on a share price of € 5.29 (2018: € 5.29) per cumulative preference share A. For 2019, this distribution amounts to € 0.17 (2018: € 0.17) per share, which is € 8 million in total. An interim dividend of € 0.06 per cumulative preference share A having been paid in August 2019, the final dividend will then amount to € 0.11 per cumulative preference share A.

The profit remaining after distribution of these dividends on the cumulative preference shares A of € 750 million (2018: € 1,069 million) will be put at the disposal of the Annual General Meeting of Shareholders in accordance with the provisions of Article 32, section 5 of the Articles of Association.

The Managing Board proposes a dividend on ordinary shares outstanding for the year 2019 of € 2.40 (2018: € 2.30) per share. With an interim dividend of € 0.77 (2018: € 0.77) per ordinary share having been paid in August 2019, the final dividend would then amount to € 1.63 (2018: € 1.53) per ordinary share.

If the Annual General Meeting of Shareholders makes a decision in accordance with the proposal, the net profit will be appropriated as follows:

Profit appropriation

	2019	2018
Net profit	758	1,077
Profit appropriation:		
- To be added to the reserves	333	665
- Dividend on cumprefs A	8	8
- Interim dividend on ordinary shares	136	135
- Final dividend distributable on ordinary shares	281	269

8 Borrowings

	2019		2018	
	Total	Of which current	Total	Of which current
Debenture loans	2,244	-	2,543	300
Total	**2,244**	**-**	**2,543**	**300**

At 31 December 2019, there were four debenture loans (€ 2,244 million, maturing in 2022 and from 2024 through 2026).

The repayment schedule for borrowings (excluding commercial paper) is as follows:

Borrowings by maturity

	2019	2018
2019	-	300
2020	-	-
2021	-	-
2022 and 2023	499	500
2024 through 2026	1,745	1,743
Total	**2,244**	**2,543**

In agreements governing loans with a residual amount at year-end 2019 of € 2,244 million (31 December 2018: € 2,543 million, of which € 300 million was of a current nature), clauses have been included which restrict the provision of security. More information on borrowings is provided in Note 19 to the 'Consolidated financial statements'.

9 Other current liabilities

	2019	2018
Liabilities to subsidiaries	1,333	732
Other liabilities	45	61
Total	**1,378**	**793**

10 Contingent liabilities

Guarantee obligations on behalf of affiliated companies and third parties amounted to € 502 million (31 December 2018: € 462 million). Koninklijke DSM N.V. has declared in writing that it accepts several liabilities for debts arising from acts in law of a number of consolidated companies (including relating to the fiscal unity for income tax and VAT). These debts are included in the consolidated balance sheet.

11 Personnel

The average number of employees working for Koninklijke DSM N.V. in 2019 was 330 (2018: 350), all of whom are based in the Netherlands.

12 Financial income and expense

Financial expense of € 79 million (2018: net € 76 million) mainly consists of the interest costs on bonds issued and the counterpart of the net investment hedge. See also Note 19 and Note 23 to the 'Consolidated financial statements'.

13 Remuneration of Managing Board and Supervisory Board

Disclosure of the total board remuneration is based on section 383 book 2 of the Dutch Civil Code. Furthermore, the members of the Executive Committee (which includes the Managing Board) and the Supervisory Board meet the definition of key management personnel as defined in IAS 24 'Related Parties'. IAS 24 requires disclosure of the total of short-term employee benefits (salary and short-term incentive), post-employment (pension expenditure) and other long-term benefits (none), termination benefits and share based payment cost (Share-based compensation), which are reported in the table below:

Key management personnel compensation and total board remuneration

x € thousand	**2019**	2018
Salary	4,695	4,215
Short-term incentive	2,565	3,387
Pension Expenditure	982	869
Share-based compensation	6,494	4,799
Supervisory Board remuneration	826	696
Other[1]	2,022	1,393
Total key management personnel compensation	17,584	15,359
Of which: Managing Board remuneration	7,705	7,836

1 Includes € 1,265,000 (2018: € 727,000), subject to article 32bb of the Dutch Wage Tax Act, being in fact a penalty to the company due to vesting of already granted share units in previous years.

Heerlen, 26 February 2020

Managing Board,

Geraldine Matchett, Co-CEO
Dimitri de Vreeze, Co-CEO

Heerlen, 26 February 2020

Supervisory Board,

Rob Routs, Chair
Pauline van der Meer Mohr, Deputy Chair
Victoria Haynes
Eileen Kennedy
Erica Mann
Frits van Paasschen
Pradeep Pant
John Ramsay

Other information

Independent auditor's report

To: the Annual General Meeting of Shareholders and the Supervisory Board of Koninklijke DSM N.V.

Report on the audit of the financial statements 2019 included in the Integrated Annual Report

Our opinion

In our opinion:

- the accompanying consolidated financial statements give a true and fair view of the financial position of Koninklijke DSM N.V. (hereafter: Royal DSM) as at 31 December 2019 and of its result and its cash flows for the year then ended, in accordance with International Financial Reporting Standards as adopted by the European Union (EU-IFRS) and with Part 9 of Book 2 of the Dutch Civil Code
- the accompanying parent company financial statements give a true and fair view of the financial position of Royal DSM as at 31 December 2019 and of its result for the year then ended in accordance with Part 9 of Book 2 of the Dutch Civil Code

What we have audited

We have audited the financial statements 2019 of Royal DSM based in Heerlen. The financial statements include the consolidated financial statements and the parent company financial statements.

The consolidated financial statements comprise:

1. the consolidated balance sheet as at 31 December 2019
2. the following consolidated statements for 2019: the income statement, the statements of comprehensive income, changes in equity and cash flows
3. the notes comprising a summary of the significant accounting policies and other explanatory information

The parent company financial statements comprise:

1. the parent company balance sheet as at 31 December 2019
2. the parent company income statement for 2019
3. the notes comprising a summary of the accounting policies and other explanatory information

Basis for our opinion

We conducted our audit in accordance with Dutch law, including the Dutch Standards on Auditing. Our responsibilities under those standards are further described in the 'Our responsibilities for the audit of the financial statements' section of our report.

We are independent of Royal DSM in accordance with the 'Verordening inzake de onafhankelijkheid van accountants bij assurance-opdrachten' (ViO, Code of Ethics for Professional Accountants, a regulation with respect to independence) and other relevant independence regulations in the Netherlands. Furthermore, we have complied with the 'Verordening gedrags- en beroepsregels accountants' (VGBA, Dutch Code of Ethics).

We believe the audit evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Audit approach

Summary

Materiality
- Materiality of € 45 million
- 4.6% of profit before tax, excluding APM adjustments as identified by management of Royal DSM

Group audit
- Audit at (business) group and local entity level resulting in a coverage of 73% of total net sales and 76% of total assets

Key audit matters
- Valuation of goodwill
- Accounting for acquisitions of subsidiaries

Opinion
- Unqualified

Materiality

Based on our professional judgement we determined the materiality for the financial statements as a whole at € 45 million (2018: € 40 million). The materiality is determined with reference to profit before tax, excluding APM adjustments as identified by management of Royal DSM, resulting in a percentage of 4.6% (2018: 3.2%). In addition, the appropriateness of the materiality was assessed by comparing the amount to consolidated net sales of which it represents 0.5% (2018: 0.4%). We have also taken into account misstatements and/or possible misstatements that in our opinion are material for the users of the financial statements for qualitative reasons.

We agreed with the Supervisory Board that misstatements in excess of € 2 million (2018: € 1.5 million) which are identified during the audit, would be reported to them, as well as smaller misstatements that in our view must be reported on qualitative grounds.

Scope of the group audit

Royal DSM is at the head of a group of reporting entities (hereafter: entities). The financial information of this group is included in the financial statements of Royal DSM.

Because we are ultimately responsible for the auditor's report, we are also responsible for directing, supervising and performing the group audit. In this respect we have determined the nature and extent of the audit procedures to be carried out for entities reporting for group audit purposes. Decisive were the size and/or the risk profile of the entities or operations. On this basis, we selected 22 entities (2018: 22 entities) to perform audits for group reporting purposes on a complete set of financial information. In addition, we selected 14 entities (2018: 17 entities) to perform specified audit procedures for group reporting purposes on specific items of financial information.

This resulted in a coverage of 73% (2018: 73%) of total net sales and 76% (2018: 80%) of total assets. The remaining 27% of total net sales (2018: 27%) and 24% of total assets (2018: 20%) is represented by a significant number of entities ('remaining entities'), none of which individually represents more than 2% of total net sales and 2% of total assets.

For these remaining entities, we performed among others analytical procedures at (business) group level to validate our assessment that there are no risks of material misstatement within these entities.

Our procedures as described above can be summarized as follows:

Total assets

65%	11%	24%
Full scope audits	Specified audit procedures	Central procedures remaining entities

Total net sales

54%	19%	27%
Full scope audits	Specified audit procedures	Central procedures remaining entities

We have:
- performed audit procedures ourselves at (business) group level in respect of areas such as the annual goodwill impairment tests, other asset impairment assessments, accounting for associates and joint ventures including acquisitions and divestments, valuation of deferred tax assets, acquisitions of subsidiaries, restructuring provisions, treasury and shared service centers
- used the work of local KPMG auditors when auditing financial information or performing specified audit procedures at business group and local entity level

The group audit team has set materiality levels for the entities, which ranged from € 5 million to € 12.5 million (2018: € 5 million to € 12.5 million), based on the mix of size and risk profile of the entities within the group.

The group audit team provided detailed instructions to all business group and local entity auditors part of the group audit, covering the significant audit areas, including the relevant risks of material misstatement, and the information required to be reported back to the group audit team. The group audit team visited local entity auditors and entity locations in the United States of America, Switzerland, China, United Kingdom and the shared service center in India.

Telephone conferences were held with all local entity auditors part of the group audit. During these visits and telephone conferences, we discussed the audit approach and the audit findings and observations reported to the group audit team. For a number of these entities we also performed audit file reviews.

By performing the procedures mentioned above, together with additional procedures at (business) group level, we have been able to obtain sufficient and appropriate audit evidence about the group's financial information to provide an opinion about the financial statements.

Audit scope in relation to fraud

In accordance with the Dutch standards on auditing we are responsible for obtaining a high (but not absolute) level of assurance that the financial statements taken as a whole are free from material misstatement, whether caused by fraud or error.

As part of our risk assessment process we have evaluated events or conditions that indicate an incentive or pressure to commit fraud or provide an opportunity to commit fraud ('fraud risk factors') to determine whether fraud risks are relevant to our audit. During this risk assessment we made use of our own forensic specialist.

We communicated identified fraud risks within our team and remained alert to any indications of fraud throughout the audit. This included communication from the group to local entity audit teams of relevant fraud risks identified at group level.

In accordance with the auditing standard we evaluated the fraud risks that are relevant to our audit:

- fraud risk in relation to revenue recognition, specifically being the risk of manual override with respect to the cut-off of revenue in the period close to the financial year-end (the presumed risk)
- fraud risk in relation to management override of controls to meet targets and/or expectations (the presumed risk)

Our audit procedures included an evaluation of the design and implementation of internal controls relevant to mitigate these fraud risks and supplementary substantive audit procedures. This included inquiries of management, detailed testing of high risk journal entries and an evaluation of key estimates and judgment by management, such as estimates relating to goodwill impairment testing and accounting for the acquisition of subsidiaries. Furthermore, in relation to the correct recognition of revenues for the period close to the financial year-end, we carried out inspection and testing of documentation such as agreements with customers and shipping documents.

In determining the audit procedures we made use of the evaluation of management of Royal DSM in relation to fraud risk management (prevention, detection and response), including the set-up of ethical standards to create a culture of honesty.

As part of our evaluation of any instances of fraud, we inspected the incident register/whistle blowing reports and follow up by management.

We communicated our risk assessment and audit response to the Managing Board and the Supervisory Board. Our audit procedures differ from a specific forensic fraud investigation, which investigation often has a more in-depth character.

Our audit is based on the procedures described in line with applicable auditing standards and are not primarily designed to detect fraud.

Audit scope in relation to non-compliance with laws and regulations

We have made an assessment of laws and regulations that are relevant to Royal DSM. In this assessment we made use of our own forensic specialist.

We identified laws and regulations that could reasonably be expected to have a material effect on the financial statements based on our general understanding and sector experience, through discussion with relevant management and evaluating Royal DSM's policies and procedures regarding compliance with laws and regulations.

We communicated identified laws and regulations within our team and remained alert to any indications of non-compliance throughout the audit. This included communication from the group audit team to local entity audit teams of relevant laws and regulations identified at group level.

The potential effect of these laws and regulations on the financial statements varies considerably:

- Firstly, Royal DSM is subject to laws and regulations that directly affect the financial statements, in particular corporate income taxation and financial reporting (including related Company legislation). We assessed the extent of compliance with these laws and regulations as part of our procedures on the related financial statement items
- Secondly, Royal DSM is subject to many other laws and regulations where the consequences of non-compliance could have an indirect material effect on amounts recognized or disclosures provided in the financial statements, or both, for instance through the imposition of fines or litigation

Based on Royal DSM's nature of operations and their geographical spread, the areas that we identified as those most likely having such an indirect effect include laws and regulations regarding employment, health and safety, products, environmental and anti-competition.

Auditing standards limit the required audit procedures to identify non-compliance with laws and regulations that have an indirect effect to inquiring of relevant management and inspection of regulatory and legal correspondence, if any. Through these procedures, we did not identify any additional actual or suspected non-compliance other than those already identified by Royal DSM in each of the above areas. We considered the effect of actual or suspected non-compliance as part of our procedures with respect to provisions and disclosures of contingent liabilities.

Our audit is not primarily designed to detect non-compliance with laws and regulations and note that management is responsible for such internal control as management determines is necessary to enable the preparation of the financial statements that are free from material misstatement, whether due to fraud or error, including compliance with laws and regulations.

The more non-compliance with indirect laws and regulations (irregularities) is distant from the events and transactions reflected in the financial statements, the less likely the inherently limited procedures required by auditing standards would identify such instances. In addition, as with any audit, there remained a higher risk of non-detection of irregularities, as these may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal controls.

Our key audit matters

Key audit matters are those matters that, in our professional judgement, were of most significance in our audit of the financial statements. We have communicated the key audit matters to the Managing Board and the Supervisory Board. The key audit matters are not a comprehensive reflection of all matters discussed.

These matters were addressed in the context of our audit of the financial statements as a whole and in forming our opinion thereon, and we do not provide a separate opinion on these matters.

Compared to last year we have added as a key audit matter the accounting for acquisitions of subsidiaries as the acquisitions closed in 2019 on an accumulated basis are significant for the financial statements. Last year's key audit matter about the divestment of DSM Sinochem Pharmaceuticals is not included anymore in 2019, given the one-off nature of the divestment.

Valuation of goodwill

Description

Royal DSM carries a significant amount of goodwill in the balance sheet. In accordance with the group's accounting policies Royal DSM is required to test the amount of goodwill for impairment at least annually. The impairment tests were significant to our audit due to the complexity of the assessment process and judgments and assumptions involved which are affected by expected future market and economic developments.

Our response

We evaluated the design and implementation of controls with respect to Royal DSM's impairment testing process. We challenged the cash flow projections included in the annual goodwill impairment tests. Our audit procedures included, among others, the involvement of a valuation specialist to assist us in evaluating the assumptions, in particular the terminal growth and pre-tax discount rates, and the valuation methodology used by Royal DSM. We furthermore assessed the appropriateness of other data used, by comparing them to external and historical data, such as external market growth expectations and by analysing sensitivities in Royal DSM's valuation model. We specifically focused on the sensitivity in the available headroom for the cash generating units. By doing so, we assessed management's evaluation whether a reasonably possible change in key assumptions could cause the carrying amount to exceed its recoverable amount. Furthermore, we assessed the historical accuracy of management's estimates. Finally, we assessed the adequacy of the disclosure (Note 8) to the financial statements.

Our observation

We consider management's key assumptions and estimates to be within the acceptable range and we assessed the disclosure (Note 8) to the financial statements as being proportionate.

Accounting for acquisitions of subsidiaries

Description

During 2019, Royal DSM closed multiple acquisitions of subsidiaries, of which Andre Pectin was the most significant acquisition. The acquisitions involved a total consideration of EUR 585 million. These acquisitions had an aggregated impact on Goodwill and Intangible assets of EUR 338 million and EUR 125 million respectively. The acquisitions were significant to our audit due to the complexity of purchase price accounting and related judgments and assumptions such as the fair values of assets and liabilities acquired.

Our response

We inspected the agreements and other documents underlying the acquisitions to gain an understanding of the contractual terms and conditions to assess the consideration and the acquired identifiable assets and liabilities. We obtained the reports from the external valuation experts engaged by Royal DSM to assist management with the purchase price accounting and the identification of identifiable assets and liabilities in the respective business combinations. We involved a valuation specialist ourselves to evaluate management's valuation methodologies, and assumptions used such as growth rates and discount rates to arrive at the fair value of assets and liabilities recognised in the purchase price allocation. Our assessment of key assumptions used by management included a comparison with available external data. We also evaluated the adequacy of the disclosure (Note 3) of the acquisitions in the financial statements.

Our observation

We consider that the acquisitions are appropriately reflected in the financial statements. Management's key assumptions and estimates are within the acceptable range and we assessed the disclosure (Note 3) to the financial statements as being proportionate.

Report on the other information included in the Integrated Annual Report

In addition to the financial statements and our auditor's report thereon, the Integrated Annual Report contains other information.

Based on the following procedures performed, we conclude that the other information:

- is consistent with the financial statements and does not contain material misstatements
- contains the information as required by Part 9 of Book 2 of the Dutch Civil Code.

We have read the other information. Based on our knowledge and understanding obtained through our audit of the financial statements or otherwise, we have considered whether the other information contains material misstatements.

By performing these procedures, we comply with the requirements of Part 9 of Book 2 of the Dutch Civil Code and the Dutch Standard 720. The scope of the procedures performed is substantially less than the scope of those performed in our audit of the financial statements.

The Managing Board is responsible for the preparation of the other information, including the information as required by Part 9 of Book 2 of the Dutch Civil Code.

Report on other legal and regulatory requirements

Engagement

We were engaged by the Annual General Meeting of Shareholders as auditor of Royal DSM on 7 May 2014, as of the audit for the year 2015 and have operated as statutory auditor ever since that financial year.

No prohibited non-audit services

We have not provided prohibited non-audit services as referred to in Article 5(1) of the EU Regulation on specific requirements regarding statutory audits of public-interest entities.

Description of responsibilities regarding the financial statements

Responsibilities of the Managing Board and the Supervisory Board for the financial statements

The Managing Board is responsible for the preparation and fair presentation of the financial statements in accordance with EU-IFRS and Part 9 of Book 2 of the Dutch Civil Code. Furthermore, the Managing Board is responsible for such internal control as the Managing Board determines is necessary to enable the preparation of the financial statements that are free from material misstatement, whether due to fraud or error.

As part of the preparation of the financial statements, the Managing Board is responsible for assessing Royal DSM's ability to continue as a going concern. Based on the financial reporting frameworks mentioned, the Managing Board should prepare the financial statements using the going concern basis of accounting unless the Managing Board either intends to liquidate the Company or to cease operations, or has no realistic alternative but to do so. The Managing Board should disclose events and circumstances that may cast significant doubt on the Royal DSM's ability to continue as a going concern in the financial statements.

The Supervisory Board is responsible for overseeing Royal DSM's financial reporting process.

Our responsibilities for the audit of the financial statements

Our objective is to plan and perform the audit engagement in a manner that allows us to obtain sufficient and appropriate audit evidence for our opinion.

Our audit has been performed with a high, but not absolute, level of assurance, which means we may not detect all material errors and fraud during our audit.

Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements. The materiality affects the nature, timing and extent of our audit procedures and the evaluation of the effect of identified misstatements on our opinion.

A further description of our responsibilities for the audit of the financial statements is included in the appendix to this auditor's report. This description forms part of our auditor's report.

Amstelveen, 26 February 2020

KPMG Accountants N.V.

E.H.W. Weusten RA

Appendix: Description of our responsibilities for the audit of the financial statements

We have exercised professional judgement and have maintained professional scepticism throughout the audit, in accordance with Dutch Standards on Auditing, ethical requirements and independence requirements. Our audit included among others:

- identifying and assessing the risks of material misstatement of the financial statements, whether due to fraud or error, designing and performing audit procedures responsive to those risks, and obtaining audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than the risk resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control
- obtaining an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of Royal DSM's internal control
- evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by the Managing Board
- concluding on the appropriateness of the Managing Board's use of the going concern basis of accounting, and based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on Royal DSM's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause a Company to cease to continue as a going concern
- evaluating the overall presentation, structure and content of the financial statements, including the disclosures
- evaluating whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation

We are solely responsible for the opinion and therefore responsible to obtain sufficient appropriate audit evidence regarding the financial information of the entities or business activities within the group to express an opinion on the financial statements. In this respect we are also responsible for directing, supervising and performing the group audit.

We communicate with the Supervisory Board regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant findings in internal control that we identify during our audit. In this respect we also submit an additional report to the Supervisory Board in accordance with Article 11 of the EU Regulation on specific requirements regarding statutory audits of public-interest entities. The information included in this additional report is consistent with our audit opinion in this auditor's report.

We provide the Supervisory Board with a statement that we have complied with relevant ethical requirements regarding independence, and to communicate with them all relationships and other matters that may reasonably be thought to bear on our independence, and where applicable, related safeguards.

From the matters communicated with the Supervisory Board, we determine the key audit matters: those matters that were of most significance in the audit of the financial statements. We describe these matters in our auditor's report unless law or regulation precludes public disclosure about the matter or when, in extremely rare circumstances, not communicating the matter is in the public interest.

Assurance report of the independent auditor

To: the Annual General Meeting of Shareholders and the Supervisory Board of Koninklijke DSM N.V.

Report on the audit of the sustainability information 2019 included in the Integrated Annual Report

Our opinion

We have audited the sustainability information in the sections 'Introduction letter', 'DSM and the Sustainable Development Goals', 'Report by the Managing Board', consisting of the chapters Purpose, Strategy 2021, How we create value for our stakeholders, Stakeholders, People, Planet, and the 'Sustainability Statements', as included in the Integrated Annual Report for the year 2019 (hereafter the 'Sustainability Information') of Koninklijke DSM N.V. (hereafter 'Royal DSM'), based in Heerlen, Netherlands.

In our opinion, the Sustainability Information is prepared, in all material respects, in accordance with the GRI Sustainability Reporting Standards and Royal DSM's internally developed supplemental reporting criteria as disclosed in the section 'Non-financial reporting policy' on page 104 of the Integrated Annual Report.

Basis for our opinion

We performed our audit on the Sustainability Information in accordance with Dutch law, including Dutch Standard 3810N 'Assurance-opdrachten inzake maatschappelijke verslagen' (Assurance engagements relating to sustainability reports), which is a specified Dutch standard that is based on the International Standard on Assurance Engagements (ISAE) 3000 'Assurance Engagements Other than Audits or Reviews of Historical Financial Information'. This engagement is aimed to obtain reasonable assurance. Our responsibilities in this regard are further described in the 'Our responsibilities for the audit of the Sustainability Information' section of our report.

We are independent of Royal DSM in accordance with the 'Verordening inzake de onafhankelijkheid van accountants bij assurance-opdrachten' (ViO, Code of Ethics for Professional Accountants, a regulation with respect to independence). Furthermore, we have complied with the 'Verordening gedrags- en beroepsregels accountants' (VGBA, Dutch Code of Ethics).

We believe the evidence we have obtained is sufficient and appropriate to provide a basis for our opinion.

Applicable criteria

The Sustainability Information needs to be read and understood together with the reporting criteria. Royal DSM is solely responsible for selecting and applying these reporting criteria, taking into account applicable law and regulations related to reporting.

The reporting criteria used for the preparation of the Sustainability Information are the GRI Sustainability Reporting Standards and Royal DSM's internally developed supplemental reporting criteria as disclosed in the section 'Non-financial reporting policy' on page 104 of the Integrated Annual Report.

The GRI Sustainability Reporting Standards are the most widely adopted global standards for sustainability reporting and are used by Royal DSM for reporting publicly on its economic, environmental and social sustainability indicators.

Scope of the group audit

Royal DSM is the parent company of a group of reporting entities (hereafter: 'entities'). The Sustainability Information incorporates the consolidated information of this group of entities.

Our group audit procedures consisted of audit procedures at corporate, business group and at local entity level. Our selection of entities in scope of our assurance procedures is primarily based on the local entity's individual contribution to the consolidated Sustainability Information. Furthermore, our selection of entities considered relevant reporting risks and geographical spread.

By performing our procedures at corporate, business group and local entity level, we have been able to obtain sufficient and appropriate assurance evidence about Royal DSM's reported Sustainability Information to provide an opinion about the Sustainability Information.

Our key assurance matter

Key assurance matters of our audit are those matters that, in our professional judgment, were of most significance in our audit of the Sustainability Information. We have communicated the key assurance matter to the Managing Board and the Supervisory Board. The key assurance matter is not a comprehensive reflection of all matters discussed.

This assurance matter was addressed in the context of our audit of the Sustainability Information as a whole, and we do not provide a separate opinion on this matter.

The sustainability indicator on DSM's solutions labelled as Brighter Living Solutions was determined to be a key assurance matter as the assessment is inherently subject to assumptions and management judgement, whereas the determination of other important sustainability indicators on Safety, Health and Environment and Human Resources do require such judgement to a lesser extent.

Brighter Living Solutions

Description

Royal DSM reports on Brighter Living Solutions ("BLS") which are products and services that have specific environmental or social benefits compared to mainstream reference solutions. The KPI is defined as net sales from BLS as a percentage of total net sales of Royal DSM. BLS was significant to our audit since we identified that it serves as a material indicator for Royal DSM to report on the environmental and social impact of its solutions and because the assessment of solutions to qualify as BLS is inherently subject to assumptions and judgement.

Our response

We evaluated the reporting process, internal controls and the applicable definitions and criteria. We interviewed Royal DSM's staff members to understand the application of these definitions and criteria and we challenged the underlying evidence, such as the life cycle assessments and expert opinions for solutions classified as BLS and assessed the calculation of the BLS percentage. Finally, we assessed whether the criteria, assumptions and definitions are sufficiently explained in the Integrated Annual Report and on the website of Royal DSM.

Our observation

We consider that the definitions and criteria for BLS as described in Royal DSM's internally developed supplemental reporting criteria on page 105 are applied and that the assumptions are adequately explained. We also consider the disclosure on BLS as being proportionate.

Limitations to the scope of our audit

The Sustainability Information includes prospective information such as ambitions, strategy, plans, expectations and estimates. Inherently the actual future results are uncertain. We do not provide any assurance on the assumptions and achievability of prospective information included in the aforementioned sections of Royal DSM's Integrated Annual Report.

Responsibilities of the Managing Board and the Supervisory Board for the Sustainability Information

The Managing Board of Royal DSM is responsible for the preparation of the Sustainability Information in accordance with the GRI Sustainability Reporting Standards and Royal DSM's internally developed supplemental reporting criteria as disclosed in the section 'Non-financial reporting policy' on page 104 of the Integrated Annual Report, including the identification of stakeholders and the definition of material matters. The choices made by the Managing Board regarding the scope of the Sustainability Information and the reporting policy are summarized in the section 'Non-financial reporting policy' of the Integrated Annual Report.

Furthermore, the Managing Board is responsible for such internal control as it determines is necessary to enable the preparation of the Sustainability Information that is free from material misstatements, whether due to fraud or error.

The Supervisory Board is, among other things, responsible for overseeing Royal DSM's sustainability reporting process.

Our responsibilities for the audit of the Sustainability Information

Our responsibility is to plan and perform our assurance engagement in a manner that allows us to obtain sufficient and appropriate assurance evidence for our opinion.

Our audit has been performed with a high, but not absolute, level of assurance, which means we may not have detected all material misstatements due to fraud or error.

Misstatements can arise from fraud or errors and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the decisions of users taken on the basis of the Sustainability Information. The materiality affects the nature, timing and extent of our audit procedures and the evaluation of the effect of identified misstatements on our opinion.

We apply the 'Nadere Voorschriften Kwaliteitssystemen' (Regulations on Quality management systems) and accordingly maintain a comprehensive system of quality control including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

We have exercised professional judgement and have maintained professional skepticism throughout the audit, in accordance with the Dutch Standard 3810N, ethical requirements and independence requirements.

Our audit engagement included among others:

- Performing an analysis of the external environment and obtaining an understanding of relevant social themes and issues, and the characteristics of Royal DSM
- Evaluating the appropriateness of the reporting criteria used, their consistent application and related disclosures in the Sustainability Information. This includes the evaluation of the results of the stakeholders' dialogue and the reasonableness of estimates made by management of Royal DSM
- Obtaining an understanding of the systems and processes for collecting, reporting and consolidating the Sustainability Information, including obtaining an understanding of internal control relevant to our audit, but not for the purpose of expressing an opinion on the effectiveness of Royal DSM's internal control
- Evaluating the procedures performed by the internal audit department
- Identifying and assessing the risks if the Sustainability Information is misleading or unbalanced, or contains material misstatements, whether due to errors or fraud. Designing and performing further audit procedures responsive to those risks, and obtaining audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk that the Sustainability Information is misleading or unbalanced, or the risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from errors. Fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control. These further procedures include among others:
  - Interviewing management and relevant staff of Royal DSM at corporate, business group and local entity level responsible for the sustainability strategy, policy and results
  - Interviewing relevant staff of Royal DSM responsible for providing the information for, carrying out internal control procedures on, and consolidating the data in the Sustainability Information;
  - Determining the nature and extent of the audit procedures at corporate, business group and local entity level. For this, the nature, extent and/or risk profile of these local entities are decisive. Based thereon we selected the local entities to visit. The visits and remote reviews to eight production sites in six countries were aimed at, on a local level, validating source data and evaluating the design, implementation and operation of controls and validation procedures
  - Obtaining assurance information that the Sustainability Information reconciles with underlying records of Royal DSM
  - Evaluating relevant internal and external documentation, on a test basis, to determine the reliability of the information in the Sustainability Information
  - Performing an analytical review of the data and trends
- Reconciling the relevant financial information with the financial statements
- Evaluating the consistency of the Sustainability Information with the information in the Integrated Annual Report which is not included in the scope of our audit
- Evaluating the overall presentation, structure and content of the Sustainability Information
- To consider whether the Sustainability Information as a whole, including the disclosures, reflects the purpose of the reporting criteria used

We communicate with the Supervisory Board regarding, among other matters, the planned scope and timing of the audit and significant findings, including any significant findings in internal control that we identify during our audit.

Amstelveen, 26 February 2020

KPMG Accountants N.V.

E.H.W. Weusten RA

Special statutory rights

DSM Preference Shares Foundation

The DSM Preference Shares Foundation was established in 1989.

By virtue of DSM's Articles of Association, 375,000,000 cumulative preference shares B can be issued. The listing prospectus of 1989 stated that if, without the approval of the Managing Board and Supervisory Board, either a bid is made for the ordinary shares or a significant participation in ordinary shares is built up, or such an event is likely to occur, then these preference shares B may be issued, which shall have the same voting rights as the ordinary shares.

Under an agreement entered into in 1999, and subsequently amended, between the DSM Preference Shares Foundation and DSM, the Foundation has the right to acquire such preference shares (call option) to a maximum corresponding to 100% of the capital issued in any form other than preference shares B, less one.

The objective of the Foundation is to promote the interest of DSM, and the enterprise maintained by DSM and all parties connected therewith, whereby influences that would threaten the continuity, independence or identity, contrary to the aforementioned interests, are resisted to the maximum extent possible.

The purpose of the agreement with the Foundation is, among other things, for the Foundation to allow DSM the opportunity to determine its position, for example with regard to a possible bidder for DSM shares or a party or parties tempting to obtain (de facto) control, to examine any plans in detail and, to the extent applicable, to look for (better) alternatives. Preference shares B will not be outstanding longer than necessary. As soon as there are no longer any reasons for the preference shares B to remain outstanding, the Managing Board will convene a General Meeting of Shareholders and recommend the cancellation of the preference shares B that are still outstanding.

The Foundation acquired no preference shares B in 2019.

The DSM Preference Shares Foundation is an independent legal entity within the meaning of article 5:71, first paragraph, under c of the Dutch Act on Financial Supervision *(Wet op het financieel toezicht)*.

On 31 December 2019, the board of the Foundation was composed as follows:

Gerard Kleisterlee, Chair
Cees Maas, Deputy Chair
Bas Kortmann

Important dates

Annual General Meeting of Shareholders

The Annual General Meeting of Shareholders is to be held at the DSM head office in Heerlen (Netherlands) on Friday, 8 May 2020 at 14:00 hours CET.

Important dates

Publication of first-quarter results	Thursday, 7 May 2020
Ex-dividend quotation	Tuesday, 12 May 2020
Publication of second-quarter results	Tuesday, 4 August 2020
Publication of third-quarter results	Tuesday, 3 November 2020

DSM figures: five-year summary

Balance sheet

x € million	**2019**	2018	2017	2016	2015
Assets					
Intangible assets	3,515	3,090	3,058	3,188	3,228
Property, plant and equipment	4,040	3,511	3,313	3,325	3,171
Deferred tax assets	217	248	281	355	366
Share in associates and joint ventures	155	205	227	586	644
Financial derivatives	27	14	16	-	32
Other financial assets	265	263	475	463	419
Non-current assets	**8,219**	**7,331**	**7,370**	**7,917**	**7,860**
Inventories	2,019	1,993	1,848	1,800	1,627
Current receivables	1,698	1,738	1,690	1,653	1,556
Financial derivatives	19	21	41	40	15
Current investments	688	1,277	954	944	9
Cash and cash equivalents	800	1,281	899	604	665
	5,224	6,310	5,432	5,041	3,872
Assets held for sale	-	-	-	-	11
Current assets	**5,224**	**6,310**	**5,432**	**5,041**	**3,883**
Total assets	**13,443**	**13,641**	**12,802**	**12,958**	**11,743**
Equity and liabilities					
Shareholders' equity	7,731	7,782	6,962	6,072	5,541
Non-controlling interests	104	33	103	108	90
Equity	**7,835**	**7,815**	**7,065**	**6,180**	**5,631**
Deferred tax liabilities	296	254	259	278	319
Employee benefit liabilities	413	413	356	490	496
Provisions	120	116	151	128	98
Borrowings	2,464	2,272	2,551	2,552	2,557
Financial derivatives	7	3	4	14	182
Other non-current liabilities	145	197	188	158	228
Non-current liabilities	**3,445**	**3,255**	**3,509**	**3,620**	**3,880**
Employee benefit liabilities	43	46	39	40	44
Provisions	48	37	53	54	41
Borrowings	189	380	77	853	253
Financial derivatives	18	51	20	239	50
Current liabilities	1,865	2,057	2,039	1,972	1,842
	2,163	2,571	2,228	3,158	2,230
Liabilities held for sale	-	-	-	-	2
Current liabilities	**2,163**	**2,571**	**2,228**	**3,158**	**2,232**
Total equity and liabilities	**13,443**	**13,641**	**12,802**	**12,958**	**11,743**

Income statement

x € million	**2019**	2018	2017	2016	2015
Net sales underlying business[1]	9,010	8,852	8,632	7,920	7,722
Net sales	9,010	9,267	8,632	7,920	8,935
Adjusted EBITDA underlying business[1]	1,684	1,532	1,445	1,262	1,075
Adjusted EBITDA[2]	1,684	1,822	1,445	1,262	1,170
EBITDA	1,586	1,754	1,348	1,146	1,046
Adjusted operating profit (EBIT) underlying business[1]	1,075	1,055	957	791	573
Adjusted operating profit (EBIT)[2]	1,075	1,345	957	791	650
Operating profit (EBIT)	954	1,245	846	657	304
Financial income and expense	(92)	(101)	(104)	(133)	(174)
Income tax expense	(152)	(194)	(115)	(89)	(68)
Share of the profit of associates and joint ventures	54	129	1,154	194	30
Profit for the year	**764**	**1,079**	**1,781**	**629**	**92**
Profit attributable to non-controlling interests	6	2	12	8	4
Net profit attributable to equity holders of Koninklijke DSM N.V.	**758**	**1,077**	**1,769**	**621**	**88**
Dividend on cumulative preference shares	(8)	(8)	(8)	(4)	(10)
Net profit available to holders of ordinary shares	**750**	**1,069**	**1,761**	**617**	**78**
Key figures and financial ratios					
Capital employed	9,311	8,181	7,766	7,889	7,553
Capital expenditure:					
- Intangible assets and Property, plant and equipment	623	653	586	485	570
- Acquisitions	585	50	264	16	106
Disposals	44	335	1,546	87	307
Depreciation, amortization and impairments	632	509	502	489	742
Net debt	(1,144)	(113)	(742)	(2,070)	(2,321)
Dividend	425	412	331	310	297
Workforce at 31 December, headcount	22,174	20,977	21,054	20,786	20,796
Employee benefit costs (x € million)	1,811	1,753	1,768	1,752	1,778
Financial ratios[2]					
- ROCE in % underlying business[1]	12.0	13.3	12.3	10.4	7.6
- ROCE in %	12.0	16.8	12.3	10.4	8.2
- Net sales underlying business / average capital employed[1]	1.01	1.11	1.11	1.04	1.03
- Current assets / current liabilities	2.42	2.45	2.44	1.58	1.62
- Equity / total assets	0.58	0.57	0.55	0.48	0.48
- Gearing (net debt / equity plus net debt)	0.13	0.01	0.10	0.25	0.29
- Adjusted EBIT underlying business / net sales in % underlying business[1]	11.9	11.9	11.1	10.0	7.4
- Net profit / average Shareholders' equity available to holders of ordinary shares in %	10.0	24.7	28.0	11.1	1.4
- Adjusted EBITDA underlying business / Financial income and expense[1]	18.3	15.2	13.9	9.5	7.2

1 Continuing operations, excluding temporary vitamin effect 2018, see table in 'Key business figures at a glance' on page 65.
2 In presenting and discussing DSM's financial position, operating results and cash flows, DSM uses certain Alternative performance measures (APMs) not defined by IFRS. These APMs are used because they are an important measure of DSM's business development and DSM's management performance. A full reconciliation of IFRS performance measures to the APMs is given in the 'Alternative performance measures' on page 178.

Information about ordinary DSM shares

per ordinary share in €	**2019**	2018	2017	2016	2015
Adjusted Net profit	4.64	5.84	3.92	2.90	2.14
Net profit	4.27	6.10	10.07	3.52	0.45
Operating cash flow	7.84	7.89	5.65	5.79	3.93
Dividend:	2.40	2.30	1.85	1.75	1.65
- Interim dividend	0.77	0.77	0.58	0.55	0.55
- Final dividend	1.63	1.53	1.27	1.20	1.10
Pay-out including dividend on cumulative preference shares as % of Adjusted net profit	52	40	48	61	71
Dividend yield (dividend as % of average price of an ordinary DSM share)	2.3	2.7	2.8	3.3	3.5
Share prices on Euronext Amsterdam (closing price):					
- Highest price	117.90	92.98	81.66	64.18	55.11
- Lowest price	69.54	68.98	57.20	41.40	39.62
- At 31 December	116.10	71.44	79.67	56.96	46.28
(x 1,000)					
Number of ordinary shares outstanding:					
- At 31 December	172,449	175,651	174,643	175,002	174,923
- Average	175,731	175,323	174,795	175,100	174,357
Daily trading volumes on Euronext Amsterdam:					
- Average	635	732	676	787	912
- Lowest	75	130	238	152	130
- Highest	2,242	2,617	2,110	2,554	4,506

Explanation of some concepts and ratios

PEOPLE

Brighter Living Solutions

See below, Planet — Brighter Living Solutions.

Eubiotics

The general term 'Eubiotics', is related to the Greek term 'Eubiosis' and relates to feed ingredients that support an optimal balance of microbiota in the gastrointestinal tract of livestock animals. They promote efficient gut performance so as to produce well-nourished animals that get the most from their feed, while at the same time sustaining their health and welfare and protecting the environment.

Frequency Index (FI)

The Frequency Index is a way to measure safety performance. The number of accidents of a particular category per 100 employees per year.

Inclusion Index

The Inclusion Index is a subset of items in the Employee Engagement (Pulse) Survey to specifically measure Inclusion. Inclusion is: "A working environment where all employees are a full and equal member of a team; where diverse perspectives are valued, and investment is made in their development; where people are respected and able to contribute as they are and not having to conform; where they can reach their potential, and where they can speak up without fear of retribution."

LWC-rate DSM own

The Lost Workday Case (LWC)-rate DSM own is the number of lost workday cases per 100 DSM employees in the past 12 months:
LWC-rate = 100 * (number of LWCs (past 12 months) / average effective manpower (past 12 months)).

Lives Reached

Lives Reached is a measure of consumers already reached through consumer products of third parties containing DSM products and solutions. This measure addresses key end-markets representing more than 25% of DSM's total sales. These end-markets cover our business segments — Nutrition, Materials and Innovation Center. The increase to 'more than 2.5 billion people' is due to the inclusion of additional cases in the Lives Reached scope.

The number of Lives Reached is calculated for each market separately and then aggregated. As a business-to-business company, our products reach end-consumers via third parties, so calculations per market are performed at global level. Consumer touch points are assumed to be unrelated, and overlap is eliminated using statistical methods (De Morgan's Law and Probability Theory — Independence). The actual overlap may be larger or smaller than calculated based on this assumption.

Key assumptions are used to perform these calculations and include DSM's market share, total consumer markets, share of wallet and consumer consumption behavior. These assumptions are made based on external market data where available, supplemented with market and business intelligence insights.

For more information on Lives Reached, see the company website.

Occupational Health Case

This refers to any abnormal condition or disorder requiring medical treatment — other than one resulting directly from an accident — caused by, or mainly caused by, repeated exposure to work-related factors.

PSI rate

The PSI rate is the number of Process Safety Incidents per 100 DSM employees and contractor employees in the past 12 months: PSI rate = 100 * (number of PSIs (past 12 months) / average effective manpower including contractor employees (past 12 months)).

REC-rate DSM all

The REC-rate DSM all is the number of recordable injuries per 100 DSM employees and contractor employees in the past 12 months: REC-rate = 100 * (number of RECs (past 12 months) / average effective manpower including contractor employees (past 12 months)).

Safety, Health and Environment (SHE)

DSM's policy is to maintain business activities and produce products that do not adversely affect safety or health, and that fit with the concept of sustainable development. The company does this by setting the following objectives: to provide an injury-free and incident-free workplace; to prevent all work-related disabilities or health problems; to control and minimize the risks associated with DSM's products for their whole life cycle and to choose production processes and products such that the use of raw materials and energy is minimized; to evaluate and improve DSM's practices, processes and products continuously in order to make them safe and acceptable to its employees, the customers, the public and the environment.

United Nations Global Compact

A strategic policy initiative for businesses that are committed to aligning their operations and strategies with ten universally accepted principles in the areas of human rights, labor, environment and anti-corruption.

United Nations' Universal Declaration of Human Rights
On 10 December 1948, the General Assembly of the United Nations adopted and proclaimed the Universal Declaration of Human Rights. Following this historic act, the Assembly called upon all Member countries to publicize the text of the Declaration and "to cause it to be disseminated, displayed, read and expounded principally in schools and other educational institutions, without distinction based on the political status of countries or territories."

PLANET

Biofuel
A fuel which is derived from renewable organic resources, as distinct from one which is derived from non-renewable resources such as crude oil and natural gas.

Brighter Living Solutions
Brighter Living Solutions (BLS) are products and services that, when considered over the product life cycle, offer an environmental benefit (ECO+) and/or a social benefit (People+) compared to mainstream reference solutions.

ECO+ qualifications are made based on comparative Eco Life Cycle Assessment (LCA). DSM is using the standard approach to evaluate environmental footprint as published by the WBCSD Chemical sector in 2014. Qualifications are also made based on documented expert opinion by business managers or relevant internal experts based on identified mainstream reference solutions and identified environmental differentiators.

The People+ qualifications are made based on DSM People LCA method or expert opinions, similar as for ECO+. The People LCA method helps to identify social impacts of products on the dimensions health, comfort and well-being, working conditions, and community development. This methodology is developed by DSM based on internal standards and external stakeholder dialogues.

More information and definitions can be found on the company website.

Carbon footprint
The total set of direct and indirect greenhouse gas emissions expressed as CO_2eq.

Carbon price
The price that is paid to emit one ton CO_2eq into the atmosphere. DSM implements an internal carbon price of € 50/t CO_2eq.

Circular economy
Circular economy refers to an economy that is restorative and in which materials flows are of two types: biological nutrients, designed to re-enter the biosphere safely, and technical nutrients, which are designed to circulate at high quality without entering the biosphere throughout their entire lifecycle.

CO_2
Carbon dioxide, a gas that naturally occurs in the atmosphere. It is part of the natural carbon cycle through photosynthesis and respiration. It is also generated as a by-product of combustion. Carbon dioxide is a greenhouse gas.

Chemical Oxygen Demand (COD)
COD is an indicator of the degree of pollution of waste water by organic substances.

Eco-efficiency
Eco-efficiency is a concept (created in 1992 by the WBCSD) that refers to the creation of more goods and services while using less resources and creating less waste and pollution throughout their entire life cycle. In the context of DSM's SHE targets, eco-efficiency relates specifically to the reduction of emissions and energy and water consumption, relative to the production volumes of DSM's plants.

Energy
Primary energy is energy that has not yet been subjected to a human engineered conversion process. It is the energy contained in unprocessed fuels.

Final (consumed) energy is the energy that is consumed by end-users. The difference between primary energy and final consumed energy is caused by the conversion process between the two as well as any transmission losses.

Essential for life
Essential for life refers to products that have a proven beneficial nutritional or pharmaceutical effect when used at the officially recommended dose.

Greenhouse gas emissions (GHGE)
Scope 1: Direct GHG emissions
Direct GHG emissions occur from sources that are owned or controlled by the company (i.e., emissions from combustion in owned or controlled boilers, furnaces, vehicles, etc.).

Scope 2: Indirect GHG emissions
Indirect GHG emissions relate to the generation of purchased energy (i.e., electricity, heat or cooling) consumed by the company. Purchased energy is defined as energy that is purchased or otherwise brought into the organizational boundary of the company. Scope 2 emissions physically occur at the facility where the energy is generated.

Scope 3: Value chain emissions
Scope 3 emissions are all indirect emissions (not included in scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions.

Location-based emissions
Reflects the average GHG emissions intensity of grids on which electricity consumption occurs (using mostly national grid-average emission factor data). Corresponding emission factor: in most cases, the country emission factor.

Market-based emissions
Reflects GHG emissions from electricity supplies that companies have purposely chosen (or their lack of choice) and contracted. Corresponding emission factors:

- Supplier specific emission factor (provided by the supplier)
- Residual emission factor (country-based grid factor, corrected for allocated purchased electricity from renewable resources)

Greenhouse gas emissions (GHGE) efficiency improvement
The GHGE efficiency improvement is the amount of GHG emissions per unit of output (specific emissions) in a given year compared to the specific emissions in the prior year. GHGE efficiency improvements are one of the ratios in the Long-Term Incentive part of the Managing Board remuneration and relate to a three-year period.

GRI
The Global Reporting Initiative (GRI) has developed Sustainability Reporting Guidelines that strive to increase the transparency and accountability of economic, environmental, and social performance. The GRI was established in 1997 in partnership with the UN Environment Programme. It is an international, multi-stakeholder and independent institution whose mission is to develop and disseminate globally applicable Sustainability Reporting Guidelines. These Guidelines are for voluntary use by organizations for reporting on the economic, environmental, and social dimensions of their activities, products and services.

Levelized Cost of Energy (LCOE)
LCOE is a figure used to compare the average cost of energy coming from different sources. It measures the cost of energy production over the lifetime of an asset like a photovoltaic panel.

Loss of Primary Containment (LOPC)
Loss of Primary Containment is an unplanned or uncontrolled release of material from the container that is in direct contact with the material.

Net-zero emissions
The Intergovernmental Panel on Climate Change states: "Net-zero emissions are achieved when anthropogenic emissions of greenhouse gases to the atmosphere are balanced by anthropogenic removals over a specified period. Where multiple greenhouse gases are involved, the quantification of net zero emissions depends on the climate metric chosen to compare emissions of different gases (such as global warming potential, global temperature change potential, and others, as well as the chosen time horizon)".

NO_x
Nitrogen oxides. These gases are released mainly during combustion and cause acidification.

Renewable resource
A natural resource which is replenished by natural processes at a rate comparable to, or faster than, its rate of consumption by humans or other users. The term covers perpetual resources such as solar radiation, tides, winds and hydroelectricity as well as fuels derived from organic matter (bio-based fuels).

SO_2
Sulfur dioxide. This gas is formed during the combustion of fossil fuels and causes acidification.

VOC
Volatile organic compounds. The term covers a wide range of chemical compounds, such as organic solvents, some of which can be harmful.

Water use and water consumption
Water use includes water used for 'once-through cooling' that is returned to the original water source after use. Water consumption is the portion of water used that is not returned to the original water source after being withdrawn.

PROFIT

General
In calculating financial profitability ratios, use is made of the average of the opening and closing values of balance sheet items in the year under review.

The financial indicators per ordinary share are calculated on the basis of the average number of ordinary shares outstanding (average daily number). In calculating Shareholders' equity per ordinary share, however, the number of shares outstanding at year-end is used.

In calculating the figures per ordinary share and the 'net profit as a percentage of average Shareholders' equity available to holders of ordinary shares', the amounts available to the holders of cumulative preference shares are deducted from the profits and from Shareholders' equity.

Adjusted net operating free cash flow
The cash flow from operating activities, corrected for the cash flow of the APM adjustments, minus the cash flow of capital expenditures and drawing rights.

Capital employed
The total of the carrying amount of intangible assets and property, plant and equipment, inventories, trade receivables and other receivables, less trade payables and other current liabilities.

Capital expenditure
This includes all investments in intangible assets and property, plant and equipment.

Disposals
This includes the disposal of intangible assets and property, plant and equipment as well as the disposal of participating interests and other securities.

Earnings before interest, tax, depreciation and amortization (EBITDA)
EBITDA is the sum of operating profit plus depreciation and amortization. Adjusted EBITDA is the EBITDA adjusted for material items of profit or loss coming from acquisitions/divestments, restructuring and other circumstances that management deem it necessary to adjust in order to provide clear-reporting on the developments of the business.

Earnings per ordinary share
Net profit attributable to equity holders of Koninklijke DSM N.V. minus dividend on cumulative preference shares, divided by the average number of ordinary shares outstanding.

High-growth economies
High-growth economies relate to the following regions: Latin America, Middle East, Asia (excluding Japan) and Eastern Europe.

Innovation sales
Innovation sales are defined as sales from products and applications that have been introduced in the last five years.

Operating working capital
The total of inventories and trade receivables, less trade payables.

Organic sales growth
Organic sales growth is the total impact of volume and price / mix. Impact of acquisitions and divestments as well as currency impact are excluded.

Return on capital employed (ROCE)
Adjusted operating profit from continuing operations as a percentage of weighted average capital employed.

Temporary vitamin effect
DSM's best estimate of the effect on sales and Adjusted EBITDA of the exceptional supply disruptions in the industry that started toward the end of 2017 and ended in the third quarter of 2018, including derived measurements.

Total shareholder return (TSR)
Total shareholder return is capital gain plus dividend paid.

Underlying business
Sales and Adjusted EBITDA (including derived measurements), corrected for DSM's best estimate of the temporary vitamin effect.

Working capital
The total of inventories and current receivables, less current payables.

List of abbreviations

ADR	American Depositary Receipts
AFM	The Dutch Authority for the Financial Markets
API	Active Pharmaceutical Ingredients
APM	Alternative performance measures
CDP	The new name for the Carbon Disclosure Project
CEFIC	Conseil Européen des Fédérations de l'Industrie Chimique (European Chemical Industry Council)
CGU	Cash Generating Unit
COA	Corporate Operational Audit department
CoBC	Code of Business Conduct
COD	Chemical Oxygen Demand
CPLC	Carbon Pricing Leadership Coalition
CRA	Corporate Risk Assessment
CRP	Corporate Research Program
CSD	Corporate Strategy Dialogue
CSR	Corporate Social Responsibility
DHA	Docosahexaenoic Acid
DNP	DSM Nutritional Products
DSGC	Dutch Sustainable Growth Coalition
DSP	DSM Sinochem Pharmaceuticals
EBA	Emerging Business Area
EBIT	Earnings Before Interest and Taxes (Operating Profit)
EBITDA	Earnings Before Interest, Taxes, Depreciation and Amortization
EEI	Energy Efficiency Improvement
EPA	Eicosapentaenoic Acid
EPS	Earnings per share
EVP	Executive Vice President
FIFO	First in, first out
FTE	Full-time equivalent
FVTPL	Fair value through profit and loss
FVOCI	Fair value other comprehensive income
GHG	Greenhouse gas
GHGE	Greenhouse gas emissions
GMO	Genetically Modified Organisms
GRI	Global Reporting Initiative
IAS	International Accounting Standards
IASB	International Accounting Standards Board
ICF	Internal Control Framework
IFRIC	International Financial Reporting Interpretation Committee
ILO	International Labour Organization
IP	Intellectual Property
LCA	Life Cycle Assessment
LoR	Letter of Representation
LTI	Long-Term Incentive
LWC	Lost Workday Case
NCI	Non-controlling interests
NGO	Non-Governmental Organization
NPS	Net Promoter Score
OCI	Other Comprehensive Income
OECD	Organisation for Economic Co-operation and Development
PDN	Stichting Pensioenfonds DSM Nederland
PPA	Purchase Price Allocation
PRA	Process Risk Assessment
PSI	Process Safety Incident
PV	Photovoltaic
R&D	Research & Development
ROCE	Return on Capital Employed
SDG	Sustainable Development Goal
SHE	Safety, Health and Environment
SHIBOR	Shanghai Interbank Offered Rate
SPP	Sustainable Procurement Program
STI	Short-Term Incentive
SUN	Scaling Up Nutrition Movement
TCFD	Taskforce for Climate-related Financial Disclosures
TSR	Total Shareholder Return
UN	United Nations
VOC	Volatile Organic Compound
WBCSD	World Business Council for Sustainable Development
WEF	World Economic Forum
WFP	United Nations World Food Programme

DSM – Bright Science. Brighter Living.™
Royal DSM is a global, purpose-led, science-based company active in Nutrition, Health and Sustainable Living. DSM's purpose is to create brighter lives for all. DSM addresses with its products and solutions some of the world's biggest challenges while simultaneously creating economic, environmental and societal value for all its stakeholders – customers, employees, shareholders, and society at large. DSM delivers innovative solutions for human nutrition, animal nutrition, personal care and aroma, medical devices, green products and applications, and new mobility and connectivity. DSM and its associated companies deliver annual net sales of about €10 billion with approximately 23,000 employees. The company was founded in 1902 and is listed on Euronext Amsterdam. More information can be found at www.dsm.com.

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