



Our innovative capabilities

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Driven by a culture of innovation

To create differentiated solutions for our customers



A strong culture of innovation is vital in driving the long-term development of cost-effective and long-lasting differentiating solutions.

By being at the forefront of the innovation stage we can be the partner of choice in creating cutting-edge, sustainable solutions for our customers. Value creation comes by spreading a culture of innovation beyond our walls and, within the Company, across our functions and business divisions.

A culture of innovation

In every innovation journey, from concept to market success, we continuously strive to strengthen our learning, challenge our thought processes and enrich the outcome. To be openly engaged with a global strategic community – from corporate peers to academia, start-ups, and technology and solution providers – is a fundamental pillar of such a journey.

In this context, one key partnership has been with MassChallenge, of which we became a founding member in 2016. MassChallenge accelerates high-potential start-ups from anywhere in the world that can have an impact on either of our divisions and across disciplines. Our MassChallenge Partnering initiative was held in 2018 with an inspiring programme that included external speakers on disruptive innovation and testimonials from successful mature businesses that were also once start-ups. It also allowed start-ups close to our business needs with the opportunity to pitch their ideas.

One of the finalists in the 2017 MassChallenge Switzerland accelerator programme was Mixfit, a US-based personalised health company that designs nutritional experiences to encourage lasting, positive changes in health behaviour. In 2018, we established a partnership with Mixfit and set up a cross-functional flavours team to develop taste and flavour solutions to create delicious, customisable nutritional drinks in collaboration with DSM.

To extend our geographical coverage, we formed a partnership with Bits x Bites, the first food tech accelerator to be based in China. Its mission is to shape the future of good food and invest in people and technology to create more sustainable food systems. Our collaboration with Bits x Bites will help us discover new disruptive technologies in food processing, digitalisation and artificial intelligence.

Similarly in the US in 2017, Givaudan piloted MISTA, which is an optimiser – enabling start-ups and established corporations to optimise ideas, products, people and investments. The official go-live was in 2018 and the MISTA Optimisation Center will open in 2019 in San Francisco.

We know that our suppliers offer significant potential to foster innovation. Through collaboration we can meet our current and future business challenges and accelerate the creation of mutual value. With selected suppliers from our base of 3,000 raw material suppliers and over 12,000 suppliers of indirect materials and services, the Procurement Innovation team seeks to accelerate the creation of mutual value. This team sets out to drive supplier engagement in innovation, leverage solutions, support to open new commercial lines and tap into our suppliers' resources to accelerate our own project pipeline.

One example of work with external collaborators is our continued partnership with the industrial bioscience company Amyris in the research, development and production of active cosmetic ingredients. This partnership, which was established some years ago, has been strengthened more recently: Givaudan and Amyris anticipate that the launch of target products in the coming years will demonstrate significant performance, cost and sustainability advantages over existing ingredients.

With Synthite, a global supplier of quality botanical and spices extract ingredients for flavours and fragrances, we established a strategic partnership in 2018 for the development of exclusive innovative natural ingredients for our business. Joint R&D on unique natural ingredients will enrich Givaudan's palette for its perfumers and contribute to our olfactive vision for naturals in perfumery.

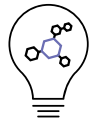
🔍 page 27, Our 2020 strategy

2018 Innovation by numbers



Spend Analysis

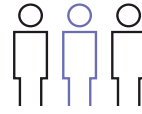
CHF **477** million invested in R&D.



Patents

We have over **3,600** active patents.

We filed **46** new patent filings.



People

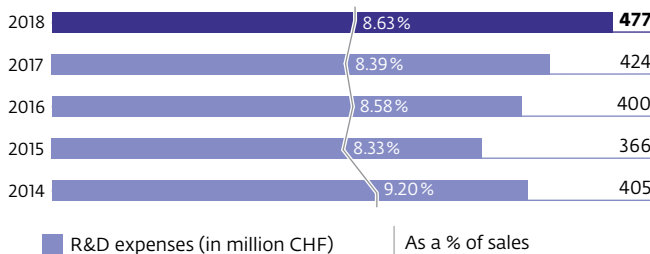
over **495** employees working in Science & Technology.



Innovation Ecosystems

Selected partnerships in **innovators, accelerators** and with **academia**. Plugged into **disruptive and digital trends**.

Five-year average R&D as % of sales (2014-2018)



Technologies and products

The surprises that delight consumers in new and different ways originate from the inspirations of our Science & Technology teams, whose research and development is the starting point for our flavour and fragrance creations. Our scientists, technologists, flavourists and perfumers are central in the process of creating the engaging tastes or smells that consumers love.

In exploring ways of offering customers these new products and solutions, our strategy of growth through mergers and acquisitions enables us to innovate beyond our core expertise in flavours and fragrances in the areas of active cosmetic ingredients, integrated solutions and naturals. These new areas of innovation build on our existing capabilities and are

supported by our commitment to invest a significant amount of our sales back into R&D – each year, this is approximately between 8-9%. The investment allows us to maintain and extend our offering of breakthrough science and technology and the best palette of ingredients.

Strategic investments were announced in 2018 in R&D and technology at our Applied Microbiomics Centre of Excellence in Toulouse, France. The investments will boost the work of our Active Beauty teams to lead the way in skin microbiome research. The teams' innovation and leadership in microbiomics was recognised during the year when Revivyl™ was voted best skin care ingredient at the Beauty Industry Awards.

We also introduced a new product development assistant called EVE, an app that handles a product brief clearly and effectively from the moment it arrives. EVE rapidly identifies the perfect match between a brief and a wide range of active cosmetic ingredients, and gives our developers and marketing teams a simpler way to follow and track projects.

For two decades our VAS technology has provided a unique competitive advantage in understanding consumer preferences, speeding the process of flavour and fragrance creation and engaging customers by overcoming the sensory language barrier. In 2018, we introduced the next generation of MiniVAS – the VAS-Air, which uses the latest technologies, is significantly lighter and has an all-new design.

Selected innovation initiatives

Consumer Sensory Insights

- Consumer insights throughout the creation cycle
- Agile consumer testing network - survey, panels, big data, etc
- Global team experts in category understanding, cultural insights and sensorial decoding.

Innovation Centres

- From molecular research to application expertise
- New technologies in delivery systems (e.g. encapsulation)
- Market-specific capabilities around the globe.

Innovators and Partnerships

- Extended innovation ecosystem globally
- Selected partnerships with innovators, accelerators and with academia
- Plugged into disruptive and digital trends.

Supplier Enabled Innovation

- Strategic partnerships with key suppliers
- Focus on bio-technology / bio-transformation
- Sustainable sourcing philosophy.

The vision of a global team of beverage flavour emulsion experts became a reality with the launch of our new emulsion creation tool during the year. This novel tool helps flavourists with limited experience become confident in creating flavour emulsions providing stable and cost effective solutions to customer briefs.

In Fragrances, our latest technology to combat malodour is able to enhance the well-being of millions of people in the growing adult urinary incontinence market. A range of scented NeutraZap™ solutions for this common problem has been developed, providing an odour-neutralising effect which can be used across a range of incontinence products.

Innovating responsibly

Sustainability is central in developing our new products. We ask if they improve access to safe, nutritious and sufficient food, promote health and well-being, and are sourced in a responsible way, making efficient use of resources and reducing the generation of waste. We also explore how we can best meet demand for natural products and improve processes to make them more sustainable.

In the area of health and well-being, for example, more and more people are reducing their consumption of meat and adopting vegetarian, vegan or flexitarian diets. As part of this trend, more consumers are seeking meat substitutes, and we are well placed to make the most of this opportunity. We are investing in new technologies to address some of the most difficult textural and flavour challenges involved. Our pioneering processes and technologies allow customers to introduce exciting, great-tasting plant-based foods and meat analogues, enabling the dietary shifts that will help promote consumer health and protect the environment.

We are involved with the Plant Meat Matters project and are in a partnership with the Sutardja Center for Entrepreneurship & Technology (SCET) at the University of California, Berkeley, through which we are providing help and support to students working on plant-based meat substitutes. We also launched Plant Attitude, a holistic multi-functional and cross-category innovation platform developed in response to the meat-free protein market space. Our multidisciplinary workshops in Kempthal, Switzerland showcased the latest developments in the biggest growth area in the food and beverage industry.

Another new and interactive tool to support plant protein creation was launched by Flavours in Europe during the year. Compendium 1.0 was two years in development, work which included over 150 experiments aimed at understanding how to design cost-competitive and consumer preferred flavours for meat analogues. Compendium 1.0 compiles a list of the most relevant ingredients from the savoury creation toolbox, mapped for their effect, performance and cost impact into a real analogue matrix. It will enable creators to explore different scenarios, accelerate development work and improve speed to the customer.

As part of our focus on health and well-being we are responding to the global drive towards sugar reduction. We launched a new unique approach in 2018 that delivers fully satisfying, reduced-sugar products without added sweeteners. The approach combines the use of a new proprietary sensory language, novel ingredients, and deep understanding of sweetness and satisfaction to deliver up to 50% reduction in sugar while maintaining consumer preference.

In Flavours, we seek to use as few resources as possible so as to reduce the impact on the environment. We incorporate circular thinking while using our scientific knowledge to replicate traditional natural processes on a large scale to produce desirable flavour ingredients. We continue to innovate in this area, using natural technologies such as bio-fermentation to produce natural complex flavour blocks that satisfy requirements for clean labels.

An example was the launch of our fully natural delivery systems inspired by how nature encapsulates flavours to meet these clean label needs. The new holistic capabilities in Kitchen Ingredients – a toolbox that helps customers provide consumers with great tastes from natural ingredients they recognise from their own kitchens – reflect the changing consumer demands for more natural ingredients and transparent food labelling. Our initiatives were highlighted in a video that won a Silver Dolphin award at the 2018 Cannes Corporate Media and TV Awards.

In Fragrances, consumers seek and trust products from recognised natural sources. We look to respond to these demands by maximising the value from nature and increasing the use of biotechnology. This will allow us to offer fragrance ingredients and design solutions that meet this consumer demand and which are constantly sought by our S&T experts in the Fragrance Division and Active Beauty business.

For example, pioneering, sustainable products have been developed by Active Beauty through processes including upcycling or through cutting-edge innovation. For example, Vetivyn[™], our patent-pending active ingredient with active anti-ageing benefits, meets our commitment to offer natural and sustainable products. It was developed by using water-soluble extract from exhausted Haitian vetiver roots, a by-product of the extraction procedure used to produce vetiver oil for fragrances. At In-cosmetics, Vetivyn[™] received the first European BSB Innovation Prize for its natural and sustainable quality.

We have also developed PrimalHyal[™] Ultrafiller, a new topical hyaluronic acid that acts like an aesthetic filler by penetrating deeply into the skin and filling wrinkles while stimulating the skin's anti-pollution defences. The patent-pending active ingredient was obtained by combining our white biotechnology capabilities. This is the production of a specific hyaluronic acid through a fermentation process, followed by its full acetylation achieved by experts at our site in Dübendorf, Switzerland. PrimalHyal[™] Ultrafiller is 100% safe, worldwide compliant, and produced from renewable raw materials.

New alternatives to animal testing have been developed through our Safe by Design[™] fragrance molecule research approach. New test regimes measuring the metabolism of molecules have been invented by a team of academics to replace testing in living fish. Givaudan has been deeply involved

PIONEERING TEAMS

Over 495 people work directly in Science & Technology. Joining them are over 165 perfumers and flavourists. All help in creating innovative and engaging tastes and smells consumers love.

supporting their validation and the new global standards have now been adopted. We began exploring alternatives to animal testing in 2006, which led to the development of the KeratinoSens[®] assay for skin sensitisation. We made this in-vitro assay openly available, working with the Organisation for Economic Co-operation and Development (OECD), to adopt and promote the solution.


Leading the industry's digital innovation

Our industry, along with our customers and suppliers, is moving to digital transformation as core processes as well as customer services are challenged by new opportunities offered by technology.

To anticipate this disruption and lead our industry's digital transformation, a dedicated digital innovation team works with the business divisions and functions, exploring transformative opportunities to enable and inspire our strategy.

This work is organised around three pillars: inspiring the organisation by stimulating new ideas and giving a space for these ideas; Executive Committee-level governance to set the priority on topics; and a 'digital factory', an internal incubator for fast-paced experimentation of the most promising ideas.

Some of the strategic areas we are exploring include how Artificial Intelligence and Big Data can transform our flavour and fragrance creations, what new value-added services can be provided to our customers through digital platforms, and how to push the boundaries of our current industry and explore new, digital-enabled business models.

 [Our Sustainability Approach – Innovating Responsibly](#)
[2018 Sustainability Progress Review – Innovating Responsibly](#)