



Sustainability Report

B·R·A·I·N

BRAIN Biotech AG

2022

Creating a #BiobasedFuture

As a technology provider and developer of bio-based products and solutions for nutrition, health and the environment, we play an active role to enable the use of biology for industrial processes and contribute to a more sustainable economy.



Adriaan Moelker

Chief Executive Officer, BRAIN Biotech AG

At BRAIN Biotech AG we strongly believe that we should take nature as our guide to find inspiration for breakthrough inventions in the areas of nutrition, health and the environment. We derive our innovations largely from the world of microbiology: the scientific study of microorganisms such as bacteria, fungi and yeasts. There is a fascinating microcosm out there which is mostly unexplored and full of miraculous surprises. In addition to the inspiring nature, we utilize natural compound discovery technologies to develop more sustainable consumer products and drug innovations. The BRAIN BioArchive is a representative collection of this microcosm and often a promising starting point for our innovations.

Molecular biology and natural product chemistry give us the tools to transform what we have learned from nature into industrial processes and products. Our proprietary genome engineering toolset gives us an additional unique selling point and creates a clear competitive advantage. These are key enabling technologies for a natural as well as sustainable industrial production and the emergence of a circular economy. Biologized industrial processes require less primary energy input, produce fewer byproducts that are difficult to handle, and are nature-based. We have fully implemented this into our corporate strategy and expressed it within our corporate claim: Creating a #BiobasedFuture.

We are very excited to actively contribute to a more sustainable living with our products and with our services to support industrial customers on their way to a biology based production as well as nature based products. Many of our products already positively contribute to a bio-based future today such as our enzymes or products from successfully completed partner projects. Additional innovations are now developed to maturity within our incubator pipeline. There we are developing

some truly breakthrough innovations with significant ecological and economical potential. We call this #BRAINImpact.

Shaping a more sustainable future fills the BRAIN Group employees with pride and gives them satisfaction in their work. It certainly has attracted me to join BRAIN as the CEO in 2020 and thankfully, many of our shareholders and customers share our vision.

We want to remain respected corporate citizens. Hence, to grow revenues and turn profitable is a prerequisite to lead innovation. In addition to our efforts to become profitable, we have set ourselves corporate sustainability targets in the areas of environment, social and governance (ESG). All corporates need to contribute within their operations to reach the ambitious global and EU sustainability targets. I am happy to personally lead the sustainability efforts at BRAIN Biotech on the executive board level.

We are proud and excited to present this inaugural ESG and Sustainability Report 2022. It will give you detailed insights into how BRAIN will contribute to a more sustainable living. This is important to us and to all our stakeholders. Thank you for your interest in BRAIN and in our activities, you can trust us to keep innovating for a #BiobasedFuture.

A handwritten signature in black ink, appearing to read 'Adriaan Moelker'. The signature is fluid and stylized, with a long horizontal line extending to the right.

Adriaan Moelker

Chief Executive Officer, BRAIN Biotech AG

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Executive Summary

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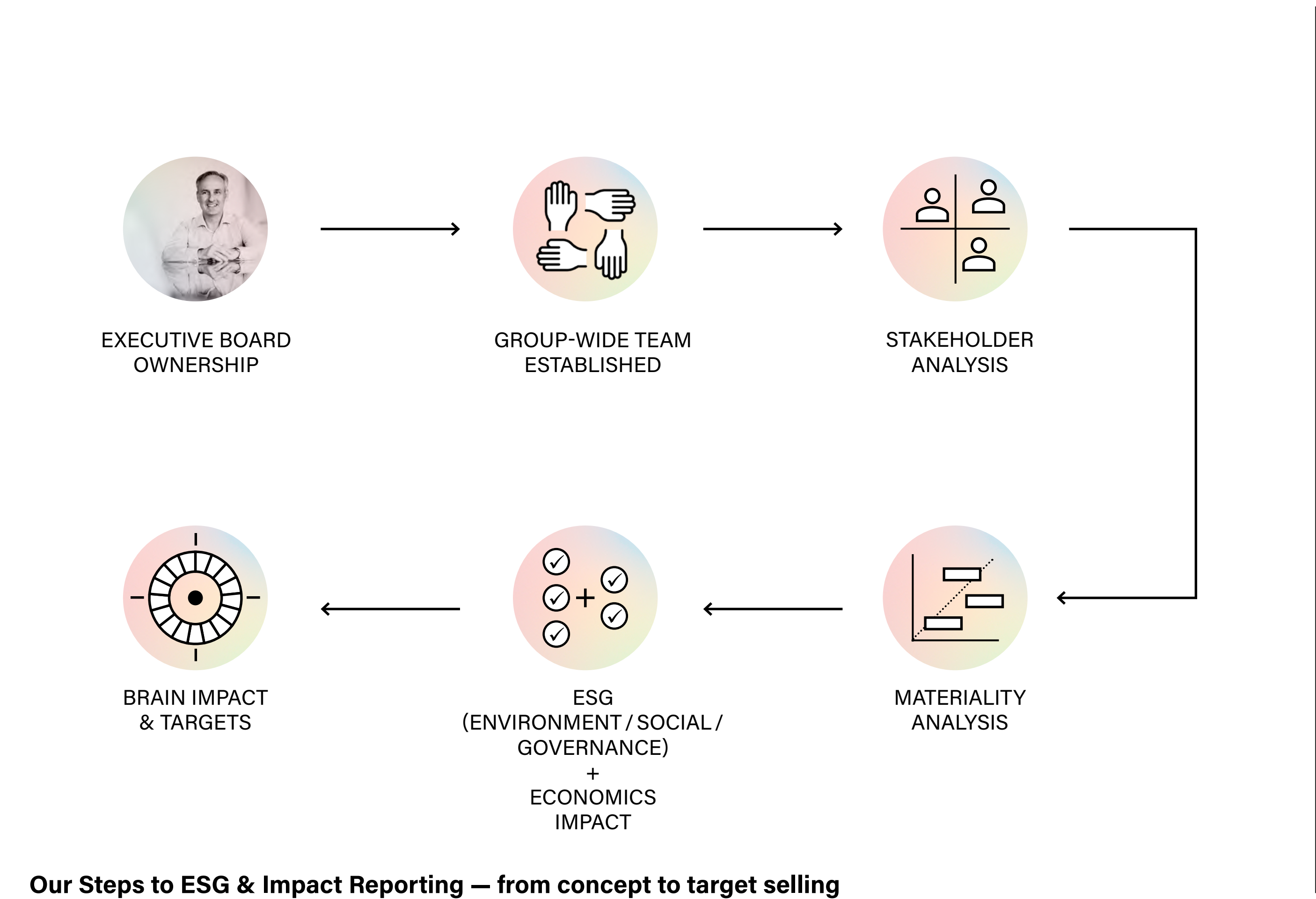
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BRAIN's Materiality-Based ESG Approach

For BRAIN Biotech AG, ESG integration starts with identifying the issues that matter most to us and our major stakeholders. We identify the material long-term issues and opportunities that our company faces. For example, while rising energy costs as a consequence of the transition to net zero might be a future risk to our profitability, the EU Green Deal will offer many opportunities for our breakthrough products and services to make a real impact on a faster transition to more sustainability.

By identifying material factors like these and carefully assessing how we can adapt in response to them, we can both sharpen the focus of our investments and strengthen the resilience of our business model. Material ESG issues are central to BRAIN's business model and long-term financial success. They form an integral part of our business risk assessment and planning.

The magnitude to which we can fulfill the requirements of our main stakeholder groups, interact with society, be compliant, reduce our own environmental footprint and contribute to the UN's Sustainable Development Goals (SDGs) determines the long-term success of our enterprise. Our ESG roadmap tries to align these targets with a prospering business and launching our impact products.



Since 2021 we have been committed to the UN Global Compact corporate responsibility initiative and its principles in the areas of human rights, labour, the environment and anti-corruption. www.unglobalcompact.org



Following established standards

Overview of Material Economic, ESG and Impact Topics

We strongly believe that in order to strive for sustainability we have to start from a solid economic base. Hence, growing revenues, increasing our EBITDA margin and turn cash-flow positive is part of our journey to a responsible business. BRAIN promotes the concept of double materiality: what is material for our financial well-being will also be influenced by what matters most to our stakeholders on ESG related matters. We call this #BRAINEconomics and have set ambitious mid-term targets to double our revenues and reach a mid-point EBITDA margin of 15 %.¹

This will enable us to:

- Secure and grow employment
- Finance our breakthrough incubator projects with strong sustainability contributions: #BRAINimpact
- Finance our business growth and future incubator programs
- Create value for our community and shareholders

#BRAINimpact incorporates our products and services which can enable a faster transition to a circular and

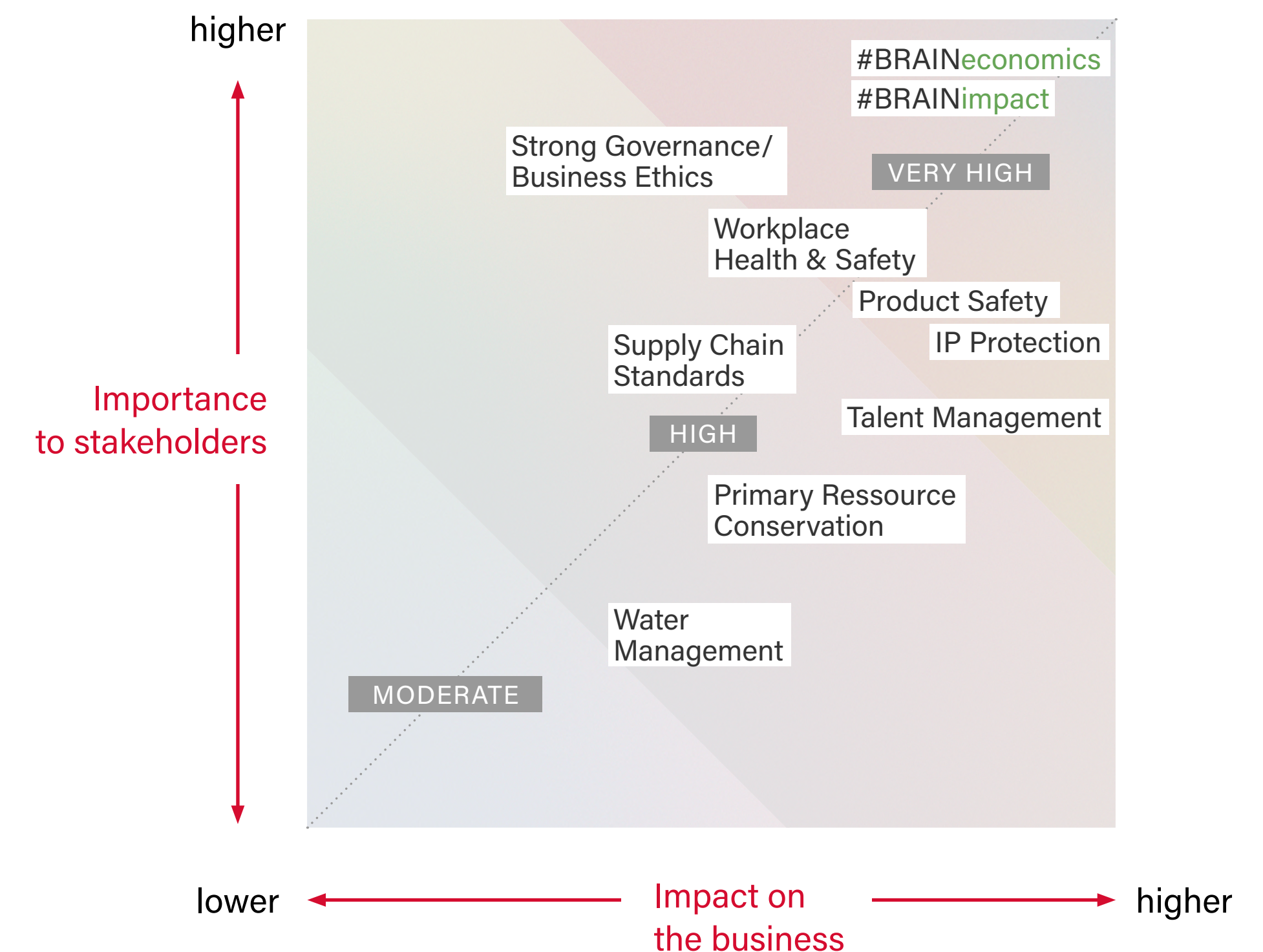
sustainable overall economy. By creating a bio-based future we focus on the areas of nutrition, health and the environment. Here the positive impact for our environment or on our society becomes the key driver of future economic value creation.

Next to our identified material economic and impact topics, our ESG driven analysis has led to the following material themes with a high importance to our stakeholders as well as a strong impact on our business:

- Strong corporate governance & business ethics
- Workplace health & safety
- IP protection
- Talent management
- Product safety



We provide a detailed description of our materiality analysis in the chapter [→ Materiality Analysis](#)



Materiality Analysis — identifying and prioritizing the most relevant topics

¹ — Capital Market guidance 09/2020, mid-term target (4-5 years), base year FY 2018/19

Contributing to United Nations SDGs

We develop products and services that change the way industrial production is done. Our natural and sustainable bio-based processes accelerate the economic transformation to a circular economy. With our current products and solutions (#BRAINImpact), we already directly address at least five UN sustainability goals.

SDG 2 – Zero Hunger:

alternative protein sources; natural compounds for food preservation; enzymes for more efficient and natural industrial food processing.

SDG 3 – Good Health & Well-Being:

natural sugar replacement; salt replacement and salt taste enhancers; natural aromas, bioactive plant cosmetics; chronical wound treatment; PHA121 as an active pharmaceutical compound to treat Hereditary Angioedema (HAE).

SDG 6 – Clean Water & Sanitation:

green microbial based mining solutions to replace chemical hazards.

SDG 9 – Industry, Innovation & Infrastructure:

enzymes as natural catalysts; biotechnological production, improving production efficiencies for resource conservation; fermented food from side-streams; microbial CO₂ usage.

SDG 12 – Responsible Consumption & Production:

green and urban microbial mining (bio-based recycling).

In addition, we incorporate sustainability aspects and good corporate governance in the daily management of our operations. Within our business and environmental initiatives we also address the following SDGs:

SDG 4 – Quality Education:

training of apprentices and students; lifelong learning is a key aspect in a knowledge driven company like BRAIN.

SDG 5 – Achieve Gender Equality:

BRAIN is a committed equal opportunity and equal pay employer. In addition, we target to actively promote female career development into management positions.

SDG 8 – Decent Work and Economic Growth:

growth and profitability build the foundation for #BRAINImpact. Our growth ambitions also consider health and safety of our employees and in our supply chain.

SDG 13 – Climate Action:

our environmental ESG targets aim to reduce our ecological footprint, preserve primary resources and prevent unnecessary pollution.

SDG 17 – Global Partnership for Sustainable Development:

we collaborate with the UN and additional partners to accelerate the sustainable impact of our corporate activities.



Our Sustainability Goals 2032 and beyond

At our Capital Markets Day in September 2020 we have communicated our ambitious economic mid-term targets: to double our revenues and reach a mid-point EBITDA margin of 15 %.² Our economic targets form the basis to address BRAIN’s wider sustainability and impact targets which we summarize here:

E

Minimizing the Environmental Impact from our Operations

Focus

- Reducing services & production related GHG emissions

Actions

- Increased share of sustainable technologies and primary resources
- Building renovation
- Redesign of deep-freeze capacities, BioArchives
- Electrification of processes and transport

KPI

- Realized decarbonization effects

S

Livable & Satisfying Employment

Focus

- Employee satisfaction
- Diversity & Inclusion
- Occupational health & safety

Actions

- Attract & retain talent
- Actively promote equal opportunity
- Safe work environment

KPI

- Employee satisfaction
- Employee retention
- Share of women in management positions
- Lost time injury frequency rate (LTIFR) per 1 Million hours worked

G

Responsible Business Operations

Focus

- Operations aligned with all legal requirements & own values
- IP protection

Actions

- Financial Control Framework (FCF)
- Ethics Code developed
- Pro-active IP filing & trade secret strategy

KPI

- Fines for compliance & operational breaches
- License & royalty income

+

BRAIN Impact

Focus

- Breakthrough products & services for health, nutrition and environment

Actions

- Execution of incubator pipeline

KPI

- Successful market introduction
- Profit Realization

2 — Capital Market guidance 09/2020, mid-term target (4-5 years), base year FY 2018/19

E

Minimizing the Environmental Impact from our Operations

Goals

- By 2032, reduce Scope 1-2 GHG emissions by 30 % in relation to current revenue base*
- By 2050, Scope 1-2 GHG emissions to net zero

Detailed Actions

- Switch to sustainable sourcing of primary energy
- Building renovation and change of cooling/heating design
- Electrification of processes and transport
- Establish employee best idea contest on cost, energy savings and process optimization

Targets ESG Roadmap 2032 / 2050

S

Livable & Satisfying Employment

Goals

- By 2032, share of women in management positions above 30 %*
- By 2032, Lost time injury frequency rate (LTIFR) per 1 Million hours worked < 3.0*

Detailed Actions

- Attract & retain talent by flexible work options, employee participation programs
- Actively promote female career development to management positions
- Promote safe work environment

G

Responsible Business Operations

Goals

- By 2032, Target zero fines from compliance & operational breaches*
- Ongoing, significantly increase share of license and royalty income in BioScience in relation to revenues*

Detailed Actions

- Evolution of Financial Control Framework (FCF)
- Pro-active IP filing & trade secret strategy to enhance and manifest IP position
- BEC/BMC franchise and producer strains

+

BRAIN Impact

Goals

- By 2032, successful market Introduction of impact products & services from today's incubator*
- By 2050, launch additional incubator products with an impact

Detailed Actions

- Continuous incubator pipeline management

* To be incorporated into the updated executive management compensation scheme as non-financial targets, base year data CY 2020.

Our Company

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Company Profile

BRAIN Biotech AG is a leading European specialist in industrial biotechnology. As a technology provider and developer of bio-based products and solutions for nutrition, health and the environment, the company supports the biologization of industry and contributes to a more sustainable economy. BRAIN Biotech AG is the parent company of the BRAIN Group.

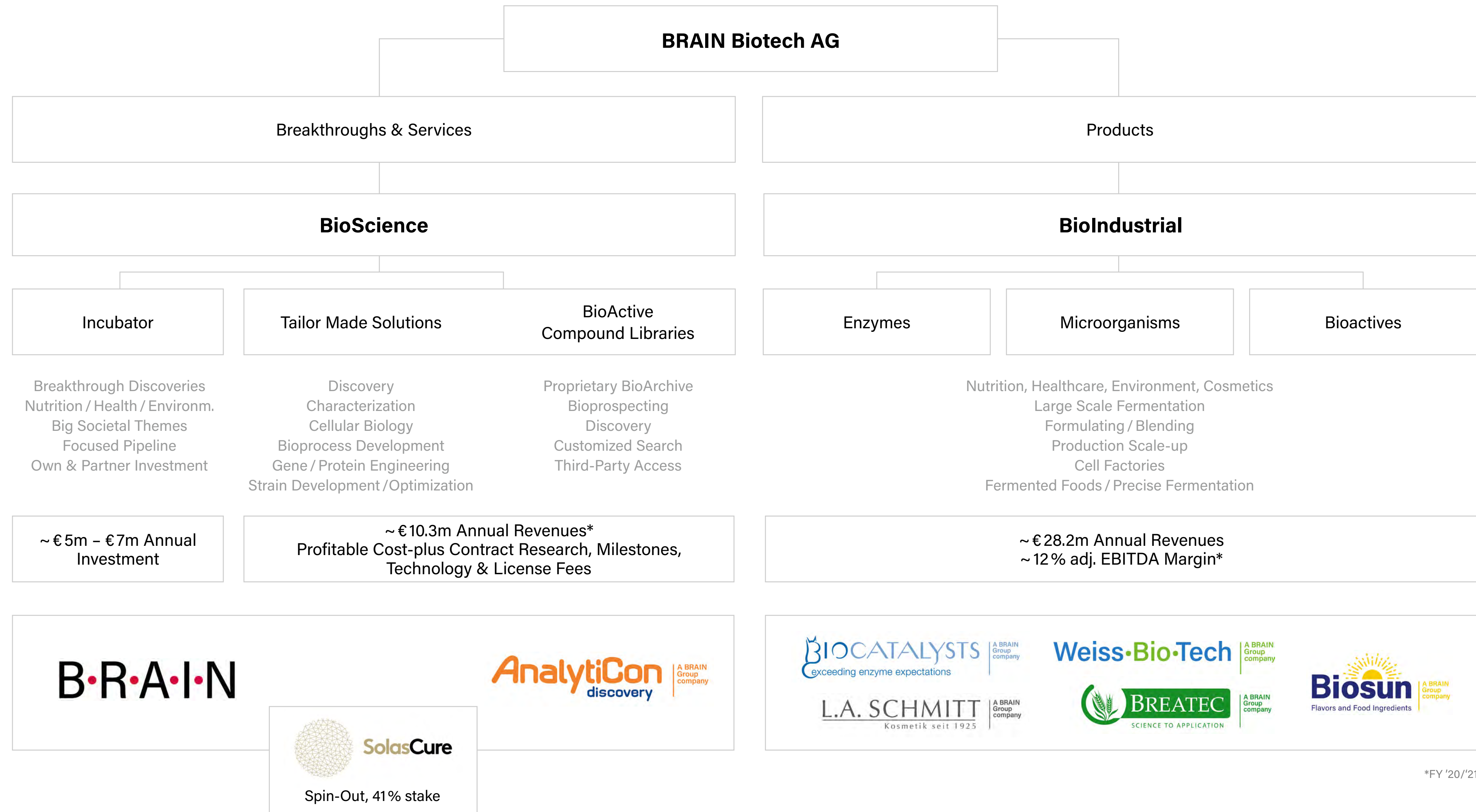
Two pillars form BRAIN Group's business: The **BioScience** segment includes contract research for renowned industrial partners as well as an incubator for the development of the company's own highly innovative products. In the incubator we develop breakthrough products and services with significant economic potential and positive environmental impact. In the **BioIndustrial** segment, the company focuses on specialty business in the production and refinement of enzymes, microorganisms and bioactive natural products and the respective distribution.

The BRAIN Group maintains its own diverse collection of natural resources: the BRAIN BioArchive comprises microorganisms, genetic material and natural substances. Based on this collection and with a comprehensive technology portfolio, BRAIN addresses technological challenges and develops bio-based products and solutions that are already successfully employed in the industry. The BRAIN Group has its own production facilities in continental Europe, UK and the US, which together with the associated biotechnological production expertise, complete the value chain within the Group.

In the fiscal year 2020/21 BRAIN Biotech AG generated a turnover of € 38.4 million with an adj. EBITDA loss of € -2.1 million. While our underlying business segments BioScience and BioIndustrial are both

profitable we continue to invest more into our incubator pipeline, our future growth and value driver, when we currently generate on our operating business. It is our clear intention to turn profitable on a group level within the next years. We have announced ambitious mid-term targets at our Capital Markets Day in September, 2020, to double our revenues and reach a mid-point EBITDA margin of 15 %.³

Since the IPO in 2016, BRAIN Biotech AG has been listed in the Prime Standard of the Frankfurt Stock Exchange (ISIN DE0005203947/WKN 520394).



Short Description Subsidiaries / Brands



AnalytiCon Discovery GmbH possesses unique resources for discovering and developing actives based on natural products, and cooperates with companies in the pharmaceutical, food and cosmetics industry all over the world. It is a global market leader, with libraries of natural ingredients with fully categorized structures and access to some 15% of all known secondary substances and thousands of structures that have not yet been published. AnalytiCon Discovery GmbH was founded in 2000 and has been a member of the BRAIN Group since 2013.



Breatec B.V.* is a by application technology driven company for applications in the cereal and baking industry. The company is based in Nieuw-kuijk, close to the Belgium and German borders, surrounded by many leading international industrial food companies. Breatec services its customers globally. Within the team Breatec has experienced people educated in milling, bakery (bread baking, fine bakery in it's widest form, pasta /noodle industry etc.) as well in the fundamentals of the functional ingredients required for these markets. Breatec has joined the BRAIN Group in February 2022.



L.A. Schmitt GmbH develops and produces cosmetics and wellness products in accordance with customers' wishes and specifications. The highly-reputed company manufactures its own product lines and goods for retailing companies and wellness and cosmetics brands. The firm's business activities center on individual client liaison, a sound knowledge base as well as a high degree of flexibility in its dealings with partners and customers. Founded in 1925, L.A. Schmitt has been a member of the BRAIN Group since 2009.



Biocatalysts Ltd. focuses on developing, producing, obtaining approvals for and distributing specialty enzymes. The company provides the rapid, cost-efficient and customized development of novel enzymes and owns the MetXtra™ metagenome library, which allows the rapid identification of tailored enzymatic solutions. With state-of-the-art enzyme production facilities and international sales structures at its disposal, Biocatalysts also offers its customers a portfolio for the direct purchasing of enzymes in several defined fields of application. Established in 1983, Biocatalysts has been a member of the BRAIN Group since 2018.



A leading manufacturer of bioactive products for the food industry, **WeissBioTech GmbH** supplies both large multinationals and medium-sized manufacturers of fruit juices, beer and wine, as well as industries that process starch and bioethanol. WeissBioTech was founded in 2002 and has been a member of the BRAIN Group since 2014.



BIOSUN Biochemicals Inc. (BIOSUN FFI) operates as a distributor, blender, and manufacturer of a complete range of food ingredients, including flavors, enzymes, natural colors and specialty food ingredients. The company serves as one of Givaudan's primary U.S. distributors for compounded flavors in select industries. BIOSUN FFI joined the BRAIN Group as of the first of January 2021 becoming a wholly owned subsidiary of BRAIN Biotech AG.

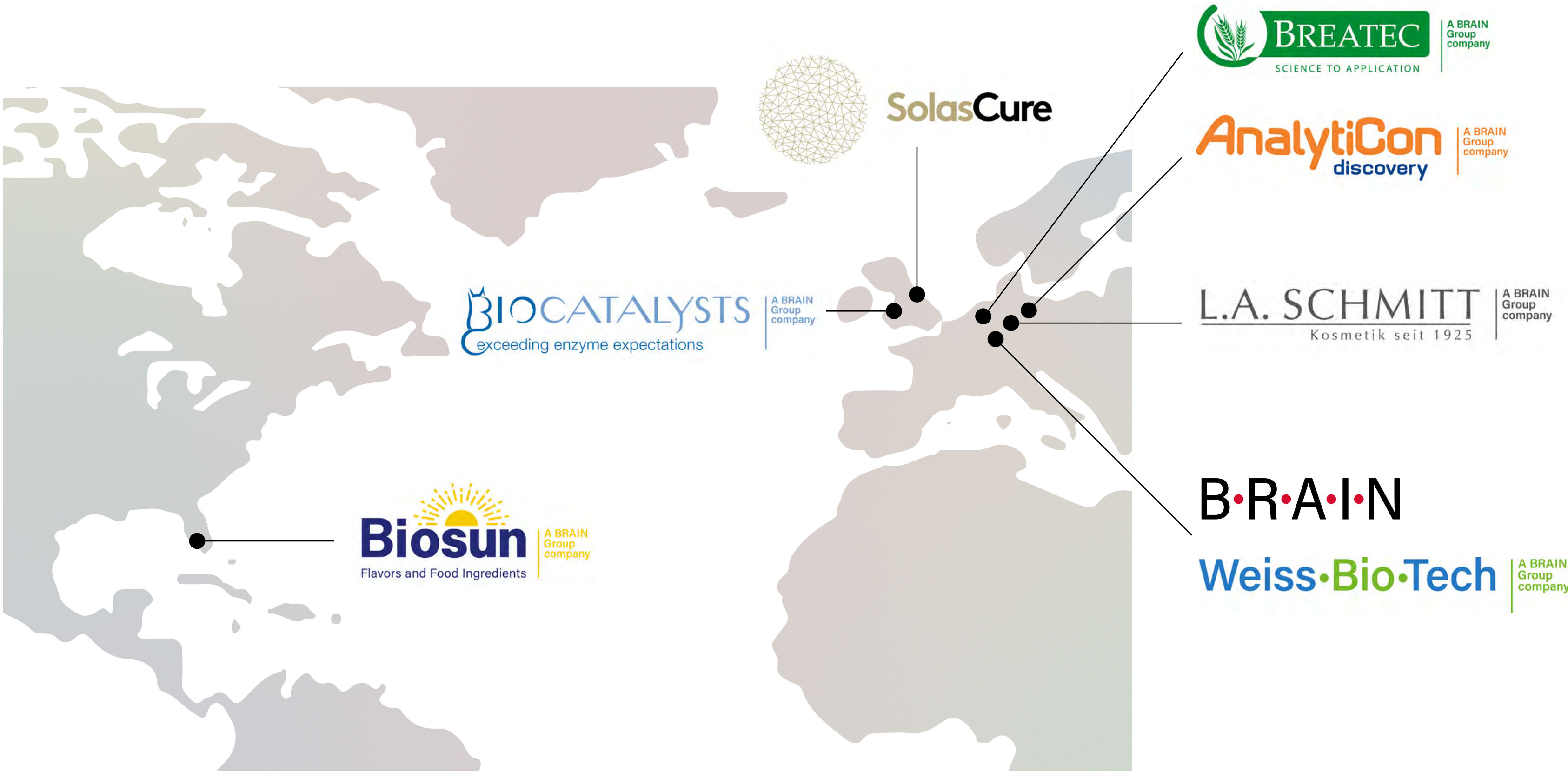


SolasCure Ltd.**, established in 2018 with the participation of BRAIN AG, is an independent company that focuses on the development, CE certification and marketing of medical products based on the novel Aurase® wound-cleaning enzyme discovered by BRAIN for the biological conditioning of chronic wounds.

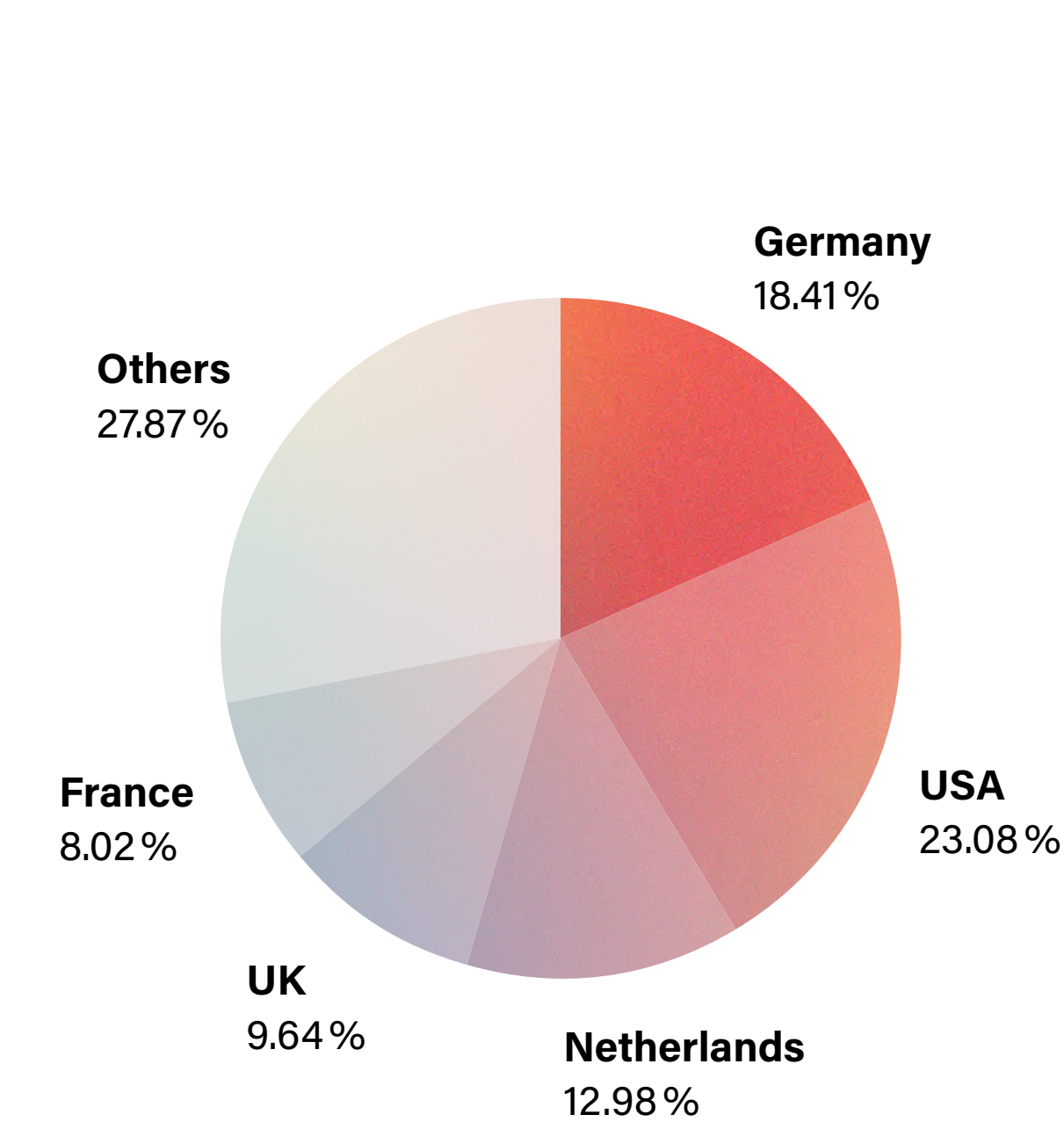
*Breatec: not part of the ESG report and data recording, consolidation from 02/2022

** SolasCure: not part of the ESG report, financial participation

BRAIN Biotech Group: International Operating Units



* excluding Breatec



Geographical Split by Revenue FY '20/'21*

BRAIN's Mission & Vision

We define **Mission** as what an organization is or does and **Vision** as what an organization desires to become.

Our Mission

We create breakthrough bioproducts and solutions for nutrition, health and the environment.

Our Vision

We will be the Industrial / White Biotech Specialist in finding and exploring high-value niches in our products business and novel solutions in our science business. We will be much more agile than others and will always look to produce products in-house or with partners.

BRAIN was founded in 1993 by a team of scientists from the Technical University of Darmstadt. During the first decade the company has mainly been focused on contract research. Meanwhile BRAIN is increasingly developing own breakthrough products and, in addition, looks to produce in-house or with partners. By extending our business focus we are now able to capture a significantly higher proportion of the lifetime value of our innovations.

Our mission and vision are well expressed in our claim:

Creating a #BiobasedFuture.

Our vision will drive organic revenue growth, margin expansion and consequently the future stock market valuation of the BRAIN Biotech AG. Powered by a solid economic performance we pursue our impact and sustainability targets.



Operational Goals

BRAIN Group key financials FY 2020/21

in € million	2020/21	2019/20	2018/19
Consolidated income statement data:			
Revenue	38.4	38.2	38.6
Total operating performance	40.7	39.2	41.2
EBITDA	-2.5	-3.9	-2.5
Adjusted EBITDA	-2.1	-2.0	-2.2
Net loss for the reporting period	-4.7	-9.0	-11.1
Consolidated balance sheet data:			
Total equity	41.8	26.1	20.2
Equity ratio (in %)	53.8	36.2	30.5
Total assets	77.7	72.2	66.1
Consolidated cash flow data:			
Cash flows from operating activities	-3.9	-4.8	-3.4
Cash flows from investing activities	-2.2	-4.5	-6.7
Cash flows from financing activities	11.6	13.1	-0.3



For detailed financials please refer to our [Annual Report](#)

Guidance FY 2021/22

After limited revenue growth in the last fiscal year due to effects of the Covid-19 pandemic and operational issues at our BioIndustrial subsidiary WeissBioTech GmbH we are now forecasting to return back to solid organic growth. In addition, in February 2022 we have acquired Breatec B.V., which will significantly add to our topline and adj. EBITDA. For the fiscal year 2021/22 we have issued the following guidance (excluding Breatec):

- Group sales of EUR 43 – 45 million
- Adj. EBITDA (excluding CRISPR investments) around break-even
- CRISPR investments EUR 2.3 – 3.5 million
- Group CAPEX EUR 7 – 8 million

4 — Depending on the chosen commercialization options / successes out of the incubator pipeline; excluding CRISPR

Mid-term Guidance

At our Capital Markets Day in September 2020 we have set ourselves ambitious economic mid-term targets. We have defined mid-term as four to five years. Our guidance is based on the starting year FY '18/'19. This guidance excludes CRISPR related costs and revenues.

Double group revenue from base '18/'19

- Double digit topline product CAGR
- Accretive M&A
- Contract research “TMS” proportionally reduced (excl. milestones)

Group adj. EBITDA margin 15 % (+/- 5 PP)⁴

- Double digit fermentation production volume of customized novel enzymes
- Mid-single digit annual productivity improvements

Proportion of new product sales: ~30 % of total revenues

- Continuous innovation pipeline management

Above targets remain in place unchanged.

Sustainability Strategy

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Sustainability & Impact Strategy

At BRAIN we believe that we can contribute in addition to our ESG strategy and targets. After a careful analysis and discussion with our stakeholder groups we have decided to base our sustainability reporting on ESG Plus.

Next to environmental, social and governance topics we incorporate in our responsible group management strategy economic and impact targets. Solid economic performance builds the base to achieve our other targets. Our #BRAINimpact products & services can make a real positive impact for our B2B customers, for consumers and for patients.

Our sustainability and impact strategy is based on five strategic pillars for long-term value creation:

1. Economic Performance
2. BRAINimpact
3. Environmental Performance
4. Social Performance
5. Efficient Governance

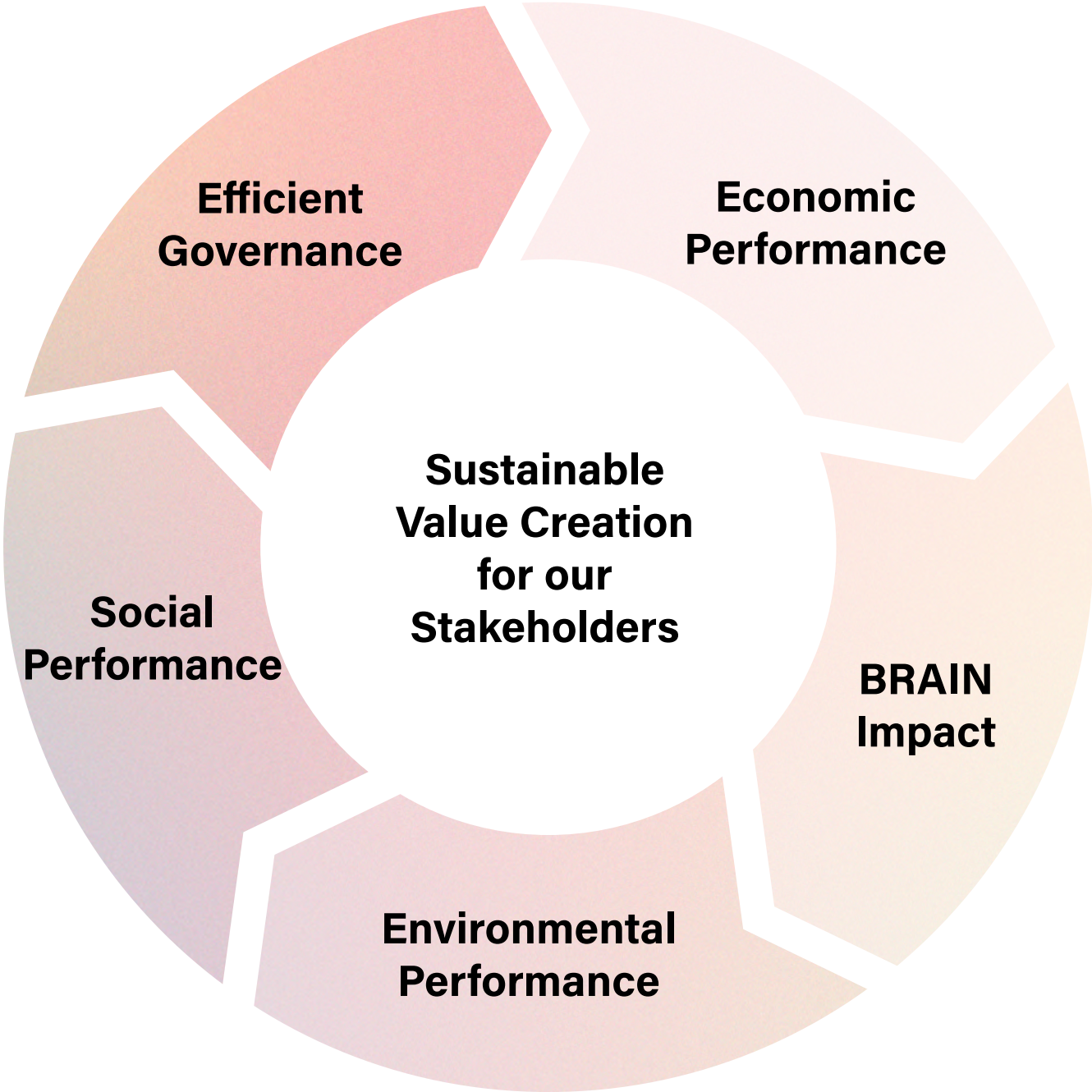
EFFICIENT GOVERNANCE

- German Corporate Governance Code (DCGK) compliance
- German Sustainability Code (DNK)
- Member UN Global Compact (UN GC)
- Quality, health and safety policies
- Internal compliance: qualified internal compliance officer, permanent risk assessment, audit committee and risk reporting, external audit, BRAIN Financial Control Framework, BRAIN Red Book
- Monthly reporting and audit meetings with the subsidiaries



SOCIAL PERFORMANCE

- Occupational health & safety
- Employee development & training
- BRAINway corporate culture enforcement
- Safe labour practices
- Community Education & Dialogue
- Promoting women in management



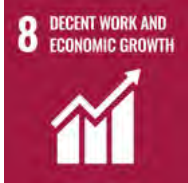
ENVIRONMENTAL PERFORMANCE

- Energy efficiency
- Reduced travel footprint
- Water management
- Waste management



ECONOMIC PERFORMANCE

- Profitable top-line growth
- Organic growth enhanced by value accretive M&A
- Target: reach a self-sustained cash flow profile



BRAIN IMPACT

- We make a difference: our products & services address at least 5 SDG's directly



ESG+: Responsible Group Management — five key focal points for sustainable value creation

1. ECONOMIC PERFORMANCE, SDG 8

Profitable topline growth will form the basis for a positive operating and free cash flow generation. Our organic growth ambitions will be accompanied by value accretive acquisitions. Altogether we target a self-sustained cash flow profile over time. A solid economic performance builds the basis for our #BRAINImpact and ESG ambitions. BRAIN promotes the concept of double materiality.

2. #BRAINImpact

Already today we directly address at least five of the UN Sustainability Development Goals by our products and services. We really can make a difference with solutions for the SDGs 2, 3, 6, 9 and 12. Most of our impact services and products are developed within our incubator pipeline.

In our incubator we currently have eleven programs at different stages of maturity. All of them address big societal topics in the areas of nutrition, health and environment. In this way, our products and services directly contribute to more sustainable lifestyles, better health, preservation of primary resources and, with our genome editing platform, we offer a basis technology which is applicable to many areas of sustainability.

3. ENVIRONMENTAL PERFORMANCE, SDG 12 & 13

Even though many of our products (e.g. enzymes) or solutions developed in the incubator have by themselves a positive impact on the sustainability of our industrial customers, we also strive to minimize the environmental footprint of our own operation.

Here the most material areas from our operations to focus on are:

- Energy efficiency
- Reduced travel carbon footprint
- Water management
- Waste management

We aspire to reduce the primary resource consumption of our production, reduce our CO₂ footprint and avoid unnecessary waste to landfill. For our inaugural ESG & sustainability report we have focused on Scope 1 (direct emissions from own sources) and Scope 2 emissions (from purchased energy sources). We aspire to incorporate Scope 3 emissions (includes indirect emissions from the entire value chain) at a later stage in time.

4. SOCIAL PERFORMANCE, SDG 4

Within our social performance targets we focus on our most valuable resource: our employees. As a knowledge driven enterprise our employees have a high level of education, and ongoing on-the-job-training as well as lifelong learning are key elements to stay competitive. We also train apprentices to give youth a head start to their careers and to increase our available labor pool for entry job positions. The group supports science master students, doctoral degrees and selectively MBAs. Within our BRAINway trainings program we aim to anchor our corporate culture throughout the group, establish best practice and actively manage our talents. Occupational health and safety including safe labor practices play a key role for an R&D driven as well as producing firm like BRAIN. Health topics have started to play a dominant role throughout the Corona pandemic. In addition, public education and dialogue are important elements with which we engage our networks and the public, including to attract local talent to the organization and to educate about advanced technologies such as genome editing.

Key material social performance topics are:

- Occupational health & safety
- Employee development & training
- BRAINway corporate culture development
- Safe labor practices
- Community education & dialogue
- Promoting women career development



For a detailed description, please refer to chapter 5:
→ Impact Products & Services

5. EFFICIENT GOVERNANCE

BRAIN is very aware that it takes a long time to build a solid corporate reputation among business partners, employees and the public, but only one misstep to break it. Hence, efficient corporate governance is a key element of our risk controlling and ESG strategy. Next to our own internal guidelines and controlling mechanisms we comply with external best practice like the German Corporate Governance Codex, German Sustainability Code and the UN Global Compact. Our internal guidelines are summarized within the BRAIN Financial Control Framework ("FCF") and will become formalized in the BRAIN Red Book which are dynamic best practice guidelines for the entire group. Compliance with the BRAIN FCF and the BRAIN Red Book is checked regularly within our internal audit process. Our current Executive Board has considerably upgraded our corporate governance processes and keeps adjusting to match best practice standards.

- Key material efficient governance topics are:
- Compliance with the German Corporate Governance Code (DCGK)⁵
 - UN Global Compact compliance and progress report
 - Compliance German Sustainability Code (DNK)
 - Strict four-eye principle for all material documents, payments and corporate communication
 - BRAIN Biotech Code of Conduct (in development)
 - Enforcement of all corporate quality, health and safety policies including standard operating procedures
 - Efficient internal compliance and financial controlling throughout the group, "BRAIN FCF" and "BRAIN Red Book" as mandatory guidelines for all group companies
 - Qualified legally trained internal compliance officer
 - Monthly reporting, quarterly forecast and frequent audit meetings with all subsidiaries and major business fields

5— For exceptions please refer to www.brain-biotech.com/investors/statement-of-conformity/2021

Following Established Sustainability Guidelines

BRAIN follows established national as well as international guidelines for its corporate sustainable development plan and reporting. This allows our stakeholders to follow our actions and compare them to other corporates in a transparent manner. By engaging, for example, with the UN Global Compact, the German Sustainability Code and the EU Taxonomy we also implement SDG 17 and form partnerships to reach ambitious societal sustainable development goals.

WE SUPPORT



Since 2021 we have been committed to the UN Global Compact corporate responsibility initiative and its principles in the areas of human rights, labour, the environment and anti-corruption. www.unglobalcompact.org

UN Global Compact

BRAIN Biotech AG actively supports the UN Global Compact starting from mid-2021. The UN Global Compact is a voluntary initiative based on company commitments to implement universal sustainability principles and to advance the United Nations Sustainable Development Goals (SDGs).

By joining the UN Global Compact, we formally commit to the values of the world's largest initiative for corporate social responsibility and thus to ten universal principles concerning human rights, labor standards, environment and climate as well as the prevention of corruption.

We develop products and services, which change the way industrial production is done. Our natural and sustainable bio-based processes accelerate the economic transformation to a circular economy. With our current products and solutions, we already directly address at least five UN Sustainable Development Goals.

Acting responsibly is elementary for all of BRAIN's stakeholders, so that our CEO, Adriaan Moelker, is personally heading BRAIN's ESG initiatives. This incorporates the implementation of our measures also under the framework of the UN Global Compact and supports SDG 17. We document our progress within the annual Communication on Progress (COP) report which we will publish on the [→ UN Global compact webpage](#).

German Sustainability Code (DNK)

The German Sustainability Code (DNK: Deutscher Nachhaltigkeitskodex) provides support with establishing a sustainable development strategy and offers a way into efficient sustainability reporting. Via regular reporting corporates can make their sustainability efforts and development visible to their stakeholders over time. To comply with the Sustainability Code, BRAIN has prepared a declaration on the twenty criteria of the Code as well as supplementary non-financial performance indicators in the DCGK database.

By supporting the German Sustainability Code, BRAIN also complies with CSR-RUG Corporate Social Responsibility) reporting obligations and implements the German national action plan for Business and Human Rights.

The German Sustainability Code criteria are:

1. Strategy
2. Materiality
3. Objectives
4. Depth of value chain
5. Responsibility
6. Rule and processes
7. Control
8. Incentive schemes
9. Stakeholder engagement
10. Innovation and product management
11. Usage of natural resources
12. Resource management
13. Climate-relevant emissions
14. Employee rights
15. Equal opportunities
16. Qualifications
17. Human rights
18. Corporate citizenship
19. Political influence
20. Conduct that complies with the law and policy

The code database is publicly accessible to create visibility and document our sustainable business conduct.

Please have a look at → [BRAIN's DNK declaration](#) which also supports SDG 17.

EU Taxonomy

Within the context of the European Green Deal the EU taxonomy for sustainable activities is a classification system to clarify which investments are environmentally sustainable. Investments are judged by six objectives: climate change mitigation, climate change adaptation, the circular economy, pollution, effect on water, and biodiversity.

At the moment, only the technical screening criteria (TSC) of climate change adaption and mitigation have been defined by the EU Commission.

BRAIN has conducted a joint project together with the Frankfurt School FS-UNEP Collaborating Centre to access to what extend the EU taxonomy for sustainable activities already is applicable to BRAIN's business. The regulation provides a classification system for economic activities and places the disclosure obligations on companies and financial market participants.

Within the study and after screening 18 products and services in detail, only BRAIN's activities around bioethanol were found to be EU Taxonomy eligible. This products fall under the

EU Taxonomy category 9.1 – close to market research, development and innovation. In the analyzed business year 2020/21 enzymes for the bioethanol production represented less than 3 % of the group turnover and less than 2 % of group CAPEX.

Hence, the EU Taxonomy is not of strategic relevance for BRAIN at the current stage. However upcoming regulations related to biodiversity and the other environmental objectives of the EU Taxonomy could have a stronger impact and relevance on our business. Especially, once the other four environmental objectives (pollution prevention, protection of ecosystems, transition to a circular economy, sustainable use of water and marine resources) are classified with its technical screening criteria, the level of alignment could change significantly. This can be particularly relevant in the case of transition to a circular economy: here BRAIN's products and services play a leading role.

In an initial assessment, BRAIN sees rather significant business opportunities from the EU Green Deal and its reporting requirements rather than operational hurdles or threats.

GRI, Core Option

The GRI Standards (Global Reporting Initiative) enable organizations to report on their impact on the economy, environment and people, thereby increasing transparency on the organization's contribution to sustainable development. The GRI Standard is well accepted among many stakeholders – including investors, policy-makers, capital markets, and civil society. The standards are regularly reviewed to ensure they reflect global best practice for sustainability reporting.⁶

This Sustainability Report was prepared along the GRI standard 2016: Core-Option. This will make it more convenient for our stakeholders to assess our sustainability efforts as well as compare them to other companies and enable a future limited assurance audit.

6— Source: www.globalreporting.org/standards

Materiality Analysis

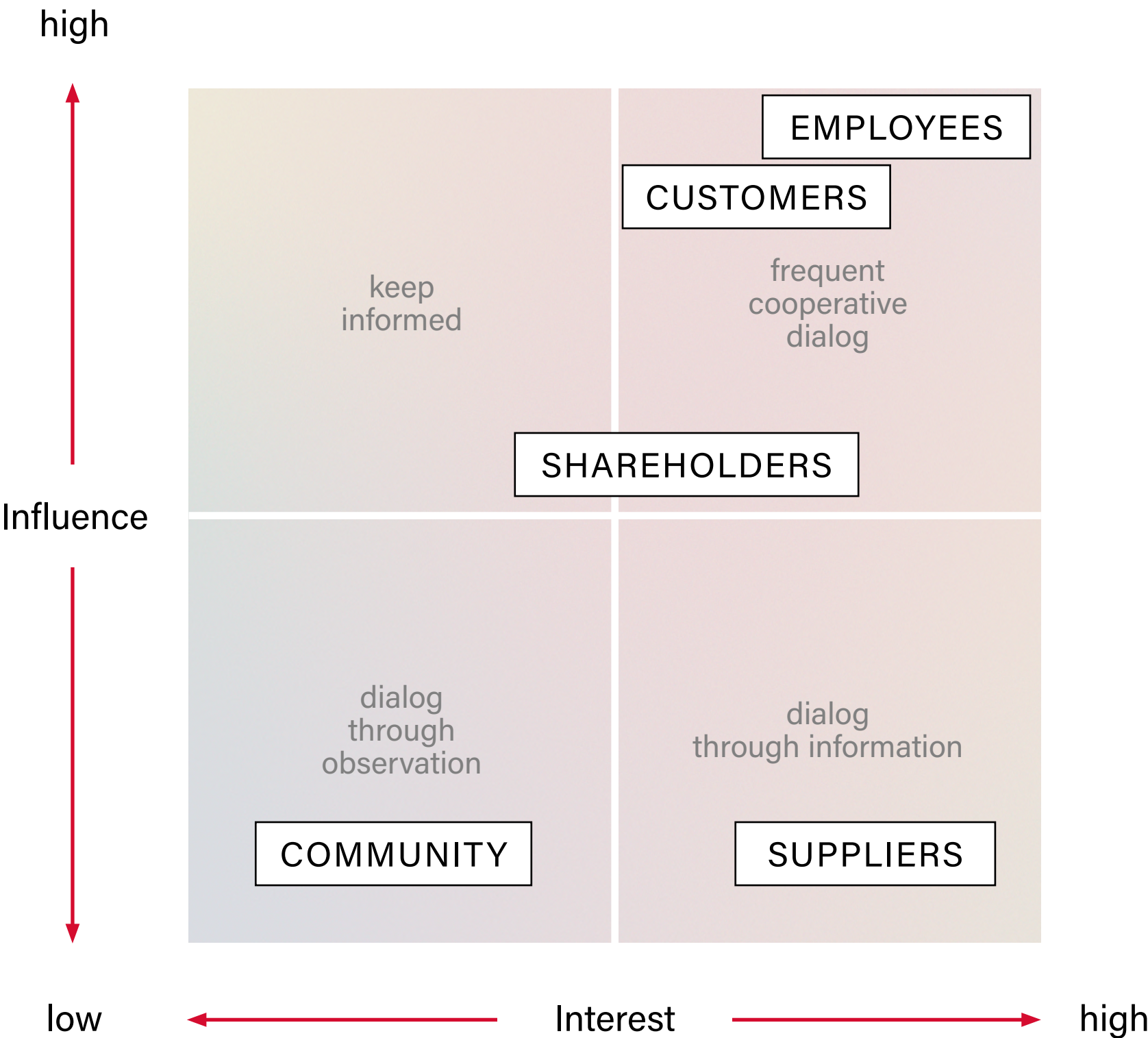
04

24 BRAIN Materiality Analysis

BRAIN Materiality Analysis

Our materiality analysis begins by first identifying our key stakeholders. We have conducted an internal analysis and cross referenced it with our equity analysts⁷ analyzing which stakeholders have at the same time a high interest in BRAIN and can exercise high influence on the company.

We have identified employees, customers and shareholders as our most important stakeholders. Accordingly, our sustainability analysis, the ESG report and our target setting focusses on our employees, customers and shareholders. BRAIN is in constant dialogue with its main stakeholders through town hall meetings, an open door policy, ongoing customer contact and a high number of investor interactions.



Stakeholder Matrix — addressing the most relevant interest groups

7 — Baader Bank, Deutsche Bank, Kepler Cheuvreux and M.M. Warburg & Co

ESG/Sustainability Task Force

As a next step we have formed a group-wide ESG / Sustainability task force consisting of employees across different functions and representing all group company members. There has been a strong commitment by our employees to participate, and it has been great to see that many volunteered to be part on our journey to publish our inaugural sustainability report. There is a strong inherent belief within the organization that BRAIN Biotech AG really can make a positive impact. Within internal workshops the ESG / Sustainability task force has developed common themes which are material to our key stakeholders throughout the group. We have cross-checked this materiality targets with the feedback and reports of the equity analysts covering BRAIN.⁸ In order to reduce complexity and costs we have refrained at the current point in time from an external assessment by conducting a dedicated survey with additional stakeholders.

8 — Baader Bank, Deutsche Bank, Kepler Cheuvreux and M.M. Warburg & Co



Executive Board
Adriaan Moelker
CEO



Operational Lead
Michael Schneiders
Head IR & Sustainability

ESG Team: BRAIN Group



- Accounting
- BioScience
- HR
- IR
- Legal
- Quality Control



- BioScience



- MD



- Controlling



- MD
- Production

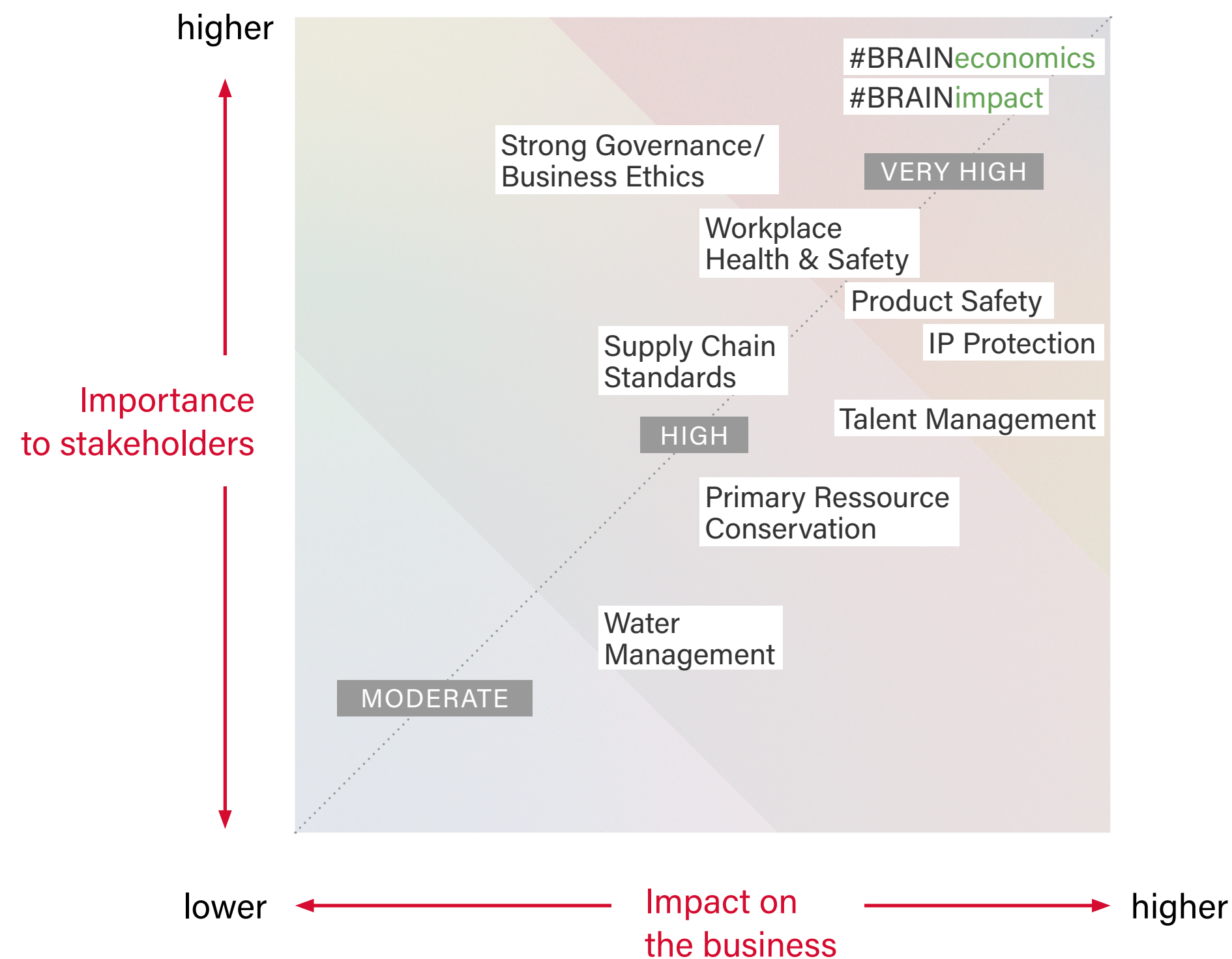


- Accounting



not yet part of the report
as base year 20/21

ESG Operational Structure — involving the entire group

Materiality Matrix

Within our materiality analysis we have identified the following key themes:

#BRAINEconomics

The executive board, supervisory board and extended management team at BRAIN strongly believe that in order to strive for sustainability we have to start from a solid economic base. Hence, growing revenues, increasing our EBITDA margin and turn cash-flow positive is part of our journey to a responsible business.

BRAIN promotes the concept of double materiality. We call this #BRAINEconomics and have set ambitious mid-term targets to double our revenues and reach a mid-point EBITDA margin of 15%.⁹ This will enable us to:

This will enable us to:

- Secure and grow employment
- Financing our breakthrough incubator projects with strong sustainability contributions: #BRAINimpact
- Finance our business growth and future incubator programs
- create value for our community and shareholders.

In addition to our internal economic assessment and planning we have held extensive discussions with our stakeholders on the importance of economic performance indicators. Especially our covering equity analysts¹⁰, customers, employees and shareholders have expressed the necessity of BRAIN to become a self-financing enterprise over time in order to remain a valued partner.

#BRAINimpact

Within our impact projects we contribute to a sustainable economic development by addressing big societal topics in the areas of nutrition, health and environment. The success of these projects has a significant impact on our own business and is of very high importance to all our stakeholders. Most of this projects are within our incubator pipeline which currently holds eleven programs at different stages of maturity. Here we directly contribute to a more sustainable lifestyle, better health, the preservation of primary resources, and with our genome editing platform we offer a platform technology which is applicable to many areas of sustainable development.



For a detailed description of our impact projects, please refer to chapter 5: [→ Impact Products & Services](#)

⁹ — Capital Market guidance 09/2020, mid-term target (4 – 5 years), base year FY 2018/19
¹⁰ — Baader Bank, Deutsche Bank, Kepler Cheuvreux and M.M. Warburg & Co

IP Protection

A strong IP protection strategy is absolutely vital for knowledge-driven enterprises such as BRAIN Biotech and expands far beyond patents. Trade secrets and process knowhow play an equally important role. In addition, also investors considering whether to put their capital into a biotech company like BRAIN will inevitably want to consider its intellectual property (IP) strategy before doing so. Investors will do their due diligence, they will look at companies' assets, including their IP, for evidence of their current value and growth potential.

Patents are always the IP asset that gets the most attention when looking at the value of a biotech company – the value of world class science and innovation is often assessed in terms of its translation into patents. However, and while patents can be hugely valuable, good opportunities in biotech could be missed if this is the only indicator taken into account.

There are a number of reasons for this:

1. Biotech companies like BRAIN by their nature are constantly pushing boundaries and cannot always get patents to protect these inventions. This does not mean that there is no value in the technology.
2. It can be really challenging and expensive to persuade patent offices to grant patents in certain areas. Instead, many will keep their patent portfolio focused and mainstream in nature.

3. In biotech, the reality is that there are often many aspects of the technology which are simply best kept as trade secrets. A subtle variation to a biotech process can be hugely valuable – enough to build a business off the back of – but can't necessarily be protected by the patent system. There is robust legislation in Europe and the US to support such an approach. Trade secrets should not be underestimated but are harder to document than patents so could be difficult to pin down in any due diligence exercise carried out by an investor.

Quality not quantity of patents is key: investors will often look at the number of patents as an indicator of value. However, the perceived value in having lots of patents filed is often misguided. In life sciences especially, it can be as important to have one patent, which is valid and broad enough to cover multiple competitors, than multiple patents which are weak or narrow in scope. Thus, quality and not quantity is often a differentiating factor. The real question investors should ask themselves is whether the patents have any value at all. In answering this question, the main issue is whether the patents are actually valid.

At BRAIN, we focus on a wide enough patent protection strategy where applicable. Hence, quality not quantity of patents is our main consideration. In total, we currently hold around 50 patent families with a larger

number of individual patents. In addition, trade secrets on process knowhow build a large part of our intellectual property.

Our IP strategy and BRAIN's commercial goals are aligned. While monetization of core patents is critical, we consider all IP assets, the entire IP strategy, and the big picture to achieve the best outcome for our company. Our detailed IP policy depends strongly on the type of project in which an invention is made. The policy distinguishes between customized solutions, BRAIN-internal research projects, collaborative projects including our incubator pipeline and enzyme development or production.

Product Safety

To manage the quality and safety profile of our products within the BioIndustrial segment is essential for BRAIN and all our stakeholders. Many of our products are supplied to the nutrition and health segment or directly have an environmental impact. Next to internal guidelines and product safety procedures we have the following certifications in place:

- Biocatalysts: ISO 9001, 14001, 45001; FSSC 22000, SMETA, Kosher and Halal
- BioSun: AIB (US) Third Party Audit; Kosher and Halal
- L. A. Schmitt: ISO 16128, EN ISO 22716:2007, NaTrue
- WeissBioTech: ISO 9001, FSSC 22000

Talent Management

We consider the BRAIN Group to be a knowledge driven enterprise. Our employees build the key differentiating factor for our competitiveness. Hence, talent recruiting and management play a key role in our corporate development. We have embedded a people strategy into our strategic planning process. Within our people strategy we set out the strategic direction of our employee development. It sets out the interventions that are required to ensure we develop as a company that is continuously fit for purpose, lives its values and delivers its objectives.

BRAIN's people strategy is strongly linked with its five strategic initiatives:

- 1. profitable topline growth
- 2. innovation pipeline management
- 3. continuous productivity improvement
- 4. accretive M&A
- 5. continuous corporate culture development.

It aims to systematically deliver on our vision and mission for BRAIN, create a high performance organization and lead this great workplace into a successful future.

These five key elements are:

- 1. **Performance management:** incentivize innovation, retain and attract talent, build leadership skills;
- 2. **Innovation management:** encourage pioneering ideas and commercialize the incubator pipeline;
- 3. **Organizational efficiency:** lean management, flexible work arrangements and effective internal communication;
- 4. **Personal development:** foster key training as well development needs, efficient succession planning;
- 5. **Corporate culture:** agile, act around core values, great place to work.

The human resources department is assisting to plan, design and facilitate this process. The process itself is led by senior management and chaired by our CEO, Adriaan Moelker.

Strong Governance / Business Ethics

At BRAIN we are aware that it takes a long time to build a solid corporate reputation among business partners, employees and the public, but only one misstep to break it. Hence, efficient corporate governance is a key element of our risk controlling and ESG strategy. Next to our own internal guidelines and controlling mechanisms we comply with external best practice like the German Corporate Governance Codex, German Sustainability Code and the UN Global Compact. Our internal guidelines are summarized within the

BRAIN Financial Control Framework ("FCF") and the currently drafted BRAIN Red Book which are dynamic best practice guidelines for the entire group. Compliance with the FCF Red Book is checked regularly within our internal audit process. Our current executive board has significantly upgraded our corporate governance processes and keeps adjusting to match best practice standards.

Key material efficient governance topics are:

- Compliance with the German Corporate Governance Code (DCGK)¹¹
- UN Global Compact compliance and progress report
- Compliance German Sustainability Code (DNK)
- Strict four-eye principle for all material documents, payments and corporate communication
- BRAIN Biotech AG Code of Conduct (in development)
- Enforcement of all corporate quality, health and safety policies including standard operating procedures
- Efficient internal compliance and financial controlling throughout the group, "BRAIN FCF" and "BRAIN Red Book" as mandatory guidelines for all group companies
- Qualified internal compliance officer
- Monthly reporting, quarterly forecast and frequent audit meetings with all subsidiaries and major business fields

11 — For exceptions refer to
www.brain-biotech.com/investors/
statement-of-conformity/2021

Workplace health and safety

In its different entities the BRAIN Group is either focusing on breakthrough innovations, contract research or the production of innovative customer solutions. In all areas it is of high importance for us to protect our employees and the environment from any potential hazards which might relate to our business activities. In addition, BRAIN actively supports selected preventive healthcare measures.



For a detailed explanation please refer to
→ [Promote Safe Work Environment](#)

Supply chain standards

We aspire to build sustainable and stable relationships with our suppliers. We prefer partners and suppliers with high own environmental and social standards. Information regarding specific supplier violations is reported and investigated directly. If confirmed, an action plan is prepared to mitigate the topics or to search for alternative sources. Most purchasing decisions are done at the level of the individual operating unit but it is intended to increasingly centralize purchasing especially in the BioIndustrial segment. This will not only unify standards but also allow to increasingly harvest economies of scale.

Close to 90 % of our BRAIN Group product sourcing is executed within the EU, UK, US and other developed countries with high labor and social standards; most of this from large or multinational suppliers. Only around 10 % of our sourced products are originated from emerging markets (mostly China) with the relative share of these purchases decreasing during the last years. Emerging market sources require our special attention when it comes to supply chain standards.

Biocatalysts utilizes a standardized Supplier Approval Questionnaire (SAQ) for all of its suppliers. The SAQ is also employed for SEDEX (Supplier Ethical Data Exchange) or equivalent certifications. In addition, Biocatalyst enforces supplier risk assessment, approval and monitoring procedures.

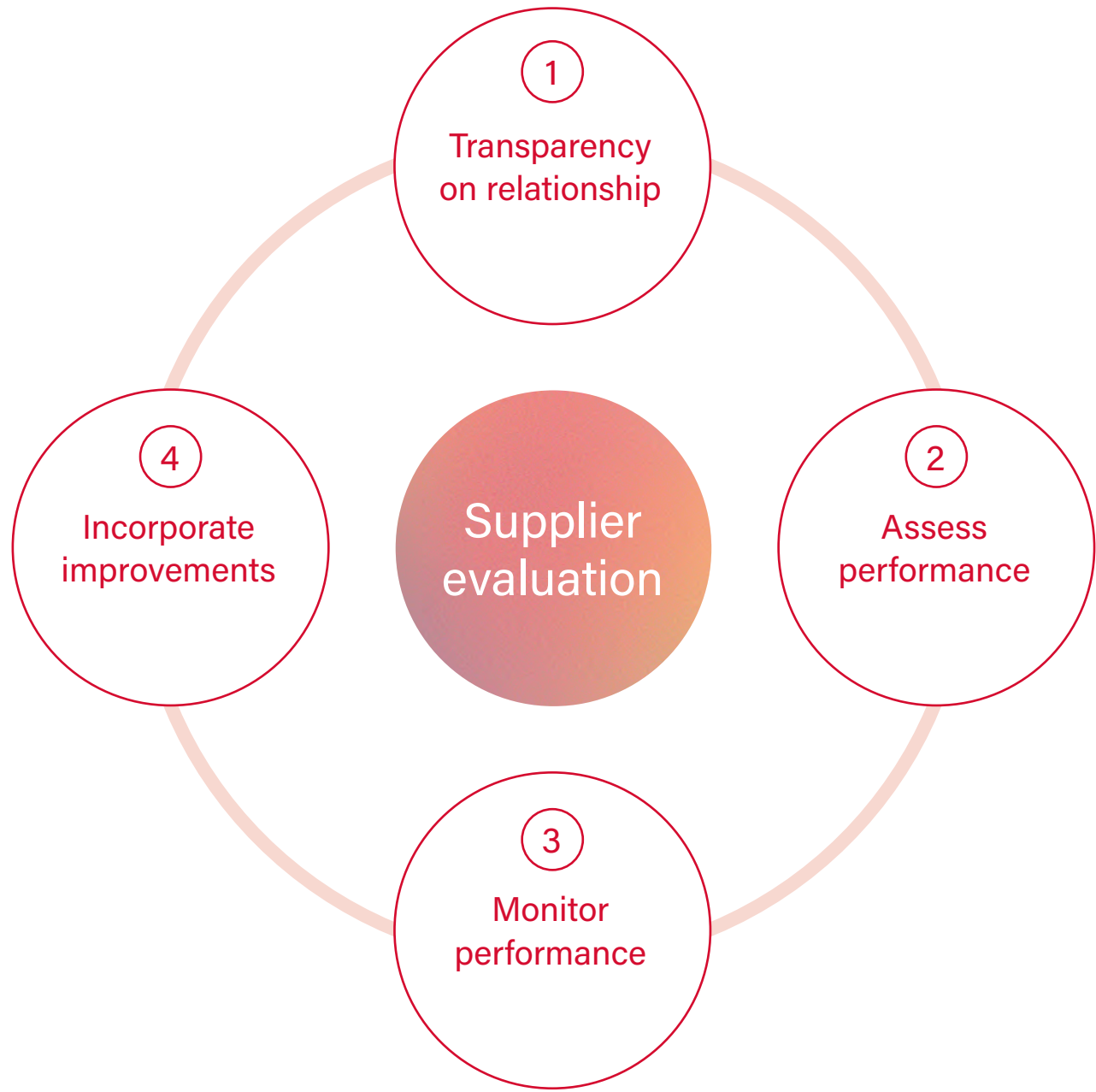
WeissBioTech utilizes the EcoVadis rating for its supply chain analysis and scorecard.

Within the framework of the NATRUE certification L.A. Schmitt checks for the sustainable supply of natural raw materials for the production of cosmetics.

We will establish the following process for all of our supplier relations:

Our Suppliers:

- Close to 90 % sourced from EU, UK, US and other developed countries
- Mostly large or multinational suppliers
- Only around 10 % sourced from emerging markets
- All business relations with Russia terminated



Supply Chain Relations —
sourcing focussed in the developed world

Special focus:
Russian invasion
of Ukraine

Shortly after the forceful Russian invasion into the territory of Ukraine the BRAIN Group has decided to terminate all business relations with Russia. As long as possible we will keep commercial links running with our partners in the Ukraine. In addition, our cosmetics daughter company L.A. Schmitt has supported aid transports into the Ukraine and donated urgently required pallets of hand soap and disinfection products. Our daughter company Breatec has sent aid to their supplier in Ukraine.

Impact

50

- 32 SDG 2: Food security and improved nutrition
- 35 SDG 3: Improving health & well-being
- 39 SDG 6 & 12: Minimizing pollutants in industrial processes
- 43 SDG 9: Promoting sustainable industrialization
- 47 SDG 2, 3, 6, 9, 12 & 13: New genomic techniques for precise gene-editing
- 50 Open Discourse on precise genome editing – the next level of genome engineering

Positive Impact: Products & Services

How can we as the BRAIN Group contribute to a more sustainable living? Where can we make a real positive impact on society?

Already today we contribute with our technologies, solutions and products making industrial processes and products more sustainable. We learn from nature and apply biology to industrial processes. This applies to application fields in nutrition, health and the environment. BRAIN Group's business is based on enzymes, microorganisms and bioactive natural compounds. Each of these can help drive the move

toward more bio-based products and processes, but enzymes are by far the most important product within our toolset for a bio-based future. Enzymes are versatile helpmates for building, degrading and modifying molecules, enabling us to produce almost any desired organic molecule we or our industry partners are looking for (see page 49: → Enzymes are nature's catalysts, serving a sustainable future).



**Food security
and improved
nutrition**



**Improving health
and well-being**



**Minimizing
pollutants
in industrial
processes**



**Promoting
sustainable
industrialization**



**New techniques
for precise
gene editing**



Food security and improved nutrition

The United Nations see their goal endangered to eliminate hunger and malnutrition as planned by 2030.¹² Cultivating, processing and producing food in a sustainable and efficient way as well as saving food from spoilage are action areas where BRAIN can make its impact.

¹²— unstats.un.org/sdgs/report/2016/goal-02 (based on the latest available data as of May 2016)
¹³— SDG Report 2021 (unstats.un.org/sdgs/report/2021/goal-02)



1 in 3

Nearly one in three people in the world (2.37 billion) did not have access to adequate food in 2020 – an increase of almost 320 million people from 2019.¹³

Our contribution to SDG 2 / Zero Hunger: alternative protein sources, natural compounds for food preservation, enzymes for more efficient and more natural industrial food processing.



Food preservation

We identify plant-based antimicrobial bioactive compounds to naturally preserve food and animal feed, such as in our “Perillic Acid” development program. Our natural preservative will help to reduce food waste in a sustainable manner. In addition, Perillic Acid is derived from side streams of the orange juice industry and helps to turn waste into valuable products.

→ BRAIN’s activities in bio-based freshness and product stability



Gene-editing technology (BEC / BMC) to allow plant growth under harsh conditions

Climate change requires breeding more robust crops in the future that can withstand heat, insufficient water supply, floods, storms, but also pests. Waiting for evolutionary genetic changes is not an option. Modern gene editing technologies are a method to make rapid and precise changes in the genome of plants minimizing negative off-target effects. BRAIN Biotech AG provides the agriculture industry with its proprietary BEC nuclease to support the development of plants that face climate challenges.



Gene-editing technology (BEC / BMC) to allow production of alternative proteins

BRAIN Biotech provides the food industry with its genome editing expertise and proprietary BEC / BMC nucleases to support producer strain development for the production of alternative proteins and for commercial use through precision fermentation.

→ We CRISPR for You



Enzymes for alternative protein

Vegetable protein sources are often not suitable for direct processing into foodstuffs: due to their structure, due to bitter substances or unpleasant taste profiles. In order to meet the trend towards sustainable meat alternatives or plant-based protein sources, further processing of the proteins is required in such cases, ideally in the most natural way possible. The BRAIN Group supports the beverage and food industry with enzymes to optimize the taste, structure, color or shelf life of their products.



Focus on our Subsidiaries

Biosun and WeissBioTech – Enzymes for waste utilization and reduction: Biosun Biochemicals and WeissBioTech offer pectinase enzymes converting food product that would traditionally be waste into side stream products. Moreover the companies distribute protease enzymes, used as meat tenderizer to reduce waste and to better use raw materials.

BRAIN Group companies offering enzyme products

→ BioSun Biochemicals

→ WeissBioTech

→ Biocatalysts

COOPERATIONS

Strategic collaboration with Formo

In February 2022 BRAIN Biotech AG launched a strategic collaboration with Formo to further advance the microbial production of animal free milk proteins. The alliance aims to optimize these microorganisms to further expand Formo’s novel and sustainable protein production for commercial use through precision fermentation, leveraging BRAIN Biotech’s expertise and its proprietary BEC platform.

 [View the press release](#)

PUBLICATIONS

From veggie day to vegan lifestyle? From trend to mainstream?

There are numerous and varied reasons for maximising the share of plant based foods in a consumer’s diet. Ethics, religion, health, taste and trendiness are some of them. Worries of finite resources, a growing population and climate crisis are adding the call for sustainability to this list.

 [Read the article](#)

How is Precision Fermentation Accelerating Food Innovation?

The food industry is undergoing radical evolution in producing the next generation of food ingredients. With a global shift towards reducing our environmental impact creeping into our diets, food manufacturers are increasingly harnessing technology to produce sustainable food ingredients.

 [Read the article](#)

Challenges of Plant Proteins in Replacing Animal Proteins

In recent years there has been a greater understanding of the significant environmental impact that producing animal-derived ingredients is having globally. This environmental impact is driving a consumer demand for substituting food products with alternatives to animal-derived ingredients, food manufacturers face the challenges of developing products that can provide the same or similar texture, taste, flavour and mouth feel as the animal-derived versions.

 [Read the article](#)



Improving health and well-being

Nutrition strongly contributes to a healthy life and thus to greater well-being.



1.5 m.

In 2012 diabetes was the direct cause of 1.5 million deaths globally. A large proportion of diabetes and its complications can be prevented by a healthy diet, regular physical activity, maintaining a normal body weight and avoiding tobacco use.¹⁴

Our contribution to SDG 3, Good Health & Well-Being: natural sugar replacement, salt replacement and salt taste enhancers, natural aromas, bioactive plant cosmetic, chronic wound treatment and PHA121 an active pharmaceutical compound to treat Hereditary Angioedema.



Less sugar

The sweet protein Brazzein can be used in the future to replace sugar in beverages and thereby reduce sugar consumption. The protein is naturally found in berries of the West African plant *Pentadiplandra brazzeana*, which have long been known as sweeteners. However, this natural source is not farmable and, hence, not suitable to sustainably cover the large demand, e.g. for sugar reduction in beverages. BRAIN developed a production process and Brazzein will – together with a food ingredients partner – be produced sustainably by precise fermentation, based on optimized microorganisms. The natural and low caloric Brazzein protein can be used in the future to replace sugar in beverages as well as food and thereby significantly reduce sugar consumption. In addition to Brazzein's positive contribution to human health a significant amount of arable land for plant sugar production can be preserved. Producing by fermentation instead of agriculture has also very positive effects on water and energy consumption.

→ BRAIN's activities in calorie-free plant-based sweeteners



Less salt

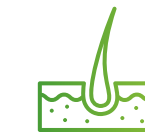
The aim of BRAIN's soon to be launched "Salt Taste Enhancer" program is to create foods with reduced sodium content while retaining the same taste experience. In addition to plant-based natural compounds that are being developed into alternative flavor carriers, a cell-based test system from BRAIN is also utilized for *in vitro* flavor testing.

→ BRAIN's activities in reducing salt in food



Less alcohol

BRAIN's "NatBev" development program focusses on the development and optimization of fermentation processes for the beverage industry to serve the trend towards alcohol-free and less sweet beverages based on natural substances.



Skin health

functional probiotics can replace chemicals in cosmetics by natural compounds. We own a collection of probiotic strains and offer our customers an evidence-based development of probiotic products for more natural products. BRAIN Biotech AG has further developed a cell-based test system that enables the identification of bioactive substances that have an effect on skin cells.

→ BRAIN's activities in bio-based skin and wound care



Gut health

Probiotics are living microorganisms having a health-promoting effect on humans and animals. Since not every probiotic strain is suitable for every application and probiotics must meet certain stability criteria, special expertise is essential to enable customers to develop novel products for gut health and well-being.

→ BRAIN's activities in probiotics



Wound healing

The Aurase® enzyme, currently going through clinical trial phase 2a (lead by SolasCure Ltd.), promotes the wound healing process. BRAIN produces this biological agent – which was originally found in larvae of the common green bottle fly – biotechnologically with micro-organisms as producers, to a high level of purity.

→ [BRAIN's activities in biological wound management](#)



Drug development for rare disease

AnalytiCon Discovery, subsidiary of the BRAIN Biotech AG, provides natural products, drug discovery and development services. In an R&D collaboration with clinical-stage company Pharvaris, the companies plan to bring oral bradykinin-B2-receptor antagonist PHA121 for the treatment of hereditary angioedema to the patients.

→ [Phavaris website](#)



Focus on our Subsidiaries

Biocatalyst – Improving casein digestibility: in April 2021, Biocatalysts Ltd launched Promod™ 517MDP, a highly efficient exopeptidase that achieves > 40 % degree of hydrolysis in casein protein. Hydrolysing casein with P517MDP breaks it down into its smaller component parts: peptides and amino acids which increases its solubility and improves its digestibility making the casein protein hydrolysate a more versatile ingredient that can be used in the production of foods for special medical purposes (FSMP) including specialist infant and follow-on formulas.

→ [Information on Promod™ 517MDP](#)

Reducing the overall fat and salt content in a final food product: in July 2021 Biocatalysts Ltd. launched Lipomod™ 4MDP, a non-animal lipase that has a high specificity toward short chain fatty acids. This enzyme uniquely produces high levels of short chain fatty acids with very low amounts of medium to long chain fatty acids produced resulting in a flavor profile that provides a sharp, cheesy, and salty flavor with no bitter or soapy notes. Ideal for Enzyme Modified Dairy Ingredients (EMDI's) going into crackers, sauces, and processed cheeses to provide a well-rounded and balanced mature cheese

flavor. EMDI's are concentrated unique dairy flavors which allow manufacturers to achieve the same great taste whilst using less dairy ingredients, reducing the overall fat and salt content in the final food product.

→ [Information on Lipomod™ 4MDP](#)

Scaling-up a bioprocess to finally reduce sugar:

Biocatalysts Ltd have successfully collaborated with a company working in the field of sugar reduction to scale up a novel enzyme technology. Working in close partnership Biocatalysts was able to rapidly scale up its process to produce a novel enzyme at commercial volumes for carbohydrate modification.

Biosun – Biosun Biochemical's pectinase enzymes improve the extraction of naturally derived anthocyanins and other health benefiting compounds.

BRAIN Group companies offering enzyme products

→ [BioSun Biochemicals](#)

→ [WeissBioTech](#)

→ [Biocatalysts](#)

COOPERATIONS

Analyticon Discovery and Pharvaris extend their fruitful collaboration

BRAIN Group company Analyticon Discovery extends its collaboration with clinical-stage company Pharvaris, focused on bringing oral bradykinin-B2-receptor antagonist small molecules to patients.

 [Read the press release](#)

Bioprocess optimization for the production of a therapeutic protein

BRAIN Biotech together with ImmunogenX optimizes a bioprocess for the production of a therapeutic protein.

 [Read the article](#)

PUBLICATIONS

Domesticated microbes in use – Why fermented foods are currently making a comeback:

Fermentation has been around for a long time and is a kind of original form of biotechnology. It uses microorganisms or their enzymes to make food keep longer and taste better. Today, when consumers choose a food product, health and sustainability are just as important as taste and shelf life. Last but not least, the current search for so-called alternative proteins is helping to reinstate fermentation in the industry. The BRAIN Group has a lot to offer on this topic.

 [Read the article](#)

Small protein with great potential

How does the substitution of a single amino acid affect the stability and sensory profile of the sweet-tasting protein brazzein? BRAIN is investigating this question in the “Pep-Dancer” project – part of its research activities on sugar substitutes.

 [Read the article](#)

Calorie-free plant-based sweeteners – BRAIN cooperates with Roquette

The highly intensive protein-based sweetener brazzein provides outstanding sweetening power while still preserving the taste profile and sugar-free functionality. As part of a joint development agreement between BRAIN and Roquette, we will now go on to obtain the approval and industrial scale-up of Brazzein in the food and beverage sector.

 [Read the article](#)



Minimizing pollutants in industrial processes

There are different ways to prevent water pollution, including reducing the amount of chemicals used in industrial processes or reducing the use of fertilizers in agriculture.



15 — Food and Agriculture Organization of the United Nations (FAO). Food Waste Footprint: Impacts on Natural Resources – Summary Report; FAO: Rome, Italy, 2013

The BRAIN Group's contribution to SDG 6 / Clean Water & Sanitation are green mining solutions to replace chemical hazards. The contribution to SDG 12 / Responsible Consumption & Production: green and urban microbial mining (bio-based recycling); enzymes for efficient food processing and enzymes for reuse of side-/waste streams.



Making metal recovery processes more sustainable

Our microbial gold recovery replaces conventional recycling processes, thereby replacing chemicals by biological metal extraction and so reducing the utilization of aggressive and partly toxic chemicals. In addition, the biological process requires less energy, which significantly reduces the carbon footprint of biological metal recovery processes. Besides gold, other precious metals and metals as lithium as well as cobalt can be recovered in this way from e-scrap, incinerator bottom ash, EV batteries and other waste of mineral origin ("urban mining").

→ [BRAIN's activities in Urban Mining](#)



Re-using carbon-rich waste streams

To support e.g. the bioleaching activity to recycle lithium from lithium ion batteries, microorganisms are fed, i.e. with a simple sugar, a carbon-rich waste stream such as beet syrup, crude glycerol from biodiesel production, or pomace from vegetable or fruit processing. Or even just with carbon dioxide. The latter could compensate for the whole amount of carbon dioxide released during the original production process.

→ [BRAIN's activities in Microbial Battery Recycling](#)



Probiotics in agriculture and household

Probiotics are living microorganisms having not only a health-promoting effect on humans and animals but also in agriculture or in the household sector. We find and develop probiotic strains for customers and support the development of more sustainable products.



Plant protection

In the agricultural sector, probiotics play a role primarily in biostimulation of growth, plant resilience, seed protection, micro- and macronutrition of the young plant, and nitrogen fixation in the root zone. The future market of "vertical farming" could also benefit from the use of probiotics.

→ [BRAIN's activities in probiotics](#)



Focus on our Subsidiaries

Biosun – Enzyme use with many advantages: Biosun Biochemicals' pectinase enzymes assures the maximum amount of juice is removed from fruits, which reduces waste and controls costs. The enzymes further increase process efficiency, which enables less water and energy to be consumed and convert product that would traditionally be waste into side stream products. The company's filter cleaner enzymes lower utilization and discharge of chemicals and decreases handling of hazardous chemicals. Their protease enzymes for meat tenderizing help to reduce waste and to better use raw materials.

→ [BioSun's enzyme products](#)

Biocatalysts – Responsible consumption and production / circular economy, reuse side-/waste streams: in November 2021, Biocatalysts Ltd launched Promod™ 324L, a unique blend of endopeptidase activities specifically for the hydrolysis of animal waste protein. Use of enzymes, such as P324L, allows pet food ingredient manufacturers to begin to repurpose and add value to some of the 1.6 billion tons of food waste that is lost globally throughout the food chain each year (FAO).¹⁶

→ [Information on Promod™ 324L](#)

16 — Food and Agriculture Organization of the United Nations (FAO). Food Waste Footprint: Impacts on Natural Resources — Summary Report; FAO: Rome, Italy, 2013

In 2018, Biocatalysts Ltd became a zero waste to land-fill manufacturing company. This great achievement was recognized as a winner of the Made in Wales Award for Sustainability. The environment has always been important to Biocatalysts with the company achieving ISO 14001 accreditation in 2012 – the international standard for environmental management – and maintaining it ever since.

L.A. Schmitt – BRAIN Group cosmetics manufacturer
L.A. Schmitt has extensive know-how in the development and production of natural cosmetics. The company is a member of NATRUE, an international non-profit association committed to natural and organic cosmetics worldwide. NATRUE certification is possible both for raw materials and finished products and the process follows widely recognized certification procedures. In addition L.A. Schmitt is certified according to the ISO 16128 standard that provides guidelines on definitions for natural and organic cosmetic ingredients.

Furthermore, L.A. Schmitt advises its clients on sustainable packaging: the company sources its solutions from various suppliers of environmentally friendly packaging made from recycled material (post-consumer resin, PCR), ranging from 100 % recyclable to fully compostable packaging. In addition to recyclable materials L.A. Schmitt has access to packaging solutions that allow to save packaging material (e.g. in the tube

sleeves), that show a good food residual drainability and have a material recycling possibility of all packaging components (e.g. tube components).

→ [L.A. Schmitt's website](#)

COOPERATIONS

Recovering platinum group metals

Heraeus and BRAIN successfully complete development of an environment-friendly process.

 [View the press release](#)

PUBLICATIONS

Umwelt Magazin
Microbial Gold Recovery
(German only)

If you want to sustainably meet the growing demand for precious metals, biotechnological processes could be the solution. We are utilizing bacteria to recover precious metals from waste streams.

 [Read the article](#)

Biosorption for heavy metal removal from sewage sludge

Sewage plant operators and water treatment companies in Germany are under pressure: by 2023 they have to present concepts for phosphorus recovery. One hurdle for the currently tested recycling processes are the remaining heavy metals. Microorganisms can be used here to separate these metals in an environment-friendly way.

 [Read the article](#)

How enzymes can add value to your food waste by-products

With consumers changing attitude towards sustainability businesses are reacting and are looking for ways to reduce their environmental footprint.

 [Read the article](#)

VIDEOS

ZDF
Gold Recycling Powered by Bacteria
(German only)

To dissolve gold from electronic scrap for recycling purposes, you need toxic acids. Or are there alternatives? A bacterium could offer an environmentally friendly alternative.

 [Watch the video](#)



Promoting sustainable industrialization

There is much potential to modify industrial processes to reduce primary resource input, replace potentially toxic materials and advance the circular economy. Bio-based solutions play a major role in this transformation.

17 — Robinson P. K. (2015). Enzymes: principles and biotechnological applications. Essays in biochemistry, 59, 1–41. <https://doi.org/10.1042/bse0590001>



1878

It was a German physiologist who first used the term “enzyme”: Wilhelm Kühne used “enzyme” (derived from the Greek word zume, meaning “yeast”) in 1878 to describe the ability of yeast to produce alcohol from sugar. With this term, he displaced the term “ferment”, which had been widely used until then.¹⁷

The BRAIN Group's contribution to SDG 9 / Industry, Innovation & Infrastructure: enzymes as natural catalysts, biotechnological production, improving production efficiencies for resource conservation, fermented food from side-streams, microbial CO₂ usage for chemical building blocks.

Besides the necessity to reduce greenhouse gases emissions right from the start, there are innovative approaches to use gaseous CO₂ as a raw material and to incorporate it into a newly produced solid or liquid substance. Microorganisms are used for these purposes to create a kind of "biorefinery".



Microorganisms transforming CO₂ into useful chemical building blocks

We develop microorganisms to convert the greenhouse gas CO₂ via acetate into a variety of chemical building blocks. These building blocks can then be turned into various industrial products, such as bioplastics, and other consumer products.



Microorganisms using CO₂ as a raw material to create bio-based lubricants for vehicles

In a joint R&D project with an industry partner BRAIN developed an enzymatic synthesis processes for the production of high quality lubricant additives from biogenic raw materials and waste streams. In this example waste streams could be used as both a nutrient for the enzyme production and as a raw material for the manufacturing of target products.



Make metal recovery processes more sustainable

A biological process usually requires less energy than a chemical process based on high temperatures and high pressures. Our bio-extraction approach for metal recovery ("biomining") can help save energy (see also SDG 6 / 12).

→ [BRAIN's activities in biomining](#)



Enzyme-based biochemical syntheses replace chemical synthesis

Another advantage of using enzymes in biochemical syntheses is that biochemical syntheses requires significantly less energy compared to chemical syntheses, since chemical reactions rely on high temperatures, high pressure, and catalysts containing heavy metals. The advantage of replacing partially toxic heavy metal-containing catalysts with enzymes becomes immediately obvious.



Focus on our Subsidiaries

WeissBioTech – Generating higher yields and lowering energy consumption: fruits and vegetables are processed into juices, purees, compotes, jellies, jams and marmalades, canned products, etc. Typically, enzymes such as pectinases, cellulases, beta-glucanases and hemicellulases are used to improve processing to generate higher yields, improved juice extraction, and lower energy consumption. Pectinases in particular are employed for juices from apples and pears and also those made from berries and tropical fruits.

Improving the economics and processing efficiency of fruit products: WeissBioTech's NATUZYM® tailored enzyme products improve the economics and processing efficiency of apples, pears, citrus and stone fruits and fruits such as peaches, strawberries and many other berries. This helps generate more out of less with a strong impact on maximum conversion of raw materials into final food product and reduction of waste.

Improving the economics and yield of bioethanol production: WeissBioTech provides enzymes for the food and beverage industries but also for starch processing. A large application for industrial enzymes outside the food space is in the production of alternative fuels, such as bioethanol. WeissBioTech's DELTA-ZYM® enzyme products are turning starch from regenerative resources such as wheat and corn into fermentable sugars and are improving the yields in fermentative bioethanol production. These products and continuous product developments are contributing to improving the economics and yield while reducing waste of bioethanol plants. Bioethanol is increasingly replacing fossil fuels, such as in E5 and E10 automotive fuels, contribution to the EU's climate and sustainability goals.

Biosun – Pectinase enzymes improving production efficiencies: assuring the maximum amount of juice is removed from the fruit, which reduces waste and controls costs; increasing process efficiency, which enables less water and energy to be consumed. Filter cleaner enzymes protect the environment: lowering utilization and discharge of chemicals; decreasing handling of hazardous chemicals.

Biocatalysts – Developing novel enzymes to produce environmentally friendly products: OXIPRO is part of the European Union Horizon 2020 program, its remit is to focus on developing a range of novel enzymes to produce environmentally friendly products ranging from detergents, textiles, sunscreens, and nutraceuticals. Biocatalysts Ltd are part of a multidisciplinary team of researchers and stakeholders from 15 entities across Europe, who will be working together to exploit the valuable potential of oxidoreductase enzymes to replace traditional chemical processes in the production of consumer products thus reducing the environmental impact of these processes.

Improving process productivity and supporting adoption of biotechnology in industry: Biocatalysts Ltd in partnership with University College London (UCL) announced as winners of the prestigious IChemE Global Food & Drink Award 2020, for the development of Ultra Scale-Down techniques in accelerating the manufacture of industrial enzymes. The successful embedding of these advanced biochemical engineering techniques into the enzyme manufacturing processes at Biocatalysts Ltd, in some instances improving process productivity by up to 50 %. This benefit along with other improvements such as better quality process streams translates to economic benefits for customers, reducing the barriers to entry for supply of enzyme manufactured at Biocatalysts Ltd and supporting the continued

adoption of biotechnology in the food and other industries.

BRAIN Group companies offering enzyme products

→ [BioSun Biochemicals](#)

→ [WeissBioTech](#)

→ [Biocatalysts](#)

COOPERATIONS

Cooperation in the field of microbial CO₂ utilisation

BRAIN and Südzucker cooperate in making the industrial by-product CO₂ available for the production of a multitude of interesting intermediates using optimised platform organisms.

 [View the press release](#)

Partnership to produce lubricants from renewable raw materials

Biotechnology company BRAIN AG and FUCHS Europe Schmierstoffe GmbH, the largest operating company of the FUCHS PETROLUB SE Group, announce a partnership involving the biotechnological production of lubricant additives from renewable resources.

 [View the press release](#)

PUBLICATIONS

CO₂ bioconversion – from greenhouse gas to valuable material

When we talk about climate change, we are also talking about climate-damaging greenhouse gases. One of them is CO₂ (carbon dioxide). It currently accounts for the majority of greenhouse gases, with around 35 billion metric tonnes emitted annually, and its share in the atmosphere has risen from around 280 ppm (parts per million) since the beginning of industrialization to 410 ppm today.

 [Read the article](#)

OXIPRO – A Project to Drive the Transition to Greener Consumer Products

Biocatalysts Ltd are excited to be part of this ground-breaking project.

 [Read the article](#)

Winners of Prestigious IChemE Global Food & Drink Award 2020

IChemE have selected Biocatalysts Ltd in partnership with University College London (UCL) as the winners of the prestigious IChemE Global Food & Drink Award 2020, for our submission – Ultra Scale-Down Accelerates Industrial Enzyme Manufacture.

 [Read the article](#)



New techniques for precise gene editing

The quest for greater sustainability is driving more innovation, and innovation in turn creates opportunities for greater sustainability. Classical approaches to gene editing are unspecific with little traceability. With next-generation genome editing system CRISPR-Cas, genomic DNA can be quickly and precisely altered at specified locations.

18 — www.statista.com/statistics/950816/crispr-genome-editing-market-size-globally



10.8 bn

According to the data, the market for CRISPR genome-editing tools is expected to increase from 846 million U.S. dollars in 2019 to some 10.8 billion U.S. dollars in 2030. CRISPR stands for „clustered regularly interspaced short palindromic repeats“ and is often referred to as “genetic scissors”.¹⁸

Our CRISPR technology as key enabling technology for Bioeconomy is the basis for many developments supporting several SDGs.

BRAIN has identified approximately 2,000 previously unutilized additional Class 2 CRISPR nucleases via metagenome sequencing. These nucleases could be deployed for genome editing. For the two lead candidate, the so-called BRAIN-Engineered-Cas (BEC) and BRAIN-Metagenome-Cas (BMC) nuclease, the company has already successfully demonstrated both activity and genome editing properties in microorganisms and mammalian cells. Activity in plants is currently being validated. The first industrial partnerships have successfully been closed to develop BEC/BMC into an established genome editing platform.

→ We CRISPR for You



Optimize the metabolic performance of microbial production strains

BRAIN Biotech is using BEC today in the development of common microbial production strains, as well as for microbial protein expression and process optimization. With targeted genome editing, we achieve higher yields in the fermentation process as well as greater stability in microbial protein secretion under specific environmental conditions.



Change microbial substrate utilization to exploit waste streams

A microorganism strain can be modified in order to utilize a different substrate to its natural one, e.g. because the utilization of a certain organic waste product is desired.



Making plants resistant against harsh environmental conditions

Climate change requires cultivating more robust plants. Gene-editing with our BEC nuclease and BMC01 nucleases results in rapid and precise changes in the genome of plants without fear of negative off-target effects.



Enabling cell-based production of alternative protein

BRAIN Biotech provides food industry with its genome editing expertise and proprietary BEC nuclease to support microbial strain development and precision fermentation for the production of alternative protein.

PUBLICATIONS

An Alternative CRISPR-Cas Tool for Genome Editing

Our scientists have isolated a non-Cas9 nuclease for genome editing and developed a novel CRISPR-Cas tool. What does this imply for our own R&D and for customer projects?

 [Read the article](#)

IN-DEPTH

Enzymes are nature’s catalysts, serving a sustainable future

Enzymes will play a key role on the way to more sustainable industrial processes. At BRAIN we see it as our task to take the evolution of enzymes in nature as a starting point and adapt them for industrial purposes.

Enzymes are proteins produced by all living organisms for their metabolic processes, for example for respiration or for the breakdown of fatty acids. The greatest advantage of these enzymatically acting proteins is that they represent organic material derived from renewable sources and are therefore biodegradable. In addition, due to these properties a lot of energy and water is saved in all enzyme-based processes, as proteins do not have to be elaborately purified from reaction vessels or containers.

Another advantage of using enzymes in biochemical syntheses is that biochemical syntheses requires significantly less energy compared to chemical syntheses, since chemical reactions rely on high temperatures, high pressure, and catalysts containing heavy metals. The advantage of replacing partially toxic heavy metal-containing catalysts with enzymes becomes immediately obvious.

Identifying and developing novel enzymes is one of the BRAIN Group’s contribution to its sustainability efforts.

Our vision is to use our innovative strengths to develop tailored enzyme solutions that enable our industrial customers to make their processes and products more sustainable. Therefore, we identify and develop novel enzymes that can be used as biocatalysts and replace classical chemical reaction processes.

The search for an enzyme for a specific reaction pathway at BRAIN always begins with a search in nature. If there is no (known) natural enzyme yet, we use bioinformatics methods to identify related enzyme proteins. We then employ protein-engineering techniques to change the enzyme structure and thus the substrate specificity.

To sum up, enzymes represent a great opportunity to reduce the environmental impact of chemical syntheses on climate change. The BRAIN Group takes-up its responsibility and realizes innovations by investing in scientific creativity, own technologies and in the development of novel enzymatic biocatalysts.

OPEN DISCOURSE

Precise genome editing – the next level of genome engineering

Genome editing remains the subject of lively and sometimes heated public debate even today. It seems that so far scientists have not been able to completely convince society with regard to the related ethical and safety issues. Maybe this is due to the fact that the ultimate potential of an innovation is often enthusiastically explained while the innovation itself is spread in a too technocratic fashion. In this context, we must keep one thing in mind, though: the targeted and precise changes to genomes that can be made today using modern molecular tools such as CRISPR-Cas should no longer be compared to the classical and more erratic gene modification approaches of the past. Such past technologies (that are still used even today as so-called non-GMO methods, for example in agriculture) are unspecific and irrational in their mode of action: living organisms were (and still are) treated in laboratories by radiation or with mutagenic chemicals to induce forced but scattered changes to the genome.

Moreover, until recently it was hardly possible to analyze how the genome had changed as a result of this treatment. Conclusions on “successful” gene modification could only be drawn based on external

“Things are moving fast in genome editing. Many different applications are being pursued, and the only limit seems to be our imagination.”

Dana Carroll (Carroll D. Genome Editing: Past, Present, and Future. 2017)

appearance characteristics (“phenotype”). In addition, unwanted changes to the genome remain undetected or persist as “silent companions”. Strangely enough, these past technologies are often labelled non-GMO and are largely accepted by the public whereas the far superior tools of precise genome editing such as the CRISPR-Cas technology are treated with skepticism.

Genome editing and next-generation sequencing (NGS) as game-changers

With the groundbreaking discovery of CRISPR-Cas systems (Cas9 and other guided nucleases) and their ability to ever more precisely modify genomic DNA, a toolbox was discovered that was based on nature and revolutionized the biotechnologically induced evolutionary process of living organisms. With this emerging technology the selection process could not only be carried out in a targeted and accurate manner; it could also be accelerated enormously and, hence, became much more cost-efficient.

Not only the “gene scissors” themselves, but also innovations such as high-throughput DNA sequencing have been game-changers in the daily work of molecular biologists. The entire genome of edited organisms can meanwhile be sequenced at enormous speed and reasonable cost to enable the evaluation of potential off-target mutations.

“Once methods are developed, who will benefit?”

Dana Carroll (Carroll D. Genome Editing: Past, Present, and Future. 2017)

The use of genome engineering for drug development (e.g. mRNA vaccines) or clinical therapies (e.g. to cure hereditary diseases) has been widely accepted by society. However, there are still some remaining safety and ethical concerns about in vivo genome editing in clinical applications such as off-target mutations, complicated regulatory issues, genetic enhancement or patient safety (Shinwari et al. 2018). Quite rightly, completely unethical applications like those conducted by He Jiankui in China must be banned in connection with any genome engineering application.

Let’s have a look at what genome editing can do outside of pharmaceutical applications, for example, in industrial biotechnology and agriculture to solve major societal problems.

Sustainable food production: In many countries genome editing is already applied in food manufacturing processes, including precision fermentation, to obtain alternative ingredients from microbial or plant sources or to optimize microbial strains to produce, for example, fermented beverages or processing aids such as proteins or enzymes. It should be noted that the final consumer product does often not include any traces of the gene modifications but that only the fermentation process itself has been made possible or been optimized using modern microbiology tools. However, first products that include the genetically modified organism (GMO) generated by genome editing have already been approved in

different markets (mainly the USA & Japan). The U.S. market has been pioneering this development, steered by the U.S. Food and Drug Administration (FDA).

Converting waste streams into valuable products by biotechnological means can lead to new and sustainable value chains. As so-called cell factories, microorganisms can use simple and cheap feedstock as carbon sources, e.g. organic waste or CO₂, to produce valuable chemical building blocks. To improve the performance of such cell factories and make the process economically viable, the microorganisms often need to be genetically modified.

Optimization of plants in agriculture is conceivable to improve their resistance to climate change, pest resistance, vertical farming, etc. Positive prospects should then include, for example, lower water consumption, reduced pesticide inputs into nature or more efficient land use for the production of crops.

Time- and cost-saving “lab-to-product” process: For industrial applications in general the development of highly efficient microbial producer strains can be significantly accelerated. Once established in the target organism, genome editing is not only precise, but also efficient and fast.

Don't judge the technology itself, evaluate the application

The list of possible, useful applications of genome editing is long. Nevertheless, there must be a public discourse on whether and to what extent we want to use genome engineering, and in which applications. What is important in our view is that we should not judge the technology itself, but evaluate its useful applications and the originating products. This, of course, includes ethical considerations. Dana Carroll at the Department of Biochemistry, University of Utah School of Medicine, Salt Lake City, UT, has raised many interesting questions about societal issues, such as: "In the medical realm, what therapies will be developed based on whom we decide needs to be 'fixed'?" Or: "Will nutritional improvements be made in specialty crops for the developed world, or in staples that predominate in the developing world?" (Carroll et al. 2017).

Another topic that is currently being discussed by the European Group on Ethics in Science and New Technologies concerns terminology: "What do we mean by genome editing and what does 'a genetic modification when referring to organisms' mean?" The group recommends fostering a broad and inclusive societal deliberation on genome editing in all fields of application and with a global scope (EGE, 2021).

Discussions on ethical, social and safety aspects of new genome engineering technologies in food, clinical and environmental applications are urgently needed, also because these technologies are such important tools for solving many pressing issues linked with our future societal development.

Genome engineering at BRAIN Biotech AG

Developing new technologies is at the heart of BRAIN's business, and our scientists do their utmost to create value for our industrial and healthcare customers by means of innovative bio-based solutions. As our motto for the use of our genome editing technologies, we have deliberately chosen "we edit the living for the better", which we will stringently enforce. Our benchmark is to develop a technology that offers improvement and to evaluate the resulting products.

Our technical and scientific employees are working according to these premises:

Our main guiding principle:
we edit the living for the better.

We are fully aware of our responsibility in the use of genome engineering technologies.

We follow and enforce all legal standards at the locations where we operate.

A BRAIN Biotech Code of Conduct is currently in development and will become mandatory for all employees which work in the area of genome editing. We will also make this code publically available.

References

Carroll D. Genome Editing: Past, Present, and Future. Yale J Biol Med. 2017 Dec 19;90(4):653-659. PMID: 29259529; PMCID: PMC5733845.

Shinwari ZK, Tanveer F, Khalil AT. Ethical Issues Regarding CRISPR Mediated Genome Editing. Curr Issues Mol Biol. 2018;26:103-110. doi: 10.21775/cimb.026.103. Epub 2017 Sep 7. PMID: 28879860.

European Group on Ethics in Science and New Technologies (EGE): Ethics of Genome Editing, March 2021. European Commission, Directorate-General for Research and Innovation, Unit 03. As of March 2021. doi:10.2777/659034

ESG

50

- 54** Environmental: Minimizing the Environmental Impact from Our Operations
- 56** Social: Livable and Satisfying Employment
- 62** Governance: Responsible Business Operations

Environmental: Minimizing the Environmental Impact from Our Operations

Even though many of our products (e.g. enzymes) or solutions developed in the incubator have by themselves a positive impact on the sustainability of our industrial customers, we cannot avoid an environmental footprint of our own operation. It is our clear goal to minimize the environmental impact from our operations and most material for this is the reduction of our greenhouse gas (GHG) emissions. With this initiatives we also directly support the SDGs 12 and 13.

Detailed Actions

- Switch to sustainable sourcing of primary energy
- Building renovation and change of cooling/heating design
- Electrification of processes and transport
- Establish employee best idea contest on cost, energy savings and process optimization

Goals

- By 2032, reduce Scope 1-2 GHG emissions by 30 % in relation to current revenue base
- By 2050, Scope 1-2 GHG emissions to net zero

GREENHOUSE GASES EMISSIONS (GHG)	
Million tons CO ₂	2020
GHG emissions, total	1,515.66
Scope 1	543.86
Scope 2	971.79

In the laboratory environment the BRAIN Group uses small amounts of technical gases such as argon, butane, propane and nitrogen (cooling) which have no or low negative impact on climate change. Due to the low amounts consumed and utilized we have excluded these from our Scope analysis. Throughout the group we promote business travel by train and avoid short-haul air travel wherever feasible.

In 2018, our largest production asset, **Biocatalysts Ltd**, became a zero waste to landfill manufacturing company. This great achievement was recognized as a winner of the Made in Wales Award for Sustainability. The environment has always been important to Biocatalysts with the company achieving ISO 14001 accreditation in 2012 – the international standard for environmental

management – and maintaining it ever since. This year Biocatalysts has switched to shorter energy consumption and price monitoring intervals which expects to result in savings of around 15 % on a comparable basis.

Biosun is recycling all used packaging containers.

At **BRAIN Biotech AG, Zwingenberg**, we have installed charging stations for electrical vehicles and started to switch company cars from combustion engines to plug-in hybrid vehicles. This process will continue with further replacements in the future. In addition, all employees are eligible for Job-Bike leasing and more than fifty employees have already taken up this option. Also WeissBioTech offers its employees the Job-Bike option.

Our daughter company **AnalytiCon Discovery** has recently redesigned its lab exhaust system and installed new fume hoods. This is expected to result in energy savings of around 10 %.

L.A. Schmitt is currently executing a significant building and warehouse renovation as well as a redesign of its production facility. Energy consumption considerations and improvements of the working environment build the focus of his multiyear program. All German locations of the BRAIN Group just conducted an extensive energy audit. This energy audit will become the basis for our path to greater energy savings in the coming years and contribute to our 2032 GHG reduction targets as well as our 2050 net zero ambitions.

Biodiversity

Biodiversity is not considered as a material topic for our company by us or our stakeholders. Our production and research sites are located in urban areas within the developed world. Our operations do not have a direct impact on protected plants or animals. Where we employ biomimicry we comply with the Nagoya Protocol.

Nagoya Protocol

The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity (Nagoya Protocol) is a 2010 supplementary agreement to the 1992 Convention on Biological Diversity (CBD). Its aims at the fair and equitable sharing of benefits arising out of the utilization of genetic resources, thereby contributing to the conservation and sustainable use of biodiversity. It sets out obligations for its contracting parties to take measures in relation to access to genetic resources, benefit-sharing and compliance. As of October 2020 it has been ratified by 128 parties, which includes 127 UN member states and the European Union.

In Germany the Federal Agency for Nature Conservation (BfN) is the responsible authority for the implementation of the Nagoya Protocol. Its audit of BRAIN Biotech, Zwingenberg, in the context of EU’s Nagoya guidelines,

was completed in 2021 without any objections. The audit at AnalytiCon Discovery has been finalized and the final review is still pending. Any potential non-compliant biomaterials are removed from our bio-archive collections. The BRAIN Group is happy to support international efforts to protect biodiversity.

Social: Livable and Satisfying Employment

Our employees are absolutely crucial for our success. BRAIN Biotech is a science based business and our employees build the decisive factor to compete globally. It is important that we continuously hire and retain the best people for the job, inspire them to stay motivated, and support their lifelong development. BRAIN desires to create an attractive, fair, and trusting work environment for all its employees. We employ local people strategies at all of our Group subsidiaries and within our headquarter to acknowledge the different requirements of the individual business operations. Responsibility for defining and implementing Group wide people initiatives lies with our Head of Human Resources (HR) at the headquarter in Zwingenberg, Germany, who directly reports to the CEO.

Our Global People Strategy is built around the following pillars: (1) engage employees, (2) make the right resources available to support our business goals, (3) continuously advance the BRAIN organization and (4) foster excellent people practices. In line with these priorities, we have launched the BRAINway program to foster intra-company exchange, enhance our corporate identity and internalize common goals.

Detailed Actions

- Attract and retain talent by flexible work options and employee participation programs
- Actively promote female career development to management positions
- Promote safe work environment

Goals

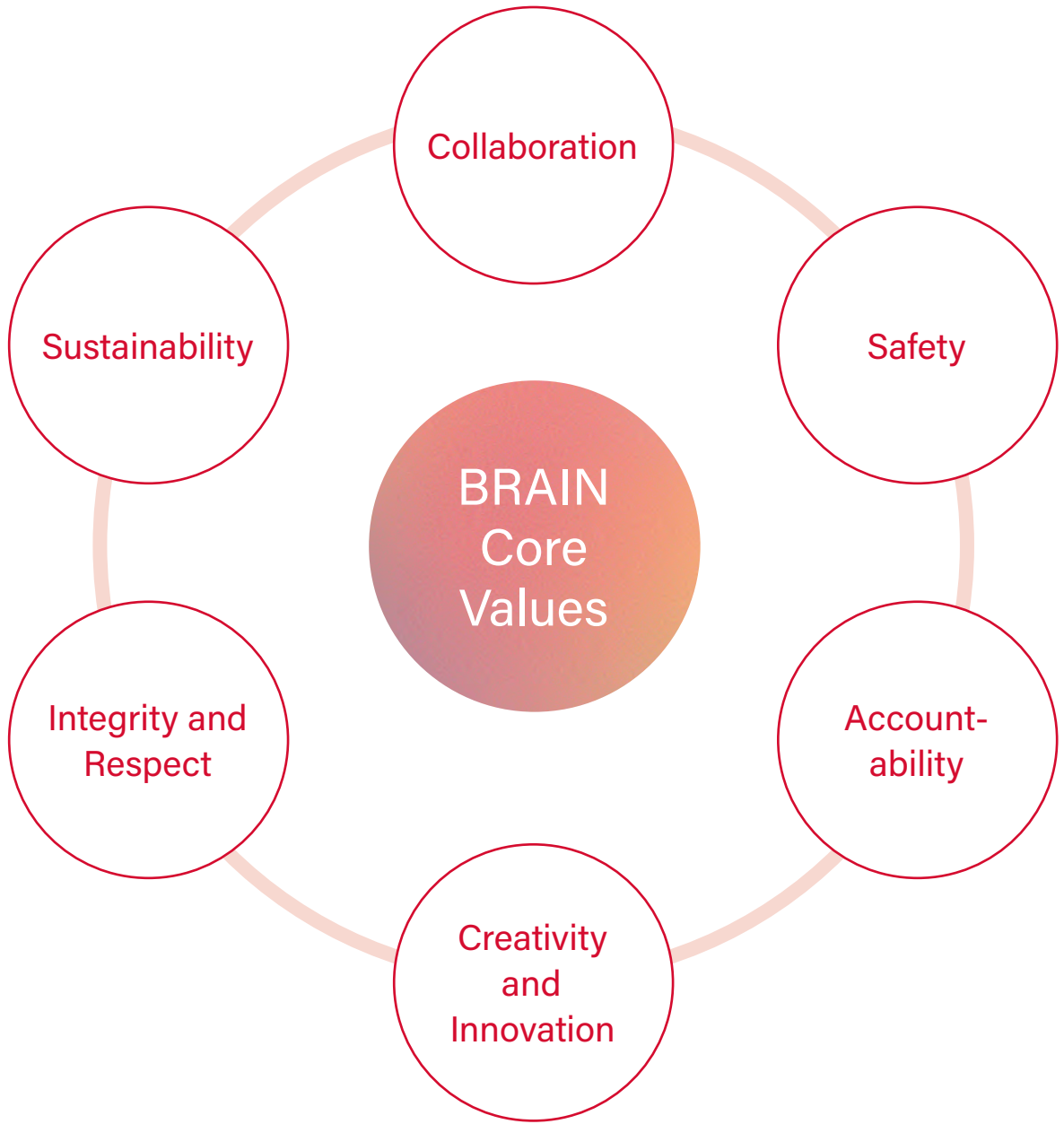
- By 2032, share of women in management positions above 30 % (SDG 5)
- By 2032, lost time injury frequency rate (LTIFR) per 100,000 hours worked < 3.0

WORKFORCE

Headcount at year end 318	2020
Full-time equivalents	265.6
Share of part-time employees (%)	31%
Share of female employees (%)	49%
Share of Non-German employees (%)	27%
Average age of group employees	42.92

Engage Employees

While all our different daughter companies have their own individual corporate culture we aim to increasingly establish also our common “BRAIN DNA”. To build a common group culture is an important part of our corporate people strategy. We communicate our common corporate culture not only in our day-to-day operations but also through our training program: the BRAINway. This program has been launched across the group in order to foster intra-company exchange, enhance corporate identity and internalize common goals. This program was custom designed to drive and achieve our main social goal of a livable and satisfying employment. Here we manifest our core corporate values: collaboration, safety, accountability, creativity at innovation, integrity with respect and sustainability. BRAIN is about to establish an employee best idea contest on cost, energy savings and process optimization. We strongly believe that the best contributions for resource conservation will be generated by our own people. With this contest we want to further increase ESG engagement within our employees and accelerate the way to our targets. One concept which we already have realized is a “Job Bike” offering for our employees.



Adequate resources to support our business goals

The company continuously monitors if we are adequately staffed and have the required overall resources to reach our ambitious strategic goals. In monthly and quarterly meetings the executive board discusses with the respective operational management recent business trends, forecasts, resources and the strategic planning. In addition, the executive board and senior management meet at least once a year with the supervisory board for a strategic dialogue.

Continuously advance our organization

We strive to constantly advance our organization by shaping the organizational setup, manage talent and our portfolio of companies. An active M&A strategy is part of this process.

BRAIN was founded in 1993 by a team of scientists from the Technical University of Darmstadt. During the first decade the company has mainly been focused on contract research. Since then BRAIN is increasingly developing own breakthrough products and, in addition, looks to produce in-house or with partners. By extending our business focus we will now be able to capture a significantly higher proportion of the lifetime value of our innovations.

During the Corona pandemic we have significantly increased the opportunity for flexible work locations as well as schedules and accelerated investments into digitalization. We currently have launched new programs to advance additional digitalization measures in the areas of project management and document flow.

Foster excellent people practices

We consider the BRAIN Group to be a knowledge driven enterprise. Our employees build the key differentiating factor for our competitiveness. Hence, talent recruiting and management play a key role in our corporate development. We have embedded a people strategy into our strategic planning process. Within this people strategy we set out the strategic direction of our employee development. It sets out the interventions that are required to ensure, we develop as a company that is continuously fit for purpose, lives its values and delivers its objectives. It aims to systematically deliver on our vision and mission for BRAIN Biotech, create a high performance organization and lead this great workplace into a successful future.

Our people strategy consists of five key elements which are built around BRAIN's core values of collaboration across the group, safety and health, accountability, creativity and innovation, integrity and respect as well as sustainability.

These five key elements are:

- 1. Performance management:** incentivize innovation, retain and attract talent, build leadership skills;
- 2. Innovation management:** encourage pioneering ideas and commercialize the incubator pipeline;
- 3. Organizational efficiency:** lean management, flexible work arrangements and effective internal communication;
- 4. Personal development:** foster key training as well development needs, efficient succession planning;
- 5. Corporate culture:** agile, act around core values, great place to work.

The human resources department is assisting to plan, design and facilitate this process. The process itself is led by senior management and chaired by our CEO, Adriaan Moelker. The BRAIN Group is an equal opportunity and equal pay employer. We are about to implement targets and schemes to develop a higher share of female employees into management positions. Female and male employees can take parental leave, financial support for childcare, and generous leave arrangements in case of illness of children or care of relatives, flexible working models and mobile working

arrangements. Part-time workers are involved in the same way as full-time workers.

In addition to a fixed salary, different programs for variable compensation exist across the group. Here we target to incentivize innovation, retain talent and encourage commercial success. The BRAIN Employee Stock Owner Plan (ESOP) is currently available for executives as well as employees based at the Zwingenberg headquarter and focusses on long-term retention which is aligned with the interest of our shareholders in a positive share price performance. The supervisory board intends to redesign the ESOP system to allow a wider participation in the program for the future and to separate the executive long-term incentives from the employee program.

Depending on the legal entity the group offers several private pension schemes as defined contribution plans to its employees.

Promote safe work environment

In its different entities the BRAIN Group is either focusing on breakthrough innovations, contract research or the production of innovative customer solutions. In all areas it is of high importance for us to protect our employees and the environment from any potential hazards which might relate to our business activities. In addition, BRAIN actively supports selected preventive healthcare measures.

WORKPLACE ACCIDENT STATISTICS

Lost Time Injury Frequency Rate (LTIFR)	2020
Group total hours worked	463,736
Number of lost time injuries	7
Number of fatalities due to workplace accidents	0
LTIFR Group*	15.09

* calculation method: number of lost time injuries x 1,000,000 / Total hours worked

Safety measures in the laboratory environment

The main laboratories at BRAIN's headquarter in Zwingenberg and at AnalytiCon Discovery in Potsdam are home to employees with different professional backgrounds and job profiles. All health and safety measures serve to ensure responsible cooperation in a safe working environment. Regular exchange in internal circles, professional supervision by external specialists and regular inspections by supervisory authorities ensure that health hazards and the risk of accidents are minimized.

Matters of general occupational health and safety are represented and supervised by an external occupational safety specialist and an external company physician. This refers in particular to matters relating to the Occupational Safety Act, the Workplace Ordinance, and the Ordinance on Occupational Medical Precautions (Arbeitsschutzgesetzes, Arbeitsstättenverordnung, Verordnung zur arbeitsmedizinischen Vorsorge). Operating instructions, risk assessments, hazard assessments and documentation on chemicals and hazardous substances are prepared by qualified

and trained professionals. In regular occupational health and safety committee meetings including the participation of external and internal experts, status and current issues are discussed and solutions and recommendations are jointly developed and communicated to management board members as well as our employees.

In the laboratories of BRAIN Biotech Group, research and development work is carried out in the areas of micro and molecular biology, process technology, application technology, natural product chemistry, medicinal chemistry and analytics. In particular, the Chemicals Act, the Infection Protection Act, the Animal Pathogens Ordinance, the Plant Pathogens Ordinance, the Genetic Engineering Act, the Genetic Engineering Safety Ordinance and the Genetic Engineering Recording Ordinance must be observed and complied with (Chemikaliengesetz, Infektionsschutzgesetz, Tierseuchenerreger-Verordnung, Pflanzenerreger-Verordnung, Gentechnikgesetz, Gentechnik-Sicherheitsverordnung, Gentechnik-Aufzeichnungsverordnung). The laboratories are registered with the relevant monitoring authorities and are regularly

officially inspected. Internally qualified and appointed experts ensure orderly documentation and regularly instruct employees about potential hazards (gene-technology project manager, biological safety officer, permit holder and test manager).

We have created a culture of open exchange within our company: regular meeting circles enable direct and transparent information as well as provide a platform for proposals of improvement. All team members are represented in project meetings and collectively work together to identify and solve any potential issues. Hence, our employees show high level of personal commitment and voluntary participation: at our headquarter more than 10 % of the workforce is trained as first aiders and more than 5 % as fire safety helpers. In the area of health protection, BRAIN Biotech AG goes beyond the minimum requirements prescribed by law – all employees are not only offered a job-related examination, but are also given the option of an examination that goes far beyond legal requirements. These activities and measures ensure a high standard of health and occupational safety and are reflected by low accident figures in the laboratory environment.

Safety measures in the production environment

The MDs of our subsidiaries and our production management teams are fully committed to ensure that the highest standard of health, safety and welfare for our employees and visitors is monitored and maintained. Our health and safety management controls are detailed in the Health and Safety Management Manuals, and our activities are structured to allow continual improvement to the management systems and all the processes necessary for the development and manufacture of enzymes, microorganisms and bioactive natural compounds.

We will comply with all statutory requirements and any other standard to which we subscribe that are related to our workplace hazards. We will achieve this by way of regular reviews of our legal compliance and workplace inspections. During the annual strategic review, the setting of health and safety objectives and targets will ensure continual improvement to our procedures, processes and systems to further improve our health and safety performance, at the same time enhancing our working environment and improving our pollution prevention practices.

Our goal is to mitigate risk and maintain a surrounding, where employees, clients, contractors, visitors and members of the public are not exposed to the hazards, and that does not contaminate or pollute environment.

We will assign the necessary human, technical and financial resources to aid development of our management systems, the regular review and evaluation of their procedures, as well as continual improvement to eliminate hazards and reduce risks.

The management team is responsible for the implementation of this policy by ensuring:

- Provision of a robust management structure to prevent accidents, work related ill health and environmental incidents;
- Information, instruction, training and supervision to allow all persons to conduct their work in a safe and risk free manner,
- Provision of maintained safe plant and equipment to reduce risk to both persons and the environment,
- Communication to all employees and interested parties of health, safety and environmental matters applicable to our activities,

- Provision of emergency procedures for accidents, safe evacuation, and environmental incidents.

Our employees participate fully in order to ensure the health, safety and welfare of themselves and other company members and to fulfil their obligation to work in an environmentally friendly manner by:

- Complying with statutory requirements, company policies and procedures;
- Doing everything they can to eliminate hazards and prevent injury, illness and environmental damage;
- Reporting all incidents that caused, or could have led to injury or damage;
- Assisting in the investigation of health, safety and environmental incidents to identify cause and prevent any recurrence.

Preventive healthcare

It is not only important to prevent accidents but also to be proactive as an employer when it comes to preventive healthcare. The group offers its employees several opportunities to stay healthy and fit as well detect any potential issues early. These measures are organized at the level of the subsidiaries. Among these the following is offered:

- Support of fitness club memberships and other sport activities
- Job-bike scheme
- Health-screening at work, access to doctors
- Yearly routine vaccination at work; including flu season vaccination
- Trained first aid and fire protection officers.

Biocatalysts grants its employees monthly access to a doctor who is contracted on improving general wellbeing.

Special focus: COVID-19 pandemic

The COVID-19 pandemic continues to present us with health challenges caring about our employees. We have introduced various measures to protect and support our employees during this health crisis. For example, significantly increased opportunities for flexible working; new technologies for virtual meetings are continuously adapted to our organization for the requirements of a virtual environment. Next to personal protective equipment as well as testing we have installed Hepa air purifiers in meeting rooms and arranged vaccination campaigns at work. All measures are constantly monitored by a Corona task force.

Engagement within our communities

The different entities of the BRAIN Group support their local communities via various fundraising and social activities.

BRAIN Biotech AG, Zwingenberg: founding member of the Kulturstiftung (Arts Foundation) Bergstrasse, grants to local Youth Fire Department, local Red Cross

and local elementary school. Offering educational opportunities to undergraduate and graduate students.

AnalytiCon Discovery: donations to regional associations with a focus on biodiversity and social youth programs.

Biocatalysts: engagement into ad-hoc fund raising, for example, "jeans for genes". Offering charity giving salary sacrifice opportunities.

Political influence

The group does not directly support any political parties but engages in different lobby activities via the participation in industry associations and lobbying organizations. Our focus is built around the important social topics of the biologization of industrial processes, bioeconomy, biotechnology, enzymes, circular economy and, in addition, local or national industry associations.

Governance: Responsible Business Operations

Good Corporate Governance involves responsible, value-based and sustainable corporate management and control. This includes the efficient cooperation between the management board and the supervisory board, respect for the interests of employees and shareholders, open and transparent communication as well as an appropriate approach to risk. This directly contributes to the SDGs.

BRAIN is targeting full operational alliance with all legal requirements and its own values. In addition, it is absolutely key for our business success to protect our intellectual property. To achieve this we have defined the following in our ESG Objectives Roadmap 2032:

Detailed Actions

- Further evolution of Financial Control Framework (FCF)
- Pro-active IP filing and strategic trade secret management to strengthen and manifest IP position

Goals

- By 2032, target zero fines from compliance and operational breaches
- Ongoing, significantly increase share of milestone and royalty income in BioScience in relation to revenues

German Two Tier Board Structure, Supporting the DCGK

BRAIN Biotech AG is governed by the German Two Tier system, also referred to as Dual Board. This is a corporate structure that consists of two separate boards of directors governing the corporation. This mandatory legal structure for a stock listed entity in Germany is composed of the “Executive Management Board” and the “Supervisory Board”. The executive management is appointed by the supervisory board and in charge of the corporate strategy and daily business operations. The supervisory board is elected by the annual general meeting, appoints as well as oversees the members of the executive board and approves major business decisions. Both boards support the targets and principles of the German Corporate Governance Code (DCGK). All members of the Supervisory Board are independent in the meaning of Sections C.6, C.7 and C.9 of the DCGK.¹⁹ At BRAIN the entire supervisory board takes responsibility for our ESG efforts as part of the operational and strategy planning.

Prime Standard Stock Market Listing

The company is listed in the Prime Standard of the German stock exchange and thereby subject to the highest level of statutory and stock exchange law transparency regulations. In particular, BRAIN Biotech AG reports on the situation and development of the company and of the BRAIN Group in both German and English in the following form: annual financial report for the financial year, interim financial report as of the first half of the financial year (6M), quarterly statements as of the first quarter (3M) and after the first nine months of the financial year (9M), quarterly conference calls, corporate presentations, publication of insider information, corporate announcements and IR announcements, publication of notifications of shareholding threshold levels, publication of ad hoc statements, publication of PR, IR and marketing releases, regular analyst events and Capital Markets Days.

¹⁹ — For details: www.brain-biotech.com/investors/corporate-governance/declaration-on-corporate-governance-2021

BRAIN Financial Control Framework (FCF)

Our internal guidelines are summarized within the BRAIN Financial Control Framework ("FCF") and the BRAIN Red Book which are dynamic best practice guidelines for the entire group. Compliance with the BRAIN FCF and the BRAIN Red Book is checked regularly within our internal audit process. In the future we will also incorporate non-financial metrics such as tracking ESG target progress into our FCF. Opportunities and risks identified within our sustainability report will become part of our regular opportunity and risk management assessments. Monthly reporting, quarterly forecast and frequent audit meetings with all subsidiaries and major business fields build part of our standard routines. Our current executive board has significantly upgraded our corporate governance processes and keeps adjusting to match best practice standards.

A strict four-eye principle is established for all material documents, payments and corporate communication.

Corporate responsibility and ESG

General corporate responsibility and ESG sustainability aspects are key to our operational business conduct, corporate strategy and development as well as risk assessment. We have documented this now in our inaugural ESG and Sustainability Report. Adriaan Moelker, CEO, holds management board responsibility for Corporate Responsibility and ESG. At the operational level, Michael Schneiders is responsible for the implementation of the ESG strategy as Head of Investor Relations & Sustainability.

In addition, the company has formally committed itself to the values of the United Nations (UN) Global Compact, the world's largest initiative for corporate social responsibility and has thereby obligated itself to ten universal principles in the areas of human rights, labor standards, the environment and climate, and the prevention of corruption. Most of our products and services contribute to the Social Development Goals (SDGs) of the UN.

In 2022 BRAIN has issued its declaration of compliance with the German Sustainability Code (DNK). The DNK provides support with establishing a sustainable development strategy and offers a way into efficient sustainability reporting. By supporting the German Sustainability Code BRAIN also complies with CSR reporting obligations and implements the German National Action Plan for Business and Human Rights.

The declaration is publically available at:
→ www.deutscher-nachhaltigkeitskodex.de/en-gb/Home/Database

IP Strategy

A strong IP protection strategy is absolutely vital for knowledge enterprises such as BRAIN Biotech AG and expands far beyond patents. Trade secrets and process knowhow play an equally important role.

For a detailed description of our strategy please refer to
→ [Page 27, IP Protection](#)

Tax Strategy

BRAIN Biotech believes its obligation as a responsible taxpayer is to comply with the tax legislation of the countries in which it operates and pays the right amount of tax at the right time. BRAIN does not only aim to comply with the letter of the law, but also with its spirit.

BRAIN uses business structures that are aligned with business activities and that are driven by commercial considerations. BRAIN only makes use of tax incentives where they are (i) aligned with business activities and operational objectives, (ii) generally available to all market participants and (iii) specified by law. As such, tax strategy always follows the business decision.

BRAIN pays tax on profits according to where value is created within the normal course of its business activities. BRAIN does not use aggressive tax planning strategies or tax havens to minimize its tax burden. The transfer pricing of intercompany transactions is done in accordance with the arm's length principle developed by the OECD and is applied consistently throughout the group.

BRAIN maintains an open and constructive dialogue with tax authorities based on transparency and trust. BRAIN engages with them in honesty, integrity and respect.

Cyber Security and Data Protection

Our cybersecurity measurements protect the information of the BRAIN Group, of our partners as well as employees and our IT systems from unauthorized access or manipulation. It is key for us ensure data integrity, reliable operations and uninterrupted availability. Employees are granted access to our IT systems only to the extend required to perform their work tasks. All systems have regular data backups. Critical data is replicated. Regular software update maintenance prevents potential security gaps.

The aim of data protection is to guarantee the right of the individual to informational self-determination. BRAIN Zwingenberg has appointed a dedicated data protection officer to align the firm first and foremost with the European General Data Protection Regulation (GDPR/DSGVO). The Zwingenberg based data protection officers coordinates its activities with the

data protection representatives at the subsidiary level. Regular trainings and refresher sessions are mandatory. Our data protection policy includes specific instructions on the processing of personal data, provides information on basic rights, such as the right to information on stored data and its deletion and is thus the basis for a sustainable data protection management system that guarantees that the implementation of legal requirements takes place and is adequately documented. In addition, we have data protection standards in place for specific areas such as the processing of personal customer and employee data and commerce activities.

Compliance

BRAIN has a legally trained internal compliance officer who conducts regular compliance trainings, monitors all compliance relevant processes and interacts with the respective authorities. The company has also established a whistle blower framework and will further adjust this to the upcoming new legal requirements. The compliance officer advises the executive board in coordination with investor relations on all potentially insider related matters. In addition, for science topics

the company has established educational measures and checks to comply with laboratory guidelines, including guidelines and the law regulating genetic engineering.

Additional Measures

We are currently developing the BRAIN Biotech Code of Conduct which will become mandatory for all employees which are employed in the area of genome editing. We are fully aware of the opportunities, risks and responsibilities associated with the programming of living cells.

For an open dialogue on genome editing, please refer to
→ [Open Discourse: Precise Genome Editing](#)

Facts & Figures

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Facts – The BRAIN Group in figures

54

metagenome libraries serve as a database to find new enzymes for our customers.

29

years of experience in biotechnology and always at the leading edge technologically.

~150

is the number of R&D projects BRAIN has successfully executed to date – including cooperation projects conducted over many years with major global companies.

38.4

is the amount of revenue in millions of euros that the BRAIN Group generated in the 2020/21 financial year.

13,000

plant parts are available to the BRAIN Group for natural substance isolation. This saves time in the search for bioactive substances.

200

is the number of scholarships BRAIN has awarded in recent years to support young scientists.

> 50

active patent families with varying numbers of individual patents are currently held by BRAIN Biotech AG.

~2,000

previously unutilized Class 2 CRISPR nucleases have been identified by BRAIN Biotech using metagenome sequencing.

53,000

microorganisms have been cultured and characterized and are ready for customer projects. This saves time in the search for organism and enzyme candidates.

~350

products from the BRAIN Group are specialty products for B2B.

320

employees work in the BRAIN Group and are committed to its goals every day.

Figures

CONSOLIDATED BALANCE SHEET AS AT 30 SEPTEMBER 2021

€ thousand	30.09.2021	30.09.2020
Non-current assets		
Intangible assets and Goodwill	13,531	13,271
Property, plant and equipment	24,291	24,470
Equity-accounted investments	550	997
Other non-current assets	251	329
	38,623	39,067
Current assets		
Inventories	7,015	6,964
Trade receivables	6,722	6,166
Other current assets	617	585
Current tax assets	9	93
Other financial assets	207	332
Cash and cash equivalents	24,545	18,943
	39,114	33,083
ASSETS	77,737	72,150

€ thousand	30.09.2021	30.09.2020
Equity		
Subscribed capital	21,847	19,861
Capital reserves	95,890	78,386
Retained earnings	-79,509	-77,497
Other reserves	555	35
	38,783	20,785
Non-controlling interests	3,044	5,358
Total equity	41,828	26,143
Non-current liabilities		
Deferred tax	2,790	2,155
Provisions for post-employment benefits for employees	2,271	2,803
Financial liabilities	17,669	27,320
Other liabilities	736	3
Deferred income	1,109	1,369
	24,575	33,650

€ thousand	30.09.2021	30.09.2020
Current liabilities		
Provisions	404	387
Tax liabilities	116	325
Financial liabilities	2,649	3,277
Prepayments received	79	70
Trade payables	3,831	3,171
Other liabilities	2,684	4,266
Deferred income	1,572	861
	11,335	12,357
EQUITY AND LIABILITIES	77,737	72,150



For all sustainability data including GRI Content Index please refer to our separate Sustainability Data Sheet which is available on the BRAIN Biotech website. This data sheet will be updated annually.
→ www.brain-biotech.com/investors/financial-publications

CONSOLIDATED STATEMENT OF COMPREHENSIVE INCOME FOR THE PERIOD 1 OCTOBER 2020 – 30 SEPTEMBER 2021

€ thousand	12M 20/21 01.10.2020 – 30.09.2021	12M 19/20 01.10.2019 – 30.09.2020
Revenue	38,389	38,225
Research and development grant revenue	833	839
Change in inventories of unfinished and finished goods and work in progress	23	-378
Other income*	1,486	552
Total operating performance	40,731	39,238
Cost of materials		
Cost of raw materials, consumables and supplies, and purchased merchandise	-15,274	-14,115
Cost of purchased services	-1,568	-2,532
	-16,842	-16,647
Personnel expenses		
Wages and salaries	-15,618	-15,584
Share-based employee compensation	-989	-629
Social security and post-employment benefit costs	-2,903	-2,935
	-19,510	-19,147
Other expenses	-6,912	-7,320
EBITDA	-2,533	-3,876
Depreciation, amortization and impairment	-4,014	-4,353
Operating result (EBIT)	-6,548	-8,229

€ thousand	12M 20/21 01.10.2020 – 30.09.2021	12M 19/20 01.10.2019 – 30.09.2020
Share of profit or loss from equity-accounted investments	-1,723	-2,389
Finance income	4,722	1,546
Finance costs	-727	-872
Net financial result	2,271	-1,715
Pretax loss for the reporting period	-4,276	-9,944
Income tax expense/income		
a) Current tax expense/income	-169	533
b) Deferred tax expense/income	-234	394
	-404	927
Net loss for the reporting period	-4,680	-9,017
of which attributable to non-controlling interests	292	667
of which attributable to the share-holders of BRAIN Biotech AG	-4,972	-9,684
Earnings per share		
Earnings per share, basic undiluted (in €)	-0.25	-0.52
Number of shares taken as basis	19,942,982	18,657,641
Earnings per share, diluted (in €)	-0.25	-0.52
Number of shares taken as basis	19,942,982	18,657,641

€ thousand	12M 20/21 01.10.2020 – 30.09.2021	12M 19/20 01.10.2019 – 30.09.2020
Net loss for the reporting period	-4,680	-9,017
of which attributable to non-controlling interests	292	667
of which attributable to the share-holders of BRAIN Biotech AG	-4,972	-9,684
Other comprehensive income		
Net gain or loss from revaluing obligations from post-employment employee benefits**	306	44
Currency translation	568	-139
Other comprehensive income, net	874	-96
Consolidated total comprehensive income (loss)	-3,805	-9,113
of which attributable to non-controlling interests	340	502
of which attributable to the share-holders of BRAIN Biotech AG	-4,145	-9,614

* Other income in 12M 2020/21 includes €858 thousand Gain on Bargain Purchase.

** Items that will not be subsequently reclassified to profit or loss.

CONSOLIDATED STATEMENT OF CHANGES IN EQUITY FOR THE PERIOD 01.10.2020 – 30.09.2021

€ thousand	Interests of shareholders of BRAIN Biotech AG					Non-controlling interests	
	Subscribed capital	Capital reserves	Retained earnings	Other reserves Currency translation	Total	Total	Total
Balance at 30 September 2019	18,056	65,170	-67,919	9	15,316	4,857	20,173
Effects from first-time application of IFRS 16	0	0	62	0	62	0	62
Balance at 1 October 2019	18,056	65,170	-67,857	9	15,377	4,857	20,234
Cash capital increase from authorized capital, less capital raising costs	1,806	12,768	0	0	14,573	0	14,573
<i>Net loss for the reporting period</i>	<i>0</i>	<i>0</i>	<i>-9,684</i>	<i>0</i>	<i>-9,684</i>	<i>667</i>	<i>-9,017</i>
<i>Other comprehensive income</i>	<i>0</i>	<i>0</i>	<i>44</i>	<i>26</i>	<i>69</i>	<i>-165</i>	<i>-96</i>
Total comprehensive income (loss)	0	0	-9,640	26	-9,614	502	-9,113
Transfers due to employee share scheme	0	449	0	0	449	0	449
Balance at 30 September 2020	19,861	78,386	-77,497	35	20,785	5,358	26,143
Cash capital increase from authorized capital, less capital raising costs	1,986	16,992	0	0	18,978	0	18,978
<i>Net loss for the reporting period</i>	<i>0</i>	<i>0</i>	<i>-4,972</i>	<i>0</i>	<i>-4,972</i>	<i>292</i>	<i>-4,680</i>
<i>Other comprehensive income</i>	<i>0</i>	<i>0</i>	<i>306</i>	<i>521</i>	<i>827</i>	<i>48</i>	<i>874</i>
Total comprehensive income (loss)	0	0	-4,666	521	-4,145	340	-3,805
<i>Acquisition of shares of non-controlling shareholders</i>	<i>0</i>	<i>0</i>	<i>2,654</i>	<i>0</i>	<i>2,654</i>	<i>-2,654</i>	<i>0</i>
Transfers due to employee share scheme	0	512	0	0	512	0	512
Balance at 30 September 2021	21,847	95,890	-79,509	555	38,783	3,044	41,828

CONSOLIDATED STATEMENT OF CASH FLOWS FOR THE PERIOD 1 OCTOBER 2020 - 30 SEPTEMBER 2021

€ thousand	12M 20/21 01.10.2020 – 30.09.2021	12M 19/20 01.10.2019 – 30.09.2020
Net profit (/loss) for the period, after tax	-4,680	-9,017
Depreciation, amortization and impairment	4,014	4,353
Deferred tax expense/income	234	-394
Conversion of deferred income into revenue	-1,373	-3,057
Income from the acquisition of fully consolidated companies (Bargain Purchase)	-798	0
Income from release of provisions and liabilities	-343	-84
Share of profit or loss from equity-accounted investments	1,723	2,389
Change in net pension provisions recognized in profit or loss	-225	11
Other non-cash expenses and income	-3,810	-304
Losses on disposals of intangible assets and property, plant and equipment	7	47
Gross cash flow	-5,250	-6,056
Change in trade receivables	-143	56
Change in inventories	-17	730
Change in tax assets and liabilities	-121	-555
Change in other assets and financial assets	126	457
Change in trade payables	313	-1,261
Change in prepayments	9	-100

€ thousand	12M 20/21 01.10.2020 – 30.09.2021	12M 19/20 01.10.2019 – 30.09.2020
Change in provisions and other liabilities	-537	707
Additions from deferred income	1,715	1,255
Cash flows from operating activities	-3,906	-4,767
Net cash inflows from disposals of companies (less cash and cash equivalents divested)	-436	0
Payments to acquire intangible assets	-11	-39
Payments to acquire property, plant and equipment	-1,251	-2,820
Net cash flows relating to other non-current assets	81	240
Investments in equity-accounted investments	-564	-1,874
Proceeds from disposal of property, plant and equipment	1	24
Cash flows from investing activities	-2,180	-4,469
Proceeds from borrowings	55	1,254
Repayments of borrowings	-2,875	-2,733
Payments of the Put-Option liabilities for Biocatalysts Ltd.	-4,586	0
Contributions to equity, less related capital raising costs	18,978	14,573
Cash flows from financing activities	11,572	13,093
Net change in cash and cash equivalents	5,485	3,857

€ thousand	12M 20/21 01.10.2020 – 30.09.2021	12M 19/20 01.10.2019 – 30.09.2020
Cash and cash equivalents at start of financial year	18,943	15,160
Exchange-rate-related change in cash	116	-74
Cash and cash equivalents at end of financial year	24,545	18,943
Cash flows from operating activities include:		
Interest paid	-431	-486
Interest received	26	28
Income taxes paid	-387	-29
Income taxes received	55	73

About this Report

BRAIN's inaugural ESG and sustainability report has been prepared following the guidelines of the German Sustainability Codex (DNK) and along the systematic of the international standards of the Global Reporting Initiative (GRI) for reporting on its non-financial and sustainability-related performance. In addition, BRAIN Biotech AG is a participant in the UN Global Compact (UN GC) and positively contributing to several of the UN Sustainable Development Goals (SDGs).

This report marks the first step on our journey to a comprehensive ESG and sustainability reporting. In coming years it is our intention to integrate the sustainability reporting in our annual financial reporting including a limited assurance audit of our non-financial disclosures.

The above sustainability record systematically presents all topics and disclosures deemed material by BRAIN regarding its business, environmental, social and governance performance for the fiscal year 2020/21. The sustainability record was prepared along the GRI standard 2016: Core-Option. Base year for the non-financial data recording is calendar year 2020 and/or fiscal year 2020/21.

Imprint

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Disclaimer

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