

Measuring the Economic Footprint of the Biotech Industry in Europe

Data-Update 2023

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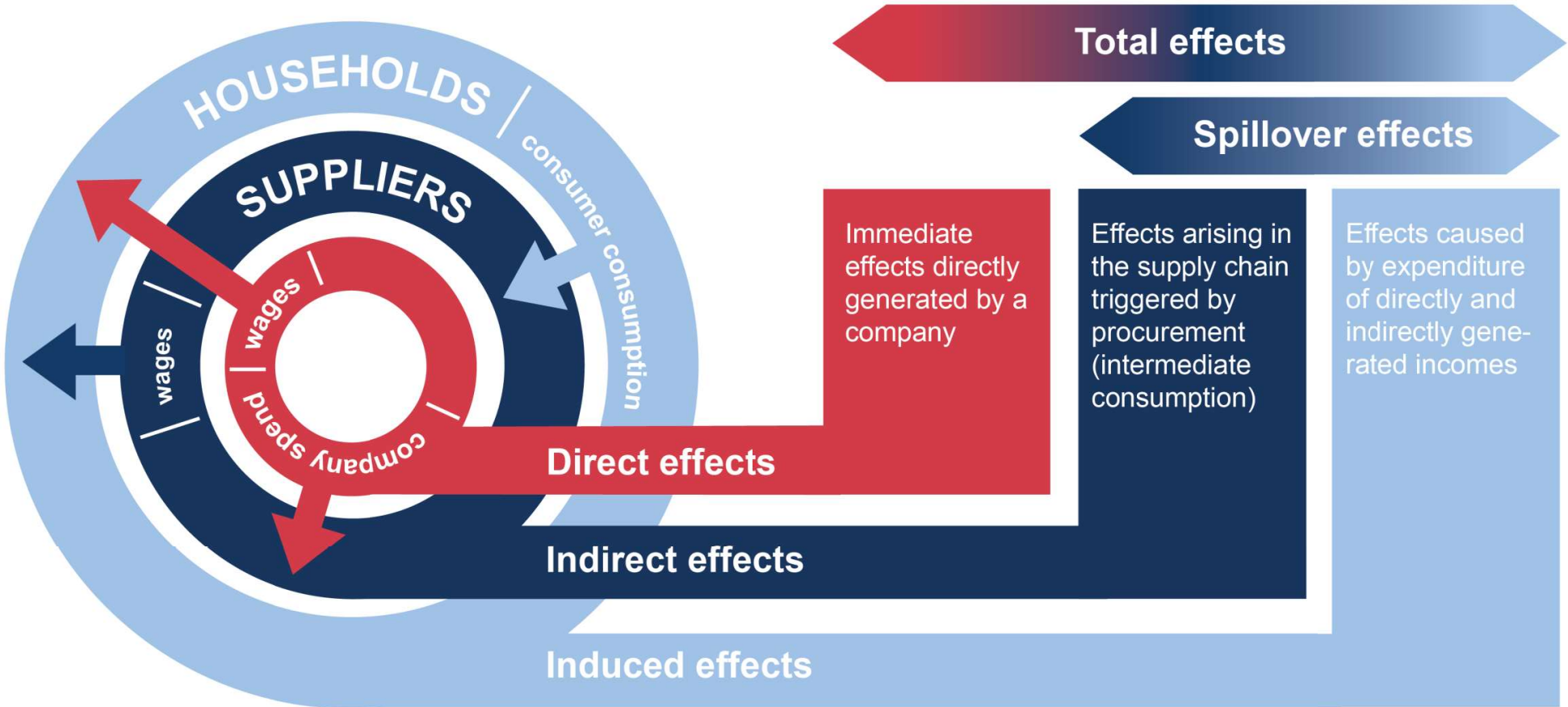
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Background on economic footprint and GVA

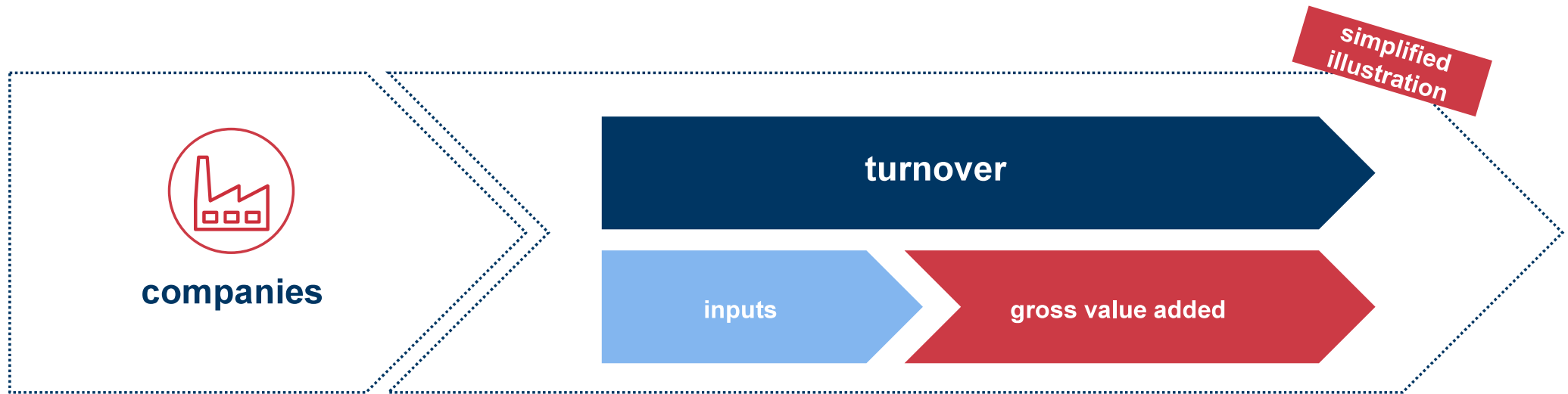
The total economic effects – the economic footprint – consist of direct, indirect, and induced effects



2023 WfOR illustration.



The macroeconomic perspective creates comparability via gross domestic product (GDP) as sum of all gross values added (GVA)



- GVA is calculated as turnover less intermediate consumption purchased from suppliers
- The sum of the GVA of all economically active actors is the GDP of a country
- Comparability between regional and national policy objectives, sectors and enterprises

2020 WifOR illustration based on the 2010 national accounts (implemented in 2014).

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Direct effects of biotech production in Europe



Biotech production leads to over 34 billion EUR of direct GDP contribution and generates 224,600 jobs in the European* economy



34.5 bn EUR

Gross Value Added in 2021

+0

Increase since 2018



224,600

Employment in 2021

+1,600

Increase since 2018



48.8 bn EUR

Exports in 2021

+8.1

Increase since 2018

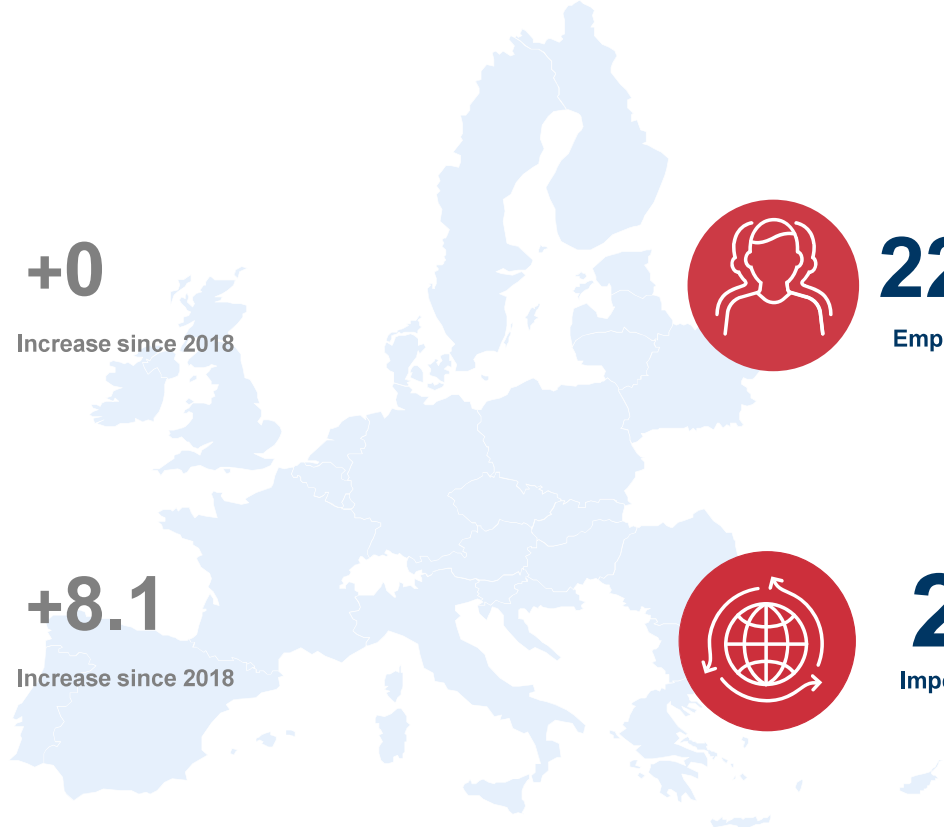


23.6 bn EUR

Imports in 2021

+2.9

Increase since 2018

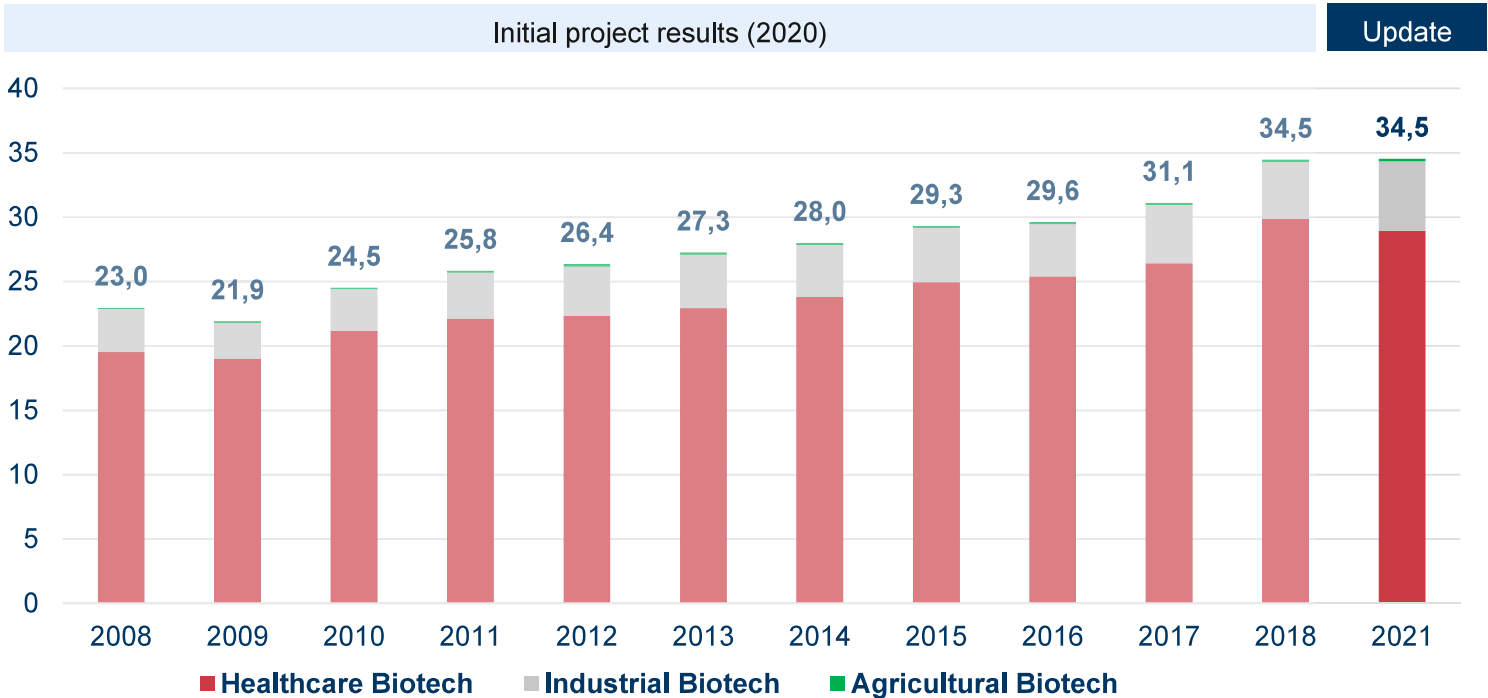


2023 WfOR calculation; *Europe = EU28 (EU27 and United Kingdom); except for trade data (EU27).



Despite the recent stagnation, Biotech is clearly outperforming the overall economy in the long run

Direct GVA effect caused by Biotech sectors
(EU28, bn EUR, current prices)



Compound Average Growth Rate (2008-21)

Total Biotech **3.2 %**

Healthcare Biotech **3.1 %**

Industrial Biotech **3.7 %**

Agricultural Biotech **6.5 %**

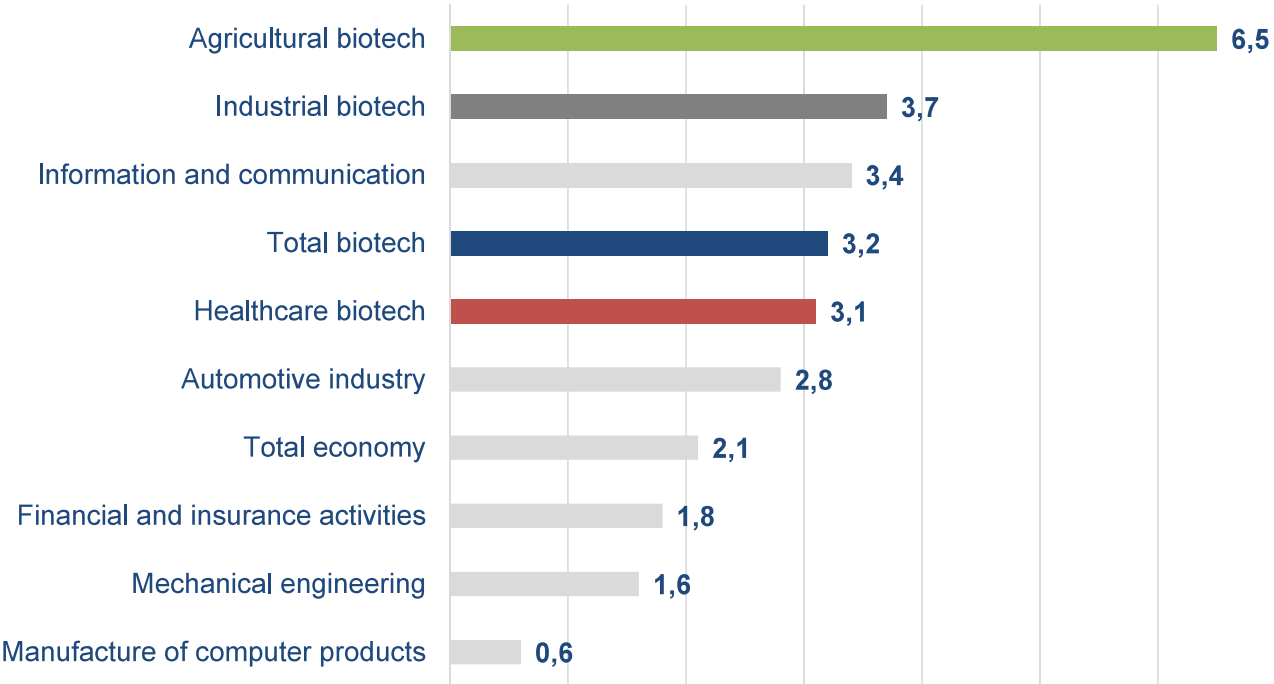
Total economy **2.1 %**

2023 WfOR calculation



A comparison with other sectors underlines the momentum of the biotech industry

GVA growth rates (2008-2021)

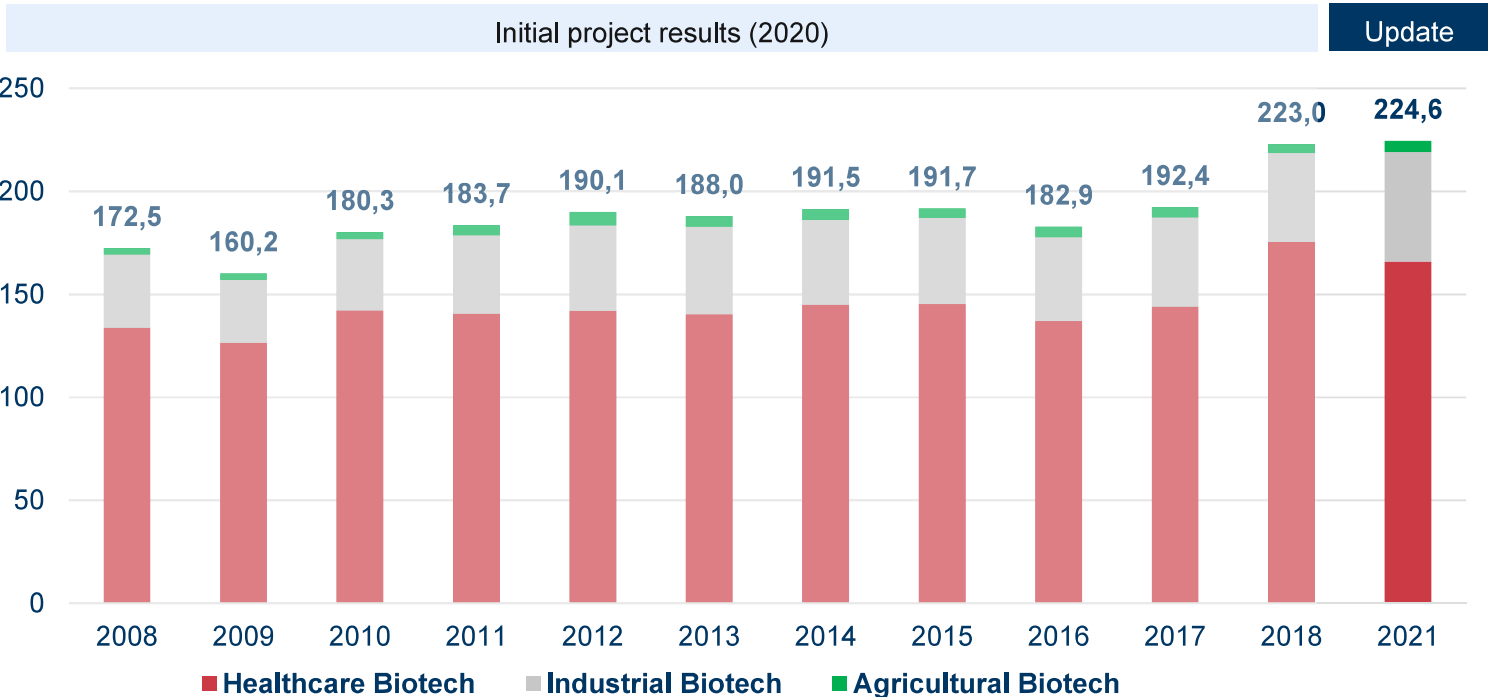


2023 WfOR calculation



Since 2008, the biotech sector created 52,000 additional jobs

Direct employment effect caused by Biotech sectors
(EU28, 1'000 persons)



Compound Average Growth Rate (2008-21)

Total Biotech **2.1 %**

Healthcare Biotech **1.7 %**

Industrial Biotech **3.2 %**

Agricultural Biotech **4.5 %**

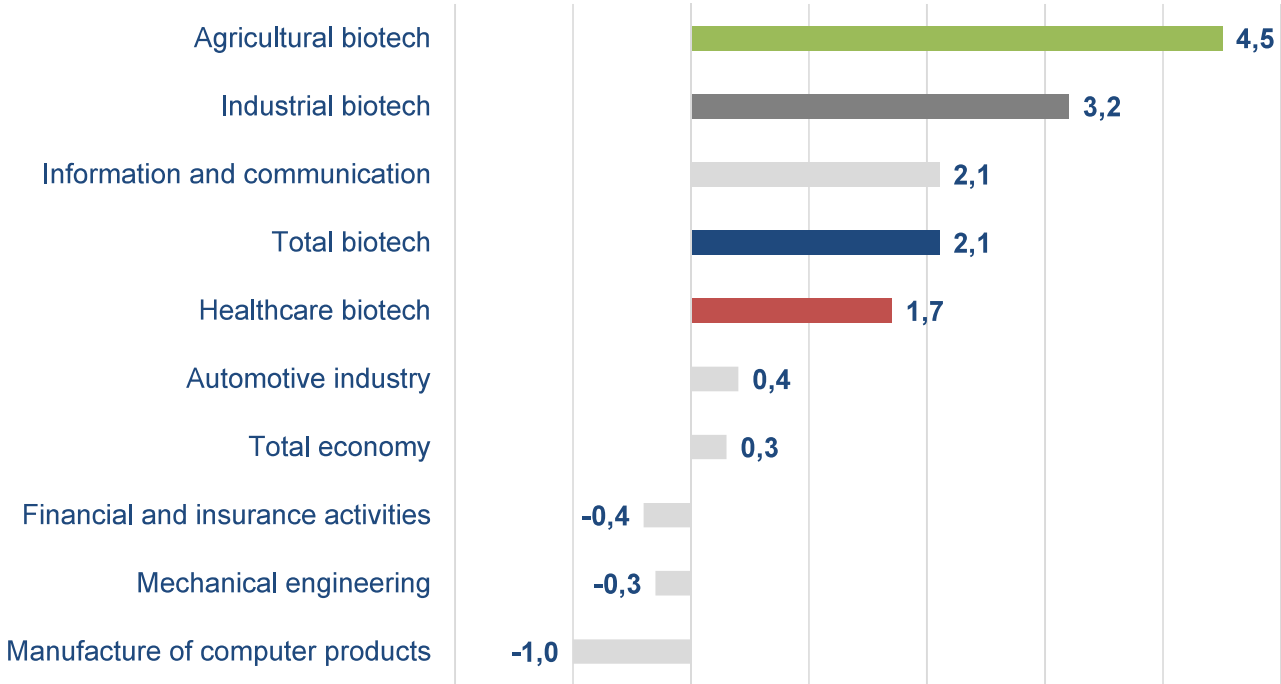
Total economy **0.3 %**

2023 WfOR calculation



Despite the decline in 2021, employment growth outperforms many other sectors in the long run

Employment growth rates (2008-2021)



Biotech GVA accounts for one quarter of pharma's direct effect to European GDP



Biotech



Pharma



Automotive



Mechanical engineering



Chemicals



Share

0.23%

0.9%

1.7%

1.7%

1.0%

EU-28 total economy (€ 14,800 bn in 2019) **€ 34.5 bn**

€ 108 bn

€ 255 bn

€ 219 bn

€ 131 bn

EU-28 labour market (242,244,000 in 2019) **224,600**

641,000

2,764,000

3,154,000

1,225,000



Share

0.1%

0.26%

1.14%

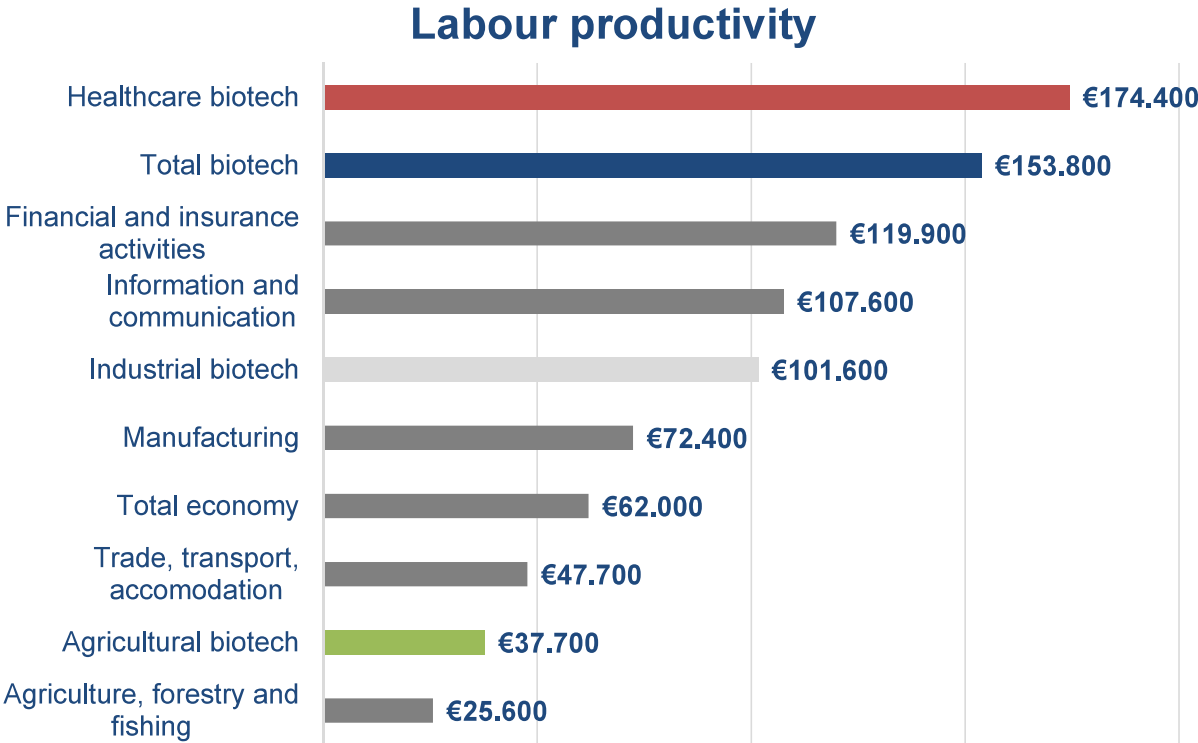
1.3%

0.5%

2023 WfOR calculation; Eurostat: National accounts aggregates by industry; Eurostat: National accounts employment data by industry, most recent data available, alle industries except automotive (2019): 2014.

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Labour productivity: biotech sector outperforms highly productive industries



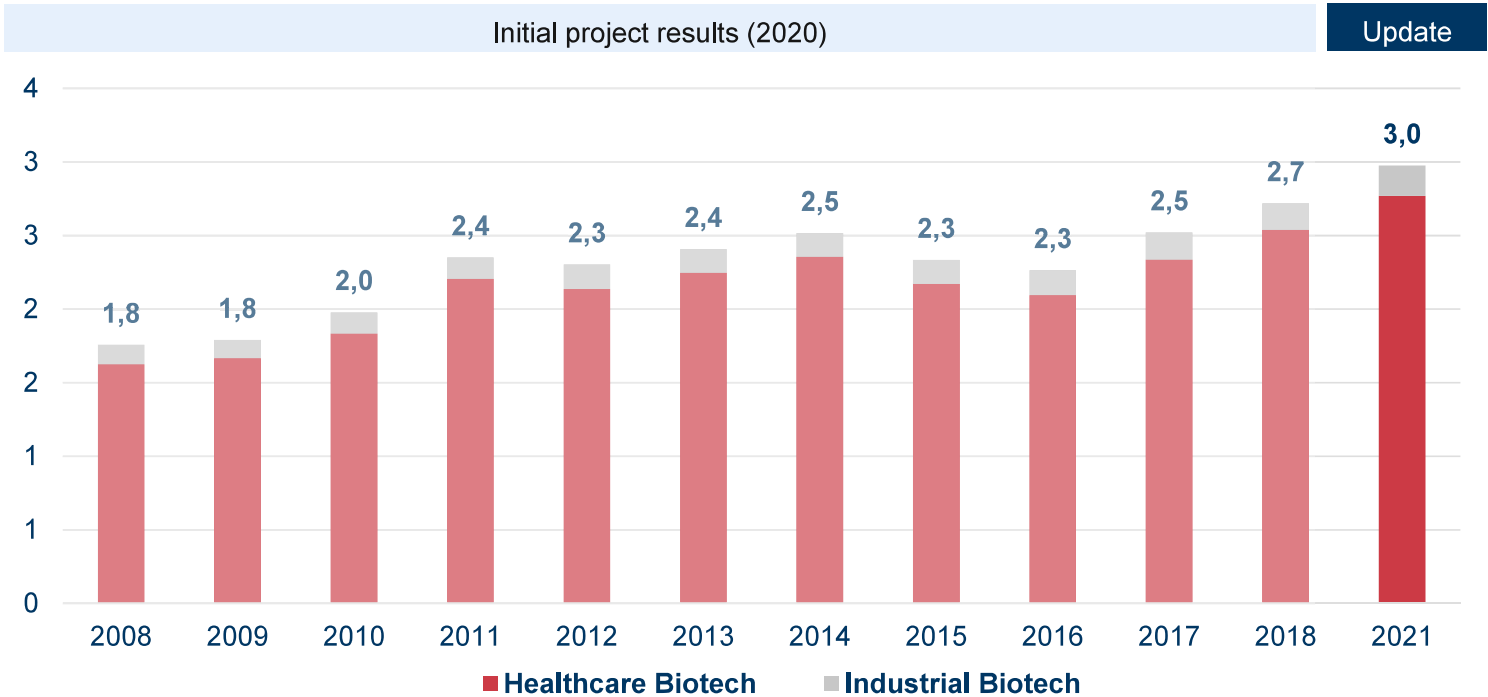
HIGHLY PRODUCTIVE INDUSTRY

With an average labour productivity of €153,800 GVA per employee, the biotech industry is a highly efficient and capital-intensive industry. It is thus comparable to highly productive industries such as the telecommunications sector and the financial sector.



The trend identified in the initial project is confirmed: GVA generated by research activities continues to climb in 2021

Direct GVA effect caused by Biotech R&D activities
(EU28, billion EUR, current prices)



Update



Compound Average Growth Rate (2008-21)

Total Biotech **4.1 %**

Healthcare Biotech **4.2 %**

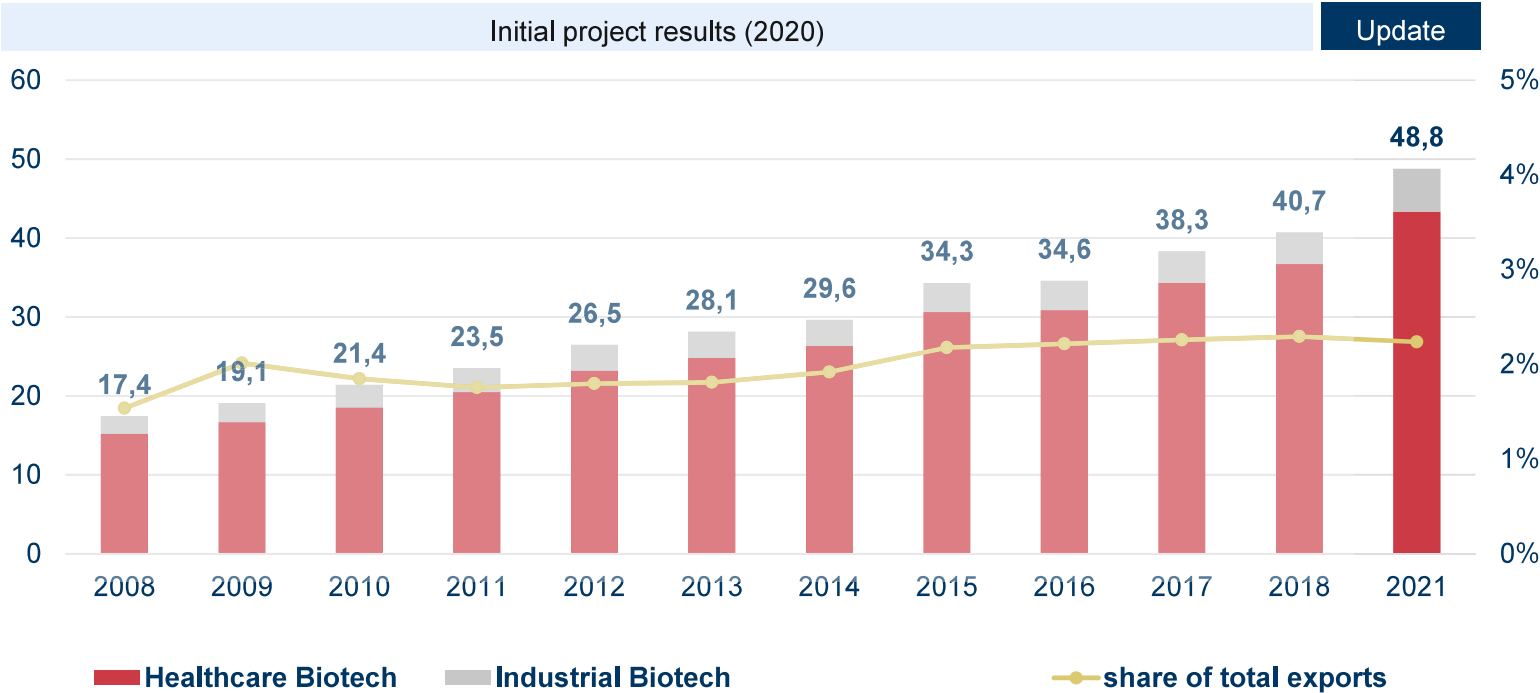
Industrial Biotech **3.5 %**

2023 WfOR calculation. Intramural r&d gva based on Eurostat Business enterprise expenditure on R&D (BERD) by NACE Rev. 2 activity and type of expenditure [rd_e_berdcostr2].



Compared with the initial project, biotech exports increased by 8 billion Euros

Extra EU Biotech export trade (EU27, bn EUR)



Compound Average Growth Rate (2008-21)

Total Biotech

8.3 %

Healthcare Biotech

8.4 %

Industrial Biotech

7.2 %

Total economy

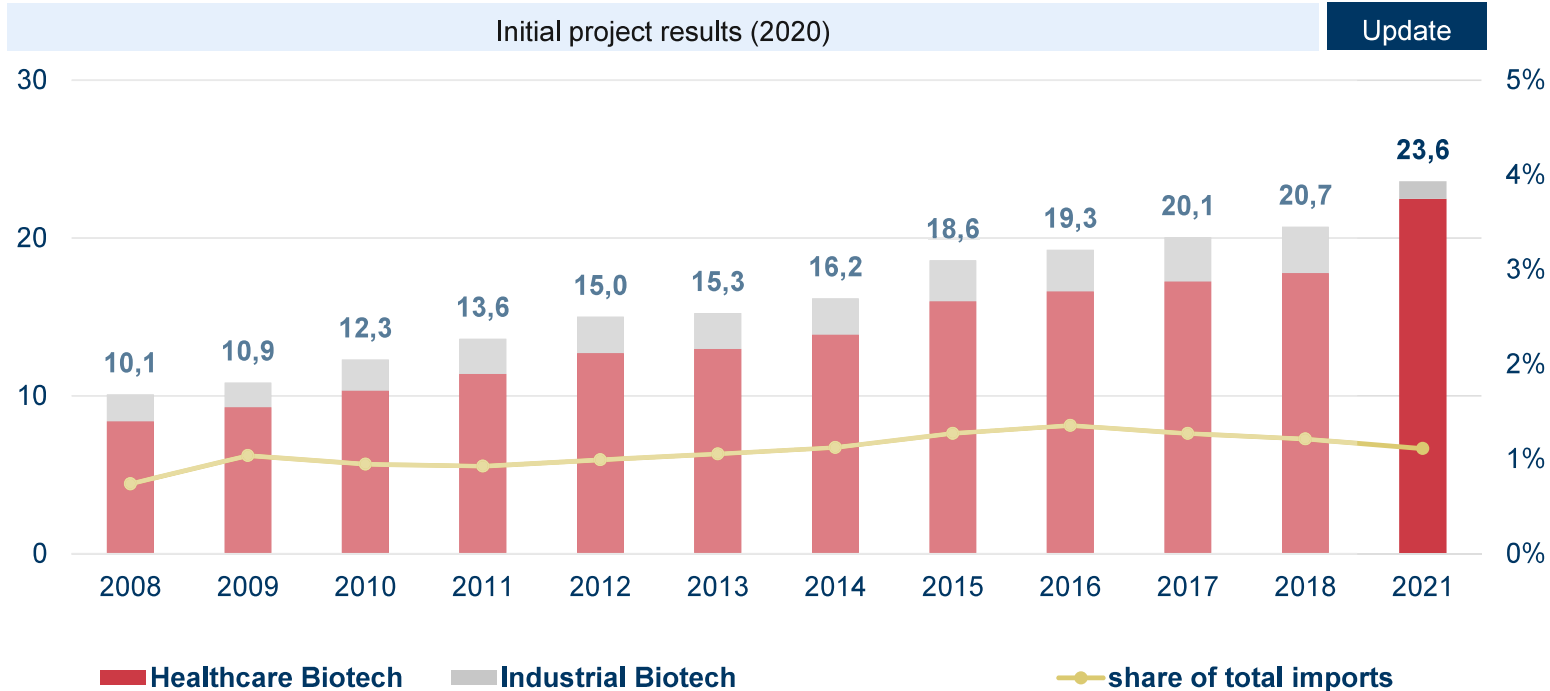
4.9 %

2023 WfOR calculation



Healthcare biotechnology's share of total biotech imports rose to 95% during the pandemic

Extra EU Biotech import trade (EU27, bn EUR)



Compound Average Growth Rate (2008-21)

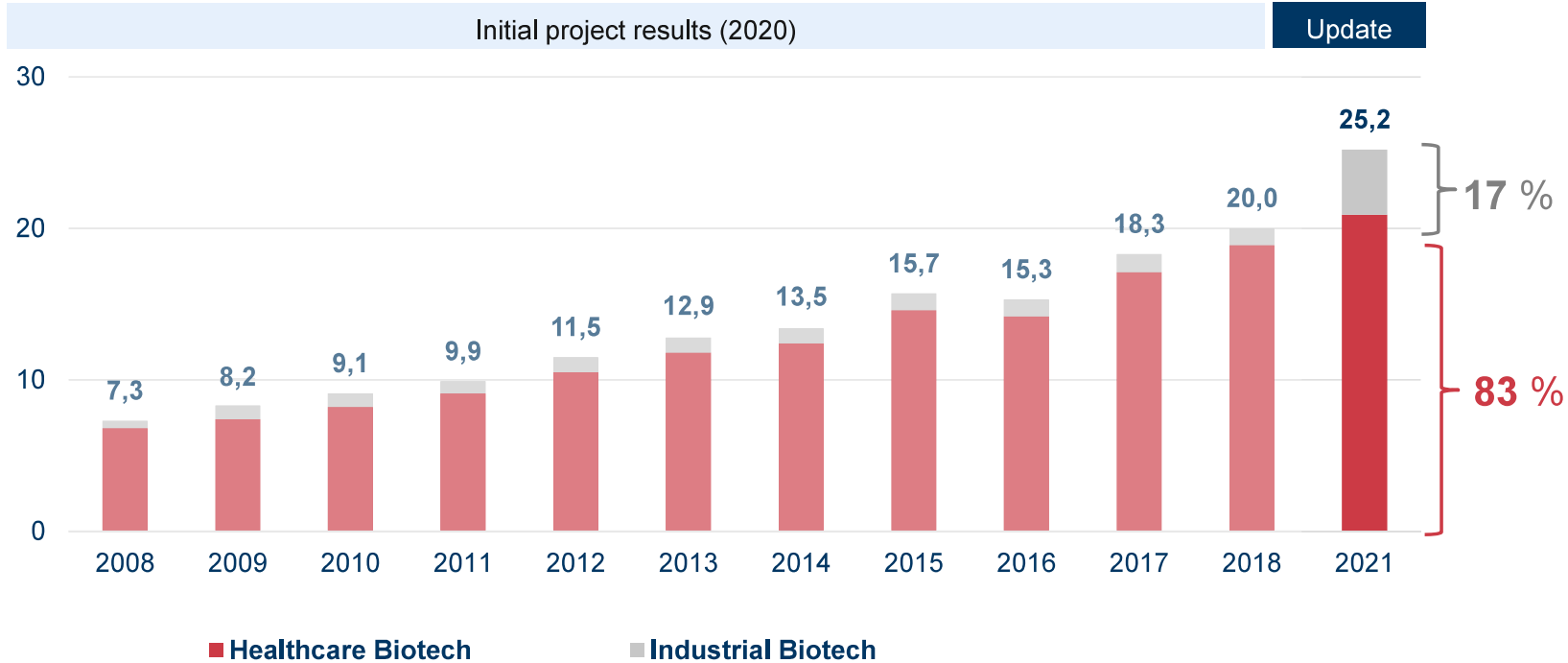
Total Biotech	6.8 %
Healthcare Biotech	7.9 %
Industrial Biotech	-3.2 %
Total economy	3.5 %

2023 WfOR calculation



At 17%, industrial biotechnology accounts for a far higher share of the positive trade balance in biotechnology than ever before

Extra EU Biotech balance of trade (EU27, bn EUR)



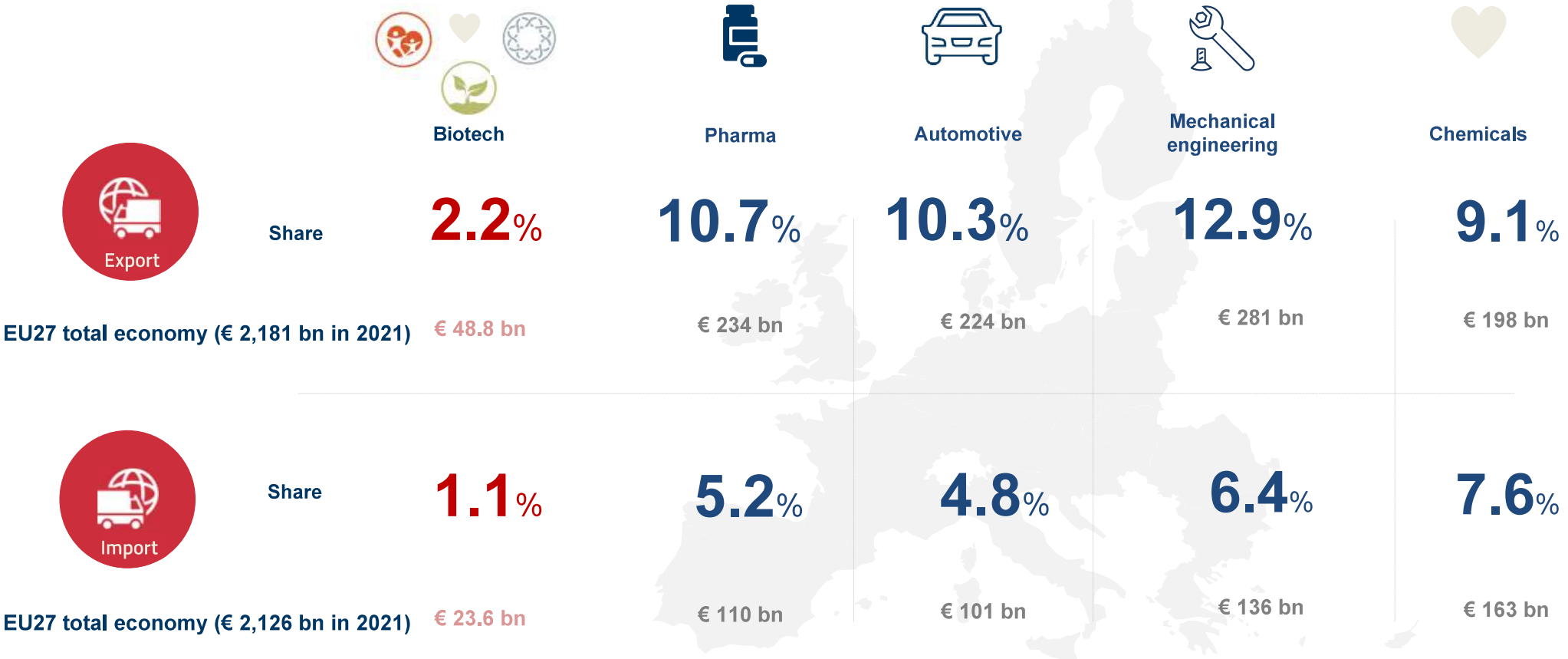
Compound Average Growth Rate (2008-21)

Total Biotech	9.0 %
Healthcare Biotech	17.7 %
Industrial Biotech	10.0 %

2023 WfOR calculation



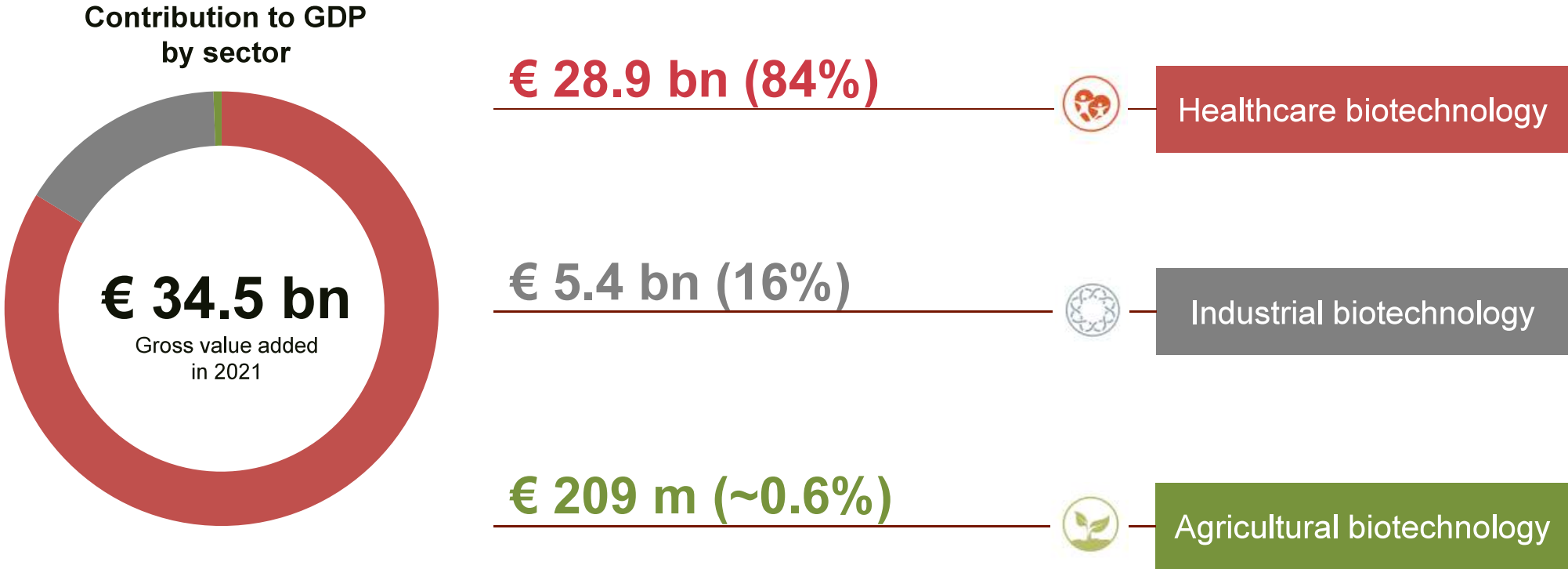
Biotechnology is a highly relevant sector for foreign trade



2023 WfOR calculation. Eurostat: EU trade since 2002 by CPA 2.1 [DS-059268].



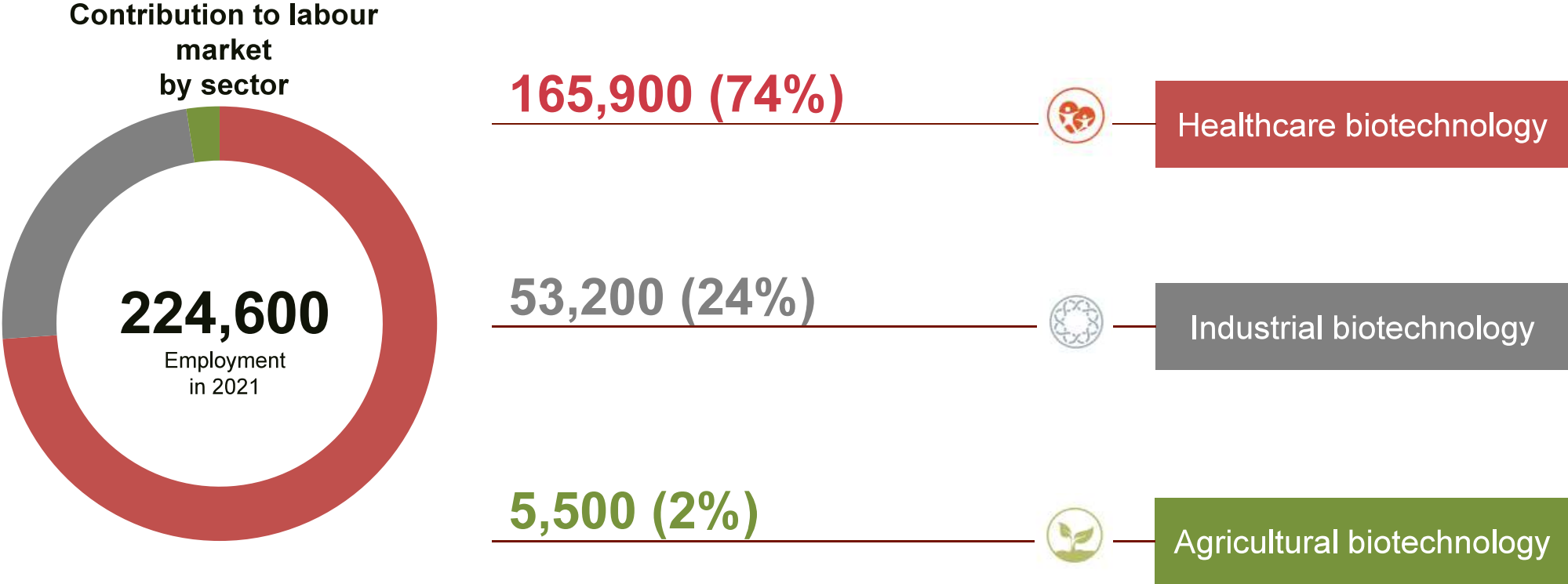
Healthcare biotech represents the main pillar within European biotech production



2023 WfOR calculation.



Healthcare biotech alone provides almost 166,000 jobs in Europe



2023 WfOR calculation.

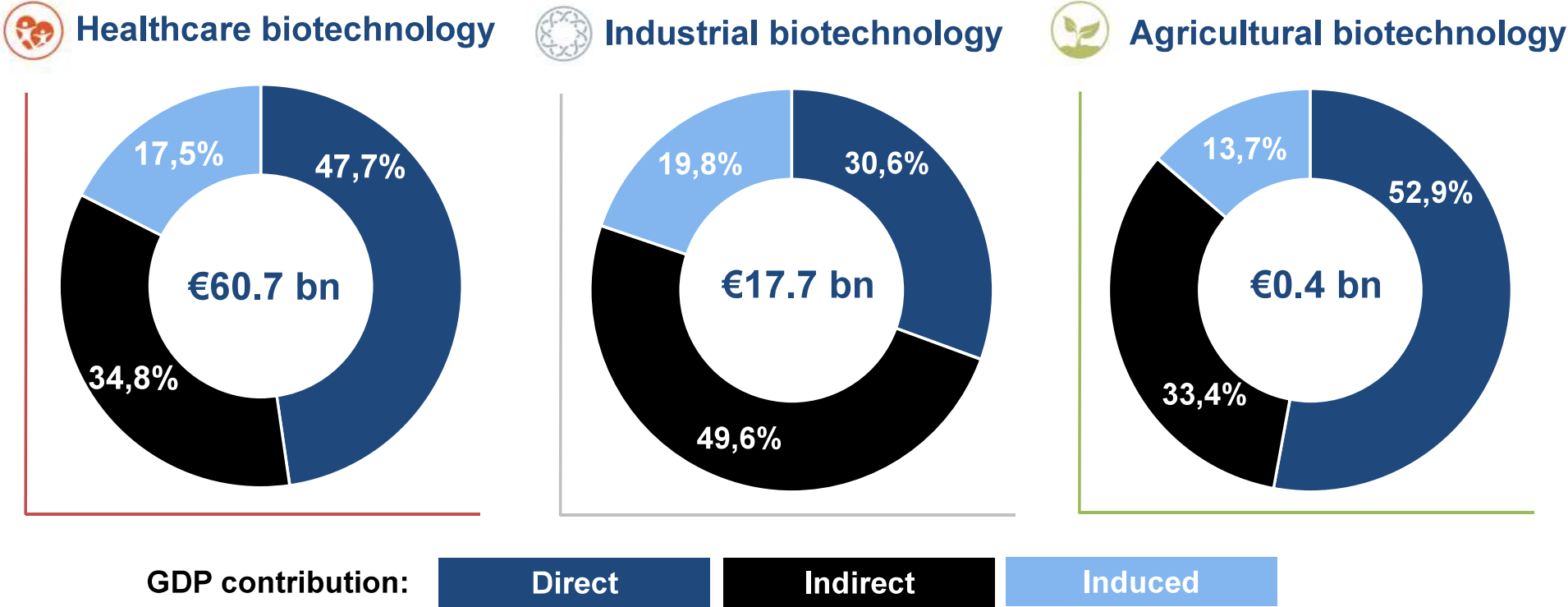


3

Economic footprint for biotech production in Europe



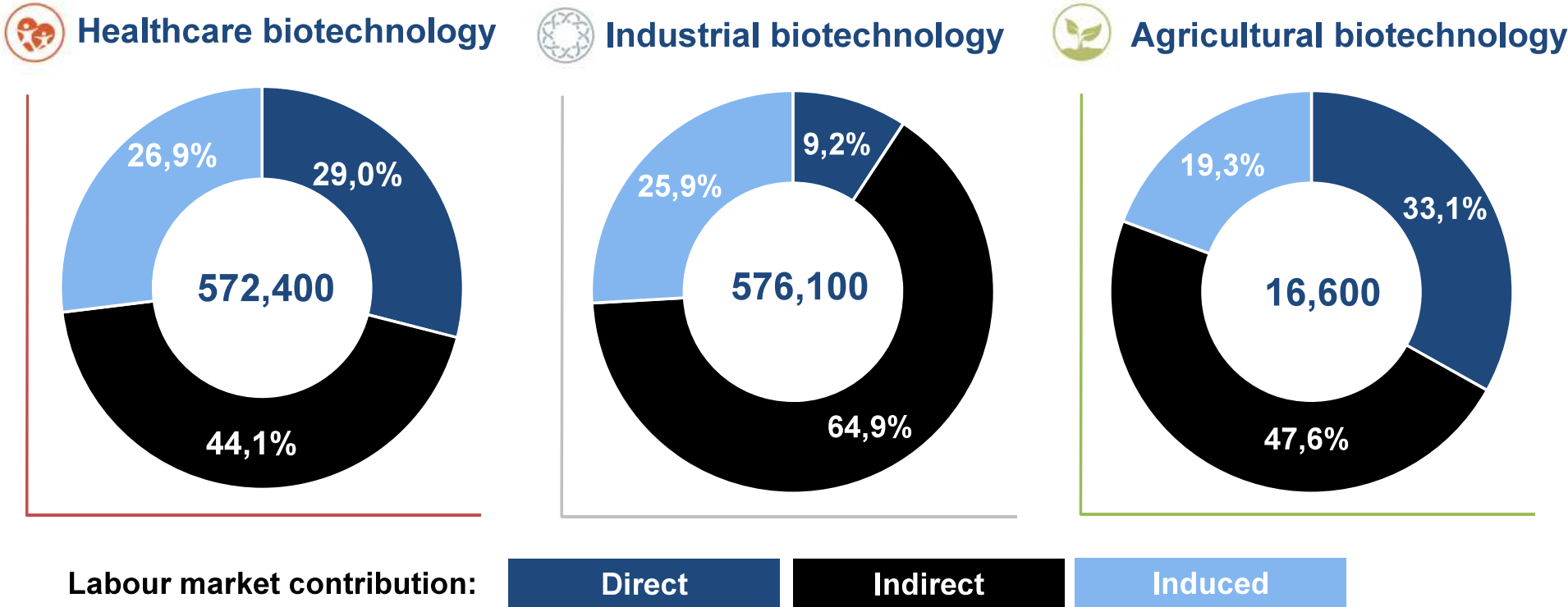
Total contribution to GDP, effect distribution per sector



2023 WfOR calculation



Total contribution to EU27 labour market, effect distribution per sector

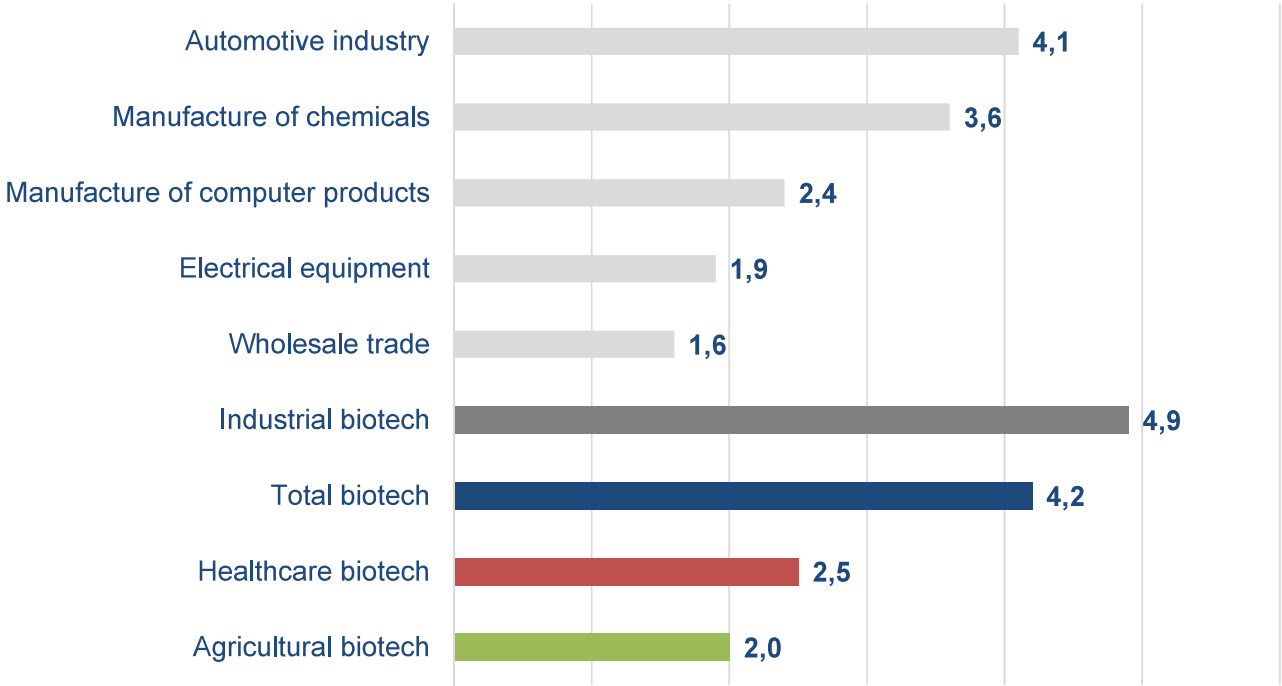


2023 WfOR calculation



For every job directly generated by biotech, 4.2 additional jobs are supported in the total economy

Comparison of employment spillover multipliers



2023 WfOR calculation



In Europe, the biotech sector contributes nearly 80 billion EUR total GVA to the economy and supports more than 1 million jobs

Spillover GVA effects

34.5	bn EUR	direct gross value added
30.0	bn EUR	indirect gross value added
14.2	bn EUR	induced gross value added
78.7	bn EUR	total gross value added

Spillover employment effects

224,600	direct employment
634,000	indirect employment
306,500	induced employment
1,165,100	total employment



Reporting year: 2021 | current prices

2023 WfOR calculation; employment figures rounded to next hundreds; differences in the totals are due to rounding.



In addition to the biotech sector's direct GVA, almost 45 billion EUR in indirect and induced value are generated in other European sectors

Total contribution to GDP



€ 34.5 bn

Direct GDP contribution

€ 30.0 bn

through the procurement of goods and services from suppliers in other European sectors

Indirect GDP contribution

€ 14.2 bn

through the consumption of goods and services by employees involved in biotech production and the employees of suppliers

Induced GDP contribution

2023 WfOR calculation, differences in the totals are due to rounding.



One job in the biotech sector secures four additional jobs in the European economy



2023 WfOR calculation; employment figures rounded to next hundreds.



Methodology and industry definition



Biotech GVA included production in the healthcare, the industrial and agricultural biotech sector

Healthcare biotechnology

Products which are covered in PRODCOM database via the NACE 21 classification:
Manufacture of basic pharmaceutical products plus „Composite **diagnostic** or laboratory reagents,, which in PRODCOM are included in NACE 20 (Manufacture of chemicals and chemical products)



Industrial biotechnology

Products which are covered in PRODCOM database via the NACE 20 classification: **Manufacture of chemicals and chemical products**



Agricultural biotechnology

Based on **grain maize production value** in Spain and Portugal derived from Economic accounts for agriculture (Eurostat)

Main product groups in the healthcare biotech sector



Product group	Sector	Comment
Antibiotics	Healthcare biotech	Drugs containing antibiotics were not included in the 2016 study
Hormones / Alkaloids	Healthcare biotech	Drugs containing hormones/alkaloids were not included in the 2016 study
Amino acids	Healthcare biotech	Amino acids were included in the 2016 study but are now classified as healthcare biotech.
Vitamines	Healthcare biotech	Drugs containing vitamines were not included in the 2016 study
Other biopharmaceuticals	Healthcare biotech	Only partly included in the 2016 study but questionable groups
Insulin	Healthcare biotech	Insulin was not included in the 2016 study.
Diagnostics	Healthcare biotech	Belong to NACE 20 (chemical manufacturing).
Vaccines	Healthcare biotech	Were not included in the 2016 study.

For more details
please refer to
our final product
group list



EuropaBio_WifOR_ProductList_FINAL.xlsx



Main product groups in the industrial biotech sector



Product group	Sector	Comment
Amino acids (Preparations for animal feeds)	Industrial biotech	Indirect estimate for amino acids mainly used as animal feed additives (Threonin, Tryptophan, Valin etc.)
Biofuel (Bioethanol & Biodiesel)	Industrial biotech	Bioethanol = 100% biotech; biodiesel only a small share as production via biological processes is only in the beginning
Enzymes	Industrial biotech	= 100% biotech
Bioplastics	Industrial biotech	Biobased production according to NOVA Institute
Biochemicals	Industrial biotech	Not all groups are considered as biomass is processed by chemical means, "other chemical products" not included as scope is not clear
Yeast	Industrial biotech	= 100% biotech

For more details
please refer to
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EuropaBio_WifOR_ProductList_FINAL.xlsx

Main product groups in the agricultural biotech sector



Biotech IR maize

- Is the only genetically modified plant with a **significant acreage under cultivation** in the EU.
- Is the **only biotech event approved in the EU** (ISAAA, Brief 53, p. 92)
- **Spain and Portugal** are the only EU member states, which **planted biotech maize annually** between 2008 and 2018.

Data sources

- **Conventional maize area:** Eurostat, Crop statistics [apro_cpnh1]; anpromis - Evolução das áreas de Milho.
- **Biotech maize area:** State of the Environment Portal Portugal, ISAAA, Brief 53, p. 94; europeansed - Spain's GM Maize Production.
- **Average yield markup:** Brookes, G. (2019): Twenty-one years of using insect resistant (GM) maize in Spain and Portugal.
- **Total grain maize production value:** Eurostat; Economic accounts for agriculture (EAA):

Calculation

- Agricultural products are **not part of the prodcom database** we use for healthcare and industrial biotech. Therefore, an estimation based on aforementioned data sources is necessary.
- This information allow us to estimate the **production value for GM maize** in the EU28.
- From there on, we can **calculate GVA and spillover effects** the same way as for healthcare and industrial biotech.

Methodological notes

EU27 vs. EU28

Where possible, we calculated EU28 figures. For trade figures, this is currently not feasible, because Eurostat does not continue to provide trade data on the UK from reporting year 2020 on. Similarly, Eurostat stopped to provide EU28 aggregate numbers which would have allowed us to apply our method to correct missing/suppressed data. Moreover, the required level of detail and product classification is not available via the Statistical Office of the United Kingdom.

Healthcare biotechnology too small?

Despite the pandemic and successful vaccine development in Europe, footprint results for healthcare biotechnology in general seem to have grown surprisingly little. There are several conceivable reasons for this:

- Lack of data quality of the European manufacturing statistics for the most recent reporting year
- Accounting effects, royalty income from e.g. Biontech have NO influence on production statistics
- We agreed to use the unchanged biotechnology keys (share of biotechnological value per product) from the initial project. However, regarding the current success of mRNA covid vaccines this might possibly be a reason to raise the biotech key of human vaccines (which should affect the results significantly).



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