Germany
Verband der Chemischen Industrie e.V. (VCI)

<table>
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<tr>
<th>Number of companies</th>
<th>Turnover</th>
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| 2,050               | €203.0 billion | Wolfgang Große Entrup  
                     | Direct employees                                      | 
                     | €7.8 billion           | Director General                             | 
                     | 462,553          | w.grosse.entrup@vci.de|

CHEMICAL AND PHARMACEUTICAL INDUSTRY SNAPSHOT

Third-largest industry in Germany

With a 2018 turnover of €203.0 billion, chemicals and pharmaceuticals are the third-largest industry in Germany, behind only automotive and machinery and equipment.

Broad and strong

The German chemical industry is strong across all segments: basic inorganics, petrochemicals, polymers, agrochemicals, specialties, cosmetics and pharmaceuticals. It is also well spread across the country, although some regions are more specialised in basic chemicals, while others focus more on specialties or pharmaceuticals.

As an enabler of all other industrial sectors, the chemical industry has its role in all economic regions or clusters. To highlight just a few specific segments, technologies or regions would not be a suitable way to describe the strength of the German chemical industry.

In 2018 nearly 2,050 companies partly organized in 40 Chemical Parks employed 462,553 people. Sales in the industry rose by almost 4 percent to 203 billion Euro in 2018. 60 percent of total sales were generated with
customers abroad.

Development until 2050: A VCI Prognos study Wege in die Zukunft, predicts growth of 1.6% a year until 2050 for the German chemical industry.

Among the most important trends affecting chemical and pharmaceutical industry are sustainability, climate change, protection of natural resources, and circular economy. The German chemical industry, together with its customers, is developing and implementing new processes and products e.g. with the aim to reach greenhouse gas neutrality by 2050, to use CO₂ as an input or to use plastic materials via recycling as feedstock for the next generation of products.

New technologies such as nano- und biotechnology and digitalisation are explored to find efficient ways to achieve these goals.

Areas of growth for the chemical industry lie in the topics addressed in the “High Tech-Strategy” of the Federal government. Due to digitalisation, process and organizational innovations are gaining in relative importance.

**Progressing through research**

More than 60% of German chemical companies have research activities, and R&D spending exceeds €11 billion each year. While German chemical companies get less than 1% of their R&D expenditures through government funding, collaboration between industry and academia is well established: one third of chemical companies collaborate with academia in research projects.

To maintain its competitive edge, the German chemical industry will enhance its research effort by 2050.
Transport matters

Three states on the Rhine have the largest chemical industries: North Rhine Westphalia, followed by Rhineland-Palatinate and Hesse, with its strong pharmaceutical industry. Good access to transport infrastructure is one important locational factor for a successful chemical industry. In Eastern Germany, Saxony-Anhalt is the top chemical producer.
HOW ARE WE DOING?

Strengths

- Highly-integrated, globally competitive clusters and chemical parks
- Highly-innovative chemical sector
- Highly-specialised small and medium-sized enterprises
- Powerful protagonist in international value chains with activities in all centres of growth
- High resource efficiency
- Well-educated labour force (academic, non-academic, e.g. via dual education)
- Close supplier-customer relations
- Network of strong research and university infrastructure
- Capable physical infrastructure, positioned at the centre of Europe
- Good cooperation between companies and unions (Social partnership)
- Long experience and focus on safety and protection of the environment
- Able to meet sophisticated consumer demands
- A leader in establishing processes of digitalisation of the chemical industry
• Positive public image

Weaknesses

• Energy prices are high and rising
• Strong reliance on imported raw materials
• Dependence on the automotive industry as important customer
• Links to international suppliers and markets become vulnerable due to rising protectionism and global tensions
• Rather vulnerable to external shocks (scarcity in many raw materials)
• Demographic change will pose an increasing threat in the future, especially in rural areas
• Lack of skills for digitalisation
• Slow upgrade of IT infrastructure including high-speed internet
• Slow progress on new electricity grids to enable the “Energiewende” towards renewable energy
• Lengthy approval procedures with legal uncertainties
• A sceptical view on change and new technologies in some parts of society

OUR CONTRIBUTION TO A COMPETITIVE EUROPE

Creating a framework for success

Germany started developing an industrial strategy in 2019. Until now the strategy’s scope remains open. Traditionally, in Germany, government sets overall horizontal framework conditions (research, energy, education, and infrastructure) and companies and other players adapt to customer needs. But ambitions in climate policy, increased international competition and emerging new technologies have raised new needs for an industrial policy.

Encouraging research through public policy

In 2017, government R&D spending, including funding of industrial R&D, was 0.94% of GDP while corporate R&D was 2.0% of GDP, making 3.04% of GNP in total.

The Federal government’s High Tech Strategy focuses on innovation in climate and energy, health and nutrition, mobility, security, communication, digitalisation and labour, and on key enabling technologies, such as bio, nano, materials and production. Complementary regional programmes of the states focus on the academic and industrial strengths of their regions.

There are some sectoral initiatives on technology development in Germany, which encompass value chains and go beyond the chemical industry. To name three:

• The National Platform on Mobility
• The Platform “Industrie 4.0” to support dissemination of digital technology throughout the economy, especially the manufacturing sector
• The support for renewable energies by the EEG (Renewable Energy Law)

Whether these initiatives will prove to be ultimately successful remains to be seen. For example, costs for renewable energy production threaten to curb production of energy-intensive products, while new jobs in renewable energy technologies have been lost in recent years.
Closely related to the field of chemicals is the national “BioEconomy 2030” strategy, which has been jointly developed by government and industry. There are several regional initiatives, such as a Hesse health industry project involving the pharmaceutical industry.

**Teaching the right skills**

Both at the Federal and the Länder level, Germany strives to strengthen the role of Science, Technology, Engineering and Maths (STEM) teaching in schools, vocational training institutions and universities and keep teaching up to date.

**Profiting from research connections**

Strong and effective links with industry and services as well as research institutions are a strategic advantage for the German chemical industry. Collaboration between industry and academia is well established: one third of chemical companies collaborate with academia in research projects.

**Working together**

Germany’s world-leading industrial sectors, such as automotive, chemistry, electrical/electronic equipment, and machinery collaborate in R&D. Its chemical parks are efficient local platforms for collaboration between chemical producers and suppliers of infrastructure, services and other inputs.

In 2015, the German Ministry of Economics, together with industrial sectors (including the chemical industry) and trade unions, started the “Bündnis Zukunft der Industrie” – a joint effort to identify measures to secure or enhance the competitive position of German industry.

**Smartening up**

Funding in the context of “smart specialisation” via the EU structural funds is of lower importance as Germany is doing very well economically, and state R&D funding of German industry is mostly from national, not EU sources.

**Landscape of the European Chemical Industry Website:**

http://www.chemlandscape.cefic.org/country/germany/