

# MARKETS

**GERMANY**

Insights into Europe's Biggest Economy 1/22

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The Digital Magazine

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### MANUFACTURING



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Demand for service robots is booming as companies find it harder to source routine labor.

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Federal Ministry  
for Economic Affairs  
and Climate Action

on the basis of a decision  
by the German Bundestag



## »A new government agenda further emphasizes the 'two Ds': decarbonization and digitalization.«

Dear Reader,

Continuity and change might well be opposites, but they're not mutually exclusive, and functioning economies need both if they're to stay competitive. That, in a nutshell, is the guiding principle of the new coalition government in Germany that assumed power in December, ending Angela Merkel's 16-year tenure as chancellor.

Germany's new leader, Olaf Scholz from the center-left Social Democrats (SPD), was the country's finance minister in the previous government and embodies the continuation of the strengths that have enabled Germany to navigate the ups and downs of the coronavirus pandemic fairly well.

But of course not everything is the same. Merkel's conservative CDU/CSU are now in opposition. Replacing them in government are the environmentalist Greens and the business-friendly Free Democrats (FDP). That's led to a new government agenda that further emphasizes the "two Ds": decarbonization and digitalization.

This issue of *Markets Germany* will focus on the former, but digital transformation will also crop up a lot in the pages to follow. Both of these initiatives require fundamental changes in German society, opening up business opportunities for international companies with innovative solutions, whether they are in hydrogen energy and circular economies or artificial intelligence and e-learning. We hope that the articles in this edition will give you some ideas and impetus toward bringing your business to the new, post-Angela-Merkel Germany.

**Dr. Robert Hermann, CEO**

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# MAJOR PLAYER



## MAJOR PLAYER: BELÉN GARIJO

Unfortunately, the top echelons of corporate Germany still have a long way to go on diversity. That's why Belén Garijo made history twice over in May 2021 when she became CEO of pharmaceutical giant Merck. Not only did she become the first non-German to head the 350-year-old company, but also the first woman to lead a DAX company on her own. But Garijo is not comfortable with her history-making status being "the only topic of conversation," as she told a podcast by *Stern* magazine last year.

As a doctor by training who began her career in a Madrid hospital, Garijo has plenty more to say. She was recruited to Merck in 2011 by her predecessor, Stefan Oschmann.

She was made president of the company's healthcare division in 2015 and set about transforming the business into a key player in oncology and immunology. "The transformation of companies is a never-ending journey," Garijo emphasizes. Merck is focusing on technological megatrends and organic growth, but will also continue to be involved where opportunities arise in order to sustainably increase Merck's profits in the long term.

The German business scene is most fixated on her Spanish nationality. Top German companies, especially if they see themselves as global enterprises, are looking abroad more often to fill leadership roles.

### Quick facts

NAME	Belén Garijo
JOB TITLE	CEO
AGE	61
NATIONALITY	Spanish
QUALIFICATION	Doctor of Medicine
COMPANY NAME	Merck
LOCATION	Darmstadt
INDUSTRY	Healthcare, Life Science, Electronics
GENERATED SALES	€17.5 billion



# 80%

**Government target for renewables** in German electricity consumption by 2030

Source: coalition agreement

# €392bn

**Market volume of Germany's environmental technology** and resource efficiency sectors in 2020

Source: Roland Berger

# -65%

Germany's target for **greenhouse gas reduction** by 2030 compared to 1990

Source: Ministry for Economic Affairs and Climate Action

## NO TIME TO LOSE

Scientists warn the world has less than eight years to act if it is to limit global warming to 1.5 degrees Celsius – widely considered to be the maximum allowable rise to avoid environmental catastrophes. And Germany is taking those warnings very seriously. In January 2022, German Minister for Economic Affairs and Climate Action Robert Habeck announced that Germany would “roughly triple” its efforts to meet its 2030 CO<sub>2</sub> reduction goals to limit global warming. That means significant accelerations in the construction of renewable electricity generating facilities, help for businesses that convert to sustainable production, enhanced standards for energy efficiency and heating in buildings, and additional support for an industrial-scale hydrogen energy economy.



Forest turbines – a coming trend? The use of forest sites for wind turbines is permitted in several German regional states. By the end of 2020, there were 2,086 of them. As there are no national regulations governing the construction of turbines in forests, each regional state makes its own rules.

# DECARBONIZING DEUTSCHLAND

The new government under Chancellor Olaf Scholz is repositioning German society and the German economy with an even sharper focus on decarbonization.

**C**ombining ecology and the economy is a goal Germany has pursued for decades. Now, for the first time, this connection is anchored in the government's institutional structure. The coalition agreement between the new governing parties – Olaf Scholz's Social Democrats (SPD), the environmentalist Greens and the business-friendly Free Democrats (FDP) – has created a new "superministry," the Federal Ministry for Economic Affairs and Climate Action, headed up by Robert Habeck of the Green Party.

"We think of economic development and ecological preservation together," the governing parties stated in the coalition contract signed at the end of last year. "An energy infra-

structure for renewable energy and hydrogen is a precondition for Europe remaining able to act and compete in the 21st century."

According to Germany Trade & Invest's director of Energy, Construction and Environmental Technologies, Thomas Grigoleit, this amounts to "a concentrated effort to accelerate the phaseout of coal as an energy source." And it will bring about a wealth of opportunities for foreign investors in Germany. "The expansion of renewables, the creation of a hydrogen economy and infrastructure, and the continuing decarbonization of the transportation and logistics sector will offer a historical chance in growing markets for German and international cleantech companies," he says.

In any event, by law Germany must become carbon-neutral at the latest by 2045. That target still requires big shifts in a variety of economic sectors and in society as a whole.

Germany is investing massively in hydrogen as a carrier of energy produced by renewable sources. The technology is a major hope for the decarbonizing industry. So, too, are the transitions to electric mobility and circular economies, bans on plastic packaging and the greening of information technology, as you will see on the pages to come.

**ONLINE**

[www.gtai.com/energy](http://www.gtai.com/energy)

## GP JOULE

... is a provider of renewable energy generated from solar radiation, wind and biomass and has been supplying power for electromobility, district heating and industry for many years. In 2020, it launched Germany's largest green hydrogen mobility project to date: the eFarm H2 filling station in Schleswig-Holstein designed to power regional public buses. At the heart of the company's ethos is the belief that the world can achieve a transition to 100% energy from renewable sources in the future, and the desire to deepen our connection with nature.



## GERMANY'S SERIOUS COMMITMENT TO DECARBONIZATION

*The growth of cleantech in Germany shows its environmental protection policies are more than just spin.*

# NO.2

**Germany is ranked second globally**  
(AFTER JAPAN) IN TERMS OF PUBLIC ACCESS  
TO HYDROGEN REFUELING STATIONS

Source: ecomento

# 4.4M

**tons of hydrogen**  
WERE PRODUCED  
BY GERMANY IN 2020

Source: VCI; German Federal Statistical Office

# 49%

OF ALL PUBLICLY ACCESSIBLE HYDROGEN  
REFUELING STATIONS IN EUROPE  
**are in Germany**

Source: ecomento



# HYDROGEN HOLDS A KEY TO A GREEN GERMANY

The task of decarbonizing a major industrial nation like Germany was never going to be easy. But innovative German and international companies, with a helping hand from the government, are demonstrating how green hydrogen could help turn the tide toward a cleaner economy.

**T**he city of Oberhausen in North Rhine-Westphalia is in many respects typical of Germany's western industrial heartland: a densely populated municipality of over 200,000 people with a gasworks for a landmark and factories and chemical plants as far as the eye can see. It's a perfect illustration of both the challenges Germany is facing with its transition to clean energy, and the critical role that green hydrogen will play in the energy turnaround.

Oberhausen's busy cityscape will soon be joined by a 30-megawatt renewable hydrogen production plant being built by France-based Air Liquide in partnership with Siemens Energy. Scheduled for completion in 2023, the new proton-exchange membrane (PEM) electrolyzer facility will be integrated into the existing local pipeline infrastructure of Air Liquide to supply key regional industries and mobility.

What's also striking is that the plant will sell not only hydrogen but oxygen, which would otherwise be wasted, for use in steel-producing blast furnaces. That's one example of how the hydrogen economy can help other sectors lower carbon emissions. In August 2021, the Oberhausen project was awarded EUR 10.9 million from the Federal Ministry for Economic Affairs and Energy.

For Air Liquide, simple geography was a major factor in its choice of location. "We carefully assessed which country we should choose, and Germany's Oberhausen won out," says Andreas Voss, a spokesman from Air Liquide Germany. "It's crucial to build up hydrogen production capacity and hydrogen applications simultaneously in geographic proximity to one another if you want to narrow the price gap between grey (non-ecological) and green hydrogen."

Air Liquide is involved in a whole spectrum of green H2 projects in Germany. Along with Siemens Energy, it is engineering mass-produced components to lower the cost of producing renewable H2. It's been involved in a pilot program for fueling Daimler trucks with liquid hydrogen. It supplies green H2 and a mobile filling station to a pilot program for hydrogen-drive trains on Baden-Württemberg's Tübingen-Sigmaringen line. And it is scheduled to build a centralized high-pressure H2 filling facility for the southwest German H2Rivers project to support fuel cell mobility.

## "Burgeoning interest in green H2"

Just up the road from Oberhausen, in the city of Duisburg, the leading American provider of green hydrogen, Plug Power, is also expanding its presence in Germany with a new European headquarters. The facility will house an innovation center with engineering labs and technical support, a monitoring, diagnostics and technical support center, a green hydrogen generator with electrolyzer infrastructure, a shipping and logistics center, and a training space. That entails quite a financial commitment.

## WHAT IS THE ENERGIEWENDE?

The word *Energiewende* literally means "energy transition" and refers to Germany's effort to switch to clean energy sources in order to limit the effects of climate change. The main policy target is carbon neutrality by 2045, and the first major intermediary milestone is to reduce 1990 emission levels by 65 percent by 2030.

From mid-2019 to mid-2021, the German government provided more than EUR 80 billion in investments related to climate change prevention in the context of its Climate Protection and Economic Stimulus Program. Between 2022 and 2025, the government plans to increase that funding by tens of billions of euros. The economics think tank ifo Institute expects the energy turnaround to cost Germany between 0.4 percent and 2.5 percent of GDP annually until 2050. The biggest share of this will go toward investments in facilities and infrastructure, from the generation and conversion of renewable electricity to smart grids, charging stations for electric cars, renewable power for district heating, and everything in-between.

## 4

## REASONS WHY GERMANY IS SET TO LEAD IN GREEN TECHNOLOGY

## 1

### Lasting commitment to sustainability

Germany has set itself legally binding climate goals to achieve carbon neutrality by 2045. This will continue to inform policy decisions, providing transparency to consumers and businesses, who will know where the country is headed.

## 2

### History of pioneering green technologies

Germany was one of the first countries in the world to think seriously about "going green" and to put strategies in place. German businesses and institutions have decades of experience and have built up a wealth of expertise, networks and intellectual property.

## 3

### Emphasis on R&D

Germany's strong industrial base and record-level of investment in R&D make it uniquely suited to develop green products and technologies. Environmental companies accounted for 15 percent of Germany's GDP in 2020, with both employment and turnover on the rise.

## 4

### Massive investments in decarbonizing the economy

Germany has already invested heavily in solar and wind energy. For the 2022–2025 period, the German government plans to increase funding for projects related to climate protection by tens of billions of euros.



»The transformation of the coal regions offers enormous potential for the hydrogen sector, with existing research centers being expanded and new ones being established.«

Heiko Staubitz, GTAI senior manager

"The expansion to Europe comes as Plug Power faces a growing customer base abroad with the burgeoning interest in green hydrogen energy," commented Plug Power CEO Andy Marsh in a meeting with Andreas Pinkwart, North Rhine-Westphalia's Minister of Economic Affairs, Innovation, Digitalization and Energy, last September.

Spurring all these activities are programs and incentives at the regional, national and European levels. Most prominent is Germany's National Hydrogen Strategy, which sets the legislative agenda and allocates EUR 9 billion+ in government money.

Germany Trade & Invest's senior manager of hydrogen, smart grids and energy storage, Heiko Staubitz, points out that the National Hydrogen Strategy has been providing the right stimuli for the hydrogen sector to pick up steam. "The regulative framework provides the guidance while the incentive programs accelerate the progress," says Staubitz. "We have been receiving many inquiries from companies around the world with promising project ideas and innovative solutions."

And the subsidies are set to rise and rise. In June 2021, the German government approved an eight-billion-euro immediate decarbonization action program that will also fund green hydrogen projects.

### Replacing coal with hydrogen

The government is particularly keen on developing hydrogen-associated industrial and research clusters in the areas directly affected by Germany's ongoing phaseout of coal mining: Lusatia, Rhineland, Helmstedt and Central Germany.

In Lusatia, for instance, the Ministry for Digital and Transport's HyStarter project

supports the local development of green H2 capacity and a large network of hydrogen filling stations. Meanwhile, the Ministry of Education and Research has allocated EUR 860 million for the Helmholtz Cluster for a Sustainable and Infrastructure-Compatible Hydrogen Economy (HC-H2) in the Rhineland area.

"The transformation of the coal regions offers enormous potential for the hydrogen sector, with existing research centers being significantly expanded and new ones established," Staubitz explains.

## H2 INVESTMENT OPPORTUNITIES

In the first half of 2022, GTAI will conduct a series of roadshows to promote hydrogen-related industrial and research clusters in three of Germany's traditional coal mining areas: Lusatia, Rhineland and Central Germany. The events will highlight investment opportunities at every stage and level of the hydrogen value chain. For more information, contact [sandra.moser@gtai.com](mailto:sandra.moser@gtai.com).

Last May, more than 60 initiatives were selected for support as part of the National Hydrogen Strategy and earmarked as Important Projects of Common European Interest (IPCEIs). Spread across all of Germany, they represent the four main aspects of the strategy rollout: hydrogen production, infrastructure, industrial uses and mobility uses. Among the foreign companies participating in IPCEIs are Vattenfall, Shell, BP, Mitsubishi, Ørsted Wind, ArcelorMittal and, of course, Air Liquide.



### Running on renewables

Germany's support for green hydrogen will create countless new markets and niches, most prominently for companies involved in producing electricity from renewable sources. Clean electricity for powering electrolyzers will be needed in huge quantities when the green hydrogen economy takes off. That means a swelling market for wind and solar energy projects both inside and outside Germany.

The first big projects in this area are already underway. One of them is AquaVentus on the island of Helgoland in the North Sea. It will bring together 40 international companies and institutions with the goal of producing one million tons of green hydrogen annually and feeding it via pipeline into a special H2 network on the mainland.

"AquaVentus is a cornerstone of the German National Hydrogen Strategy," says Jörg Singer, the company's chief executive and the mayor of Helgoland. "We've got support from the German ministries of research and economic affairs, and we're awaiting support from Brussels."

### Room for mid-sized companies

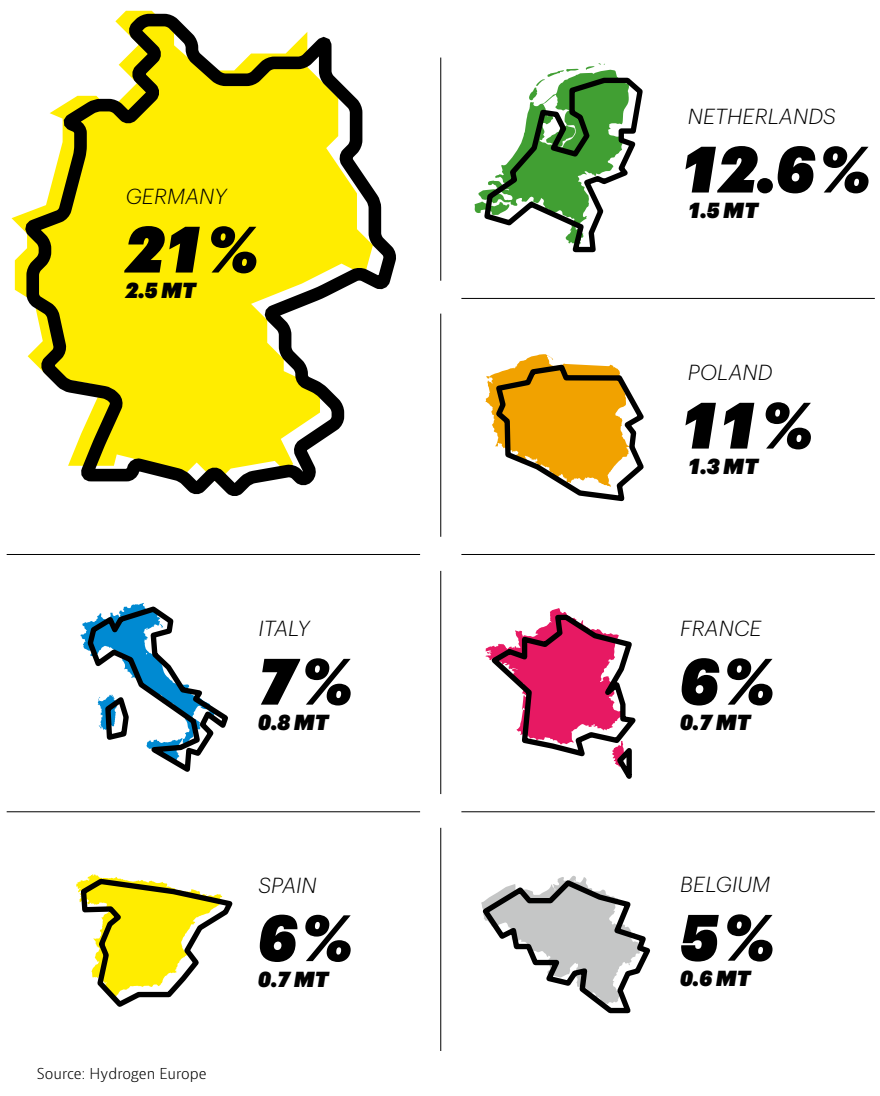
There's potential for smaller and medium-sized international companies to get involved too. For example, Swiss-based power producer aventron, which operates renewable energy power stations in Switzerland, France, Italy, Germany, Spain and Norway, and has recently acquired the 7-megawatt Hellberge V wind farm south of Berlin. As aventron's tenth wind farm in Germany, it will complement its 6.1-megawatt Hellberge III wind farm built in 2016.

"Germany is attractive for us due to the geographic proximity to Switzerland, its precise laws and long-lasting and consistent government support for wind energy, as well as ample investment opportunities," says Antoine Millioud, aventron's CEO. "We hope to set up or acquire another two or three wind farms over the next five years to arrive at a portfolio of more than 100 megawatts."

Contributions from international SMEs like aventron will play a vital role in Germany's bid to achieve its green hydrogen goals and to change the energy game in central Europe.

# GERMANY IS EUROPE'S BIGGEST H2 FACTORY

Annual hydrogen production capacity in Europe in 2018  
by country and by share (in million tons)



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# ELECTRIFYING THE MARKET

Coming soon to supermarkets, street corners or private residences: charging stations for electric vehicles. As the German government ramps up investment into the country's charging network, it's a good time for foreign investors to join the e-revolution.



Photo: Fastned

**I**t may not have been blockbuster news but in October 2021 there was a pivotal moment for the e-charging market in Germany: The national government put out new tenders for its EUR 2 billion investment into establishing a network of a thousand new fast e-charging stations across the country. In cities and on the highways, land is being made available as part of a major push to win over electric car skeptics.

## THE BOTTOM LINE

Carmakers are producing more and more fully electric vehicles. Now, the infrastructure needs to expand to meet the demand – a challenge worth billions in Germany.

The companies that win those bids will be well positioned to determine the future of the market. Among them is Virta Germany, the German branch of the Finnish e-charging giant Virta Global, whose managing director Nicolai Woyczehowski says his company is determined to establish “a big presence” in Germany. “Germany wants to go this way, the targets are already set by the government, and the subsidies are heavy,” he says.



At this new e-charging station in Limburg, operated by Fastned, customers can charge their cars for a 300-kilometer range in 15 minutes.

### The chicken and the egg

Germany Trade & Invest auto industry expert Stefan Di Bitonto also sees this as a crucial moment. “We always had a chicken and egg problem before,” he says. “Should we first have charging stations, or should we first have electric vehicles?”

Industry seems to have found a way through the dilemma having started to deliver electric cars on a massive scale. According to Germany’s Motor Transport Authority, the KBA, the number of fully electric cars on German roads increased from 2,300 in 2011 to some 517,000 on October 1, 2021. And observers expect those numbers to grow steadily as EV infrastructure is put into place.

“The hybrid era doesn’t seem to have stuck – we’re really moving fast toward fully electric vehicles,” says Di Bitonto. “But the infrastructure is lagging behind. We need a real boost in investments. The EUR 2 billion means there’s a lot of assets out there, so that would be a great opportunity to profit.”

### The heart of a revolution

That’s why people like Linda Boll are so enthusiastic about the German market. The public affairs manager at Dutch e-fueling specialist Fastned says Germany is key to her company’s plans. Fastned, which has won multi-million-euro German government subsidies in the past has been expanding rapidly across Europe since its foundation in 2012, with fast-charging stations in the Netherlands, Belgium, Switzerland and the UK.

Most roads that traverse Europe pass through Germany. “It’s a no-brainer: Germany is at the heart of Europe,” says Boll. “Geographically and strategically there was never

## POWERING UP AT HOME

**8-12**

**MILLION**

NUMBER OF DETACHED AND SEMI-DETACHED HOMES IN GERMANY AT WHICH CHARGING POINTS COULD BE INSTALLED

Source: dena

**74.8**

**PERCENT**

OF HOUSEOWNERS WOULD PREFER TO CHARGE THEIR VEHICLES AT HOME

Source: EuPD Research

any doubt that Fastned would need to have a strong foothold in Germany in order to build this Europe-wide network.”

Both Fastned and Virta were founded less than a decade ago and both identified Germany as a prime market. Virta was just three years old when it opened its first offices in Germany in 2016. It’s been expanding its customer base ever since: The firm now counts state energy utilities like Pfalzwerke and private-sector giants like E.ON among its partners.

### Two problems, one solution

As Woyciechowski points out, e-mobility provides solutions to two urgent problems, not just one: how to make transport cleaner and how to store energy from naturally variable sources like the sun and wind. “When electric vehicles are parked, you can use them as a stationary battery,” Woyciechowski says. “You can connect them to the electricity grid as a storage form.”

The incentive for the customer is simple and compelling: Your car is earning while it’s parked. “You will get reimbursed for selling, say, 10 percent of your battery capacity during high-peak times. Isn’t that nice?” says Woyciechowski. “This is a tremendous opportunity to help accelerate the transition to renewable energy in Germany.”

Virta already has these operations up and running in three European countries – Finland, the UK and France – and is hoping to roll them out in Germany in the next two years. While the technology is already in place, the key to commercializing the model, according to Woyciechowski, is navigating the varying grid regulations in different countries. He adds that major German carmakers like Volkswagen have already shown interest in investing in this technology.

Cars have long been at the heart of Germany’s economy, which makes the transition to electric all the more critical. The industry is heavily focusing on fast charging now to overcome consumer skepticism. Fastned claims its stations can charge a range of up to 300 kilometers in 15 minutes, depending on the capacity of the electric car. “The customers will come,” says Boll. “As we see the big car manufacturers embracing e-mobility, we’re 100-percent convinced of that.” The revolution is underway – the infrastructure needs to keep up.



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# German IT GOES GREEN

Digitalization can be both a curse and a blessing from a sustainability standpoint. On the one hand, information technology makes companies more efficient. On the other, IT itself consumes a lot of energy. More and more firms are therefore investing in sustainable options.

**T**he new data center of IT specialist Equinix in Frankfurt heralds a new era. Inside the building – whose exterior is covered with plants and greenery and features a roof garden – energy-efficient, high-performance computers hum, and fans supply the building with cool air. This low-energy building is intended as a model for the other 65 outposts of the US parent company, which has pledged to become climate-neutral by 2030.

Data centers house vast numbers of servers and routers and consume huge amounts of energy as well as releasing heat. The all-encompassing advance of digitalization means the amount of data and with it the energy consumed is growing exponentially. This can outweigh the environmental benefits of “going digital,” including measures like saving paper or streamlining operations.

The result is a new niche known as green IT. “This market is growing in Germany,” says Niklas Meyer-Breitkreutz, expert for digitalization and sustainability at the industry association Bitkom. “Companies that bring digitalization and sustainability together have a competitive advantage in the German market.”

## Software and hardware

In May 2021, in a global survey of 1,000 companies with annual sales of more than USD 1 billion, Capgemini Research Institute found that over half (52 percent) believed that tech

## THE BOTTOM LINE

Calls are growing in Germany for the information technology industry to become more sustainable. That's created a new market for “green IT.”

## GOING DIGITAL AND GREEN TOGETHER

Share of companies per sector that cited energy savings as the reason for digitalization projects in Germany (2017–2020)

**36%**

ICT HARDWARE

**27%**

ICT SERVICE PROVIDERS

**30%**

MEDIA INDUSTRY

Source: ZEW

corporations should take sustainability into account in their products and services. One way to do that is to develop effective software that uses less computing power: 45 percent of respondents would be willing to pay up to 5 percent more for software of this sort.

Equinix has recognized Germany's potential as an investment location and has been operating its own data centers here since 2014, exclusively with electricity from renewable sources. “Our customers are increasingly interested in their IT becoming more sustainable,” says Jens-Peter Feidner, managing director of Equinix Germany.

And software isn't the only approach. Equinix operates its data centers using state-of-the-art hardware. The Frankfurt facility has a power usage effectiveness (PUE) rating of 1.2. PUE indicates the amount of electricity consumed in relation to the computing power provided (the closer to 1.0, the higher the efficiency). On average, German data centers reach 1.7 to 1.8.

Higher efficiency values come with a higher price tag. Equinix invested EUR 110 million in its Frankfurt site – but it turned out to be money well spent. The company has recently added another data center in the city and four more are in the works – representing a total investment of around EUR 1.1 billion. Equinix hopes to take advantage of the growing interest in Germany in sustainable IT expertise.



“Many German companies are developing exciting innovations that make IT more sustainable,” says Feidner.

One example is the start-up etalytics. It developed the artificial intelligence used by Equinix to measure whether it can make the cooling of individual servers even more energy-efficient.

#### More location advantages

Innovation is just one of the reasons why Equinix is expanding its presence in Germany. Frankfurt is Germany’s financial center and a banking metropolis whose international significance has grown markedly after Brexit.

It’s also home to Europe’s largest data hub DE-CIX, which has served as a magnet for attracting large computing power companies. Furthermore, the German power grid is stable and uses a large and growing share of renewable energies.

“This is an enormous locational advantage,” says Marc Schattenmann, head of the Department for Digitalization at the German Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection.

The German government is taking a hard look at its own IT emissions and has cut them by half since 2008. This was primarily achieved through the acquisition of sustainable IT prod-

ucts. These days, when government administrations purchase new computers, their decisions are based in part on the products’ energy efficiency. The public sector in Germany has a great deal of financial clout and will be paying even more attention to sustainability in its IT contracts and products. Thus, companies in Germany with expertise in green IT could even attract the national government as a potential customer.



#### CONTACT

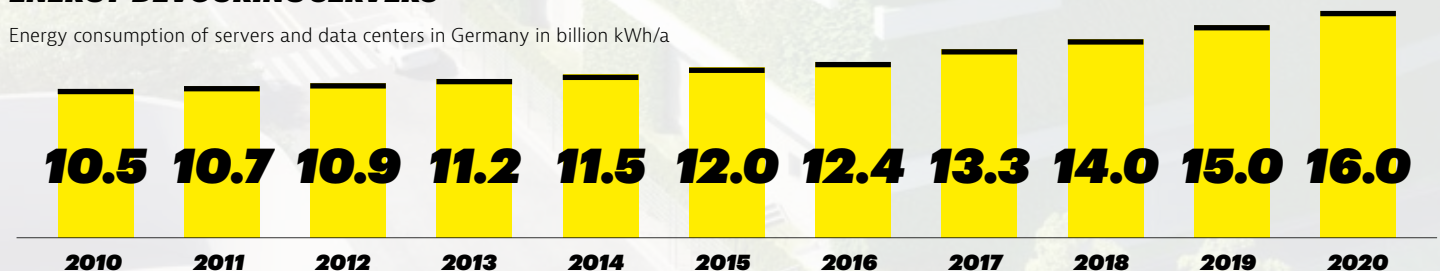
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Equinix’s state-of-the-art, low-energy data center in Frankfurt, which is covered in greenery, cost the US company EUR 110 million.

#### ENERGY-DEVOURING SERVERS

Energy consumption of servers and data centers in Germany in billion kWh/a



Source: Borderstep Institute



## WASTEFUL PACKAGING

End-consumer plastic waste in Germany by application in 2019



PACKAGING

**59.1%**



CONSTRUCTION

**9.8%**



ELECTRONICS

**5.9%**



AGRICULTURE

**5.5%**



VEHICLES

**4.4%**



HOUSEHOLD GOODS

**3.2%**



OTHER

**12.3%**

Source: Conversio

**77%**

of German consumers prefer to buy products that use as little packaging as possible

Source: Ipsos 2019

The tide is turning as German consumers are rejecting unnecessary packaging and single-use plastics in favor of eco alternatives.



# Non-Plastic **FANTASTIC**

The European Union has dramatically restricted single-use plastics and may eliminate them entirely. That's shaken up the market in favor of product developers who are able to think outside of conventional containers.

**A**s children, many of us were told not to chew on straws or spoons. But for one inventive German company, Kulero, that's precisely the idea. Its novel, non-plastic disposable eating and drinking utensils are the brainchild of Hemant Chawla and Juliane Schöning. Now based in Göttingen in Central Germany, Chawla began developing the technology after being appalled by the amount of discarded plastic trash during a festival in his native India in 2017.

Kulero's products are made of bread dough and therefore entirely edible. A Kulero ice-cream spoon is not just a means for eating a dessert. It's part of the sweet itself and completely vegan to boot. After some initial success in India, the company entered the German market in 2020. It claims it has replaced more than one million plastic spoons and has dug out a unique niche in the market.

"There aren't currently any viable alternatives," Chawla told the German business magazine *Wirtschaftswoche*. "Wood and paper have a taste many people don't like. Other products aren't stable enough for hot food and fall apart."

## Post-ban boom for eco alternatives

If the European Union has anything to do with it, Kulero's success story won't be unique. On July 3, 2021, the bloc instituted a wide-ranging ban on plastic cotton-bud sticks, cutlery, plates, straws, stirrers, balloon sticks, polystyrene drink and food containers and non-bio-degradable plastic bags.

## THE BOTTOM LINE

New EU regulations will drastically reduce single-use plastics in the years to come and generate opportunities for foreign companies with smart new packaging solutions.

The restrictions form part of the EU's Circular Economy Action Plan, adopted in 2020, which is in turn part of the bloc's Green Deal. This huge initiative addresses big global challenges including ocean pollution: The Heinrich Böll Foundation, headquartered in Germany, estimated some 930 billion pieces of plastic waste ended up in the North Atlantic in 2019 alone.

The new EU restrictions will help reduce that kind of pollution, but many types of plastic containers and packaging are still allowed, if in restricted form. They include PET bottles, immediate-consumption beverage and food containers, packets, wrappers, tobacco filters, sanitary items and wet wipes. Germany's Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection estimates that Germans use almost three billion disposable coffee cups every year – around 320,000 an hour.

So it seems inevitable that the market for non-plastic alternatives will expand exponentially. Moreover, Germany will also need systems for distributing and collecting multi-use replacement products. "This new frame-

work will become even more noticeable in the coming months," expert Victoria Kintzinger explains. "Restaurant-related companies are already active here. But alternatives for personal care products are also being increasingly produced and marketed."

## Large-scale partners

Wherever there's a large demand, business heavyweights will quickly jump in to meet it. Some of the major players in the food and drink industry, for instance, are hard at work figuring out how to decrease their plastic consumption.

"Danone, Nestlé and Unilever are already investing millions in alternative packaging," Duy Ton, a portfolio manager in Union Investment's sustainability team, told the Internet platform T-Online.

Soft drinks giant Coca-Cola is also moving its portfolio toward more sustainable packaging and has even looked at paper bottling. So the chance is there for innovators to scale their business rapidly while doing something to solve one of the planet's most pressing environmental problems.



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# VIRTUOUS CIRCLES

Waste not, want not, runs the old adage, but traditionally, Germany has been more interested in recycling than in circular economies. All that's starting to change.

## GERMANY'S CIRCULAR ECONOMY IS ON THE INCREASE

*Projected annual growth in Germany from 2020 to 2030*

CIRCULAR ECONOMY OVERALL

**+ 5.9%**

RECYCLING

**+ 13.6%**

CO2 CAPTURE

**+ 34.6%**

Source: Roland Berger





**I**n the second half of 2021, the global shortages in raw materials and essential industrial components and parts underscored how vulnerable supply chains are in Germany and most other developed countries around the world. Consumers were forced to wait months, for instance, for new cars, and businesses lost out on revenue. But what if there were a way to program the procurement of materials into the production process itself?

There is, and it's called the circular economy: a model of production and consumption where existing materials and components are modularized and utilized as thoroughly as possible. The concept goes above and beyond conventional recycling. And for Germany, a country not blessed with an overabundance of natural resources, it's a logical path to take.

Statistics underscore how central circular economies can be to Germany's future: The Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection's most recent GreenTech Atlas put the market value of Germany's circular economy sector at EUR 24 billion. That amounted to over 16 percent of the world total for 2020. The Atlas also predicted average annual growth of 5.9 percent, with market value reaching EUR 32 billion by 2030.

### A new economic model

In November 2021, the German business newspaper *Handelsblatt* published a study by the Boston Consulting Group projecting that Germany could source up to 75 percent of many materials from recycling.

To achieve this, the country would need to invest EUR 50–60 billion between now and 2040, but it would also create countless business opportunities and one million new jobs in the process. By comparison, the sector currently employs approximately 310,000 people.

"Recycling plays an important role in a rapidly increasing number of areas, such as battery recycling and wind turbine recycling, and the whole area for investments in recycling technologies made in Germany is gaining momentum," says expert Victoria Kintzinger. "Environmental technology and the companies active in this field play an outstanding role for Germany, with

German solutions being well received internationally."

### Germany's green foundations

The policy groundwork for the current dynamic was laid early. For four decades, companies in Germany have tapped into incentives of the Environmental Investment Program (*Umwelt-innovationsprogramm*) to invest in innovative technological processes.

In 1996, the Circular Economy Act came into force, setting clear rules for waste avoidance, reuse and recycling. And since 2009, all companies selling packaged products to end-consumers are obligated to pay license fees to the recycling sector under the Dual System.

But regulation alone cannot bring about the sea change that is needed. Impetus must come from innovative companies bringing original new

solutions to market. "Germany is a world champion in recycling and has the best infrastructure for the waste industry," said Henning Wilts, director of the circular economy division at the Wuppertal Institute for Climate, Environment and Energy, speaking to *Handelsblatt*. "But we're only average

### THE BOTTOM LINE

Germany wants to take recycling to the next level by harnessing sustainable production models and waste repurposing technologies towards a truly circular economy.

where the circular economy is concerned."

As a result, big companies in Germany are waking up to the need for change and the potential business opportunities that entails. Chemicals firm Covestro says it wants to switch completely to a circular economic model. BASF, the German multinational chemical company, is building a new battery recycling prototype plant in Schwarzeiche, eastern Germany. The plant will use innovative technology for extracting lithium, nickel, cobalt and manganese from end-of-life lithium-ion batteries and production scrap. And at last year's international mobility show in Germany, the IAA Mobility, BMW debuted a prototype of a circular concept car made nearly entirely of recyclable or already used materials. It's called "i Vision Circular."

### International cooperation

In an example of groundbreaking international cooperation in the private sector, Dresden-based

→



→ equipment manufacturer Biofabrik and Switzerland-based ENESPA are currently setting up a recycling plant for mixed plastic waste from the Dual System. It is located at Schwarze Pumpe, a coal energy plant scheduled for decommissioning and an industrial park near Spremberg in the eastern regional state of Brandenburg.

“In Spremberg, our project was welcomed with open arms,” says ENESPA CEO Cyrill Hugi. “Choosing Germany as our first market was a no-brainer, because there is strong policy pressure to collect plastics, and refineries are under pressure to include recycled plastics in their mix of inputs. The location will allow us to adhere to the wall-to-wall concept, meaning CO2 emissions from the transportation of waste and recycled materials will be kept to a minimum.”

ENESPA's unique feature is that it only comes into play after PET, PVC and metals have been removed from the Dual System by other recyclers. In other words, ENESPA takes those waste plastic types that would otherwise be incinerated. It does so by heating the waste

plastic, breaking down its molecules, then vaporizing, condensing and detoxing them to create paraffin oils for use in plastic-making refineries.

The supply of suitable plastic waste for this system is virtually inexhaustible, as modern food packaging usually consists of multiple chemical compounds that cannot be separated mechanically. According to ENESPA, the incineration of one kilogram of such plastic typically creates three kilograms of CO2. ENESPA ensures these carbon emissions remain locked up in the plastic production cycle.

“We get EUR 80–120 per ton from the Dual System for processing the waste and another EUR 300–500 per ton from selling the paraffin oils to the refineries, making the revenue equation highly predictable,” says Hugi. “Our next milestones will be scaling up the Schwarze Pumpe plant from the current pilot of one ton to eight tons per day and building new plants elsewhere in Germany, Switzerland, France, Italy and other European countries.”

### Putting bad waste to good use

Change is also imminent in other areas. Since the start of 2021, the German subsidiary of France-based Air Liquide has been running a facility in the western German town of Oberhausen that recycles waste CO2 from another chemical plant.

After being purified, the CO2 is sold to food processors for the production of things like sparkling mineral water and as a filling gas for food packaging. It's also sold to Dutch tomato growers who use carbon dioxide to accelerate the tomato growth cycle in their greenhouses. Other customers include welders and chemical plants, where CO2 is used as a reaction medium and in metal and plastic cleaning processes. Air Liquide says its Oberhausen facility reduces CO2 emissions by an amount equivalent to that produced by more than 30,000 cars.

“Even though Germany is increasing its capacities for green hydrogen, CO2 management will remain a pressing issue for many years to come,” Andreas Voss of Air Liquide Germany points out. “In the past, such major CO2 recycling efforts have not been feasible, but with rising public awareness and new use cases, they are becoming very interesting for many companies that rely on processes that create CO2.” It's time for Germany to look for new business models in “waste” products.

## WHAT IS THE CIRCULAR ECONOMY?

The European Union defines the circular economy as a model of production and consumption which involves sharing, leasing, reusing, repairing, refurbishing and recycling existing materials and products for as long as possible. The new approach extends the life cycle of products and represents a complete departure from the established, linear economic model, which follows a pattern of “take – make – consume – throw away.”



## STARTING A CIRCULAR REVOLUTION

Interview with Sarah Brückner, managing director of the VDMA Waste Treatment and Recycling Technology Association

### What has made Germany's recycling sector as big as it is now?

Very early on, Germany began to create a political framework for a recycling economy. Especially the Packaging Directive (*Verpackungsverordnung*), which came into force in the early 1990s with heavily incentivized investment, advanced this project.

### What segments of recycling technology will increase in importance in the future?

The entire plastics industry is transforming from a linear to a circular economy. Waste and recycling technology has developed enormously in recent years. Let me give you an example: For decades, black plastics were not considered recyclable. With modern sorting machines, this is possible today. However, there are other fields, such as electrical and electronic waste (WEEE), where there is still potential for development. Another key segment is building demolition waste. Right now, we are tearing down many buildings from the 1990s. In that era, not much was known about toxicity of construction materials. That's changing.

### What will the VDMA Waste Treatment and Recycling Technology Association be showcasing at IFAT, the Trade Fair for Water, Sewage, Waste and Raw Materials Management in Munich in May/June 2022?

We will focus on plastics recycling. Visitors can experience the odyssey of a shampoo bottle from disposal to the very end of the recycling process. In addition, we will be hosting our famous live demonstrations for biomass recycling and mineral recycling.



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# WHY GERMANS LOVE Cargo Bikes

The demand for cargo pedal bikes and light electric logistics vehicles is growing in Germany. Consumers and delivery companies are looking for nimbler and more sustainable alternatives to cars and vans for shorter journeys.

**G**ermany may be known as “the country of cars,” but these days its city streets are increasingly home to a new breed of transport: cargo bikes. They’re a sustainable alternative for local journeys and nimble, last-mile logistics. Families are using them to schlep kids around and get groceries. Delivery companies employ them to bring take-out food and postal services to move packages. Growing numbers of Germans are getting on their cargo bikes as a low-cost and eco-friendly transport option.

International companies such as the Dutch cargo-bike leasing company DOCKR are moving in on the opportunity. It recently signed an agreement to supply the booming Gorillas delivery chain with hundreds of bikes for deliveries in cities across Germany. “The market is booming with cargo bikes,” says the CEO of DOCKR’s German operation, Shahram Rezasade. “The zeitgeist has changed. People are really looking into alternatives.”

Germany represents a substantial business opportunity. In 2021, there were more than 100,000 cargo bikes on its streets and sales figures are expected to increase by 50 percent each year. It’s a logical development: More and more people are realizing that for short journeys bikes can be more effective and convenient than cars or delivery vans. That’s coupled with a growing desire to go green. While electric cars have received the bulk of the investment and state support, switching from internal combustion engines to electric won’t eliminate traffic jams or speed up deliveries.

## “Light electric logistics vehicles”

Drawing on the country’s engineering expertise, German entrepreneurs are coming up with some novel ideas: For instance, Ducktrain from Aachen

offers four-wheeled, battery-driven “ducks” just bigger than a standard pallet and small enough to fit onto sidewalks and bike lanes. Up to five can be formed into “duck trains,” dramatically increasing the amount of cargo a single rider can manage. “It’s five times the payload you would have from a single cargo bike,” says Ducktrain CEO Kai Kreisköther.

Kreisköther says the German market is ripe for investment from automotive and other suppliers – and recommends looking at the growing market in terms of “light electric logistics vehicles” rather than “cargo bikes.” “There is a whole segment that is smaller than a car and bigger

than a bike,” Kai says. “For companies involved in brake components, mechatronics, tires, electronics, there’s a huge opportunity here.”

The consumer market is booming, too. The Berlin showroom of Punta Velo, a cargo bike dealer with stores across Germany, has long waiting lists for people hoping to buy family cargo bikes. Punta Velo CEO Gerd Lemken says more families are opting for a cargo bike – often with an electric motor – rather than a second car, for both convenience and environmental reasons. “These aren’t hippies from the ‘70s,” Lemken says. “They’re paying full price for a transportation alternative that’s still much cheaper than an electric car.”

**100,000**

Number of cargo bikes in Germany in 2021.

**50%**

Expected cargo bike sales growth in Germany per year.

Source: European Cargo Bike Industry Survey





# IN BRIEF

Investors around the world admire the spirit of invention that inspires the German economy. Here we throw the spotlight on some of the trends and research projects coming from Germany's east.



## MUCH ADO ABOUT MEMBRANES

### Two innovative water filtration systems from eastern Germany

About 250,000 square meters – that's how much MYTEX membrane the Thuringian company WTA Technologies produces every year. "We are able to treat wastewater for half a million people," says its managing director Carsten Bachert. The firm from the city of Gotha custom-designs its filtering systems to customers' needs and retrofits existing ones with its patented, non-woven membranes. They are able to filter out even the smallest insoluble particles from water.

Further north in Halberstadt, Saxony-Anhalt, another company is picking up awards for cleaning up H<sub>2</sub>O. Nanostone Water has developed a system that combines the two most common types of filter membranes – plastic and ceramics – to maximize effectiveness and ease of cleaning. "Because our membranes last a long time and can be cleaned while in use, we save several steps," explains Nanostone CEO Christian Göbbert. "In this fashion, each module or filter unit can purify up to 5,000 liters of contaminated water an hour." In 2020, Nanostone was awarded an IQ Innovation Prize for Central Germany.

[www.wta-tec.com/en/](http://www.wta-tec.com/en/)  
[www.nanostone.com](http://www.nanostone.com)

## HELP FOR DIABETICS

### Novel protein bandage to treat venous ulcers

Venous ulcers predominantly affect older people and diabetics and are a growing problem in ageing societies. Academic researchers from the city of Halle in Saxony-Anhalt have come together with private enterprise to develop a new sort of bandage to treat these extremely painful chronic wounds more effectively.

The material is based on the protein elastin that has many of the same properties as human skin. "Elastin is chemically and enzymatically extremely stable, biocompatible and does not produce immunological rejections when used as a biomaterial in humans," says Christian Schmelzer from the project team at the Fraunhofer Institute for Microstructure of Materials and Systems.

[www.imws.fraunhofer.de/en](http://www.imws.fraunhofer.de/en)



Traces of time at the microstructural level: scanning electron micrographs of elastin fibers of the skin of a 6-year-old subject (left) and a 90-year-old subject (right)



## METAL MIRRORS FOR SPACE

### Award-winning inventions from Fraunhofer IOF spin-off



The Thuringian city of Jena has a tradition in optics that goes back hundreds of years. Now SPACEOPTIX, a spin-off from the Fraunhofer Institute for Applied Optics and Precision Engineering, has developed optical metal mirror systems that can be used for earth imaging and a range of industrial and scientific applications.

Metal optics offer several advantages: They can be formed into complex shapes, equipped with integrated functionalities and manufactured in high volume. SPACEOPTIX technology is the result of more than 20 years of applied research. The company, which was only founded in 2020, has already won several awards including the 2020 Thuringia Innovation Prize.

[www.spaceoptix.de/](http://www.spaceoptix.de/)

## SOIL SAMPLING IN THE FIELD

### Measurement system helps farmers cut corners and costs



Farmers' lives may be about to get a bit easier. The Stenon company from Potsdam in Brandenburg state has developed a system called FarmLab for carrying out soil analysis without having to send samples to a laboratory. The field device takes thousands of measurements including nitrogen, phosphorus, potassium, carbon and magnesium levels as well as parameters like temperature, moisture, pH value, soil type and texture.

The system uses GPS and is networked, so that farmers can get fertilizer recommendations and field maps for application. FarmLab will cut costly laboratory analysis out of the loop and optimize fertilizer use. "The product serves the real needs of the farmer and solves real challenges facing their land," says Daniel Töppe, deputy chairman of the executive board of the farmers' association in the Brandenburg community of Groß Machnow.

[www.stenon.io/en/](http://www.stenon.io/en/)

## CUTTING EDGE

### Plasma technology makes metal cutting cleaner

A company from the Brandenburg town of Finsterwalde wants to improve the way we cut aluminum and steel by using plasma technology. Kjellberg has been working in this area for 60 years and its HiFocus Technology promises metallically bright cut surfaces, narrow kerfs and significantly less dross formation.

# 1-160 mm

HiFocus's hi-tech cutting system mixes different plasma gases to cut various widths from 1mm to 160mm.

The cutting process starts with a pilot arc ignited between nozzle and cathode by high-voltage electricity. It partly ionizes the atoms between the plasma torch and the metal. As soon as the pilot arc touches the material, the electric circuit closes and the main arc is ignited by the increased power. The advantages are high cutting speeds, cut quality and keeping the heat-affected zone to a minimum.

Kjellberg's system cuts out the need for reworking and promises longer cathode lifespans. Different mixes of plasma gases tailor the system's performance to various widths from one to 160 millimeters.

[www.kjellberg.de/en/start.html](http://www.kjellberg.de/en/start.html)

## TRIPOD-SHAPED TURBINES OF TOMORROW?

### New wind turbine enables higher altitude operations

A 92-year-old retired mechanical engineer from Leipzig in Saxony has designed a novel wind turbine that experts say could generate up to 200 percent more electricity than conventional ones.

The most striking difference is that the turbine is mounted atop a tripod rather than a pillar. Furthermore, instead of having a single generator in the nacelle behind the hub and blades, Horst Bendix's design has multiple ones in the base. That makes his turbine more stable, allowing it to operate at higher elevations where wind speeds are greater and more constant. The idea is patented and Bendix hopes a full-scale prototype will be built.

[www.sprind.org/en/projects/bendix/](http://www.sprind.org/en/projects/bendix/)



Retired engineer Horst Bendix has designed taller, tripod-based turbines for use in the highest wind-speed areas.

# CUSTOMIZING Cancer Treatments

Germany's single-cell biotechnology sector is transforming cancer treatments by shining a light on the genetic activity of individual cells. It's also advancing our understanding of how our immune defences respond to Covid-19.

**T**he Max Delbrück Center for Molecular Medicine (MDC) in Berlin is one of the many research institutions around Germany that is fighting the good fight against humanity's deadliest diseases. And one of the scientists on the frontline is PhD student Matthias Jürgen Schmitt, who was honored last year for his contribution to cancer research by the Berlin Cancer Society. He used single-cell analysis to investigate why glioblastoma – the deadliest brain tumor of all – becomes resistant to treatments.

"We were able to see that there are many different cell types at different stages, and that a one-size-fits-all treatment is not possible," explained Schmitt, a researcher from MDC's Molecular Oncology lab, in a press release.

As the name suggests, single-cell sequencing (SCS) is a branch of biology that focuses on individual cells, a technique that yields different results from research conducted on cells en masse or biopsies of entire tumors. It allows doctors to monitor patient health by using sophisticated biochemical readings from blood and other tissues. These so-called biomarkers help clinicians detect diseases at an early stage, make accurate diagnoses and chart the progress of treatments.

Research in the field is booming in Germany – which accounts for more than 10 percent

## THE BOTTOM LINE

Single-cell analysis is one of the most exciting areas of recent biomedical research and something of a German specialty. International companies are taking advantage of Germany's expertise and access to Europe's largest healthcare market.

of all publications relating to single-cell technology. And that's good news for sufferers of everything from cancer to Covid.

### No more one-size-fits-all

The relatively young field of single-cell genomics has seen a number of advances in recent years. The journal *Nature Methods* selected SCS as Method of the Year in 2013; and in 2018, *Science* chose single-cell analyses of gene activity over time as its 2018 Breakthrough of the Year.

Along with the MDC, the Fraunhofer Institute for Toxicology and Experimental Medicine and the Berlin Institute of Health at the Charité (BIH) are active players in the field in Germany, as are companies such as Darmstadt-based Merck, QIAGEN in Hilden, CeGaT in Tübingen and Jena-based ALS Automated Lab Solutions.

Merck and QIAGEN are active in the development of liquid biopsies, which are transforming cancer diagnostics and treatments. Instead of using tissue samples, liquid biopsies

test blood for cancer cells or DNA particles from tumor cells.

"We are moving away from the era of chemotherapy where everybody gets the standard treatment and some will benefit, but the majority will not, while still experiencing its side effects," says Professor İlhan Celik MD, senior program lead of global clinical development at Merck. "With liquid biopsies, we also can analyze hundreds of molecular biomarkers within a single patient sample – each one a potential signal that can help answer important questions."

### Not just for cancer

The benefits of single-cell analysis aren't restricted to cancer. It has also become essential to our understanding of the Sars-CoV-2 virus, in particular why children's immune systems are better at limiting the effects of Covid-19 than adults'.

In a highly respected recent study, researchers at the BIH and the German Cancer Research Center (DKFZ) used single-cell sequencing to examine nearly 270,000 cells from 42 children and 44 adults. Their findings could help protect adults against the virus.

"If we could generate the immune response already present in children in a controlled manner in adults, this would provide increased pro-

# SINGLE-CELL SCIENCE: MULTIPLE APPLICATIONS

Single-cell research is transforming the diagnosis and treatment of various types of cancer and also aiding scientists in developing therapeutics against diseases like Covid-19. The growing number of applications using single-cell technology include:



## LIQUID BIOPSIES

... which are used to test blood rather than tissue samples for cancer cells



## DETAILED STUDIES

... of malignant brain tumors to improve therapies



## SEQUENCING OF BIOPSIES

... of advanced, non-small cell lung cancer (NSCLC) to further individualize treatment



## INSIGHTS INTO SARS-COV-2

... possibly leading to greater protection against the virus and boosting our understanding of how the body reacts to infection

viding promising insights into the complex processes that take place in the bodies of people infected with the virus and contributing to the development of new treatment possibilities.

### "A completely new dimension"

The economic potential of single-cell technology in the field of biology and medicine is plain to see. Germany is Europe's largest healthcare market, and around 500,000 people in the country develop malignant tumors every year.

Foreign companies are taking notice. The Chinese firm Singleron Biotechnologies recently established a new lab in Cologne in addition to its facilities in China and North America. The fast-growing company develops high-throughput single-cell multi-omics platform products with a focus on clinical applications. Singleron currently provides products and services to about 300 hospitals, research institutes and pharmaceutical companies.

"Single-cell analysis has brought a completely new dimension to research, diagnosis, and treatment of human diseases," says CEO and cofounder Nan Fang. "Complex diseases such as cancer and immune system disorders can only be accurately deciphered if measured at single-cell resolution. At Singleron, we are focused on developing single-cell analysis products and solutions for clinical applications."

With its new German location, Singleron is aiming to establish partnerships in Europe and promote its services and products. One of those new partners is the laboratory for Translational Molecular Pathology at the University Hospital Cologne, which recently collaborated with Singleron on single-cell sequencing of advanced non-small cell lung cancer (NSCLC).

"We receive many inquiries about biotechnology in Germany, especially in regard to personalized medicine and oncology," confirms Marcus Schmidt, director of Chemicals and Health at Germany Trade & Invest. "We are happy to assist international companies interested in expanding their R&D activities in this field."



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tection against coronavirus," says Professor Irina Lehmann of the BIH. "We are already thinking about how this could be done."

Researchers are looking at the possible development of a nasal spray that could stimulate the immune system in the nose, she adds. Another area in the field of single-cell research that has also become crucial in understanding Covid-19 is "omics" – an emerging multi-disci-

plinary and rapidly evolving field. Multi-omics research collects and combines data on several molecular levels.

The German Covid-19 Omics Initiative (DeCOI) is a national network founded in 2020 that involves scientists from more than 40 universities, organizations and research institutions using omics data based on next-generation sequencing in Covid-19 research. SCS is pro-



This year, construction begins on the site of AI Innovation Park Baden-Württemberg in Heilbronn. The world-class artificial intelligence hub is funded by the state.

## INTELLIGENT SOLUTIONS FROM THE SOUTH

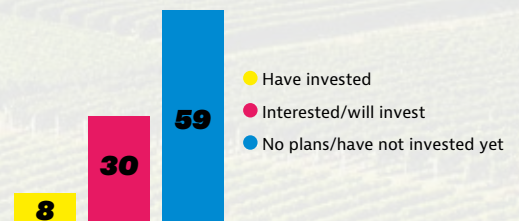


**HEILBRONN**  
BADEN-WÜRTTEMBERG

In July 2021, the champagne corks were popping in Heilbronn. The southwestern German city was awarded the state project **AI INNOVATION PARK BADEN-WÜRTTEMBERG**. A state-of-the-art AI campus will be built on a 23-hectare site in the south of the city by 2026, with the goal of establishing an ideal AI ecosystem. It will include an innovation center for start-ups with coworking spaces and a range of services and advice for corporate development. A Gaia-X data center will supply the necessary networking and computing power on the new campus. The consortium behind the project is investing around EUR 70 million, with another EUR 50 million coming from the regional state of Baden-Württemberg. Heilbronn University of Applied Sciences, which began offering AI courses last year, is also supporting the project. The campus hopes to attract both national and international companies, start-ups, research institutions and investors by creating an optimal environment for innovation in the field.

## GROWING INTEREST IN AI

Percentage of companies in Germany that have invested or want to invest in AI



Source: Bitkom, April 2021

# €5BN

Amount the German government is investing between 2018 and 2025 to make the country a competitive location for AI technology

Source: BMBF

# AI Made in Germany

Experts agree that artificial intelligence (AI) will be one of the major technologies of the future. But AI is no longer just something from Silicon Valley. Germany is emerging as the ideal location for providers in Europe.

**H**ow much maternity leave am I entitled to? And how do I apply for it? These are the kind of questions employees at multinational conglomerate Siemens entrust to Carl. The friendly chatbot, who speaks five languages, answers their most important HR questions around the clock. And if he doesn't know the answer, he helpfully provides an internal contact who might.

Nowhere is Carl more popular than in HR, since he saves his human colleagues hours of time answering standard inquiries. That's why he is used worldwide. Carl was developed in Munich by IBM, which operates its own artificial intelligence (AI) development center there. In 2017, the US company invested around EUR 200 million in the IBM Watson Center Munich to develop tailor-made AI solutions for customers.

Chatbot Carl is just one example of how AI can make day-to-day life in companies easier. The areas of application for AI technologies are becoming more diverse by the hour. From HR to inventory to assembly lines, many companies already rely on AI to get run-of-the-mill jobs done. Germany is a pioneer in this burgeoning field – in terms of both innovative AI providers and demand from large manufacturers.

## The advantage of strict standards

In April 2021, Germany's digital trade association Bitkom surveyed more than 600 companies about the current and future use of AI technology. While only around 8 percent of companies in Germany were using AI at the time, the trend is an upward one. More than two-thirds of German companies surveyed said that AI is the most important technology of the future. And the proportion of companies that are actively planning to use it, or discussing deployment, has risen by eight percentage points to 30 percent.

## THE BOTTOM LINE

From HR to assembly line, the possibilities of AI are almost endless. Germany offers numerous advantages to foreign companies as a location for AI development and sales.

Germany is an extremely attractive location for foreign AI companies right now, says Wolfgang Rodler, head of the IBM Client Center in Munich. The main selling point is proximity to a large number of potential customers, as evidenced by IBM's portfolio. As well as Siemens, the company has provided solutions for the German Aerospace Center. On average, the IBM Client Center welcomes 500 groups of potential new clients a year.

Several universities are deeply involved in *künstliche Intelligenz* (KI), as it's called in Germany, and the academic scene supports the private sector, not only with research cooperation but also by turning out highly employable IT talent.

"There is hardly any other area that relies as heavily on company data as AI," explains Rodler. "The technology only works properly in the extended application."

The legal and political framework in Germany also supports the entry of AI companies into the wider market. The country's strict data protection regulations are actually more of a help than a hindrance for developers, argues Rodler, because it means AI developed in Germany will fulfill or exceed the standards of almost every other country in the world.

"Removing a data backup solution from a product because it is not needed in a country is much easier than adding a new technology," Rodler says.

## Useful ecosystems

Vera Demary from the economic research institute IW underlines a fourth advantage: German entrepreneurship.

"There is a lively start-up scene in Germany, for example in Berlin, Munich or in the Ruhr area, where foreign AI developers will find functioning ecosystems and can quickly join networks," she says. "Local AI start-ups know the market. They know about computing or research centers, and they know the funding landscape. Foreign companies can quickly establish contact with customers, associations or authorities."

Germany's Ministry of Education and Research is doing its part to ensure that the country continues to develop as a premium AI sales and development location. In September 2021, the ministry announced a huge fund for the construction of AI service centers that doles out up to EUR 10 million per project.

These new computing power centers will support research institutions and private enterprises to develop intelligent, self-learning software and integrate it into their projects. Overseas companies setting up shop in Germany can use these data centers and avoid the substantial upfront costs of having to invest in their own digital infrastructure.



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# LESSONS LEARNED from a Pandemic

Coronavirus restrictions have provided a huge boost to the digital learning sector in Germany, shaking the country out of its traditional approach to education. Online learning companies can now benefit from a range of government programs.

**L**EARNTEC is Germany's main trade show for education solutions and the place to be for innovators and decision-makers. One of the exhibitors at the latest show, which took place in Karlsruhe in February, was eSquirrel. The Austria-based company offers a learning portal and a quiz app that match textbooks and learning materials all the way from the second grade up to university, as well as providing tools for companies.

eSquirrel entered the German market in 2019 by digitizing schoolbooks by publishers Cornelsen and Klett. Now it plans to set up a German subsidiary. "Germany has all along been the logical extension of our home market, and the German educational sector's relatively sluggish pace of digitalization translates into additional opportunities for our innovative solutions," says Michael Maurer, eSquirrel's cofounder. "A range of government programs is gaining momentum and so is LEARNTEC, as our professional audience is keenly aware of all the remaining challenges."

## Funding German education

Germany has one of the best-funded educational systems in the world. National, regional and local governments allocated a preliminary EUR 158.6 billion for education in 2020, up 5.3 percent from the previous year. If private education plus science and research spending is included in the calculation, that number is far higher: EUR 325.6 billion in 2019, up 4.4 percent year-on-year.

The Digital Pact for Schools is one of a long list of national programs designed to bring Ger-

man schools into the digital age. It allocates EUR 6.5 billion over a period of five years to bring learning infrastructure up to date.

It's bolstered by the Post-Covid Action Program for Children and Young People, which allocates EUR 2 billion for 2021 and 2022, including EUR 1 billion for after-school tutoring and EUR 1 billion for early childhood education, sports, leisure and vacation activities, and support for children and teenagers in their everyday lives.

## THE BOTTOM LINE

The Covid-19 pandemic taught Germany that education needs to go digital. The government has responded with a variety of programs that make e-learning an exciting market for smart foreign investors.

There's also the 630-million-euro fund for the National Education Platform. Running until 2025, it aims to better integrate Germany's countless regional educational programs into a single national platform for digital access to innovative learning and teaching formats. Some EUR 150 million of this fund is earmarked for companies, universities and project consortiums that develop solutions.

## Learning new tricks

The National Education Platform was motivated by the recognition that the country's

decentralized, regional educational policies were ill-equipped to tackle the challenges that arose during the corona pandemic and continue to affect students.

eSquirrel's Maurer points out that concerted private sector efforts, such as the Alliance for Education (*Bündnis für Bildung*), have given additional momentum to digital learning in Germany. The alliance brings together a wide variety of stakeholders, from established schoolbook publishers and educational technology start-ups to international IT conglomerates including Samsung and Microsoft. "Our membership in the Alliance for Education and our participation in LEARNTEC bring us closer to the decision-makers here in Germany," Maurer says. "And by opening our first German office later this year, we will also be able to react faster to public tenders."

Industry expert Johannes Fischer confirms that politicians across the spectrum are aware that there is much left to be done. Innovative solutions are urgently needed not only for schools but also for universities and corporate training. "We see that some countries are ahead of us in terms of digital learning," he says. "And we are very receptive to foreign companies that come here with new ideas to help us upgrade our solutions."

## ONLINE

[www.gtai.com/e-learning](http://www.gtai.com/e-learning)

# FDI PERSPECTIVE

**GoStudent: Germany is the Austrian e-learning unicorn's most important market.**

GoStudent, a digital matchmaker and education platform for students and private tutors, was founded in Austria in 2016. Since then, it has achieved unicorn status and become Europe's highest valued K-12 edtech company. Given that the German market accounts for 55 percent of GoStudent's revenue, it's no surprise that the company's marketing team is mainly based in Berlin, with a Düsseldorf office handling sales and customer success. As of October 2021, the Berlin and Düsseldorf offices employ 50 and 40 staff members, respectively, and GoStudent plans to double its Berlin workforce.

"Germany is a major market for the private tutoring of students needing additional support with their school curriculum," says GoStudent founder and CEO Felix Ohswald. "But there is also demand from students in rural areas seeking to learn languages that are not taught at their schools. "Our ongoing expansion in Germany is driven by partnerships with regional governments for subsidized tutoring sessions for disadvantaged students," he adds.

**>1,500,000**

tutoring sessions per month are arranged through GoStudent

**>80%**

of GoStudent's revenue comes from the German market

**€1.3BN**

GoStudent's valuation ranks it among the top 10 valued start-ups in Germany

**140**

subsidized GoStudent sessions are available in 130 German districts

A young learner gets to grips with geometry on the GoStudent platform. The German government is investing heavily in programs to bring schools into the digital age.



# MECHANICAL Servants

Good help can be hard to find, as many businesses discovered in 2021. Service robots are increasingly being adopted in countries where wages are high and labor shortages threaten many economic sectors.

## 4

### **GROWING NICHEs FOR SERVICE ROBOTS**

#### 1

##### **Transportation and logistics:**

Germany's manufacturing processes are highly automated but intra-factory logistics still aren't.

#### 2

##### **Professional cleaning:**

Industrial cleaning still relies on human beings but demographics are making recruitment difficult.

#### 3

##### **Medical robotics:**

Robotic surgery devices, the most expensive type of service robot, are in increasing demand.

#### 4

##### **Hospitality:**

The corona pandemic has put a premium on maintaining distance between staff members and minimizing their contact with food.

Sources: IFR; MiR; UR





»It is obvious that the demand for our solutions is only going to grow in Germany.«

Jörg Faber, MiR's sales director for DACH and Benelux

**S**hielded from its surroundings by a plexiglass cube, a robotic arm pours chopped spring onions into a wok and plunges a basket of Thai noodles into boiling water. Right next to the robotic cook, a display explains the dish, and once the bowl is ready, it is passed to the buyer through a flap opening. No money changes hands. Orders are placed and paid for by smartphone.

Service robots like the cooking booth developed by Leipzig-based start-up DaVinci Kitchen and powered by Denmark-based Universal Robots have a bright future in Germany. Mechanical help is especially needed in high-wage countries, where virtually all parts of the service sector are suffering from labor shortages that can only get worse given unfavorable demographics.

### Good prospects for service bots

According to the International Federation of Robotics (IFR), the sector blossomed globally in 2020, with the number of new professional and consumer service robots increasing by 131,800 and 19 million units, respectively. That translates into 41 percent and 6 percent growth, easily outpacing the figures for industrial robots.

The definitions of industrial robots and service robots aren't clear-cut, but the IFR defines the former as being used in industrial automation applications, while service robots encompass everything but industrial applications. "In 2020, the pandemic pushed service robot demand in Germany, as local manufacturers further automatized intra-logistics that bring inputs to production equipment and outputs to inventories, while e-commerce warehouses deployed more AMRs (autonomous mobile robots) to reduce the number of people exposed to risk of infection," says IFR's general secretary Susanne Bieller. "Another strong rationale for employing AMRs is that they can adjust

easily to changes of production patterns since they can cope with alternative surroundings, unlike conventional intra-logistic equipment that either needs fixed tracks in the floors or antenna-affiliated infrastructure."

### Cleaning up in higher-wage countries

Bieller also points out that Germany's high wage level translates into buyers enjoying a much quicker amortization for robot purchases than would be the case in low-wage countries. And the high density of industrial robots in the country suggests that there will be strong future demand for service robots. "Companies

### THE BOTTOM LINE

**As demographic shifts and economic circumstances make it harder for companies to source routine labor, demand for service robots is booming. Companies bringing solutions to Germany can expect tidy profits.**

that have already automated their manufacturing processes are much likelier than others to invest in organizing their intra-logistics with AMRs," Bieller says.

On the list of international robot-makers expanding their presence in Germany is Denmark-based Mobile Industrial Robots (MiR), which in late 2019 opened an office in the western German town of Eschborn for distribution and support in German-speaking Europe and the Benelux region. It also set up a demonstration and training center. MiR currently employs nine people in Eschborn and plans to expand its workforce in the coming years.

MiR's transport robots are deployed for use in hospital sterile centers, where they load racks

with unclean instruments and then send them to disinfectant washers. Among the other intriguing areas of application are electronics manufacturers' clean rooms, where robots reduce the risk of contamination through dust and human hair. "Germany is a country with a lot of highly automatized manufacturing of cars, food, cosmetics and electronics, but all these sectors struggle to recruit people willing to toil away in intra-factory logistics," says Jörg Faber, MiR's sales director for German-speaking Europe and Benelux. "It is obvious that demand for our solutions in Germany is only to grow."

### A universal product

Meanwhile, DaVinci Kitchen is expected to go on the market in 2022. Andrea Alboni, Universal Robots' General Manager Western Europe, projected that it will be a hot-seller among owners of canteens, for instance, in train stations or companies. Universal Robots sells its cobots (robots that work together with humans) to sectors ranging from food processing and electronics to machine-builders and science and research.

Universal Robots currently employs about 30 people in Munich and has expanded its workforce by 30 percent annually since establishing its office in the Bavarian capital in 2015. "Our steady progress in improving interface between humans and robots allows us to serve many of the small and mid-size enterprises that had previously regarded robots as unaffordable and too complex," Alboni says. "Germany has played a key role in our company's development all along, and we expect that to continue."

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# HERD Mentality

More and more German start-ups are achieving one-billion-dollar-plus unicorn status. The global boom in venture capital investment is reshaping the start-up landscape in Germany and could even reconfigure Europe's largest economy as a whole.

**I**n mythology, unicorns are elusive creatures. In business these days, they are anything but. Take, for example, Munich's process-mining start-up Celonis. When the company, which was founded in 2011, achieved its EUR 1 billion valuation in 2018, the business newspaper *Handelsblatt* still described German unicorns as a "rare sight."

Fast forward just three years to June 2021, and Celonis took in USD 1 billion in fresh capital in a *single* round of funding. That made it a "decacorn" – a company valued at over USD 10 billion.

Henry Ellenbogen, chief investment officer at America's Durable Capital Partners, described the Celonis model as having "a massive market potential to create a new and modern way to run your business." But a great business model is only one part of the equation. The increased availability of venture capital (VC) and a long-term shift in the German economy are two others.

The number of German start-ups valued at USD 1 billion or more is rising exponentially. In late 2021, the venture capital database firm consultants CB Insights put the number of German unicorns at over 20 and growing. More than half of the companies concerned achieved that status last year alone.

One of them was Contentful, a Berlin software provider whose innovative and user-friendly digital content platform is now used by nearly one in three companies in the Fortune 500 stock index. In July 2021, the firm raised USD 175 million from foreign investors.

## Reimagining the German economy

According to a study by consulting firm EY, EUR 17.4 billion flowed into German start-ups in 2021. That was more than three times as much as in 2020 – or a percentage rise of 229 percent.

## THE BOTTOM LINE

Germany has greatly benefited from the global explosion in VC investment and last year produced a record number of unicorns. Entrepreneurs weighing up their location options should take a long look at the heart of Europe.

And there's no sign of a slowdown. Consultants McKinsey see the potential for 41,000 new start-ups by 2030, along with 1.4 million new jobs and a market capitalization of EUR 2.3 trillion. That would be more than the total worth of Germany's current blue-chip DAX 40 stock index. At present, around 2,900 start-ups are founded in Germany every year.

"Technology advancements, particularly in the areas of digitalization and connectivity, are compelling Germany to reimagine the fundamentals of its economy," wrote McKinsey in a paper entitled *Entrepreneurship Zeitgeist 2030*. "The widespread conclusion is that a robust start-up ecosystem – enabled by these technology trends and comprised of founders, their businesses, corporates and SMEs, educational institutions, investors, and government agencies – needs to become a pillar of the economy if Germany is to remain prosperous at home and competitive abroad."

"The ecosystem for start-ups has improved markedly in the last few years," says Stefanie Burgdorff, Germany Trade & Invest's trend & innovation scouting expert, who is in charge of internationalizing Germany's Digital Hub Initiative. "Young research-oriented companies in particular are attracting more attention and support. Nationwide entrepreneurship programs and network initiatives like the Digital Hubs have grown in importance and enabled

closer cooperation between start-ups, research institutions and private companies. Finally, international success stories like Zalando, HelloFresh, FlixBus and SoundCloud elicit admiration far beyond Germany's borders."

## Future Funds

The German government is also doing its bit. The centerpiece of state efforts to help Germany catch up with start-up powerhouses like the US and UK is the 10-billion-euro Future Funds, designed to trigger massive venture capital investments. Those monies, combined with other instruments pledged by the last government in March 2021, should provide fledgling companies with some EUR 50 billion in the coming years. There is also a 900-million-euro high-tech entrepreneurs fund and a one-billion-euro deep tech fund. "Our aim is to foster the best start-up ecosystem in Europe," says Thomas Jarzombek, who until recently was the government's start-up commissioner.

Germany – and particularly the cities of Berlin and Munich – is already profiting. In Berlin, the investment volume more than tripled in 2021 from EUR 3.1 billion to EUR 10.5 billion. And in Bavaria and Munich, the amount of venture capital likewise shot up – going from EUR 1.5 billion to EUR 4.4 billion.

But Burgdorff suggests that entrepreneurs searching for the perfect location should also look beyond the national and Bavarian capitals. "Germany has a decentralized economic structure with regional specialties. You don't have to establish your company in big, often expensive cities to be successful."

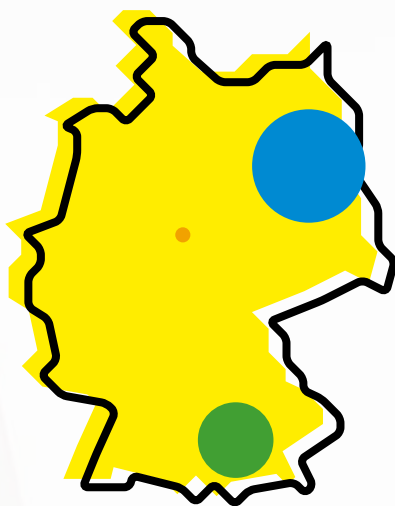


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# TOP 10 GERMAN UNICORNS

German unicorns with the highest valuation (in USD billion)



**1**  
**CELONIS**  
\$ 11BN, MUNICH ●

**2**  
**N26**  
\$ 9.23BN, BERLIN ●

**3**  
**PERSONIO**  
\$ 6.3BN, MUNICH ●

**4**  
**MAMBU**  
\$ 5.5BN, BERLIN ●

**5**  
**TRADE REPUBLIC**  
\$ 5.3BN., BERLIN ●

**6**  
**OTTO BOCK HEALTHCARE**  
\$ 3.5BN, DUDERSTADT ●

**7**  
**GORILLAS**  
\$ 3.1BN, BERLIN ●

**8**  
**FLIXMOBILITY**  
\$ 3BN, MUNICH ●

**9**  
**CONTENTFUL**  
\$ 3BN, BERLIN ●

**10**  
**FLINK**  
\$ 2.85BN, BERLIN ●

Source: Statista

## SECTORS BIRTHING UNICORNS

The four German start-up sectors with the largest inflows in 2021



**€3.77BN**  
FINTECH/  
INSURTECH



**€3.71BN**  
E-COMMERCE



**€3.59BN**  
SOFTWARE  
& ANALYTICS



**€1.96BN**  
MOBILITY

Source: EY

## RECORD-BREAKING INVESTMENT

Total amount invested in German start-ups in 2021

**5.3**  
**BILLION EUROS**  
IN 2020

**17.4**  
**BILLION EUROS**  
IN 2021

Source: EY



Pia Michel, COO of LegalTegrity, a legal services company which supports SMEs

# PLATFORM for Female Founders

Increasing numbers of women are founding start-ups in Germany and gender-diverse teams are delivering better returns, but there's still a long way to go toward equality. We look at the challenges facing female entrepreneurs and the rewards of backing them.

**T**he figures look promising for women in business: The latest studies show that start-ups with female founders generate more revenue and have a higher return on investment than all-male teams. But female-led companies still only account for a minor percentage of start-ups and financing, whether that's in Germany, Europe or the rest of the world. Equality is a tough nut to crack.

The German Startup Monitor found that the share of women setting up companies in-

## THE BOTTOM LINE

The share of women founding start-ups in Germany has increased, but there's still a big gap. More focus on female entrepreneurship in education and more women investors are needed to redress the balance.

creased during the pandemic, from 15.9 percent in 2019 to 17.7 percent in 2021. While growth is headed in the right direction, the organization notes that the conditions for women, particularly women in tech, still could be better.

One excellent role model is Maraja Fistanic, who founded LegalTegrity in Frankfurt in 2019 together with her colleagues Thomas Altenbach and Pia Michel. The company offers a plug-and-play whistleblower service for medium-sized companies. LegalTegrity



## “SEEKING OUT DIVERSITY IS EXTRA DE-RISKING OF A HIGH-RISK INVESTMENT.”

**Bettine Schmitz is managing director of Auxxo, Germany's leading all-female venture capital fund, which invests in early-stage European start-ups. She spoke with *Markets Germany* about finding and funding women-led start-ups.**

### **How did you and your partners start Auxxo?**

The three of us started doing angel investments when we all had small children. We wanted to play the long game rather than aim to cash out quickly, so we created the Female Catalyst Fund, a co-investment fund exclusively for companies with at least one female founder. We aren't just looking at start-ups for women – we're looking for hypergrowth.

### **Why focus on women?**

Historically, there haven't been many female investors at any level — few women work in venture capital or operate as business angels. Many women find it hard to reach partner level at established VC firms, so they're setting up their own funds. Across the board, founders are trying to solve really big issues. And in Germany, incredible women who have worked in management at hypergrowth companies are now founding their own start-ups.

### **Are investors paying more attention to female-led companies?**

When we started, focusing on female entrepreneurship felt like a token thing. But we're not a charity. We're not just investing in femtech. People are starting to understand that it's about potential. We see things from a different angle and are very thorough.

### **What needs to happen next?**

Investment funds have to keep working at hiring women for senior positions. And funds need to work harder to court successful women interested in VC investing. And female founders just need to put themselves out there and ask the question: What's the biggest possible vision for what you're building? Building a company with 10 people or 2,000 are two very different things. But if you want to go big, go for it!

enterprises. But women still only account for 10 percent of senior employees in Europe's VC firms, reports the online journal *Sifted*. According to *The State of European Tech 2020*, out of the EUR 38.6 billion raised by European start-ups in 2020, 90.8 percent of the capital went to founding teams that were entirely male, 7.5 percent mixed and just 1.7 percent all female.

“Everyone believes mixed teams – viewpoints, experiences, genders – is something companies benefit from, especially when looking at sustainable growth models,” Schmitz says. “But mixed founding teams remain underfunded. All of VC is really high-risk, so seeking out diversity is extra de-risking of a high-risk investment.”

### **Growing interest in femtech**

Investors saw an opportunity in a Berlin-based femtech start-up. Keleya, a platform to help pregnant and postpartum women access health and midwifery services, was able to raise EUR 3 million in its Series A round.

“Four years ago, it was much more difficult. Investors told me I seemed insecure. I'm not a shy person, but that made me think about giving up. I didn't want to change my personality just to get funding,” says Keleya's cofounder and CEO Victoria Engelhardt. “Four years later, it's not totally better, but there is a bit more awareness of this bias.”

The Start-up Scale Program was a perfect fit for Keleya. “I really liked how they put me in contact with specialized experts based on the questions we had,” says the CEO. “We had questions around branding and market launch, and they put us in touch with experts who did deep-dive sessions with us.”

Keleya is now poised to launch telehealth consultations that are covered by public health insurance. Engelhardt encourages international investors curious about Germany's start-up scene to come to Germany and meet with real female founders. “You can't understand a market without talking to the players directly,” she says.

is addressing an urgent need: A whistleblower protection directive that came into effect in December 2021 requires EU firms employing more than 250 staff to offer employees a way to anonymously report violations of the law. But without a dedicated legal department, compliance presents a substantial challenge for SMEs. No surprise then that just one year after going live, LegalTegrity has 60 clients and counting.

### **Support for female entrepreneurs**

Fistanic and her cofounder Michel took part in the Start-up Scale Program, funded by what was then the Ministry for Economic Affairs and Energy, which has made supporting female entrepreneurs a top priority. Under the umbrella of the Digital Hub Initiative, the program was set up in 2020 to address the start-up gender gap and offers personalized networking, market strategy and mentoring to five female-led companies.

“We found that the mentoring and the sessions we had were super-constructive and helpful,” says Fistanic. “We wanted to figure out where the quick wins are, and we found them.” She recognizes that there's more support today for fledgling female entrepreneurs. “When I was finishing school and university, nobody was talking about founding a company, especially not women,” she says. “Now, there are a lot of programs connecting with universities to support that.”

### **The similarity bias**

Bettine Schmitz is the managing director of Auxxo, Germany's leading all-female venture capital (VC) fund. She believes encouraging more women investors is a big part of closing the gender funding gap. “We all have similarity biases – if you see someone like you, it's easier for you to get into their head. If someone is different from you, from your gender or ethnic background, it can be harder,” says Schmitz. “In venture capital, it's heightened. Venture is so much about believing in people.”

The statistics back up her theory: VC companies with female partners are more than twice as likely to invest in women-led





Sergel's Square in central Stockholm is a buzzing commercial and cultural forum. A number of new infrastructure projects are being built in the vicinity to support the capital city's growth.

# “EVERY DEFICIT MEANS POTENTIAL FOR BUSINESS...”

Sweden wants to take more of its originaive designs to foreign markets. Germany Trade & Invest's Sweden representative Michał Woźniak and Ralph-Georg Tischer, managing director of the German-Swedish Chamber of Commerce, discuss why Germany is its main focus.

**Sweden struck out on its own in not instituting coronavirus lockdowns. Did that pay off economically?**

**RALPH-GEORGTISCHER:** Sweden's “novel approach” to the pandemic only seems novel to the outsider. Taking responsibility and having faith in common sense is the default way of handling difficult situations up north. As for the economic implications, compared to Germany the downturn was much less severe and recovery will be much faster. But smaller countries in general seemed to navigate the pandemic better. Of course, the highly globalized Swedish economy also suffers from the worldwide repercussions, be it supply chain issues or travel restrictions. Yet, local businesses and especially the service sector benefited from the lack of lockdowns.

**MICHAŁ WOŹNIAK:** I'd argue this is also the only differentiator compared to our Scandinavian neighbors. Although Denmark and Norway implemented much tougher restrictions, their economies fared more or less equally well through the pandemic. Their GDPs recorded slightly smaller drops than Sweden but will most likely also recover at a somewhat slower pace. This isn't, however, as much a testimony to the effects of different corona strategies as it

is to the varying economic structures among the three countries.

**What image do Swedes have of Germany as a business location and what motivates them to invest here?**

**TISCHER:** Size and potential – that's what the majority of Swedish businesses associate with the German market and what attracts them. Due to the common market, the EU tends to be the first step in Swedish expansion. And after Brexit, Germany is more than ever the prime destination within it. Swedish investors often aim to scale up their businesses on the German market. They appreciate the abundance of potential partners with global activities they piggyback upon to reach the world market.

**Which sectors invest in Germany the most?**

**WOŹNIAK:** In the past six years, the main drivers of Swedish FDIs in Germany were service activities and retail. They were largely focused around traditional industries, like fashion and other consumer goods, as well as machinery. But almost one-third of Swedish investment projects in Germany between 2015 and 2020 were initiated by the ICT sector.

**What are their biggest concerns and hurdles when investing in Germany?**

**TISCHER:** The ICT sector is a good example. With regards to digitalization, Sweden is among the world leaders, whereas Germany has upward potential. And that's exactly the Swedish approach – every deficit means potential for business. If digitalization is not at the highest level, there's a big market for digital solutions. If there are slightly different rules and conditions between Germany's 16 regional states, you can start with one instead of trying to take over the biggest European market all at once. Swedes know that success is only a matter of having the right people to navigate. That's something we can help with.



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# How Germany Works

## THE FEDERAL SYSTEM

The Federal Republic of Germany, like the US, is a confederation of regional states – there are 16 in total. It is also a parliamentary democracy with a separation of powers between the legislative, executive and judicial branches. Germans

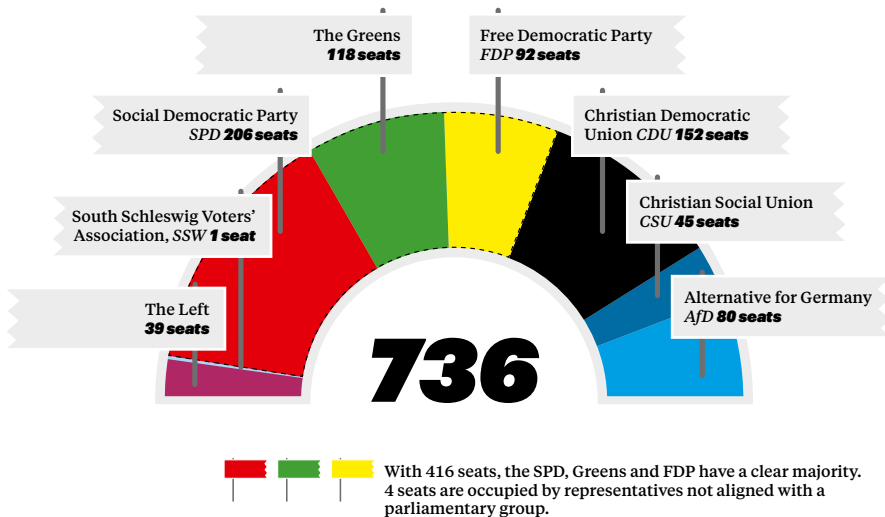
elect their central legislative body, the Bundestag, in national elections that are usually held every four years. Parliamentary seats (currently 736) are distributed proportionally to all the major parties based on their share of the vote. The other

parliamentary body, the Bundesrat, consists of representatives from all 16 states and has the power to ratify or vote down certain bills proposed by the Bundestag. Single-party and, more typically, coalition majorities in the Bundestag elect the execu-

tive – the German chancellor. He or she then appoints cabinet ministers to form the national government. The Bundestag is also responsible for naming the judges on Germany's highest judicial body, the Constitutional Court.

### CURRENT COMPOSITION OF THE BUNDESTAG

Germany's current three-party coalition brings together the center-left Social Democrats (SPD), the environmentalist Greens and the business-friendly Free Democrats (FDP) in a majority national government with 416 parliamentary seats.

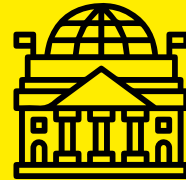


Source: Der Bundeswahlleiter



#### EXECUTIVE

Chancellor, Chancellor's Office, government ministries



#### LEGISLATIVE

Bundestag, Bundesrat

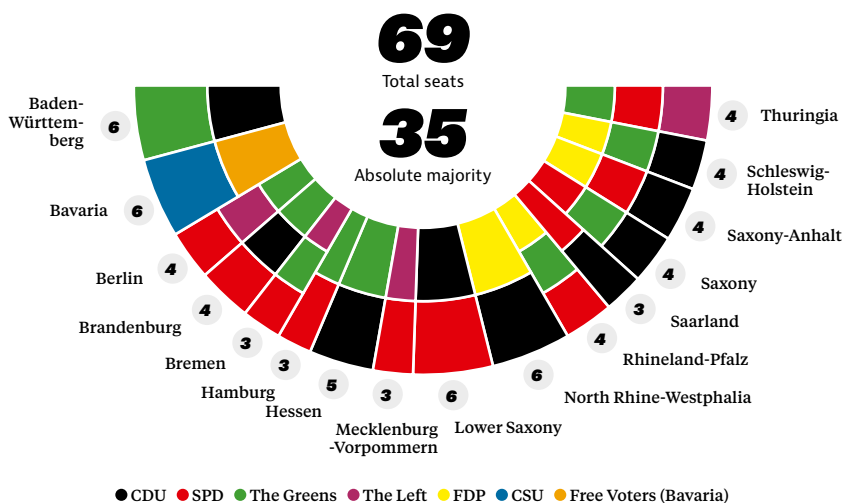


#### JUDICIAL

Constitutional Court, regional courts

### CURRENT COMPOSITION OF THE BUNDES RAT

The Bundesrat reflects the parties in power in Germany's 16 regional states. It has 69 seats: 35 are therefore needed for an absolute majority, which is usually required for legislation needing Bundesrat approval.



Source: Bundesrat

# 76.6%

eligible voter participation in the 2021 German National Election



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