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GERMANY

Insights into Europe's Biggest Economy 2 / 21

PUTTING THE E IN E-MOBILITY

More and more EV battery production is coming to Europe. And that's electrifying Germany's massive automotive sector.

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Turning emissions into raw materials

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A NEW POWER CENTER

Asian imports of e-car batteries have long dominated the market, but that is about to change as major players like CATL and Tesla start battery production in Germany.

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The Digital Magazine

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Routing the Future

Coronavirus has done nothing to dent Germany's leading role in logistics. page 28

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on the basis of a decision
by the German Bundestag



»Proximity to Europe's largest economy and one of the world's leading automotive markets is key for success.«

Dear Reader,

The motto for this issue comes from a regional German director of Amazon who reminds us: "It's important to stay close to your customers." That point has been driven home by the coronavirus pandemic, one of the negative outcomes of globalization, which has changed lives and businesses even at the most local levels.

The topic of our title story – batteries for electric vehicles (EVs) – is a perfect example. In the past, EV batteries have tended to come from Asia, but production is shifting to Europe at an incredible pace. Germany is the absolute heart of this trend and it is easy to see why. As industry and Germany Trade & Invest experts explain, proximity to Europe's largest economy and one of the world's leading automotive markets is key for success in the rapidly changing mobility sector.

Germany's "New Space" industry may be set up to cover thousands of kilometers, but it too has evolved from the desire to give the micro-satellite delivery sector a local home in the center of Europe. For that reason, the German government is making it a priority.

And speaking of home, this issue also delves into the rapidly expanding German gaming sector. Video games and classic board and card games are experiencing a renaissance as people have been forced to spend more time within their own four walls. So with that in mind, I'd like to wish you lots of fun with this issue of *Markets Germany*.

Dr. Robert Hermann, CEO

Email: invest@gtai.com



ONE TO WATCH



WHY **SOPHIE CHUNG** FROM AUSTRIA FOUNDED A COMPANY IN BERLIN

Sophie Chung jokingly characterizes her decision to choose business over medicine as “going over to the dark side,” but her customers would beg to differ. After all, Chung, a qualified doctor, grasped an opportunity to make a difference. “I saw there was a gap between what patients need and what they get in their local healthcare systems,” she says. “What I experienced as a patient was that people were left on their own to choose what was right for them.”

That’s why, in 2015, after a stint at a start-up in New York, the 32-year-old Austrian came to Berlin to launch Qunomedical, an online platform that connects patients to medical professionals around the world. Chung could have founded the

company almost anywhere – the business works with doctors and hospitals in 25 countries and helps patients in over 50 countries – but she settled on Germany. “Whenever I get asked why I decided to launch the company in Germany, I always ask back: ‘Why not?’” she says.

Chung praises Germany for its rock-solid healthcare system and wealth of technological talent. The cost of living in Germany is relatively moderate, she adds, and the country has ample financing and funding opportunities. “The venture capital scene here has matured over the past few years,” she says. “And quite frankly, the European way of life makes it a good place to settle down.”

Quick facts

NAME	Sophie Chung
PROFILE	Healthcare entrepreneur
AGE	37
NATIONALITY	Austrian
QUALIFICATION	Doctor of Medicine
COMPANY NAME	Qunomedical
LOCATION	Berlin
INDUSTRY	Digital health
LINK	www.qunomedical.com



PUTTING THE E IN E-MOBILITY

Batteries are the heart of the electric vehicle revolution. Previously, Asian imports of lithium-ion batteries dominated the European market, but production is now shifting to Europe – and Germany in particular. That means big changes and chances.

When the Chinese battery manufacturer SVOLT went in search of a location for its European manufacturing plant, it set the bar pretty high. “We knew we were going to have a very highly complex, sensitive production process,” says its president of Europe, Kai Wollenhaupt, “and as a result the quality of the workforce was extremely important.” The idea was to build one of the most advanced factories in the fast-moving e-mobility industry, with over 3,000 production parameters guided by cut-

THE BOTTOM LINE

The past few years have seen major players in the EV battery sector – SVOLT, Tesla, CATL, Farasis – expand production to Germany. Experts say that having a German subsidiary is becoming “a must” for companies that want to take part in the e-mobility revolution.

ting-edge artificial intelligence. Moreover, it had to make its products exclusively with green energy, since that’s what buyers of electric vehicles demand, but the price of power still had to be competitive.

SVOLT executives visited 32 sites all over Europe before settling on the southwestern German state of Saarland on the French border. “We realized Germany was the best fit – Saarland really combined all the factors we needed,” Wollenhaupt says. If all goes according to plan, SVOLT will begin producing battery



Photo: picture alliance/dpa/dpa-Zentralbild, Patrick Pleul

Tesla CEO Elon Musk at the vast construction site of the Tesla Gigafactory in Grünheide near Berlin

FDI PERSPECTIVE: A NEW GIANT IN THE EAST

The construction of Tesla's Gigafactory just outside of Berlin has prompted a flood of inquiries for e-mobility-related investments in the eastern German state of Brandenburg.

Just outside of Berlin, a giant is rapidly taking shape: A massive, low-slung factory stretches as far as the eye can see. Built from the ground up by US electric carmaker Tesla, it represents a EUR 1.1 billion investment in the European EV market. Tesla spokesperson Kathrin Schira says the 492,000-square-meter Gigafactory will be the "most advanced mass production facility for electric cars in the world," capable of turning out 500,000 cars per year – mostly Tesla's Model Y SUV to start with. As the facility nears completion, local officials hope it will create the foundation for a larger boom.

"We have had more inquiries for possible investments in Brandenburg than ever before – and all that in the middle of a pandemic," Brandenburg State Minister for Economic Affairs Jörg Steinbach told Bloomberg News. French gas manufacturer Air Liquide is already investing EUR 40 million to supply the factory with oxygen and nitrogen, and Microvast from the US is opening a factory for fast-charging modules in the area.

500,000

Tesla car sales in 2020

€ 50,000

Price of Model Y

12,000

Projected number of people the new European Tesla Gigafactory will employ

modules and packs in Saarland next year, with a full-fledged battery factory operational by 2023. Ultimately, the China-based company plans to produce enough batteries for up to 500,000 electric vehicles (EVs) per year at its German facilities.

World coming to Germany

SVOLT is just one example of a growing trend. A new market analysis by the Brussels environmental protection association Transport & Environment (T&E) predicts a bright future for electric vehicle battery production in Europe's largest market. T&E anticipates a nearly tenfold increase in European capacity between 2020 and 2055, from 49 to 460 gigawatt hours. Around half of this production is expected to take place in German factories, the organization says, and European supply could meet European demand in the near future. Of the 20+ so-called "gigafactories" (factories that produce electric car batteries on a huge scale) planned on the continent, ten will be located in Germany, including those of heavyweight manufacturers like Tesla, CATL and Farasis.

Experts point to a number of reasons why battery and component manufacturers are choosing Germany. Some are obvious: being close to major German auto manufacturers, for example, or the availability of a highly trained workforce. Other factors aren't as immediately apparent. The high proportion of green power in Germany's energy mix, for instance, makes it possible to produce batteries at nearly CO₂-neutral



»Looking at the global market, the 400,000 e-vehicles sold in Germany make it one of the largest e-car markets worldwide, with more new car registrations than the US.«

Professor Stefan Bratzel,
executive director of the Center of Automotive Management think tank

levels, and a well-developed rail infrastructure means it's easy to transport them to customers.

A roadmap for carmakers

Meanwhile, strong government mandates for electric vehicles are supercharging Germany's transition to e-mobility. More than a decade ago, the auto industry promised to reduce its carbon emissions on a voluntary basis. But that didn't happen, and the regulators had to step in to encourage European carmakers to act.

The Paris Agreement in 2015 gave the industry a major push in the right direction. The international treaty laid out a roadmap for steady reductions in CO₂ for the auto industry. Up until 2019, fleets could average 130 grams of CO₂ per kilometer. Starting in 2021, that dropped to 95 grams per kilometer, and planned reductions will continue over the next decade. "There's no way that this can be achieved with combustion engines," says GTAI's deputy director for Mechanical & Electronic Technologies, Stefan Di Bitonto. "That means companies need to reduce the number of internal combustion engines they sell. They need more electric cars."

The changes had a big impact on the German market in particular. Reducing overall emissions has been trickier for German carmakers that tend to focus on the premium market – bigger, more powerful cars, with big engines and big appetites for gasoline. "They produce more emissions than, say, French or Italian volume cars with their smaller engines," Di Bitonto explains.

4

REASONS TO EXPAND INTO GERMANY

1

Location, location, location: Some of the world's most recognizable and successful automotive brands are headquartered in Germany, along with hundreds of smaller suppliers.

2

Energy prices: Germany eases its high taxes on electricity for energy-intensive industries involved in the green economy, making power cheaper for e-mobility suppliers.

3

Skills base: Germany's skilled workforce is a perfect fit for the high-tech requirements of e-mobility manufacturers' highly automated production centers.

4

Growing market: Germany is the largest electric car market in Europe and the second largest in the world. Battery producers who want to be part of the e-mobility revolution need a direct connection to these car buyers.

The new EU-wide regulations regarding CO₂ emissions from cars that come into effect in Germany in 2021, which will steadily tighten over the next decade, have prompted a flurry of investment in the various components that go into building EVs. Demand for batteries, the most critical component in electric cars, is booming. "The timing is totally driven by regulation," says Sebastian Wolf, head of EU operations for the Chinese-American battery manufacturer Farasis Energy. "That's really making OEMs accelerate their activities."

State subsidies

German policymakers have also been actively working on incentives to drive uptake of electric cars. It's now possible for car buyers to get up to EUR 9,000 off the price of a new EV, making them competitive with combustion engines and hybrids. That's yielded impressive results. In 2020, the proportion of EVs in overall new car registrations in Germany jumped from 3 to 13 percent. Volkswagen, for example, tripled sales of its electric cars, moving over 200,000 vehicles in 2020 alone.

Experts expect the trend to continue, and some auto manufacturers in Germany – Ford, for instance – already have plans to phase out combustion engines entirely. "When we look at the global market, the 400,000 e-vehicles sold in Germany make it one of the largest e-car markets worldwide, with more new car registrations than the US," says Professor Stefan Bratzel, executive director of the Center of

ELECTRIC CAR BATTERIES "MADE IN EUROPE" ¹⁾

Growth forecast for electric vehicle battery production in Europe

49

GIGAWATT HOURS IN 2020

460

GIGAWATT HOURS IN 2055

50%

SHARE (OF 460 GIGAWATT HOURS IN 2055)

GLOBAL MARKETPLACE FOR ELECTRIC VEHICLES ²⁾

Largest EV markets worldwide in 2020 (plug-in hybrid and battery-only vehicles)



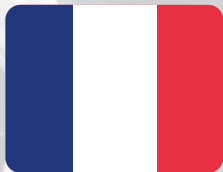
China
1,337,000



Germany
398,000



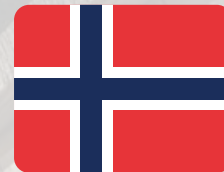
USA
328,000



France
194,000



United Kingdom
181,000



Norway
108,000

Automotive Management think tank. “That’s a turning point. Germany is now the world’s second largest EV market after China.”

That means companies are rushing to enter the German market now and getting ready for high demand a few years down the line. SVOLT, Tesla, CATL and Farasis have all announced billion-euro battery production plant investments in the country, and last year French energy giant Total announced a partnership with PSA, the company behind the German car brand Opel, to build twin battery production facilities in France and Germany.

The heavy investment in battery production is also driving interest in other parts of the e-mobility value chain, from charging stations to battery raw materials, connectors, and self-driving and power management technology and software. “Five years ago, a lot was different in the European market,” says Maxim Hantsch-Kramskoj, vice president of sales and marketing at SVOLT. “Right now, demand is

»The number of platforms for full e-mobility is expanding rapidly. We’re at a tipping point where demand is rising significantly.«

Maxim Hantsch-Kramskoj,
VP sales and marketing, SVOLT

low, but the number of platforms for full e-mobility is expanding rapidly. We’re at a tipping point where demand is rising significantly.”

Affordable energy sources

Battery manufacturing is one of the most energy-intensive steps in the making of an electric car, so at first look it might appear that Germany is at a competitive disadvantage. Since the mid-2000s, most German companies and private consumers have paid a tax surcharge to support the development of renewable power under the Renewable Energy Sources Act or

EEG (Erneuerbare-Energien-Gesetz). “The energy costs in Germany are quite high compared to other places in Europe,” concedes Bratzel.

But that’s not the whole story. To ensure German industry remained competitive with its counterparts elsewhere in Europe and around the world, the EEG doesn’t necessarily apply to companies with particularly high energy consumption. In 2017, for example, several thousand companies saved approximately EUR

8 billion in power costs through the EEG rebate program. “When it comes to energy, Germany is not a low-cost country,” says GTAI’s Markus Hempel, who facilitated Chinese company CATL’s expansion to Germany. “But you have a chance of getting exempted if you’re part of a green industry or product, which means the end user price is not the price you would have to pay.” That changes the arithmetic for e-mobility manufacturers.

HOW DOES THE GERMAN AUTO INDUSTRY WORK?

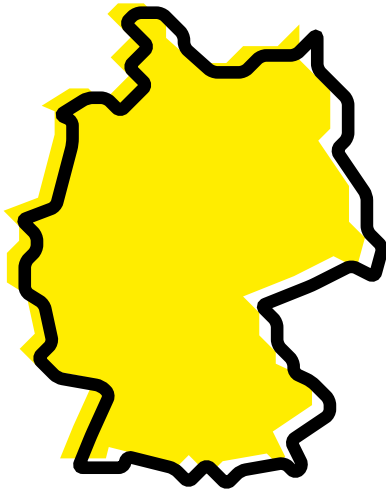
Ever since Carl Friedrich Benz invented the world’s first internal-combustion engine automobile in 1885, the car industry has been integral to the German economy. From major manufacturers to the hundreds of smaller companies that supply them with parts and materials, the sector employs nearly a million people and represents one-tenth of Germany’s GDP. The transition to electric vehicles (EVs) has the potential to hit smaller suppliers particularly hard, because EVs use many fewer moving parts than combustion engines.

Behind the Big Three (Volkswagen, Daimler, BMW) are more than 500 SMEs that produce parts and accessories from timing belts to batteries and airbags. Industrial giants like Bosch, Continental and ZF Friedrichshafen also supply the auto industry.

In 2018, the German auto industry generated EUR 426 billion in sales, represented 40 percent of Germany’s R&D expenditure and employed 834,000 people.

UPWARD TREND FOR EVS

Share of total new car registrations in Germany in 2020



6.9%
PLUG-IN HYBRID



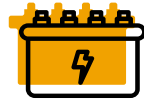
11.2%
HYBRID



46.7%
GASOLINE



0.5%
NATURAL GAS



6.7%
BATTERY



28.1%
DIESEL

Source: CAM Electromobility Report 2020

Good clean energy sources

Aside from price, the source of the electric power is also significant. Governments and consumers demand that EVs are produced with clean energy, and that's particularly true of batteries. "The battery is one of the most expensive and energy-intensive components," Hempel says, "and e-mobility is only as green as the energy you're putting into it."

Di Bitonto says some business managers demand guaranteed access to green energy sources, not just certificates showing green power is part of their factory's power mix. "Everyone wants as much renewable energy as possible," Di Bitonto says. "Manufacturers can't market cars as environmentally friendly if they have a value chain that includes coal."

As a result, batteries produced in eastern European countries that lean heavily on coal-fueled power are at an immediate disadvantage. "Battery cells made in Poland have quite a high CO₂ footprint," Bratzel says, "and manufacturers want a low CO₂ footprint for the whole cycle."

Germany's regional advantages

Germany's regional states offer a variety of deals on land, transport connections and other infrastructure to attract battery and other e-mobility industries. Conversely, foreign e-mobility investments are expanding the map of the German automotive industry from its traditional center in the South/Southeast to other parts of the country: from SVOLT's Saarland plant in the Southwest to Tesla's 300-hectare factory in Brandenburg, just outside of Berlin. Other eastern German states like Saxony-Anhalt and Thuringia are also quickly establishing e-mobility centers.

Germany maintains a global reputation for highly skilled workers particularly in the automotive sector. Though salaries can be high compared to some parts of Europe, more and more manufacturers are realizing that locating in cheaper labor markets further east adds additional costs, especially as batteries made there need to be transported to auto plants in Germany.

There are indications the initial flood of foreign companies into Hungary and Poland has exhausted the relatively small pools of qualified labor in those markets, while over the past two years demand has been increasing. "The automotive heartland that is Germany has showed battery makers this is the place to be," says Di Bitonto.

There are other reasons to build battery factories in close proximity to where cars are produced. In today's car industry, "just in time" is a mantra. Shipping batteries from Asia takes up to two months, an eternity in the precisely timed automotive world. "You simply can't afford to have millions of euros worth of batteries sitting on a ship for six to eight weeks," Di Bitonto says. "Manufacturers have to be closer to where the batteries are needed."

Less transportation is better for the environment, too. Farasis' Wolf asserts that sustainability was a major factor behind his company's decision to build a major new battery plant in Germany. After Farasis signed a contract with Daimler to produce batteries for their e-cars

in 2018, the next step was to open a European production center. “We knew, if we wanted to make a sustainable product, we couldn’t be transporting heavy products by ship,” says Wolf. “We decided to produce in Europe for Europe.”

With labor costs, electricity prices and proximity to Daimler and other major car manufacturers all important considerations, Farasis settled on the eastern German state of Saxony-Anhalt, signing a deal in late 2020 to invest EUR 600 million in a new plant in Bitterfeld, near Leipzig.

A “must” for international companies

Stefan Bratzel predicts that establishing subsidiaries in Germany will become “a must” for foreign companies hoping to make it in the European market. “What is quite attractive is that we have car manufacturers with production plants in Germany,” he says. “And when you’re a supplier, it’s better to be closer to production.”

That holds true for the whole supply chain, experts say. Battery manufacturers need components, too – particularly housing, connectors, coatings and the many specialized chemical components required to make a battery. “You need deep pockets to build a battery plant,” Di Bitonto says, “but it has a multiplier effect – a lot of smaller suppliers are also necessary. There are so many ways all these companies can find opportunities in Germany.”

SVOLT expects its operations in Saarland will employ 2,000 people directly and create thousands of ancillary jobs on top of that. “There are going to be a lot of services and suppliers,” Wollenhaupt says. “And for a lot of that we are looking for strong partners so we can focus on our own core business.”



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GTAI expert for the
automotive industry



Photo: picture alliance/dpa/dpa-Zentralbild/Martin Schütt

FDI PERSPECTIVE: BATTERY BOOM IN THURINGIA

When the biggest manufacturer of e-vehicle batteries in the world announced it was building a EUR 1.8 billion plant in Thuringia, eastern Germany, it gave other foreign companies confidence to follow.

China’s Contemporary Amperex Technology Co. Limited (CATL) may not be a household name. But it’s the biggest EV battery manufacturer in the world, accounting for more than 109 gigawatt hours in 2020. That’s why it was a big deal when the company announced plans to build a EUR 1.8 billion plant in the eastern German state of Thuringia in 2019. When it’s finished in 2025, the facility – which will include a research facility, battery production and recycling operations – will employ at least 2,000 people.

“Germany is home to a strong automotive industry and several of CATL’s key customers,” said Matthias Zentgraf, co-president of CATL Europe at the time. Whereas its South Korean competitors had gravitated toward Poland and Hungary, CATL was the first big Asian producer to invest in Germany. And its expansion set a precedent that other companies, from SVOLT to Farasis, have followed. “For Thuringia, this is one of the biggest industrial investments in the last few decades,” said State Minister for Economic Affairs Wolfgang Tiefensee on welcoming CATL to the region in 2019.

- 1/3**
of Thuringia’s population works in manufacturing industries
- 14**
GWh (gigawatt hours) production expected at German plant by 2022
- 25,000**
CATL global workforce

IN BRIEF

Investors around the world admire the spirit of innovation that powers the German economy. Here, we throw the spotlight on just some of the trends and research projects that are changing the face of things to come.



Photo: Monika Hoeffler/ichosystems

HEALTHCARE: THERAPY BALL

Helping dementia sufferers to reconnect and engage or relax

A trio of students from Duisburg has come up with an innovative therapeutic tool for dementia sufferers. The ichó ball is a tactile electronic sphere that uses color and sound to help people with cognitive disorders reengage and communicate with the world around them.

The ichó ball comes with its own software and apps, developed according to the principles of established therapy methods. Different apps can be loaded according to the needs of the users and their environment. The ball can be activated for entertainment or for calming and relaxation.

The project has won numerous awards and represented Germany at the European Union's "Ideas from Europe" competition, qualifying for the finals.

www.icho-systems.de

DIGITAL HEALTH: DRESDEN'S SURGICAL ROBOTS

Modeling and implementing the use of artificial intelligence during operations

Scientists at the National Center for Tumor Diseases Dresden (NCT/UCC) and the Technical University of Dresden have used artificial intelligence to develop the world's first computer program to predict the use of surgical instruments before they are used.

One of the project's directors, Professor Jürgen Weitz, said that the idea was not to replace surgeons with machines but rather to assist surgical teams, for example, through the employment of autonomous robots that could take over simple tasks such as draining blood.

The system uses an artificial neural network that imitates the human ability to learn from examples. The intelligent algorithm develops by analyzing the role of instruments in video footage of successful operations.

"Support functions are only possible if computers are able to anticipate major events and complications during operations," says Professor Stefanie Speidel of the NCT/UCC.

www.nct-dresden.de/en.html
www.ceti.one
www.tu-dresden.de



Photo: NCT/UCC André Wirsig, Pressefoto

In the future, autonomous robotic systems and other intelligent assistance systems will increasingly support surgical teams. (The image was created before the corona pandemic.)

AIR MOBILITY: EASTERN GERMANY'S DRONE ZONE

€1.3M

The German market for drones is exploding (see *Markets Germany 1/2021*), and Kamenz in Saxony is getting in on the act. Together with international scientific institutions, universities and companies, the eastern German city has founded an "expertise center for autonomous and electronic flight."

A budget of EUR 1.3 million has been allocated to construct a hangar, where autonomous and electric air vehicles can be designed and constructed. The focus will include electric battery and hydrogen technology, swarm applications, and data transfer and security.

www.aef.aero



"The Engineering Center will put us in a position to react better and more quickly to customers' special wishes and offer complete solutions for all of Europe."

Norbert Teeuwen,
Okuma Europe's managing director

COMPUTER ENGINEERING: MADE IN KREFELD

Japanese control tools manufacturer comes to Germany

The Japanese toolmaker Okuma has opened a new engineering center in Krefeld. The facility will produce bespoke CNC (Computerized Numerical Control) solutions, including software and control systems, for machinery.

"The Engineering Center will put us in a position to react better and more quickly to customers' special wishes and offer complete solutions for all of Europe," says Okuma Europe's managing director, Norbert Teeuwen, in a statement.

The company plans to equip standard Okuma machines with locally produced accessories and automation solutions. The 1,200-square-meter engineering center has the capacity to work on 20 machines simultaneously.

Okuma promotes itself as a "world leader in CNC machine tools and machining process optimization" and "the industry's only single-source provider with the CNC machine, drive, motors, encoders, spindle, and CNC control." Customers can experience live demonstrations of its automation tools for manufacturing at the new engineering center.

www.okuma.eu/tech-centres

LOGISTICS: DELIVERING EFFICIENCY

Are they bicycles or automobiles? Or a bit of both?



The new trend in last-mile delivery is a hybrid drive that uses the technology of small electric motor vehicles. The hybrids don't have chains or gears, and they also have more than two wheels and drive more like ultracompact cars. They're designed for transporting heavier payloads, up to 200 kilos, and need less maintenance than bikes, while offering far greater convenience and higher green credentials than cars.

Berlin is leading the way in this new segment. ONO, which was cofounded by a former head designer for Mercedes and Volkswagen, has introduced its limited "Pioneers Edition" in selected German cities. Meanwhile, citkar has been producing its "Loadster" since April 2020. The Loadster won the coveted German Design Award in 2019, as well as numerous other prizes.

Munich's Bio-Hybrid, whose founders come from the automotive parts manufacturing sector, is also getting in on the act. It hopes to enter serial production before the end of the year.

www.onomotion.com
www.citkar.com
www.biohybrid.com

AUTOMOTIVE: INTELLIGENT MOTORING

Cars are getting smarter thanks to AI

Israel's SafeRide Technologies has opened its first European subsidiary in Bochum. The company produces artificial intelligence solutions for monitoring motor vehicles.

"Vehicles have become extremely complex, and original equipment manufacturers and fleet operators are demanding smarter and smarter solutions to ensure condition, security and safety," says the general manager of SafeRide's new German subsidiary, Martin Ridder.

SafeRide has its main headquarters in Tel Aviv and offices in Silicon Valley and Detroit in the United States. The strength of Germany's auto industry was central to SafeRide's decision to base its European offices in North Rhine-Westphalia. "Expanding our presence in Germany supports our business growth strategy and helps us establish a larger footprint in Europe to further grow and develop relationships within the automotive industry," adds company cofounder and CEO Yossi Vardi.

www.saferide.io

GERMANY'S FINTECH BOOM

The popularity of online financial and insurance services has created a bumper crop of opportunities for start-ups in both new areas and established sectors. International companies looking for a foothold in Germany can take advantage of this trend.

Ask the French insurtech start-up Zelros what it was like to expand into Germany last year, and they'll tell you that it was a learning process. "You need to have some German language abilities (as a company) or it gets difficult to do business here," says Gero Reiniger, sales director for Zelros in Germany, Austria and Switzerland.

The company uses artificial intelligence (AI) to help insurance companies better advise and attract customers. That entailed putting a learn-

THE BOTTOM LINE

As Europe's largest market, Germany already had one of the world's leading financial sectors.

Brexit has only bolstered its status, while disruption in the sector could make this an ideal time for foreign companies to get involved.

ing process in place for their customers. "With AI being relatively new, people don't know what to do with the topic," Reiniger says. "It's not magic. It's a tool and we need to put it to work."

So, do the results justify the effort? Definitely, says Zelros. One advantage is the availability of highly trained employees. The success of Germany's insurtech sector helped Zelros find qualified applicants with experience in the field despite a competitive job market. And the benefits don't stop there.

INVESTMENT IN FINTECHS

Where investment into Fintechs went in 2020 (in EUR million)



BERLIN



BAVARIA



BADEN-WÜRTTEMBERG



OTHER REGIONS

Source: EY Startup barometer Germany – January 2021



Photo: picture alliance / Hans Klaus Techt

Valentin Stalf, founder of Berlin-based online retail bank N26, is typical of the young start-up talent that is flocking to Germany's fintech hubs.

A decade of growth

Insurance and financial technology companies have thrived in Germany over the past decade by tapping into the country's unique mix of market size, government support and diverse environments. In 2015, Germany attracted EUR 332 million in investment, but by 2019 that number had grown to EUR 1.2 billion, business consultants Ernst & Young have calculated. Although the figure slipped in the pandemic year of 2020, the number of

completed investments remained high, and investors appear to have just been catching their breath. This year started off with a record 13 deals in January alone. They were worth EUR 275 million, according to Barkow Consulting.

That was, in part, due to another disruption. "Brexit has expanded Germany's traditional financial sector," says Josefine Dutschmann, senior manager in financial services at Germany Trade & Invest. "London remains the European

financial capital, but Germany is quickly making up ground." Part of Germany's strength in this regard is that the country doesn't depend on just one main financial location.

A number of hotspots

Although Germany's banking sector was historically based in Frankfurt, the lively urban backdrop and start-up-friendly infrastructure of Berlin has put the German capital firmly on the map. In 2020, Berlin fintech start-ups

received EUR 342 million in financing, or 64 percent of the total invested in the German sector. And the dynamism doesn't stop there. Bavaria came in second with EUR 123 million in investment, about 24 percent of the total. As Munich is Germany's traditional insurance hub, Zelros chose the Bavarian capital over Berlin for its expansion.

Digital hubs

Zelros benefited from a program devised by the German Ministry for Economic Affairs and Energy to create regional concentrations of fintech/insurtech start-ups through a network of four digital hubs that bundle expertise. Berlin and Frankfurt, together with nearby Darmstadt, are fintech hubs, while insurtech is focused in Munich and Cologne. The hubs are part of the Digital Hub Initiative, a network of 12 hubs in digital fields ranging from mobility to digital health to artificial intelligence.

The hubs capitalize on Germany's unique decentralized economy. In many European countries, expertise and industries are focused on large urban centers, but Germany's industrial landscape is spread around the country – an added advantage perhaps for companies looking for the ideal location in Europe's biggest economy.

Big Data cluster

The German government and nearly 50 partners are also working together to explore how a financial big data cluster in Frankfurt can contribute to the country's data sovereignty. About a dozen of those partners have agreed to top up a EUR 10 million subsidy allocated by the government. The cluster links financial institutions, regulatory bodies, start-ups and research institutions to develop commercially viable platforms based on big data.

Launched in 2020, the Financial Big Data Cluster is an excellent opportunity for foreign

4

REASONS WHY GERMAN FINTECH ROCKS

Robust infrastructure and support for start-ups and the availability of skilled workers offer a winning combination for companies looking to invest in Germany's financial tech sector.

1

Europe's biggest economy

Germany is the continent's most populous country and is its largest national market. Companies and investors cannot afford not to be here.

2

Established networks

The German government has established four hubs to support the foundation of fintechs and insurtechs in Germany. The insurtech hubs in Cologne and Munich, for example, leverage the historical expertise of both those cities.

3

Start-up infrastructure

Berlin attracts more fintech investment than any city within the European Union, and Germany is home to some of Europe's biggest start-ups. Executives, founders and employees will find excellent support networks for any questions or issues they might have.

4

Qualified employees

Germany's labor laws support both employers and employees to find an enjoyable and productive work-life balance. And the country's network of colleges and universities means qualified labor is available anywhere a company might choose to locate.

investors to get help from established players and gain a foothold in a burgeoning industry in Germany. While fintechs such as online banks and payment solution providers were quick to attract investor attention, interest in insurtech is now also ramping up. Insurtechs ranked fourth in new investments in Germany behind payment- and trading-solution providers last year. Still, the trend for traditional banking going online continues to be the biggest driver of financing. That's thanks in no small part to Berlin's N26 and Solarisbank.

Fantastic fintechs

N26 is a purely online retail bank and Solarisbank allows other companies to use its platform and banking license to offer financial services. N26 simplified banking in Germany and attracted a new class of international, highly qualified, young start-up talent. Contrary to the stereotypical image of the banking sector, fintech benefited from Berlin's hip image and relatively low rents compared to other major German and European cities.

"Berlin is a massively growing tech hub with lots of start-ups, a lively and creative cultural scene and attractive nightlife," Robert Bueninck, chief commercial operator at Heidelberg-based payment provider Unzer, told the *Berliner Morgenpost* newspaper last year. Bueninck's career trajectory illustrates the growth of fintech in Germany: Up until March 2021, he was general manager DACH for Klarna, the Swedish online payment company that is now Europe's most valuable financial start-up with a valuation above EUR 30 billion.

Unzer itself was picked up by US private equity firm Kohlberg Kravis Roberts & Co. for a reported USD 600 million (EUR 502 million) in 2019. With Germany's fintech infrastructure so robust, and the sector being particularly accommodating to current geographical and technological shifts and changes, we are likely to see more of these major deals and acquisitions in this exciting growth market.



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»Berlin has a big talent pool in the adtech scene.«

Bastian Winterkemper, head of sales, Liftoff

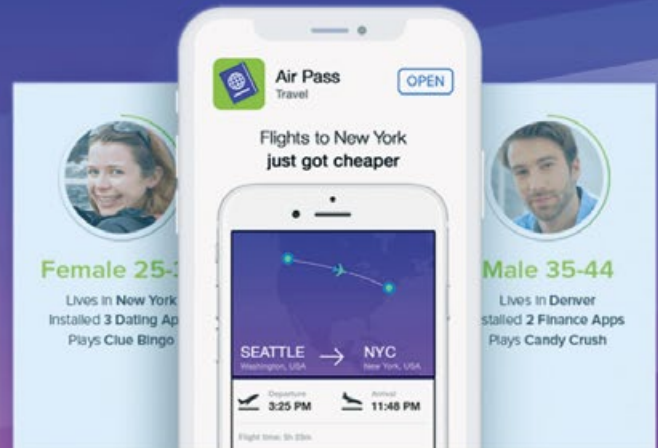


Photo: Liftoff, Pressefotos

ADTECH Bucks the Trend

Although advertising sales have declined worldwide as a result of the coronavirus pandemic, adtech is thriving. Germany has a number of hotspots of innovation and entrepreneurship.

Liftoff chose a heck of a time to expand to Germany. The Californian adtech company, which helps companies acquire and retain high-quality mobile app users, opened its Berlin office last year, just as the coronavirus pandemic hit. “Working with leading brands and app publishers, we reached a portfolio size where we felt it was necessary to hire people on the ground to be closer to our clients,” says Bastian Winterkemper, Liftoff’s head of sales in Germany. “Of course, with the pandemic we stick to digital face-time now.”

The coronavirus era has not been kind to advertising in general – spending has dropped 11.9 percent globally. And yet the mobile adtech space has benefited, with sales in the sec-

tor increasing last year by 26 percent to USD 240 billion, according to industry analytics resource App Annie.

In Germany, the 2021 outlook is excellent, with expected growth of 19.4 percent (or EUR 5.35 billion), according to eMarketer. One major reason for this is innovation, driven by artificial intelligence. In fact, despite Germany’s reputation for being slow to digitalize, the German market is nearly as large as the next three European ones combined (EUR 28.5 billion). That’s why Liftoff started a recruitment drive in Germany at an otherwise precarious time. “Berlin has a big talent pool in the adtech scene,” says Winterkemper. “That will help us to accelerate our growth and support even more marketers across Germany.”

Germany has seen the birth of a number of adtech companies that specialize in the many niches that this sector offers. GTAI’s digital industries expert Oliver Wilken explains: “Essentially, Germany is triply interesting for adtech. There are a lot of players who use the services, there are a lot of end consumers, and there are a lot of potential recruits. And Germany is home to many companies on the Forbes list of most valuable brands, which are potential clients.”



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BIG THING IN SMALL

One up-and-coming industry attracting the attention of international companies is micro/nano engineering. A cluster has coalesced in the eastern German state of Thuringia, a part of the country best known for its excellence in optics.

60KM

Radius of Thuringia's micro/nano cluster, which encompasses twenty research institutes and boasts top-notch R&D

67%

Share of all goods made in Thuringia that are exported

30%

Share of the population with higher degrees in the Thuringian city of Jena, a world center of the optical industry

Within Germany, Thuringia is most often associated with the iconic German optics companies Zeiss and Jenoptik. But the number of foreign firms doing business in that part of eastern Germany is also on the rise, increasing by 41 percent between 2016 and this year, and not all of them are involved in the region's traditional industry. More and more micro/nano technology enterprises are also choosing to set up shop here.

Japanese companies are particularly prominent. For example, in 2017, Japan's KOA Corporation acquired VIA Electronic, a small but top-notch maker of Low Temperature Co-fired Ceramics (LTCC). LTCC facilitates the carrying and packaging of the smallest sort of electronic components like sensors and is therefore of key interest for the electronics supply chain.

KOA is now part of the Thuringian micro/nano technology cluster. "I was looking for a successor to bring VIA into the future and to inject enough capital to buy important new machinery," says Franz Bechtold, VIA's founder and now co-managing director. "Since KOA's entry, we acquired a CNC punching machine, a lamination press and upgraded our clean room. There are no doubts as to our Japanese owners' strategic commitment here."

VIA's other managing director, Yuji Iwasa, says KOA's move came in recognition of the fact that Europe constitutes the most promising market for LTCC. "Our business is very customer-oriented, requiring detailed technical communication, and our investment in Thuringia caters to these needs," Iwasa explains.

Center of R&D expertise

It's easy to see why German and foreign companies in micro/nano manufacturing would be attracted to Thuringia, with its world-class R&D ecosystem. There are twenty research institutes within a 60-kilometer radius, including the Fraunhofer Institute for Applied Optics and Precision Engineering and the Ilmenau University of Technology.

Research carried out at that university and at Micro-Hybrid Electronic GmbH, a Thuringian specialist for miniaturized electronic circuits and infrared sensors, is a key element of the EUV (Extreme Ultraviolet) li-

THE BOTTOM LINE

Optics and photonics is a fast-growing and exciting, future-oriented sector in Germany with lots of room for foreign companies.

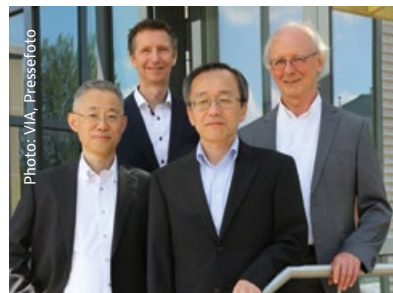
ON THE GROUND

Japanese systems integration corporation NTT DATA set up a software arm in Erfurt to meet the demand for sensorics in Europe.

The automotive industry's quest to make autonomous driving a new standard means that carmakers will require a new generation of sensorics, including the operational software linking them with 5G base stations.

Since 2019, the Japanese multinational systems integration company NTT DATA, an IT services and business consulting provider, has been setting up a center for software development in Erfurt, the heart of Thuringia's micro/nano cluster. NTT DATA plans to increase staff there from 15 to 25 by the end of 2021. All but one of the current 15 employees are homegrown Thuringian talent.

"The swift progress in micro/nano technologies illustrates the need to adopt supporting IT development in faster cycles, and this is exactly what our Erfurt presence is about," says Ralf Malter, managing director of NTT DATA's Erfurt office. "We benefit from our parent company's massive R&D spending of nearly USD 3.6 billion (EUR 3 billion) per year, and in our most recent meetings between NTT DATA's regional directors, it was clearly spelled out that Erfurt is a strategic location for our long-term involvement."



In 2017, the Japanese electronics corporation KOA bought VIA Electronic, a specialist manufacturer of low temperature co-fired ceramics from Thuringia. Their products play a vital role in the electronics supply chain.

thography technology that won the prestigious German Future Prize last November. The technology is predicted to revolutionize computer chip production.

"EUV lithography represents a giant leap forward for the chip packaging industry, as it will enable the likes of Apple to achieve enormous breakthroughs in audiovisual displays," says Knuth Baumgärtel, Micro-Hybrid's managing director. "The Thuringia cluster allows small and medium-sized companies like us to test prototypes in the local research institutions' clean rooms, which would otherwise require initial investments of EUR 20 million or more."

Finding a spot in Thuringia

Foreign businesses interested in coming to Thuringia can get free help from Germany Trade & Invest (GTAI) and the Thuringia regional economic development agency LEG. There are investment subsidies of up to 30 percent, loan guarantees of up to 80 percent and subsidies for wages, training and R&D.

Nevertheless, LEG sees the micro/nano cluster itself being the strongest selling point for international business managers. "Thuringia's biggest-ever FDI project, the EUR 1.8 billion battery factory currently being built by China's CATL near Erfurt, is mainly about investors seeking to tap into the cluster's expertise to improve manufacturing processes, rather than incentive programs or geographic proximity to the target markets," says Arnulf Wulff, a member of the LEG board.

Silke Poppe, head of the Eastern German States/Structural Change division at GTAI, explains that Germany's national economic development agency has been actively supporting investor recruitment in Thuringia, with measures including a cluster marketing program and foreign delegation visits. "Companies taking part in our delegation visits can gain a firsthand impression of available locations and business opportunities," she says.



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A Virtue of **NECESSITY**

With schools scrambling to teach children during Covid-19 lockdowns, teachers and parents discovered the value of educational technology. International companies are already finding a foothold in this rapidly growing market.

As the full force of the second wave of coronavirus hit Germany in late 2020, regional and local authorities throughout the country had to close schools and quickly find remote-learning solutions. One supplier that was ready to meet their needs was Norway-based itslearning, whose

comprehensive lesson planner helps structure curricula, streamline educational processes and manage record keeping.

Last December, Germany's third largest regional state, Baden-Württemberg, signed a deal with itslearning's German subsidiary to deliver a learning management system for

THE BOTTOM LINE

International firms have profited from the edtech boom in Germany amid coronavirus school closures. Government initiatives and a shift in public attitudes suggest the market will continue to expand in the longer term.

HOW DOES GERMANY'S EDUCATION SYSTEM WORK?

Germany has a federal system in which the national government takes a backseat on educational policy in the country's 16 regional states. This educational policy can vary considerably from place to place. School attendance is mandatory, and optional kindergarten instruction is provided for children from shortly after birth until the age of six. Elementary education runs from ages four to six or nine. This is followed by lower secondary education, designed to teach basic general knowledge, and five types of upper secondary education, which range from vocationally focused to university-track instruction.

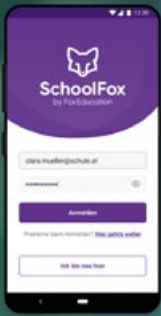
Over one-third of Germans obtain tertiary degrees, and MINT (mathematics, informatics, natural sciences, and technology) subjects are more popular than in any other OECD country. Germany is also famous for its dual vocational education and training system, which combines theory with training embedded in a real-life work environment (see also page 39). All told, Germany spends EUR 310 billion on education, research and science – and EUR 1,182 per capita on schools, universities and other educational establishments.

up to 1.6 million teachers and pupils. And in January 2021, the municipal government of Berlin formally signaled its intention to work with the company. When the ink is dry on the agreement, it will mean the Norwegian company will serve 5 of Germany's 16 regional states.

"Our platform can adapt easily to the individual curricula of Germany's regional states, which are the basis of the curricula of many thousands of schools," says Peter Sidro, key account manager at itslearning's Berlin office. "Another main selling point are our professional servers, which can meet the demand for data capacity in Germany."

A lucrative market

Germany spends a lot on public education – approximately EUR 147.2 billion or 4.2 percent of its GDP. Since 2010, the sector has enjoyed annual gross value-added growth of around 3.6 percent, outpacing the overall economy, which



Austria-based company Fox Education Services supports German schools' need for communication and data exchange tools that are independent of typical social media platforms, which are banned during the school day.



MARIA SPIES
joint CEO of HolonIQ

What advice would you give an international edtech company seeking to enter the German market?

You will be pitching to people who demand evidence of efficiency, so the strongest sales argument is evidence of your tool's impact and satisfaction levels. If you can show that your solution has a proven track record in other markets, you're already ten steps ahead of your competitors. By sector, I think it's especially worthwhile pitching solutions for workforce upskilling, as reflected by the ample funds and investment momentum we currently observe in that area.

Procurement shifts

Education is the responsibility of the 16 regional states that make up the Federal Republic of Germany. Several regional states launched pilot projects last year for centralized procurement, which means edtech suppliers could be signing blanket contracts with states' ministries of education rather than hundreds of individual schools.

Beth M. Havinga, a digital education solutions consultant at Berlin-based Connect EdTech, is confident that "Covid-19 has been strengthening the political will for change." And she points to another interesting trend:

"The rapidly growing tutoring sector, driven by parents' perception that public schooling alone doesn't sufficiently prepare their children for the job market." In 2018, German parents spent EUR 6.4 billion on learning aids and private lessons.

Digital makes learning fun

Johannes Fischer, GTAI senior manager for the digital economy, knows that Germany's federal system can seem rather daunting to foreign companies seeking to enter the market, and offers reassurance: "There's a lot of momentum in the German edtech market, and GTAI is well positioned to bring together novel solutions from abroad and those who make procurement decisions in Germany's educational sector."

The boom in digital education tools is a virtue born of necessity, Fischer adds, predicting that it will continue unabated after the pandemic. "There's every reason to think that we will win the battle against Covid-19, but the changes in German education are here to stay. Germans are very diligent when it comes to education, and they've discovered that digital solutions are not just useful for better learning – they're also a lot of fun."



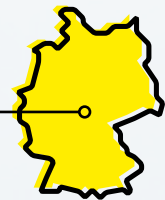
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Regional Spotlight

EISENACH



The city of Eisenach in the eastern German region of Thuringia has an extensive manufacturing history. Today, it attracts German and international manufacturers of not only cars and automotive parts but also light aircraft and other products.

One hundred and twenty-five years ago, the first car factory opened in Eisenach, laying the foundation for the manufacturing industry in the city and surrounding area. It was taken over by car manufacturer BMW in 1928 and then nationalized. With the demise of communism and the reunification of Germany in the early 1990s, the factory was shut down, but carmaker Opel simultaneously set up shop in Eisenach and continues to do business there today.

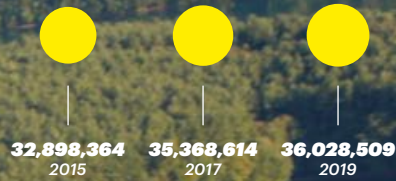
The share of industrial workers in the Eisenach region exceeds the average for Germany. And the high density of skilled employees and craftspeople makes the area attractive to automotive manufacturers throughout Germany and the world. South African company Bell Equipment, for example, produces dump trucks as well as other industrial machinery and parts there. And one year ago, Opel began making hybrid cars at its Eisenach plant, underscoring the area's future orientation.

Other Eisenach industries range from metal processing to watchmaking to aviation. For instance, Flight Design, a medium-sized German company and a major player in the global market for light aircraft, established a location there. Flight Design specializes in sustainable flight solutions and recently expanded its range to include an aircraft fully powered by electricity.

AIRCRAFT CONSTRUCTION PROPELS LOCAL INDUSTRY

Turnover (in EUR thousand) and employees of manufacturing companies in the eastern German regional state of Thuringia

ANNUAL TURNOVER



NUMBER OF EMPLOYEES



A model for the future of low-carbon, recreational flying and flight training: The F2 from Flight Design is a light aircraft designed for EASA CS-23 certification that costs EUR 160,000. From 2022, it will also be available as a fully electric-powered aircraft costing EUR 245,000.

DIRECT BUT EFFECTIVE: GERMAN WORK CULTURE

To foreign businesspeople expanding to the country, German workplaces may initially seem overly formal and rules-bound. But there are many advantages that benefit employers and employees alike, as human resources consultant and leadership coach Anke Wolf tells us.

What's the biggest surprise for foreign companies when they come to Germany?

ANKE WOLF: I would have to say works councils. You have them in many European countries, but if you don't come from the middle of Europe, like Belgium or France, it's a surprise. The works council takes care that employees' rights are represented in the company and can help in case of conflicts.

They watch out for the majority of employees, usually everybody who is not senior management.

Could you expand on that?

WOLF: If there is an internal transfer or new hire, the works council has a vote on it. If there is a downsizing in the company, if the company is laying off people for certain reasons and then at

the same time wants to hire someone externally, the works council might say: "You know, we have a lot of people and some might lose their jobs. You should consider them first." The idea behind the works council is that they oversee all employment-related topics. Not only hiring but also other topics like training or performance management. So, the council has a say in how to use performance management, what criteria to use and who is evaluating who.

But the relationship between the works council and management isn't intrinsically adversarial, is it?

WOLF: The cooperation with the works council is usually constructive. HR and works councils meet regularly, and they negotiate employment-related topics. If a company and a works council can't agree, they could, in the worst case, go to court, but I personally have never seen that. The employees of all companies with more than a certain number of workers have the right to form a works council.

In your experience, is there anything unique about the office environment in Germany? Do people interact differently compared to other countries, for example?

WOLF: What my international colleagues told me is that they find the German working environment very formal. I experienced the opposite when I worked abroad. It was much more informal there compared to what I was used to in Germany. In Germany, you usually use last names when speaking to each other. And of course, in the German language there are formal and informal forms of "you." You use the formal one until the point when you agree to use the informal one. But that's changing a bit. It depends on the industry. For example, if you go into more IT-related or creative areas, people use the informal form right from the start.

What about the use of academic titles?

WOLF: If you have a doctorate in anything, it becomes a regularly used part of your name in Germany. That's an expression of respect and politeness. But to foreigners it sometimes sounds like you're a medical doctor.

ANKE WOLF

is a human resources consultant and leadership coach based in Cologne. Before launching Anke Wolf Coaching & Consulting, she worked as a human resources expert and manager in three multinational companies where she advised management in Europe, the US and Asia. Today, her clients include both large, international companies as well as German SMEs.

Is it common for Germans to socialize with their fellow employees outside of the workplace?

WOLF: In traditional industries, it's not very common to do something in your free time with your colleagues. We usually don't have a Friday afternoon beer in Germany. But this is changing and it is definitely different when you work with younger people. They merge private and professional life much more.

Germans are well known for their directness. How does this influence communication in the workplace?

WOLF: For Germans, it's very important to make things clear. There is probably a fine line between what you might perceive as rude, but what to a German is just direct. A German might say, "This is a fact and I really need to make it clear," whereas you might say, "I don't need to know this fact right now – I think I understand without it." On the other hand, Germans are very reliable. They say what they mean and they mean what they say. You can count on that.

Is data protection a big issue within German companies?

WOLF: I mean, it's a European data protection law, but I sometimes have the impression that Germans are especially sensitive to pro-

viding personal data to organizations. At work, you would not hand over personal information to someone else without letting the person concerned know about it. A manager might ask to see a performance review, but you can't necessarily just give out such information. I've had many long discussions with non-Germans, especially non-European managers, about this topic. For them, it can be hard to understand that the careful handling of personal data is meant to protect the employee's privacy.

How important are German language skills for workers coming from abroad?

WOLF: If you don't live in a large city like Berlin, people may not speak English very well or feel comfortable speaking English, even if they can. When I was the only German employee in my department, I handled a lot of daily stuff for all the expats because they were unable to communicate. So, for example, if they got a traffic ticket, they couldn't read it and they couldn't talk to the police. So, I did that. If you want to talk to your landlord, they often don't speak English. If you plan to stay for longer in Germany, I strongly recommend learning German.

How has Germany adapted to remote working?

WOLF: Before coronavirus, remote working was not very popular in Germany. But I think this has changed. A lot of companies will keep the home office option because it has proven to work in many areas. Companies probably won't do it 100 percent, but they'll show much more flexibility than before. People still value social links to their colleagues and do not want to work from home every day. And many managers don't know how to lead virtually, but this is a leadership problem, not necessarily a cultural problem.



GERMANY'S NEW SPACE LIFTOFF

5

REASONS WHY GERMANY IS A STELLAR LOCATION FOR SPACE TECHNOLOGY COMPANIES

1

Support

The German government has stressed the importance of the space sector and is supporting cross-industry initiatives to enable the use of space technologies in modern society and the development of domestic spaceports.

2

Established Hubs

From well-established aerospace clusters in Bavaria and Baden-Württemberg, to the "City of Space" Bremen and the fast-growing start-up scene in Berlin, there are companies and products throughout Germany that are in global demand.

3

Commercial Opportunities

"Space travel will be even more important in the future than it already is," says Thomas Jarzombek, the German government's coordinator of aerospace policy. "Above all, commercial operations will be decisive for the future." The emerging sector known as "New Space" is going to be "really big," Jarzombek asserts, with new players and considerable private funding.

4

Innovation

The German Aerospace Center (DLR) is promoting cutting-edge technologies such as wind-generated hydrogen to be transported, stored and used in fuel cells for rocket testing and other vital applications.

5

Industry Demand

Plans for a floating spaceport are broadly supported by German industry, including the leading space technology group OHB, satellite communications firm MediaMobil, offshore wind farm specialist Tractebel DOC Offshore, BLG Logistics Group and shipping company Harren & Partner.

Germany is reaching for the stars as it embraces an increasingly vital and commercialized aerospace market. You can expect to see more and more German-based companies putting more and more satellites into orbit.

If the recently formed consortium German Offshore Spaceport Alliance (GOSA) gets its way, the North Sea area near the city of Bremen will become the world's latest gateway to space. GOSA is aiming to create the first offshore launch platform for small modern carrier rockets known as micro-launchers. It aims to exploit the trend toward smaller "New Space" rockets, designed to put micro-satellites into space.

The initiative has support from the highest political levels. The national government wants to make it easier for German companies to launch satellites from domestic spaceports, while promoting innovation and bolstering Europe's aerospace infrastructure. "The central element of German space policy is independent European access to space," says Thomas Jarzombek, Germany's coordinator of aerospace policy.

Smaller is better

With its robust aerospace industry, Germany is poised to play a major role in this new space race. It is already the main market for domestic supply-chain stakeholders. They include highly qualified experts and a network of more than 2,300 specialized companies with over 100,000 employees and annual revenues north of EUR 30 billion.

Previously, the European Space Agency's Ariane 6 launch system and the Kourou spaceport in French Guiana had been Europe's primary routes into space. But now New Space initiatives from Germany are offering alternatives. Promising start-ups include HyImpulse, a spin-off from the German Aerospace Center (DLR); Isar Aerospace, founded at the Technical University of Munich; and Rocket Factory Augsburg (RFA), part of Bremen-based OHB, a leading space and technology group and a GOSA partner. These companies are "challenging the established space sector," says Jarzombek, as the trend continues toward

THE BOTTOM LINE

The "New Space" movement and the miniaturization of satellites is opening up an exciting new market for start-ups and established companies. With thousands of satellites to be launched in the coming years, Germany is a location that foreign companies can't afford to ignore.

ever-smaller satellites for Earth observation, environmental and climate research, and Internet connectivity.

The Federation of German Industries (BDI) points out that some 10,000 satellites will be launched into orbit by 2028, 86 percent of which will be small-scale. They will require tailor-made infrastructure. "These satellites need a launcher and a launch site," Jarzombek adds. "We want to open up this market for Germany."

GOSA's planned launchpad, currently under government review, would be carried on a ship near the hub of Bremen, allowing rockets to take off vertically from the sea. Foreign investors have embraced the plan. US imaging satellite company Planet Labs acquired German geospatial information provider RapidEye in 2015. Planet's mission control center – its largest office outside of the US – is located in Berlin, along with about a quarter of its personnel.

"Planet is monitoring the development of the micro-launcher market with great interest," says Martin Polak, Planet Lab's director of Public Institutions Business in Berlin. "Launch has traditionally been the largest bottleneck for New Space companies like Planet Labs to build and scale their business. We would truly welcome the emergence of a micro-launcher market in Europe, as it would create additional opportunities for companies to launch spacecraft."

A domestic spaceport would not only provide cost benefits but also allow Planet to optimize launch schedules and orbit selection, Polak explains. Currently, Planet has to rely on launch sites in the US, Russia, Kazakhstan, Japan, New Zealand, India and French Guiana.

Bremen and beyond

The DLR is also looking at other potential launch sites, such as the Rostock-Laage Airport in the state of Mecklenburg-Vorpommern. Although not a floating platform, this onshore site would also allow horizontal launches from carrier aircraft.

The growth of Germany's space sector is expected to provide ever-greater opportunities for foreign suppliers. For example, Airbus, Europe's largest aerospace corporation, is increasingly using international supply chains.

The German Ministry for Economic Affairs and Energy and the DLR are supporting the development of micro-launchers designed to carry light payloads of just a few hundred kilograms from Earth into orbit. As part of a EUR 25 million competition fund, last year the DLR awarded HyImpulse, Isar Aerospace and RFA EUR 500,000 each for their rocket designs. "The New Space launchers are a paradigm shift in public financing, away from the development of rockets down to the last detail and toward the commissioning of specific launch services," Jarzombek says.



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NO SLOWDOWN FOR GERMAN LOGISTICS

The coronavirus pandemic has not dented Germany's leading role in European and global logistics. In many respects, it has even handed the sector additional growth potential.

Last year, the First Mover Group, a Norwegian project management and relocation business with 450 employees across Scandinavia, acted in the true spirit of its name. Not deterred by the significant obstacles presented by the pandemic, management decided the time was right to expand its European presence. In December, the group opened its German new home in Krefeld in the heart of the Rhineland, one of the most densely populated regions in Europe.

Martin Grønberg Myrold, managing director for Germany, worked with Germany Trade &

THE BOTTOM LINE

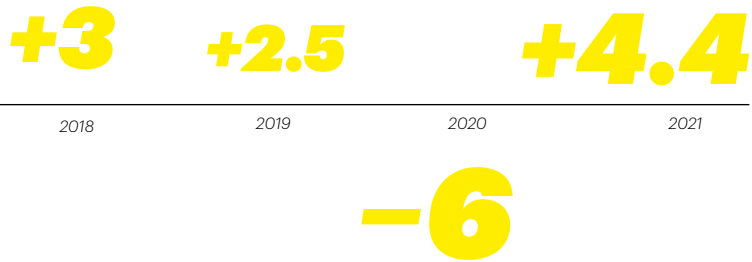
Germany's response to the second and third waves of coronavirus was to keep as much of the economy open as possible. Logistics has proved to be one of the few sectors to emerge stronger in 2021.

Invest (GTAI) to find a location for the logistics company during this unusually challenging time. "Coronavirus has forced companies to modernize and change their workspaces," Myrold says. "There's excellent infrastructure between the big cities, so we can serve about 18 million people within an hour of our office."

First Mover Group is hardly an outlier. Germany continues to attract international companies with its central European location, strong domestic market and extensive export expertise. Even as the coronavirus pandemic disrupted Germany's attempts to maintain

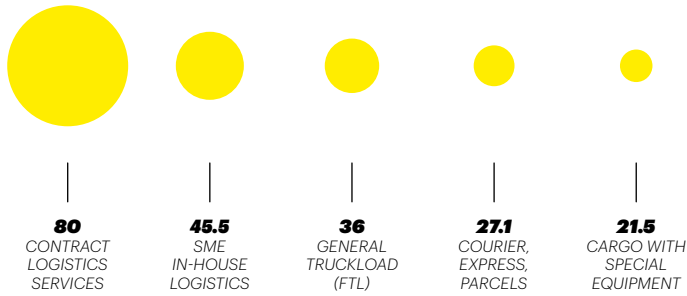
THE FORECAST IS SUNNY¹⁾

Logistics market in Germany, annual growth (in %)



SECTOR BREAKDOWN²⁾

German logistics market segments (in EUR billion)



E-COMMERCE IS BOOMING³⁾

E-commerce turnover (B2C) in Germany





»What used to be 'just in time,' has become 'just in case.'«

David Chasdi, GTAI

“business as usual” in 2020, the logistics sector proved resilient.

“Revenue in the logistics sector in Germany has doubled in the past 20 years, proving itself to be an enormously important driver of growth,” says Christina Thurner, a board member of logistics company LOXXESS and the German Logistics Association (BVL).

Overall, Germany’s logistics sector has over 60,000 companies with three million plus employees, accounting for roughly EUR 285 billion revenue in 2019. “The pandemic made the systemic relevance of logistics clear for the first time to a large part of the population,” Thurner says. “Despite national borders closing, goods arrived at supermarkets, medicines at phar-

macies, and medical products at hospitals and care facilities. And the public recognized the important work by logistics professionals, such as truck drivers.”

The pandemic also showed that “lean and mean” supply chains might not have enough of a buffer to get a company through a rough patch. “Covid-19 taught us that if you’re too reliant on any one supply chain, and there’s a disruption, you might risk scrambling to find a replacement,” says GTAI logistics expert David Chasdi. “What used to be ‘just in time,’ has become ‘just in case.’”

An international frontrunner

Germany has come out No. 1 in the World Bank’s three most recent biannual Logistics Performance Indices, rankings of 160 countries. “When it comes to logistics, Germany is the frontrunner by international standards, especially in the areas of infrastructure quality and logistics technology,” Thurner says.

The country’s strong exports and strong purchasing power combine to produce an internationally connected economy with high domestic consumption.

Road transport accounts for nearly 80 percent of freight movement volume in Germany. Moreover, heading north on the Rhine River, the city of Duisburg boasts the largest inland seaport in the world. Germany is also home to three of the top ten air cargo hubs in Europe. “Logistics in Germany is highly diversified with both global giants and many smaller niche players,” Chasdi says, adding that individual companies’ logistical needs help determine the best location within the country.

Supply chains in flux

Thurner believes that German companies will want to reinforce their supply chains and increase “near-sourcing,” leading to higher demand for contract logistics services and

HOW DOES GERMANY'S TOLL SYSTEM WORK?

Germany introduced tolls in 2005, and since 2018 they’ve applied to trucks weighing over 7.5 tons on 52,000 kilometers of highways and major roads. Electricity-driven vehicles are exempt. The company Toll Collect (www.toll-collect.de) collects the fees, calculated per kilometer based on weight and emission class. Digital onboard units allow tolls to be recorded and deducted automatically throughout Germany and Austria.

warehousing. As a result, demand for suitable real estate in Germany is also expected to rise.

After data centers, logistics was named the second biggest investment opportunity by the Urban Land Institute and PwC's *Emerging Trends in Real Estate: Europe 2021* report. And that same study identified four German cities among the top ten locations for real estate investment in Europe.

E-commerce boom

The coronavirus pandemic turbo-charged German e-commerce in 2020, with total sales jumping 14.6 percent to EUR 83 billion, a new record. More than one-third of that volume comes from a single company: Amazon.

Since Amazon opened its first fulfillment center in Bad Hersfeld in 1999, the US online retail juggernaut has rapidly expanded its German operations and now has 15 logistics centers, with about 40 sorting centers and delivery stations around the country. Since 2010, Amazon has invested over EUR 8 billion in German facilities and infrastructure and now employs over 20,000 people countrywide.

In the last three years alone, it has opened two vast fulfillment centers in North Rhine-Westphalia (a 100,000-square-meter facility in Werne and a 55,000-square-meter facility in Mönchengladbach) and a new distribution center in Raunheim Mönchhof, Hessen.

Two more fulfillment centers are in the works: one in Achim, near Bremen in the North, scheduled to open in summer 2021, and another in Gera, in the eastern state of Thuringia, set to start operating by the Christmas season. An even larger facility is being established in Erfurt, which is projected to bring as many as 600 new jobs to Thuringia. In 2020, Amazon also launched its first regional air hub in Europe at the Leipzig/Halle Airport in Saxony. And construction is underway on a 34,000-square-meter sorting center in Schönefeld, close to Berlin's new BER airport.

Like all companies, Amazon has had to adapt its business processes to protect employees during the pandemic. "But as a logistics company, this is what you do," Cossmann says. "You adapt to new situations every single day." With growing markets, Germany is adapting and keeping the pace for success strong.

FDI PERSPECTIVE

Amazon keeps expanding in Germany



Photo: picture alliance/dpa, Soeren Stache

At Amazon's Brandenburg sorting center in Germany, thousands of incoming parcels are sorted every day according to delivery districts, over an area of about 34,000 square meters.

Since it opened its first fulfillment center in Bad Hersfeld in 1999, Amazon has expanded its German operations to 15 centers, with two more set to open this year, one in Achim, near Bremen in the North, and another one in Gera, in the eastern state of Thuringia. Since 2010, Amazon has invested over EUR 8 billion in German facilities and infrastructure.

"It's important to stay close to your customers," says Armin Cossmann, regional director for Amazon's German fulfillment center network. "Our buildings in Germany are part of the European network, and we are proud to be able to fulfill orders from customers in many European countries. A product ordered in Italy might be delivered from Bavaria."

€8BN+

Amount invested by Amazon in Germany since 2010

Total sales in Germany:
(from top to bottom 2018, 2019, 2020)

\$19.9BN

\$22.2BN

\$29.6BN

20,000+

Permanent jobs created in Germany

Sources: Amazon; Börsenblatt; Statista



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WINNING STRATEGY for the Games Industry

Germans are mad about games of all varieties – this has become evident during the corona lockdowns. And Brexit has increased Germany's appeal as a location for international game developers, producers and marketeers.

Germany is not the first country you might associate with light entertainment. But Germans are avid game players, representing the world's fifth largest market behind China, the US, Japan and Korea. It's a trend that has only increased during the pandemic, as people have been forced to spend more time indoors.

None of this is news to Ubisoft Blue Byte, the maker of such games as *Rainbow Six Siege*, *Beyond Medusa's Gate* and *The Avatar Project*. The German subsidiary of Ubisoft, the world's largest game developer, actually scaled up its three German studios in Berlin, Düsseldorf and Mainz last year, while some businesses were trying to just hold on. Since 2015, Ubisoft has more than doubled its German-based developers to 680, and expects to be up to 1,000 by 2024.

Ubisoft isn't alone. The German Games Industry Association – which represents the computer games industry – reports that its members are quite optimistic about their business prospects, with 70 percent expecting growth in 2021 and 45 percent planning to hire more staff. Not bad considering the pandemic-driven economic downturn. But there is still headroom to grow. "The share of German-based companies' games in the domestic market has hovered below five percent," says the association's managing director Felix Falk. "So there's a clear urgent desire to release the brakes through public game funding and to level the playing field compared to other markets."

Serious commitment to fun

The German government is well aware of the considerable economic clout of an industry devoted to leisure time. Last year, during the

A SHOT IN THE ARM

The German government's new funding program for game developers totals EUR 250 million. It injects EUR 50 million annually in grants to specific projects, covering up to 50 percent of investment.

The definition of a project is wide, including new projects, project segments, expansions of existing projects or prototypes.

The projects are required to pass a "cultural test" as part of the funding application. This set of questions helps the government to assess whether the games serve the ideal of cultural advancement.

In some cases, at least half of the team members must primarily reside in Germany, be taxed there or be otherwise familiar with German culture, for instance, having studied and acquired qualifications in Germany.

Team members must fall under one of the following categories: producer, art director, technical director, leading texter, author, concept developer, composer, sound designer, game designer.

THE BOTTOM LINE

Germany's games market is already the fifth largest in the world. But now, thanks to Brexit, the coronavirus pandemic and government support, this unsaturated sector is all set for unprecedented growth.

second coronavirus wave, which was accompanied by a gaming boom, it launched a five-year program of EUR 50 million in annual subsidies to help game developers. These funds help protect companies against many of the inherent risks that are associated with games development, such as the need to pay fixed salaries between projects in order to retain talent. "The new funding program adds to Germany's strongest selling point of robust growth in an unsaturated market," says Ubisoft Blue Byte Managing Director Benedikt Grindel. "It can help us in scaling up projects from prototype all the way to the production stage, which is otherwise risky."

Germany's biggest gaming competitor in Europe is the UK. But Brexit and the high costs of maintaining studios in London may change that, says Oliver Wilken, GTAI senior manager for the digital economy. "When foreign games companies were considering investing in Europe, they tended to look at London first and then at eastern Europe, where there may be deficiencies in terms of ease of doing business. Germany is now positioning itself as the optimum choice."

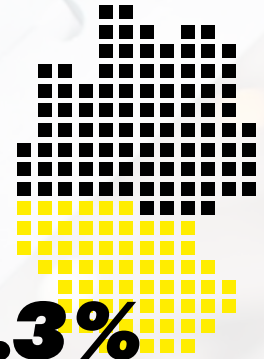
Businesses with international sales and distribution know-how are also in demand since the German games sector is still lacking the business case and marketing experience that can be found in East Asian countries.



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industries expert

FEDERAL REPUBLIC OF GAMING



Germany has **34.3 MILLION GAMERS**, or 41.3 percent of the population. That's roughly equal to the combined populations of the Netherlands, Belgium and Denmark.

Source: German Games Industry Association



THE "CORONA EFFECT" IN HOME ENTERTAINMENT

The German gaming sector is upbeat about its own medium-term prospects. **71 PERCENT** of companies expect business to increase in 2021, while 19 percent predict it will remain stable.

Coronavirus was a major contributor to the 2020 boom.

Source: German Games Industry Association



HIGH UP THE RANKS

Germany's games market is the **BIGGEST IN EUROPE** in terms of revenue of USD 8.53 bn in 2020. Estimates for other countries for 2020: China (USD 40.9 bn), US (USD 36.9 bn), Japan (USD 18.7 bn), South Korea (USD 6.6 bn), UK (USD 5.5 bn), France (USD 4 bn).

Sources: Newzoo; German Games Industry Association

32%

Games market growth in Germany in 2020

Source: German Games Industry Association

A colorful character at gamescom, the world's largest computer games trade fair at the Koelnmesse congress center in Cologne.

MAXIMIZING Minimally Invasive Surgery

The specialist but lucrative German market for minimally invasive surgery is increasingly open to small and medium-sized players from all over the globe. Government support at the national and regional level is boosting this trend.

A s medical technology advances, so do the possibilities of reducing the negative impact of operations on patients. That's caused a shift in a sector that in Germany has been dominated by a few large companies, and opened doors for modestly sized, up-and-coming international firms with a presence in the country.

One case in point is Kardium Inc., a Canadian maker of a catheter-based system for the treatment of atrial fibrillation (AF), the world's most common heart rhythm disorder. It expanded its GLOBAL-AF Clinical Study to Germany in the summer of 2017 by enrolling its first patient at the Leipzig Heart Center. The following year, it made its first local hires at its subsidiary in Dortmund, and by June 2020, Kardium had been authorized to begin commercial sales in Europe.

Investors have been impressed by Kardium's innovative prowess and the potential of its expansion efforts. The company raised EUR 95.5 million (USD 115 million) in December 2020 to provide financing until the company goes public. "Germany is a large innovative market for our electrophysiology catheters thanks to the number of big centers and renowned doctors, who help us implement them and give us the feedback needed for the

THE BOTTOM LINE

Germany has traditionally been a global frontrunner in minimally invasive surgery, but the market is becoming more accessible. International businesses can benefit from a new investment program for hospitals and a trend toward open platforms.

continual improvement of our technologies," says Stefan Avall, Kardium's director of product management. "Given that we are smaller than our competitors, this is particularly important for us, as it helps us to always maintain an innovative edge."

The data gained from Kardium's German clinical trials, he adds, will feed into the devices' application for approval by the American Food and Drug Administration.

Law helps medium-sized players

The widespread cancellation of surgeries amid the coronavirus pandemic has underscored the appeal of minimally invasive procedures. And a new joint investment program by the German national and regional state governments is making the sector accessible to more companies than ever before. The program, launched in January 2021 under the Hospital Future Act, allocates a total of EUR 4.3 billion for hospi-

tals' emergency capacities, digitalization and IT security, and devices used for minimally invasive surgery.

Another key motor in the expansion of the devices sector has been Germany's healthcare reimbursement program, which allots the same fixed repayment for a given intervention to any hospital carrying it out. An additional draw, especially for internationally expanding businesses, is the flexibility of Europe's regulatory system. As is the case with Kardium, this has led companies to use the data they collected during the certification process in Europe as a stepping stone to acquire certification in the United States as well.

Physicians and business intersect

Professor Tobias Keck of the University Medical Center Schleswig-Holstein (UKSH), one of Germany's three excellence centers for minimally invasive surgery, says that clinical implementation of minimally invasive surgery systems requires constant close contact between manufacturers and the doctors using their equipment.

Visceral surgery systems, he predicts, will enjoy robust market growth, with thousands of systems in the pipeline and expected to enter the German market by 2027. While the device

sector has traditionally been dominated by industry giants like Johnson & Johnson, the trend toward open platforms is now creating opportunities for smaller suppliers, including those from outside the medical realm.

“There are big new open platform projects being developed, which present ample opportunities for the broader robotics supply chain, such as optics, imaging and instrument control,” says Professor Keck. “Another factor opening up the market is that more German hospitals see minimally invasive surgery systems as an important competitive factor – not only university hospitals but hospitals of all sorts. A good example is prostate surgery, which today’s hospitals need to attract enough patients.”

Keck advises potential suppliers to identify solutions they could add to the open systems and to craft sophisticated training and implementation concepts. With the advent of powerful simulation software, the need to implement local training programs no longer necessarily translates into a competitive disadvantage for non-German companies, he explains.

Free assistance available

Germany Trade & Invest (GTAI) has been actively assisting Kardium’s entry into the German market, offering help, for example, in navigating the complex regulatory environment and understanding the German disbursement program. In this regard, Kardium has benefited from Germany’s diagnosis-related groups

(DRG) browser, which allows companies to access reimbursement rates and surgery data, such as the number of interventions.

“Public availability of the relevant data is something many other countries lack,” says Gabriel Flemming, GTAI healthcare senior manager. “For investors, be it domestic or foreign, the significance of the DRG browser cannot be overestimated, as it greatly helps in crafting business plans and minimizing risks.”



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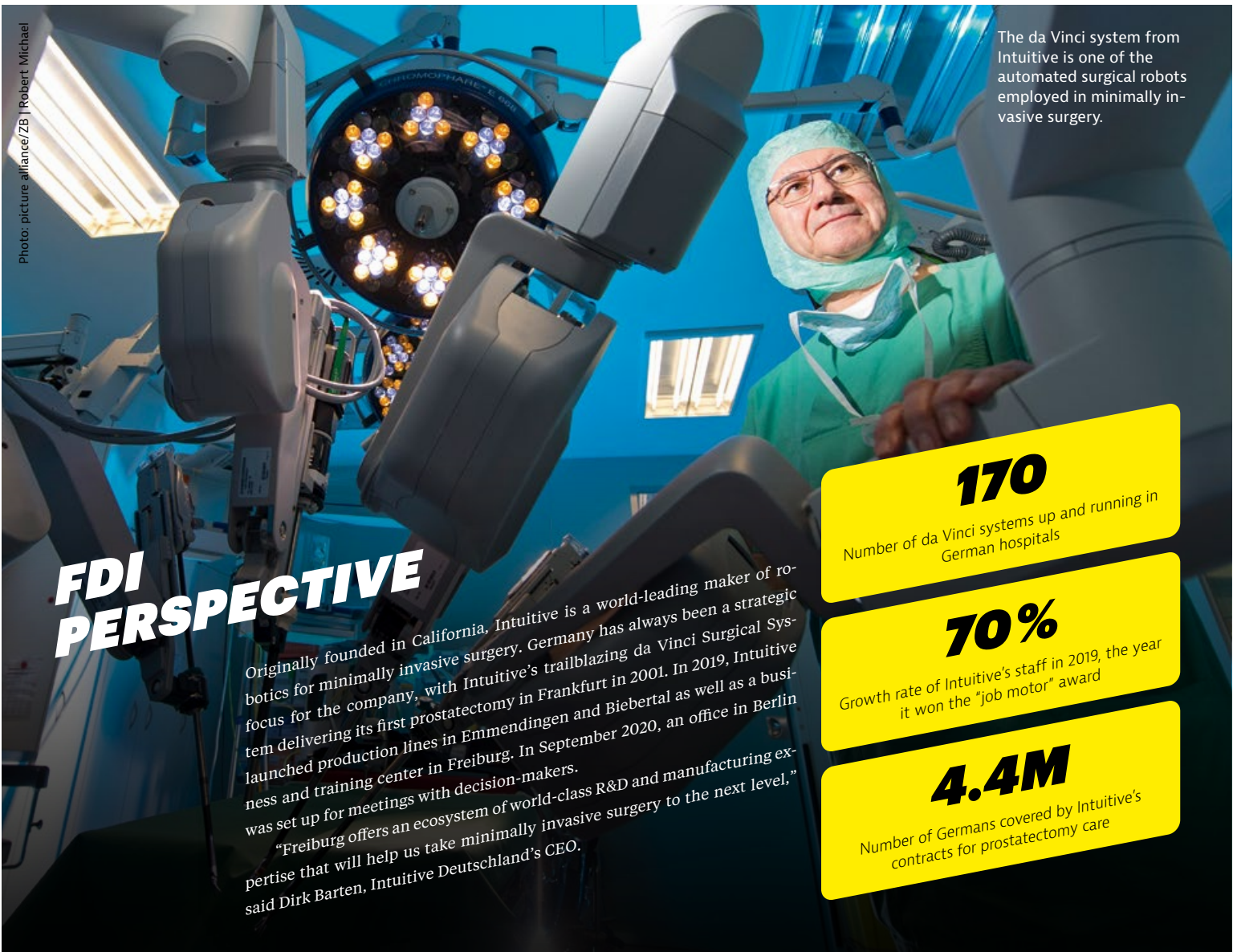


Photo: picture alliance/ZB | Robert Michael

The da Vinci system from Intuitive is one of the automated surgical robots employed in minimally invasive surgery.

FDI PERSPECTIVE

Originally founded in California, Intuitive is a world-leading maker of robotics for minimally invasive surgery. Germany has always been a strategic focus for the company, with Intuitive’s trailblazing da Vinci Surgical System delivering its first prostatectomy in Frankfurt in 2001. In 2019, Intuitive launched production lines in Emmendingen and Biebertal as well as a business and training center in Freiburg. In September 2020, an office in Berlin was set up for meetings with decision-makers.

“Freiburg offers an ecosystem of world-class R&D and manufacturing expertise that will help us take minimally invasive surgery to the next level,” said Dirk Barten, Intuitive Deutschland’s CEO.

170
 Number of da Vinci systems up and running in German hospitals

70%
 Growth rate of Intuitive’s staff in 2019, the year it won the “job motor” award

4.4M
 Number of Germans covered by Intuitive’s contracts for prostatectomy care

PROFITS from Industrial Smokestacks

The global environmental focus is on reducing greenhouse gas emissions. But a forward-looking initiative from the Fraunhofer Institute and steel manufacturer thyssenkrupp is investigating how to use CO₂ as a raw material.

Carbon2Chem is one of a handful of research projects currently underway in Germany that aim to capture otherwise harmful, industrial, gaseous emissions and convert them into high-value chemicals. Carbon dioxide (CO₂) that would usually be released into the atmosphere as waste is a potentially valuable raw material that has a range of applications.

“It’s actually more of a systems approach than a single technology,” explains Professor Gorge Deerberg, deputy director of the Fraunhofer Institute for Environmental, Safety, and Energy Technology (UMSICHT). “We have some applications right now in the lab and in our pilot plant.”

THE BOTTOM LINE

Carbon dioxide could soon partially replace crude oil and be used as a raw material to produce fuels and high-value chemicals.

Researchers in Germany are working on developing economically viable catalytic processes to do so.

Supported by the national government and no less than 17 commercial and research partners, Carbon2Chem is a prime example of the potential for companies with solutions to help heavy industry move toward a more environmentally friendly future. The project’s main target is to capture and clean CO₂ emissions from industries ranging from steelmaking and concrete production to waste incineration.

The steel industry alone creates about 20 million tons of gaseous emissions every year, according to the German Ministry of Education and Research. That’s the equivalent of 10 percent of the combined emissions from all

German industrial and manufacturing processes. Deerberg and his team have been working with a number of German companies on the pilot project in Duisburg since 2019, although the project first launched in 2016. The research group is using a mill from German steelmaker thyssenkrupp to test out its ideas in a real, industrial setting.

Powered by public millions

Carbon2Chem is now in its second phase, which runs through 2024 and looks at how its ideas can be commercialized. The Ministry of Education and Research is backing the second stage with a EUR 75 million subsidy after supporting the first phase with a EUR 60 million grant. An additional private sector investment of EUR 1 billion will also be needed before the concept reaches commercial viability.

“We’re already seeing global interest in this technology,” thyssenkrupp CFO Klaus Keysberg said at the announcement of the second subsidy. “By extending the public support, the collaborative project can now be developed up to commercial viability. We want to start using Carbon2Chem in just a few years’ time.”

Emissions from steel production also contain nitrogen and hydrogen as well as carbon dioxide. All can be captured and converted into the chemical precursors needed to produce substances like methanol or ammonia. In this way, a resource that would otherwise “go up in smoke” through chimneys can be used to make fuels, fertilizers and plastics, as initial trials have shown.

Link to green hydrogen

Hydrogen (H₂), generated via electrolysis, is needed to produce some valuable chemicals from CO₂, so thyssenkrupp has built an electrolysis pilot plant next to the Duisburg steel mill. The plant produces hydrogen from water primarily powered by wind energy. The hydrogen is not only used in the Carbon2Chem research but also in an independent project to introduce this “green hydrogen” as a substitute for H₂ produced from natural gas by steam reforming in steel production.

The process is technologically challenging, however, and still requires additional research and testing. Emissions must first be captured and then separated and cleaned before they



“THE RIGHT CHEMISTRY”

Interview with Professor Grge Deerberg, deputy director of the Fraunhofer UMSICHT research institute

What technological hurdles still need to be overcome before Carbon2Chem can be integrated into heavy industry?

Basically, three essential aspects play a big role. The first is the provision and purification of the corresponding raw material gases. Of course, they can’t be used directly to make chemicals. First, they have to be purified and conditioned. In other words, the right conditions have to be set up so that they can be used in a chemical stage. This is a technological issue that can be addressed with gas purification and appropriate processes. Another aspect that plays a major role here is synthesis: the catalytic processes that then convert this gas into marketable products.

Can you tell us more about this synthesizing process?

In principle, these processes already exist on a large scale. That’s why we’re quite confident that we’ll be able to implement our ideas in a very short time. But you also have to adapt these new gases to a new raw materials basis. Many of the processes we are talking about here operate on a natural gas basis today, and we now have to switch over to a CO₂ basis, indeed to a carbon mixture. That’s what comes, for example, from the steel or cement plant. And this is still a technical and logical challenge: manufacturing economical and high-quality products.

And the third aspect you mentioned?

The third aspect are the dynamics. Right now, chemical production goes on continuously and statically. That is, it always runs the same around the clock because fuel, i.e. natural gas or crude oil, is continuously available. In our process that will change. Carbon dioxide won’t always be available in the same quantity, nor will it always be of the same quality. The processes have to be adapted accordingly to deal with these dynamics and this volatility. Those are the scientific and technical challenges. And a final challenge is, of course, that sufficient renewable energy has to be available to run these processes. Because if we do this with a conventional carbon-based or fossil energy supply, then nothing is actually gained in the end.

can be processed into useful chemicals. The capture itself requires extra energy, which researchers hope will also come from renewable resources. Traditionally, it’s been more economical for heavy industry to use fossil fuels, but that is changing as carbon taxes become more prevalent and environmental technologies more advanced.

“At the moment, crude oil and natural gas are simply still far too cheap, and the subsequent environmental costs of using crude oil and natural gas aren’t factored in at all,” says Deerberg. “The new technology becomes interesting economically the moment carbon emissions are associated with costs.”

Plenty of industrial opportunities

Although the partners are currently focused on the one steel plant in Duisburg, experts say about 50 steel-producing facilities around the world could benefit from the technology as it matures and becomes more widespread over the next 15 years. Furthermore, it could be adapted for use in other types of plants. So Carbon2Chem could become yet another environmental technology that Germany exports around the world.

The Carbon2Chem process does create some new hurdles for heavy industry. Steel producers traditionally use the combustible part of emissions from their furnaces in order to produce energy for own processes. Nonetheless, energy experts agree that using combustible emissions for energy generation is inefficient, however economical it might appear in the short term.

In the context of a holistic life-cycle assessment, if companies are subject to a carbon dioxide tax at some point in the near future, it may become more profitable for them to use the combustible exhaust gases as a raw material for fuels and chemicals. So, these sorts of technologies are likely to attract more attention from investors, both domestic and foreign, in the years to come.



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SINO-GERMAN SUCCESS

“The similarities between German and Chinese Greenfield investors often outweigh the differences” – that’s the conclusion drawn by Dennis Wilkens, Germany Trade & Invest’s China director. And that’s why lots of Chinese companies are setting up shop in Germany.



You’ve lived in Beijing for quite some time. What’s your impression of it?

DENNIS WILKENS: Beijing offers a unique combination of tradition and modernity and is home to many top Chinese cultural sites such as the Forbidden City and the Great Wall. But I’m also fascinated by the lightning-quick, high-tech developments, for example in the Zhongguancun district. In the past four years, USD 131 billion has been invested in Beijing tech start-ups. That’s impressive even when compared with Silicon Valley. China now leads the world in unicorns. The development since 1999, when I first came here, has been overwhelming.

In your experience, are Chinese investors different from German or other international ones?

WILKENS: Actually, the similarities between German and Chinese Greenfield investors often outweigh the differences. Both value stable business environments, in order to make long-term investments. And another commonality is both believe that a good professional network on the ground is important for successful long-term business development.

How do Chinese firms use the services offered by Germany Trade & Invest?

WILKENS: Businesspeople in China appreciate that they can contact our investment team in Beijing and get quality information in Chinese about how to make a greenfield investment in



DENNIS WILKENS

朱德威

*Your contact
in Beijing*

Before becoming GTAI’s China director, Dennis Wilkens helped German and Chinese medical technology companies expand in both directions. Previously, he was the head of the Industry and Technology department at the AHK Greater China (German Chambers of Commerce Worldwide Network).

Germany. That’s reflected, we believe, in the large number of projects we’ve been involved in. We direct our clients to local economic assistance in Germany, help them find the right location and even introduce them to strategic partners if necessary, for example local suppliers for setting up manufacturing in Germany.

What are the main business opportunities right now and in the near future?

WILKENS: Chinese companies have achieved global success in future markets such as life sciences, digital infrastructure, new forms of mobility and renewable energies. These are

also dynamic markets in Germany, and so there are many opportunities for crossover. In 2020, for example, there were more than 5,400 companies of Chinese origin in Germany with more than 100,000 employees.

We expect Chinese companies’ interest in greenfield investment in Germany to continue. The good business environment in Germany generates promising Greenfield investment opportunities. The industrial sectors that are particularly attractive are in the areas of innovative, climate-friendly mobility and energy storage solutions. There are also excellent opportunities for Greenfield investments in automation technology, digital infrastructure and robotics because there are so many industrial customers in Germany.

Germany is open to Greenfield investments from China, particularly at the moment in the area of life sciences. With that in mind, we’re planning to increase our focus and activities in e-health, pharma, biotech and medtech, and are planning a roadshow with our Chinese partners and trade associations. We warmly extend an invitation to make contact with us to any companies in the life sciences area who are considering expanding to Germany.

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How Germany Works

VOCATIONAL TRAINING SYSTEM

Germany's dual training system is the foundation of the country's broad vocational skills base and professional prowess and is the

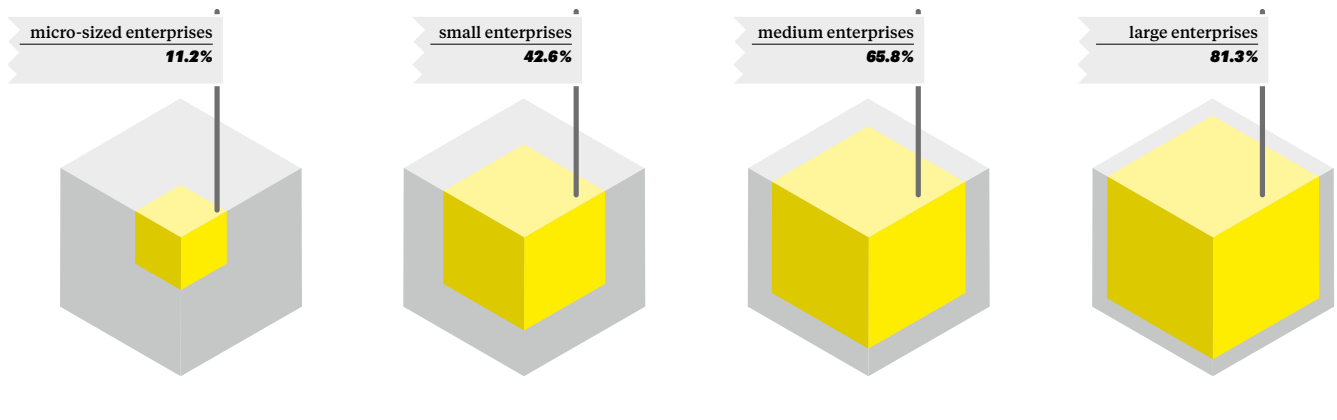
reason for low youth unemployment. After completing secondary education, students can opt for a career in one of around 330

apprenticed professions. They are typically taught theory in vocational schools for one day a week and work embedded in

real business enterprises, from large corporations to small and medium-sized local companies, for the rest of the week.

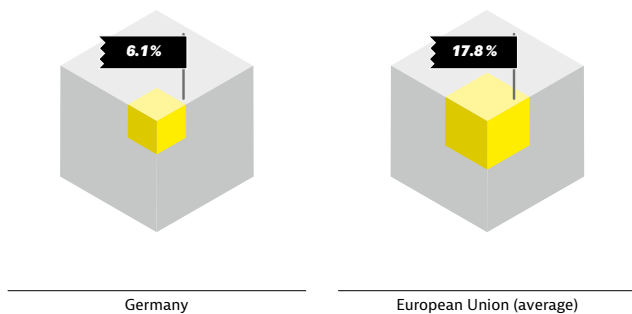
POPULAR WITH ENTERPRISES

Share of enterprises in Germany participating in the dual training system



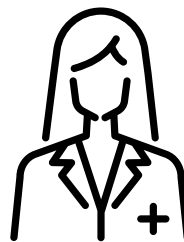
LOW YOUTH UNEMPLOYMENT

Germany's dual training system results in low youth unemployment.

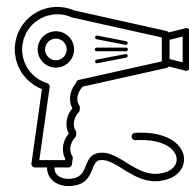


MULTIPLE CAREER PATHS

The occupations requiring formal training in Germany range from doctor's assistant to hairdresser.



Doctor's assistant



Hairdresser

50%

Share of school leavers in Germany who undergo vocational training in the dual training system

71.3%

Share of trainees in Germany who are "very satisfied" with their training program

SAFEGUARDING THE SYSTEM DURING THE PANDEMIC

On August 1, 2020, the German government implemented the "Securing Apprenticeship Places" program for small and medium-sized companies. Running until the end of 2021, the program includes supporting measures totaling EUR 500 million. Among the benefits is a EUR 2,000 bonus for companies that leave their trainee headcount untouched despite being hit hard by the pandemic.

At your service!

SET UP BUSINESS IN GERMANY

Want to be part of Europe's largest market? We're your first point of contact. **Germany Trade & Invest** (GTAI) provides potential investors with free, reliable information on the latest opportunities and risks in the German market.

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- Market entry strategy support
- Individually tailored tax and legal information, e.g. on company establishment, labor law and visa options
- Recommendations concerning financing & funding opportunities
- Project partner identification and contact (location and financial)
- Site identification, site visit support

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STARTED IN
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