


MARKETS

GERMANY

1/20



Sierra Nevada is reviving production of the Dornier 328 short-haul passenger aircraft in Germany.

HEAVY IN LIGHTWEIGHT

Germany is a world leader in *Leichtbau*, or lightweight construction. And that is generating opportunities and innovation in engineering, materials technology, design and services.

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Chemical Industry:

The German chemicals sector is putting billions into R&D

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Germany's travel sector is the biggest and most competitive in Europe

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Music Tech:

Music technology is thriving in Germany and looking for seed investors

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FOCUS

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How lightweight technologies are changing the fabric of engineering, manufacturing and construction
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TRANSPORT

All Aboard

Deutsche Bahn's modernization drive is opening up Germany's railway industry.
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CHEMICALS



Chemical Attraction

Germany excels at producing basic chemicals efficiently, which is why the sector is so profitable. But it still has a few new tricks up its sleeve.
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on the basis of a decision
by the German Bundestag



»The need to transport people and things sustainably is perhaps the most pressing issue of our times.«

Dear Reader,

We live in fast-moving times, and this issue of *Markets Germany* is all about motion. The need to transport people and things sustainably is perhaps the most pressing issue of the age. Here, German lightweight engineering will play a vital role. Making things lighter means we expend fewer resources moving them, and German engineers are working on everything from lightweight carbon-fiber air taxis to cardboard automotive parts to this end.

Travel and tourism represent another form of mobility. After all, Germany is Europe's largest market for travel at source – worth almost EUR 60 billion in 2017. But there's still lots of room for growth, as the online share of bookings increases and the demand for instant trip planning expands. One new company trying to meet this demand is Omio, which was founded in 2013 in Berlin as GoEuro by Indian entrepreneur Naren Shaam. It's recently become one of Germany's tech unicorns.

Finally, there are movements in the musical sense. Germany is famous for its music technology – everything from traditional instruments to digital innovations, including the MP3. German audio software is used on nearly every Hollywood soundtrack, while musicians the world over plug into state-of-the-art German amplifiers. So put on your favorite CD, or stream, and sit back and enjoy this mobile issue of *Markets Germany*.

Dr. Robert Hermann, CEO
Email: invest@gtai.com

ONE TO WATCH

Photo: Freshworks/PR/Maisberger.com



Girish Mathrubootham, CEO of Freshworks

"I'm the kind of person who learns by doing," says Girish Mathrubootham, CEO of Freshworks, which provides a broad range of simple-to-use business software. When he first launched Freshdesk in Chennai, India in 2011, he acquired six international customers within a fortnight. "They found us! We were tapping into existing demand," he beams. Eight years on, the tech unicorn he cofounded is worth USD 1.5 billion.

Mathrubootham set up his first venture, a Java training company, in 1999, and went on to build helpdesk systems and work as VP of product development for Zoho. The idea for a new venture came when he was shipping his belongings from Texas back to India, and his expensive LCD TV got broken in transit. After

many futile hours trying to claim insurance, he started sharing his experience in a forum ("I wanted justice or revenge!"). Within a day, he had an apology from the company's president. Something clicked: "I saw that the power had shifted to the user. I decided to build a fresh helpdesk product." Unlike most U.S. companies, Freshworks is as big in Europe as it is in the States. In 2016, it set up its European HQ in Berlin to go "deeper and wider" in the region. He chose Berlin "because of the talent pool" and the "relatively low costs." Mathrubootham is mainly based in the U.S., but he is constantly traveling. "It's fantastic to see how the company changes every six months – it's like a baby growing up, or a beast that you can't understand," he says.

Quick facts

Name Girish Mathrubootham

Age 44

Nationality Indian

Company name Freshworks

Founded 2010

Based in USA

Industry Software as a Service

Value EUR 1.35 billion



www.freshworks.com



Engineers work on the Lilium jet. The flying taxi's lightweight carbon fiber hull is essential for achieving electric-powered vertical takeoffs and landings. Where there are moving parts or mass needs to be transported, the rule is: the lighter the better.



Going Heavy in Lightweight

Germany's expertise in lightweight engineering, design and services is generating exciting new opportunities and innovations in manufacturing, construction and other industries.

The Lillium jet is ready and requesting takeoff. A man standing in a field in southern Bavaria gets the "OK" on his radio and fires up the electric engines. The sleek aircraft's wings are fitted out with 36 small ducted fans and 12 flaps that allow for vertical takeoff and landing – just like a helicopter but without the dangerous blades. The flying taxi achieves a velocity of 100kmh before landing safely.

The successful test flight in October 2019 was a momentous achievement for Lillium. Founded in 2015 near Munich, the start-up aims to offer aeromobility for all by creating a network of air taxi hubs. Its five-seater air taxis, designed to fly autonomously, are made possible thanks to lightweight technologies.

Germany has become a heavyweight when it comes to lightweight technologies. *Leichtbau*, as it's known in German, is an innovative branch that includes engineering, materials technology, design and services. The principles of lightweight technologies can provide substantial benefits

across a range of industries, from aerospace to construction to robotics. Anywhere efficiency can be improved by reducing overall mass, you will find lightweight tech making an impact.

»I think we're approaching a renaissance in the lightweight industries.«

*Dr. Rainer Müller,
senior manager of lightweight
technologies at GTAI*

Lightweighting can trigger a butterfly effect through all levels of the supply chain. If you make the moving parts in a machine lighter, the engines and gears can also be made

smaller, which saves energy during operation and money for the operator. Liliium's lightweight carbon fiber hull is essential for achieving electric-powered vertical takeoffs and landings. But it also obeys the general rule: the lighter the better.

A culture of innovation

Germany is a world leader in lightweight industries thanks to its great engineering tradition and because of the specialized companies and research institutes concentrated there. "Germany has the infrastructure and the experts in material design and technology to drive the Fourth Industrial Revolution," says Dr. Rainer Müller, senior manager of lightweight technologies at GTAI. "You can't create that from scratch – you've got to already have a tradition of engineering to be able to serve new industries."

Liliium is one of many companies around the world that are rushing to create a flying taxi, but few have actually completed a successful test flight. The company's location is strategic. Its founders met at the Technical University of Munich and decided to stay in Bavaria: "It made sense to remain here as the aerospace supply chain is strong throughout central Europe, and there's a strong manufacturing base," says spokesman Oliver Walker-Jones. The company is building the first of two factories that will employ hundreds of people once production is in full



Werner Loscheider »The Lightweight Initiative serves as a central contact point.«

Werner Loscheider is the head of the division that looks after construction, lightweight construction/new materials, and resource efficiency at the Federal Ministry for Economic Affairs and Energy (BMWi).

How did the Lightweighting Initiative come about?

The Federal Ministry for Economic Affairs and Energy supports a cross-technology and efficient transfer of expertise between the various lightweighting stakeholders in Germany. The Lightweighting Initiative serves as a central contact point for German businesses. As the head of the division "Construction Industry, Lightweight Construction/New Materials, Resource Efficiency," I'm responsible for the Lightweighting Initiative. With a view to bringing together all the activities relating to this field, the Federal Ministry for Economic Affairs and Energy has set up the Lightweighting Initiative Coordination Office in Berlin. Part of the Lightweighting Initiative, the Coordination Office, financed by our Ministry, is a national and international networking hub and assists German businesses, particularly medium-sized companies, as they implement lightweighting in their operations.

What does Germany need to do to further develop its ecosystem of lightweight products and services?

In 2020, the Federal Ministry for Economic Affairs and Energy plans to launch a technology transfer program for lightweighting. This funding program promotes cross-branch and cross-material knowledge and technology transfer concerning broad life-cycle assessment. It is a logical continuation of the already successfully established Lightweighting Initiative of the Federal Ministry of Economic Affairs and Energy and aims to bring lightweighting into a broad range of industrial applications, as has been described above.



The full interview:
www.marketsgermany.com

swing. Liliium aims to have its flying taxi hubs operational by 2025.

The strong supply chain was also a reason for U.S. aerospace giant Sierra Nevada Corporation to select Germany as the location for renewing production of the Dornier 328 passenger plane. The EUR 400 million investment will create the first new aerospace production facility in the former East Germany since the fall of the Berlin Wall. → **Taking Off in Eastern Germany, page 8**

Building new foundations

"I think we're approaching a renaissance in the lightweight industries," GTAI's Rainer Müller says. "It's not just about carbon composites. It's also about high-performing metals and computer-driven materials research."

Architecture also benefits from lightweight engineering's ability to lower mass while maintaining strength. Reducing the weight of a ceiling, for example, makes it possible to redesign columns and walls because they need to support less weight. Considering all the intricate interdependencies and possibilities requires digital tools for planning and simulation. These types of calculations are too complex to be done with paper and pencil. → **The Fourth Industrial Revolution, page 10**

Researchers at the University of Stuttgart's Institute for Computational Design

FACTS & FIGURES

German aerospace renaissance

and Construction (ICD) create experimental architecture projects, often inspired by nature and using robotic construction methods. The structures that the researchers are building might seem fanciful today, but the techniques and materials could one day become commonplace.

ICD researchers cooperated with local company FibR to create a pavilion for the 2019 Bundesgartenschau, a biennial German horticulture show. It was produced by two robotic arms spinning 150,000m of glass and carbon fibers. The resulting lightweight but sturdy structure was then covered by an ETFE (Ethylene Tetrafluoroethylene) membrane that's both waterproof and recyclable. The finished pavilion looked like a futuristic circus tent, both alien and organic.

"I think that the sector of architecture and lightweight construction will grow because we are faced with the challenge of creating more housing and living space in cities for more and more people with fewer resources," says Dr. Wolfgang Seeliger, managing director of Leichtbau BW GmbH, Baden-Württemberg's development agency for lightweight innovation. "Lightweighting is the only way to cope with these challenges."

Regional strengths

It's no fluke that so many *Leichtbau* specialists can be found in southern Germany. Baden-Württemberg and Bavaria are renowned for their auto industries, which are currently facing the challenges of the shift to electric mobility. "One will find all stages of the value creation process here, from product concepts and designing methods to simulation and manufacturing," explains Seeliger. "Customers from abroad often ask for solutions to reduce the costs of lightweighting, or they want to benefit from German manufacturing excellence when it comes to criteria like quality or process stability."

Keeping weight down is of the utmost importance for electric vehicles. A lower weight will increase a car's range without any increases in the size of its battery, which is not only expensive but adds additional weight.

€400m

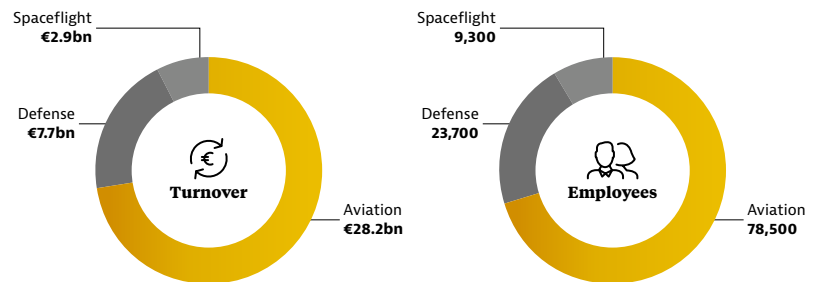
The investment by the U.S. aerospace giant Sierra Nevada Corp. in Germany to produce the Dornier 328¹⁾

€28.2bn

The total aviation turnover in Germany in 2018, not including spaceflight and defense²⁾

Exports flying high

Germany's Aerospace Industry³⁾



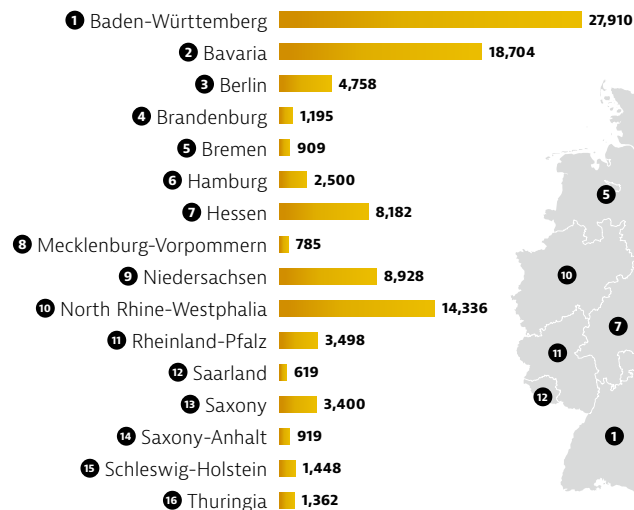
76%

The share of exports out of the total turnover of the aerospace industry in 2018



RESEARCH & DEVELOPMENT

Aviation R&D expenditure by federal state in 2017 (in EUR million)⁴⁾



1) Source: Sierra Nevada Corp.; 2) Source: BDLI (German Aerospace Industries Association); 3) Source: BDLI; 4) Source: Federal Statistical Office

Using components made of hybrid plastic-metals or carbon composites can drastically reduce a vehicle's overall mass.

Auto companies are looking ahead to the not-too-distant future when autonomous vehicles will be commonplace. "A car needs a lot of sensors and systems to be able to drive alone," says Seeliger. "And since, for safety reasons, many systems must be available redundantly in the vehicle, we can expect that the weight of a car will rise. By using lightweighting, you can compensate for the weight gain."

Optimizing manufacturing

Although automobility and aerospace are the industries that most obviously gain from new lightweighting technologies, traditional manufacturing will also reap benefits. Digitalization is revolutionizing traditional production methods in what's been termed *Industrie 4.0* in Germany – the Fourth Industrial Revolution. The possibilities presented by a fully-digitalized factory – one that takes full advantage of innovative materials, artificial intelligence and computer-aided design – are yet to be realized.

In the case of Bahmüller, a family-owned mechanical engineering firm, the company used lightweight engineering to reduce the mass of a corrugated cardboard processing machine. They found that the carriage that moved the product batch through the machine during the operational cycle was the part with the greatest potential to optimize the machine's functionality. Reducing the carriage weight led to being able to reduce the weight of the mounting frame as well (the frame had to meet specific requirements of strength and stiffness in order to absorb the machine's vibrations). By reducing the moving mass in the machine, the amount of vibrations were reduced as well. Overall, Bahmüller was able to reduce the mass of the machine by 50 percent, while saving 25 percent on the cost of building it and 40 percent on energy use.

In Stuttgart, the Fraunhofer Institute for Manufacturing Engineering and Automation (IPA) has developed a processing machine that can not only mill carbon fiber-reinforced plastics (CFRP) but also perform the post-processing. Cutting back on manual labor allows for post-processing savings of up to 50 percent and protects workers from harmful dust.

Carbon fiber-reinforced plastics are as stable as steel but eight times lighter. However, the manufacturing and processing costs of CFRP components have remained high because of the manual work required. Operators have to take freshly milled components from the machine, remove protruding fibers, and clean the items before sealing the edges.

The new machine developed by Fraunhofer IPA and its industrial partners solves this problem. When a near-net-shape CFRP component is fed into the machine, it is milled into the desired shape. A brush then removes all the protruding fibers, and nozzles blow the fine dust into an exhaust system. A sensor uses strip light projection to check the CFRP workpiece for defects. If all measurements are within the tolerance range, the processing machine seals the edges with a liquid lacquer cured with ultraviolet light, and the component is ready. The system isn't just limited to CFRP projects — it can also mill, finish and paint wood, aluminum or metal components.

MADE IN GERMANY

Taking Off in Eastern Germany

The Sierra Nevada Corporation chose Saxony for a EUR 400 million investment to build short-haul passenger aircraft.

Classic German model revived

Nearly two decades after the celebrated German aircraft maker Dornier closed its doors, U.S. aerospace company Sierra Nevada Corp. is reviving production of the Dornier 328 short-haul passenger aircraft. And they're doing it in Germany.

After an intensive site selection process, 328 Support Services GmbH, a wholly owned subsidiary of Sierra Nevada Corp., chose Germany as the location for its EUR 400 million investment. The new original equipment manufacturer DRA GmbH will produce the D328NEU passenger aircraft at Leipzig/Halle Airport in Saxony, creating up to 250 jobs. An additional 100 jobs will be added at 328 Support Services' headquarters at the Oberpaffenhofen Airport near Munich.

Reenergizing aircraft construction

The DRA GmbH project represents the first new production facility in the east since the end of aircraft construction in the former East Germany. "Germany's return to the design and building of a Part 25 category com-

mercial aircraft is long overdue, and the new operation intends to create an aviation legacy founded on the heritage of aircraft pioneers," says Dave Jackson, managing director of 328 Support Services GmbH. More details on the project will be released in early 2020. The D328NEU will have new engines, a new cockpit and a slightly extended fuselage that will be able to accommodate 39 passengers, up from the current 32. New propellers will make the D328NEU more fuel-efficient and quieter but preserve "the DNA and reliability of the Dornier 328," according to DRA.

Buying into history

Dornier Flugzeugwerke was a pioneer of German aviation. Founded in 1914, it became part of Daimler-Benz in 1985 and was acquired by Fairchild Aviation in 1996 before the company's insolvency in 2002. To continue supporting the aircraft – 180 of which are still in service – 328 Support Services purchased the assets for the plane in 2005. Sierra Nevada Corp. acquired the company in 2015.

→ See also picture on the right

Schkeuditz, Saxony on August 21, 2019: German Economy Minister Peter Altmaier, Transport Minister Andreas Scheuer, Chancellor Angela Merkel, Eren Ozmen, owner of Sierra Nevada Corp., and Michael Kretschmer, state premier of Saxony, stand in front of a Dornier 328 aircraft at the start of the first national aviation conference at Leipzig/Halle Airport. The conference focused on how the German aviation industry could become more competitive while becoming more environmentally friendly.

Photo: picture alliance/Jan Woitas/dpa-Zentralbild/dpa



AUTOMOTIVE INDUSTRY

€422.8bn

Total turnover of the German auto industry in 2017 (up 4% on the previous year)

820,200

Employees working within the German auto industry in 2017 (up 1% on the previous year)

Source: 2017, VDA (German Association of the Automotive Industry)

Looking to the future

Unsurprisingly perhaps, more and more international companies are investing in German engineering. In November, Elon Musk announced plans to locate Tesla's fourth Gigafactory for producing its electric cars, batteries and motors in Grünheide, Brandenburg, an hour southeast of Berlin. The multi-billion-euro Gigafactory should create 3,000 new jobs when the facility opens in 2021, and up to 8,000 when it is fully operational.

Musk had been searching for a European location for Tesla for years. Analysts suspected that it might end up in Germany because of its strong auto supply chain. "Germany builds great cars," Tesla's CEO Musk said at an awards ceremony in Berlin shortly before the Gigafactory was announced.

Tesla already had a German connection – it has sourced parts from ElringKlinger, an automotive supplier specializing in lightweight components, for years. Now ElringKlinger will also supply the cockpit cross-car beams for Tesla's new SUV Y series produced in California. The company uses hydroforming and injection molding in a single step to produce lightweight, hybrid, plastic-metal components with both high dimensional accuracy and structural strength.

Lightweight construction solutions could also determine Germany's future competitiveness when it comes to wind power. Most windmill rotor blades are currently made of fiberglass composites. The bigger the blades, the greater the energy output.



Plattform Industrie 4.0

The Fourth Industrial Revolution

Germany's Plattform Industrie 4.0 is one of the largest associations in the world focusing on the changes that will arise from digitalization and automation.

The Fourth Industrial Revolution (Industrie 4.0) refers to the advances that are sweeping industry as automation is combined with digitalization and big data. Germany's Plattform Industrie 4.0 is driving the digital transformation of industry. Members share best practices, use cases and ideas for international standardization.

Supported by Germany's Ministry for Economic Affairs and Energy and the Ministry of Education and Research, the association brings together companies, associations, trade unions, politics and science to work on concepts, recommendations for action, implementation projects and support for small and medium-sized enterprises (SMEs).

"Lightweighting is a game-changer technology. It is now possible to reduce the time to market, optimize processes and design better products to stay one step ahead of the competitors," says Dr. Wolfgang Seeliger, MD of Leichtbau BW GmbH, Baden-Württemberg's development agency for lightweight innovation.

Engineers and designers are able to make innovations more quickly than ever before. "The complex simulations and feedback loops that lightweight design requires depend on digitalization," Seeliger says. "A fully digitalized process chain can leverage the entire optimization potential during the product development – especially if lightweight technology has been taken into account from the beginning of the process." This makes it possible to achieve, for example, 20 iteration loops in as little as two days, rather than just three iterations in six weeks.

Plattform Industrie 4.0's mission statement for 2030 focuses on interoperability, sustainability and autonomy. It's a common vision of how businesses in Germany, Europe and the world can help upgrade the social market economy for the digital age. And it lays the groundwork for Germany's all-important SMEs to digitally network with each other to reinvent their businesses as B2B services.

A futuristic circus tent which feels simultaneously alien and organic. ICD researchers cooperated with local company FibR to create a pavilion for the 2019 *Bundesgartenschau*. Two robotic arms spun a structure made from 150,000m of glass and carbon fibers.



→ Wind turbines have become a major product for carbon fiber-reinforced plastics manufacturers, with rotor blades measuring up to 90m being made. They need to be lightweight – not only to achieve maximum performance and aerodynamic efficiency but to make transportation and installation easier as well.

»Lightweighting is a game-changer technology.«

Dr. Wolfgang Seeliger,
managing director of Leichtbau BW GmbH

Industry leaders are waiting with baited breath to see what can be achieved when additive manufacturing is combined with lightweight technologies. 3D-printing technologies already reduce waste, cost and energy use compared to traditional manufacturing. The potential for experimental structures and extreme lightweighting is still being explored.

Because lightweight technologies are so diverse and affect so many industries, getting an overview of the entire ecosystem is a challenge. But Germany's Federal Ministry for Economic Affairs and Energy hopes to make those connections easier with its *Initiative Leichtbau*, the Lightweighting Initiative. → See Q&A with **Werner Loscheider**, page 6

The first ever lightweight-focused trade show, LightCon, will take place in Hannover in June 2020. It's organized by Deutsche Messe AG with Composites United as technical partner. All materials – from carbon composites to high-performance metals to

wood – will be represented, and the program includes product lifecycle and the possibilities for reducing environmental impact.

“Our network started looking into recycling opportunities and applying methods to reduce and reuse materials quite early on,” Composites United CEO Gunnar Merz says. “In the case of hybrid materials, you can only address recycling by getting all the partners together.” That kind of collaboration will hopefully continue all year round. Composites United regularly arranges tours of German facilities for overseas visitors and

international tours for German delegations. “International cooperation is very important in this innovative field,” Merz says. “It's hard to implement the newest developments when you do it alone.”



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INDUSTRY GROWTH AREAS

Future-oriented Leichtbau applications

Aerospace



Flying taxis

The Lilium jet, powered by 36 small electric engines encased in a lightweight, carbon fiber hull, has reduced noise and vibrations compared to a traditional helicopter.

Automotive



Plastic components

Every kilogram counts when it comes to building a car – ElringKlinger has developed cockpit cross-car beams made of polymer-metal hybrids that are lightweight but strong.

Construction



Aluminum scaffolding

Tobler's MATO aluminum scaffolding systems, adaptable to any shape of construction project, can save up to 50% of the time of erecting normal heavyweight scaffolding.

Medical Technology



Carbon prosthetics

Using carbon fiber construction, Ottobock's Terion K2 prosthetic foot can support a person weighing up to 175kg while itself weighing just 325g.

Germany Trade & Invest news

Happy Birthday, GTAI!

2019 marked the tenth anniversary of the founding of Germany Trade & Invest (GTAI). To commemorate the occasion, Germany's agency for promoting business investment to and from the country threw a two-day party with friends, partners and stakeholders in Berlin, one of GTAI's two locations in Germany. GTAI Chairman/CEO Dr. Jürgen Friedrich opened the event on October 14, before a keynote speech by the director of the German Economic Institute, Michael Hüther, on "Global Markets – Challenges and Chances." Economy Ministry State Secretary Claudia Dörr-Voss held a second keynote address that evening. Other lectures and panel discussions tackled topics ranging from Africa and artificial intelligence to open markets, energy and digital infrastructure, and marketing Britain in the age of Brexit. In conclusion, GTAI CEO Dr. Robert Hermann introduced their ambitious promotional campaign "Germany Works." to the attendees.

www.gtai.com



GTAI is Germany's economic development agency. It was established for the purpose of facilitating foreign investment in Germany and promoting exports.

Photo: GTAI

Biotechnology

Soft Cell

An ingenious solution for mass producing stem cells

Stem cells are a vital element in biotechnology research, but so far they have been difficult to mass produce. Dresden start-up denovoMATRIX wants to change all that. Founded in 2018, the award-winning company has come up with a chemical coating for laboratory containers that mimics the environment in human bodies where stem cells grow. The idea evolved from years of research carried out by cofounder Robert Wieduwild at Leipzig University's Institute for Biochemistry. DenovoMATRIX already sells its technology – including screenMATRIX, a modular microenvironment using biomimetic coatings, and myMATRIX

MSC, a serum-free and chemically defined cell culture – to more than 10 research institutes and hopes that someday it will be standard for use in equipment like petri dishes. The company's aim is to make stem cell treatments accessible. Stem cell therapies are increasingly replacing conventional medications for the treatment of blood, skin and eye ailments and are also used to treat spinal cord injuries, stroke, heart disease and diabetes. The research team hopes that one day they will be able to use the stem cells to grow replacement body organs.

www.denovomatrix.com



Product technology

Smart Thermostats

Saving up to 40% in energy costs

2019 was a good year for Hamburg-based, B2B start-up "vilisto." In April, the young company, which produces intelligent radiator thermostats, won a prestigious Perpetuum Award for innovation in energy efficiency. Then, in summer, vilisto raised capital investment of seven figures to fund further growth. "We deliberately opted for smart capital when selecting the investors," said Christoph Berger, founder and CEO of vilisto. The smart capital trend emphasizes long-term and strategic growth and relies on investors' experience and access to networks. Digital heating technology can save clients up to 40 percent in energy costs, the company claims. Vilisto's solutions are based on artificial intelligence technology, which can memorize users' behavior and regulate heating to meet various weather conditions. The technology also includes sensors that only heat rooms when they're actually being used.

www.vilisto.de



E-commerce

Speedy Business

Making e-tail run more smoothly



1 sec

Even a one-second delay can reduce online retail turnover by as much as 10 percent.

Online consumers are increasingly impatient: Studies suggest that delays of even a single second can reduce e-tail turnover by 10 percent. New software from Hamburg start-up Baqend, which was founded by Hannes Kuhlmann, Florian Bücklers and Felix Gessert, allows commercial websites to operate between twice and ten times faster. It uses cloud databases to compress words and images, shortening loading times. According to the founders, it is the "result of three PhD dissertations."

www.baqend.com

Automobility

Revving Up



Doubling e-car motor performance

Manuel Hartong and Michael Anton Naderer came up with the idea for their start-up "dynamic E flow" while driving together in a rented electric vehicle. "We passed a number of cars, then drove up a hill, and the motor shut down because it overheated," the two entrepreneurs from the Bavarian town of Kaufbeuren say. Dynamic E flow aims to solve this problem. Hartong and Naderer claim their innovative product can double motor performance without increasing motor size by using copper wire to disperse coolants to engine coils. They believe their solution can be used in air taxis, industrial machinery, and electric buses and trucks. At the moment, dynamic E flow sells individual electric motors to niche companies and has development agreements with larger car-makers and aviation enterprises. But in the future, Hartong and Naderer hope they will design new motors in collaboration with these partners.

www.dynamiceflow.com

Product innovation

Scratching an Itch

Hot new app relieves insect bites

Three young entrepreneurs from southwestern Germany have come up with a device to relieve the discomfort of insect stings using the principle of hyperthermia. Users simply hook up the "heat_it" device to a smartphone and enter the type of insect concerned. They then apply the gadget to the sting, briefly heating the skin area to 50°C, which inhibits production of the histamines that cause swelling and discomfort. The heat_it application is set to go on the market in 2020 for around EUR 30.

www.heatit.de



Relieving the pain of insect stings has never been easier than with heat_it, an app which treats the bite area with heat.

Chemical Attraction

Germany's chemicals sector is the largest in Europe and also one of the most innovative in the world. While its strength lies in producing basic chemicals efficiently, it also has a few lucrative secrets up its sleeve.



Martin Erharter
**»Know-how in
 basic chemicals is
 advanced.«**

The global chemicals business faces challenges ranging from international trade tensions to slowdowns in the automotive and construction sectors. But the German industry has a number of advantages, including the efficiency of its chemical parks, its skilled labor force, its central location in Europe with proximity to end customers and, last but not least, the hearty German appetite for research and development (R&D).

“The German economy basically lives from high-end engineering and intellectual property in the automotive and chemicals sector,” notes Christoph Gehse, managing director of Dymax Europe, a subsidiary of the U.S. Dymax Corporation, a world leader in light-curable adhesives. “And although Germany now produces fewer chemicals than some other countries [China and the U.S.], we are still one of the most innovative.”

High level of investment

Around 10 percent of the almost half a million people in the German chemicals workforce are engaged in R&D. And the chemical and pharmaceutical industries have devoted more and more money to this area every year since 2005. In 2018, the German Chemical Industry Association (VCI) announced a record-breaking EUR 11.8 billion in invest-

Martin Erharter is a partner in the Chemicals & Pharma Competence Center at the Roland Berger consultancy. He began his career at the Sandoz/Novartis Group and has worked as a management consultant (notably in the manufacturing, engineering and auto sectors) since the mid-1990s.

Germany's chemicals sector is predominantly basic chemicals. Despite market challenges, it continues to do well. Why?

For a number of reasons. Firstly, the production facilities this sector has. These are extremely well maintained in state-of-the-art environments. Investment in them is high. Know-how in basic chemicals is advanced, and companies are putting effort into making what are essentially small improvements, using digital technology or data analysis. If you can improve output by a tenth of a percentage point, that has incredible monetary impact. And the supply of raw materials in Germany is very economical. Key production sites – the famous chemical parks – are all supplied by a pipeline network which is highly efficient and very competitive.

That doesn't sound very exciting.

It's not something that is necessarily very exciting, or even something that gets written about a lot. It's more of an ongoing process. But it is a very solid business and it remains the cornerstone of the chemical industry in Germany.

ment. That level of spending is equal to over five percent of the sector's total revenues of around EUR 203 billion, and 16 percent of all R&D spending in Germany. No surprise then that German companies file the second most chemical patents at the European Patent Office. Moreover, the VCI predicts that investments will rise to EUR 16.5 billion by 2030.

Potential for chemicals start-ups

Interestingly, most of the innovation takes place within Germany's *Mittelstand* – its often family-owned small and medium-sized enterprises, which account for 90 percent of Germany's 2,200 chemicals companies. There's also a new emphasis on chemicals start-ups which offer less conventional products and services. In Berlin, for instance, local authorities and the city's technical university are putting EUR 11 million into an incubator for fledgling chemicals companies.

The most promising areas for future innovation in this field are digital development and sustainability. The German government is legislating emissions reductions, and the chemicals sector's most important customers, including the auto industry, are desperately seeking solutions to deal with the new rules. This generates opportunities. For example, in October 2019, Japanese-founded company Sunstar opened a new 20-mil-



Dymax light-curable adhesives are solvent-free and form strong, highly stable bonds to plastics, metals and glass. Dymax Europe in Wiesbaden is a subsidiary of the U.S. company Dymax Corp.

Photo: DYNAMAX

INDUSTRY OVERVIEW

Advantage Germany

While it's not exactly fast-paced, the German chemicals sector is a solid bet.

Chemical parks

Germany has a network of industrial parks that are not only cost-efficient, adaptable and convenient but well serviced by transport of all kinds and often near other chemical parks.

Proximity to client industries

Chemicals companies are close to all-important customers in the automotive and construction industries in Germany and beyond.

Good labor relations

The last strike in the German chemical industry was in 1971.

Secure power supply

Many chemical parks use a redundant energy supply (i.e. their business is emergency-proofed) with two or more suppliers, and Germany's grid is stable.

Innovation and academic networks

One third of German chemicals companies collaborate with academia, and over 60 percent undertake R&D activities.

tancy Roland Berger, but that's not due to a lack of innovation. Instead, some firms, particularly those in specialty chemicals, are not necessarily patenting the new processes they develop but rather keeping them in-house to maintain a competitive edge.

Smaller companies are "more likely to use their specialist know-how about certain materials for very specific applications," Erharter explains. "They're shifting into more differentiated products, and they make very good money by adding value. It's an extremely risk-resilient area. It's also relatively easy to defend your niche." He concludes: "What is also really interesting is that a lot of these companies are privately held and therefore have high investment potential."

lion-euro headquarters in Bavaria for its engineering wing. The company, which already supplies Nissan and Toyota in Asia, will work on exciting new projects such as novel structural adhesives that respond to the changing needs of European carmakers. As the company explains in a statement: "The Bavaria region is particularly attractive due to the strong presence of premium car manufacturers such as BMW and Audi."

Valuable industry secrets

One of the most intriguing aspects of Germany's chemical sector is that increasingly innovation is hidden. While the industry still relies on know-how in basic chemicals, it also harbors scores of potentially lucrative secrets – exciting interest from investors. Globally, the number of chemicals patents coming out of industrialized nations has been falling since 2010, explains Martin Erharter, partner and chemicals specialist at consul-



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Travel Tech's New Frontier

Germany has Europe's largest and most competitive travel sector with a high out-bound share. Travel technology start-ups are setting up camp around the country, while Berlin boasts its first travel tech unicorn.



1

1 Pictured: a colorful facade in Cape Town, South Africa, a popular destination for Germans who love to travel abroad. Travel tech is more than just bookings. It's about personalization, online marketing and increasingly new forms of dialogue such as chat and voice control.

2 The Munich travel technology company Fineway offers instant trip planning. After answering 10 questions, you receive your individual, directly bookable travel offer.

Germany ranked third in the 2019 World Economic Forum’s Travel & Tourism (T&T) Competitiveness Index, which measures factors and policies that enable the sustainable development of the sector in each country. Underscoring the findings were Germany’s large domestic T&T market, strong overall enabling environment, infrastructure and natural and cultural resources. The country’s robust economy has created a major domestic market that in turn has resulted in the largest T&T GDP in Europe.

With a booking volume of EUR 58.8 billion in 2017, Germany is the largest source market for travel in Europe, says Dirk Rogl, deputy director of the German government’s Tourism Expertise Center. “It’s not only Germany’s size and central location within Europe that argue for investment: Our sales and booking technologies are unique in the world,” Rogl adds.

Germany plays a significant role in the European tourism market with a high outgoing share – Germans like to travel abroad. Nonetheless, the German online travel market is below the European average, partly due to the traditional strength of tour operators and traditional offline travel agencies in the country, according to travel research company Phocuswright. There are, however, numerous opportunities for growth.

An emerging new market

At 42 percent, the share of online travel in Germany in 2017 was still below the European average, but roughly in line with the booming Indian and Chinese markets, Rogl notes. “It is foreseeable that the share of online bookings will continue to increase. In addition, travel agencies and call centers use modern booking systems and by no means book offline in the classic sense.” As Markus Feigelbinder, cofounder and COO of Munich travel tech firm Fineway, put it to news portal Munich Startup: “In five years, we will have reached the point where the instant trip planning we offer will be the norm and a completely new market will have emerged.”

Travel tech is not just about bookings, Rogl stresses. “It’s much more about person-

FACTS & FIGURES

€299bn

Estimated value of the European travel market by 2020 as online bookings continue to grow

Germany’s travel habits



€58.8bn

Germany’s travel booking volume in 2017



€64bn

Estimated gross travel bookings in Germany by 2020



4.5m

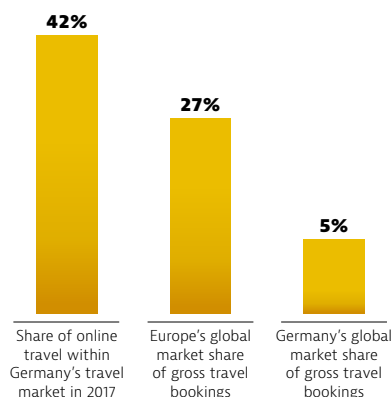
The record number of overnight stays in Germany in 2018



122.6m

Number of passengers who boarded flights in Germany in 2018

Europe’s booming sector



Sources: Phocuswright study “Tourism in Germany 2030”; Federal Statistical Office

alization, online marketing and, increasingly, about new forms of dialogue such as chat and voice control,” he says. “Such technologies are already in use in Germany and in high demand.”

The Indian entrepreneur Naren Shaam → *Markets Germany 2/17, page 8* is helping meet that demand. He founded Berlin-based GoEuro in 2013 to help tackle the problem of Europe’s fragmented transport infrastructure. The online platform allows users to find the fastest and cheapest travel options by train, bus and plane to thousands of cities, towns and villages across Europe. In 2019, the company changed its name to Omio to reflect its global ambitions.

Omio’s journey to success

“The transport system across the continent is impressive in many ways, but with thousands of ticket prices and options, and multiple providers and languages, it can be incredibly difficult to plan travel and book tickets,” says Shaam. “To develop a solution, I knew I would have to be based in Europe. Berlin, with its burgeoning tech scene, was the right place. It’s great for attracting talent, is a more affordable city than some other European tech hubs and is also well placed from a travel perspective.”

Omio has become one of Europe’s largest travel booking platforms. What’s more, it’s a tech unicorn. Available in 21 languages, it has more than 27 million monthly users and an extensive inventory of mobile ticketing.

Travel tech is attracting major funding from international investors, Shaam notes. “Our investment comes from the U.S. and Asia as well as Europe, reflecting the interest and recognition German travel tech is getting outside of the continent.” Last year, the company raised EUR 136 million in one of Germany’s largest-ever investment rounds, doubling its total capital raised. Swedish investment firm Kinnevik AB and Singapore-based Temasek led the round, with participation from China’s Hillhouse Capital.

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All Aboard

Germany's national rail operator Deutsche Bahn is facing the biggest modernization in its history. This bold endeavor will create a range of opportunities for foreign railway equipment suppliers and construction companies.

Deutsche Bahn (DB), Germany's state-owned railway company, is planning major renovation and construction projects, purchasing new trains and digitalizing the entire rail system as part of a major effort to modernize and expand the country's railway infrastructure. In 2019 alone, DB invested EUR 11 billion, and in January 2020, the company and the German government committed to spending an additional EUR 86 billion by 2030.

Growth in long-distance travel

More long-distance passengers in Germany chose to travel with DB last year than ever before, and the company is keen to ensure that trend continues. The government is supporting the rail operator as a clean alternative to air travel and has approved EUR 62 billion in funding over the next decade. "Taking the train is a form of active climate protection – rail is the only truly green mode of transport," DB's CEO Richard Lutz says. "We are well on our way towards the target of more than 200 million long-distance passengers by 2030."

The volume of investment represented a 54 percent increase over the previous administrative period. Part of the money will

GROWTH SECTOR

€86bn

Total investment in the sector by 2030 by the government and DB

€10.7bn

Total investment from DB in 2019 to improve capacity, network efficiency and infrastructure

260m

Annual number of long-distance passengers DB anticipates it will be carrying beyond 2030

Sources: Deutsche Bahn; German Federal Government

be used to renew around 2000 kilometers of tracks and 2000 switching points every year.

"The record size of this investment – plus the scope of areas it involves – will offer a wealth of opportunities for foreign companies as well as German firms to get involved," says Germany Trade & Invest (GTAI) transportation expert Stefan Di Bitonto.

Foreign investors get on board

The massive investment and expansion plans are creating exciting opportunities for foreign companies, explains Christian Böttger, professor at Berlin's University of Applied Sciences (HTW) and an expert on the rail sector. "Germany will invest more in public transport in the years to come, and Deutsche Bahn has already been extending its supplier base internationally over recent years, as other German rail operators have," says Böttger.

Deutsche Bahn's biggest expansion project encompasses the federal states of Hessen, Baden-Württemberg, Rheinland-Pfalz and North Rhine-Westphalia. The EUR 4 billion endeavor, which includes tunnel extensions and major track expansions, will start construction this year and be completed in the 2040s. Upgrades to and new construction on the Hamburg/Bremen–Hannover line



Photo: Deutsche Bahn AG / Tricon AG

Deutsche Bahn is unveiling a long-distance, multisystem electric locomotive to pull passenger coaches within Germany and across borders. The ECx system will be built by the Spanish firm Talgo. The framework agreement is for 100 locomotives. Pictured: a digital simulation of the engine.

will also commence this year at an estimated cost of EUR 3 billion. Another big construction and upgrade project will be the Hanau-Würzburg/Fulda-Erfurt lines in the 2030s.

Participating suppliers include railway vehicle manufacturers like Spanish firms Talgo and CAF, Canada's Bombardier, Pesa in Poland, Switzerland's Stadler Rail, Czech group Škoda Transportation, Russia's United Wagon Company and China's CRRC. "Germany is more open to international suppliers than many other countries are," Böttger says.

Spanish manufacturer Talgo signed a major agreement with DB for up to 100 multisystem locomotives and passenger wagons, valued at EUR 2.3 billion. Talgo is to begin delivery of its first EUR 550 million order of 23 new long-distance trains, known as the ECx, in 2023. "For Talgo, signing this contract is not only a great honor, it also brings great responsibility," says Talgo CEO José

María de Oriol Fabra. "We will be delivering the best product to one of the most demanding customers in the world: Deutsche Bahn." The DB deal helped propel Talgo's new orders in the first half of 2019 to EUR 804 million – a level the Spanish company describes as "historic."

Opportunities for growth

Foreign companies are likely to find openings in other areas, such as civil engineering, railway signaling and electrification. Germany is aiming to equip its entire rail network with the European Train Control System (ETCS) and digital signaling technology. While this area is largely dominated by Siemens, the French group Thales is well positioned, and growing investment in the sector could lure other foreign players like France's Alstom, Italy's Ansaldo and Canada's Bombardier. There's also increasing competition from Chinese players, says Böttger.

The boom in Asian tourism to Germany is also creating investment opportunities. Ctrip Group, China's largest travel service provider, signed an agreement with DB last year to enable the sale of tickets on its multilingual platforms. "Through our partnership, we are enabling our 300 million members to conveniently purchase German rail tickets, supporting travelers to discover all corners of Germany," says Ctrip Group general manager Amy Wei. With new infrastructure, digital transformation and ambitious plans supporting millions more passengers over the next decade, Germany's railways are charging "full steam ahead" – only this time with clean energy.



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A Certain Musical Genius

German music technology is used by major international artists and respected around the world. Even so, many music tech start-ups with clever and cutting-edge products are suffering from a general lack of investment.

When it comes to music technology, Germany has centuries of expertise to draw on – from instrument craftsmanship to the invention of the MP3. That tradition has carried on into the next generation of high-tech digital products. Yet many start-ups in the German music tech business are overlooked by investors.

“The German music industry is setting worldwide standards in digitalization,” says Thomas Wendt of Integrative Concepts, which provides PR strategy for Celemony, Kemper and several other German music tech companies. The same holds true for technology aimed at musicians, their managers and their audiences. New developments in this area are in step with market trends: 2018 was the first year that digital music formats made more money in Germany than physical ones. According to the German Music Industry Association (BMVI), 56.7 percent of turnover came from audio and video streams, compared with 43.3 percent from physical formats.

The ubiquity of German equipment and technical expertise in the industry flies largely below the radar in terms of investment, even though, according to Wendt, German audio software is now used on “virtually every Hollywood soundtrack.” The Oscar-winning film composer Hans Zimmer, for instance, is

MUSIC MAESTRO

German Tech: Global Groove

Matthias Strobel, president of the industry association MusicTech Germany, provides some insights that should be music to investors' ears.

What distinguishes the German music tech industry?

Historically, German inventors have been responsible for just about everything that fundamentally changed the music industry: from the gramophone to the microphone to the MP3. But the market was more condensed in those days. Today, there's a huge range of different tools.

What technologies will shape the future of the industry?

We're already at the point where virtually any kind of music is available anywhere. The next step is personalized music experiences – for example, there are firms that are using algorithms to recreate frequencies that people lose as they age, and firms that are making apps that remove the technical and financial barriers to musical creativity.

What are the most promising companies in your industry right now?

The ones who are working out how artists can get paid more fairly by setting up metadata banks or working with blockchain. They will play a big role because the market is getting so fragmented.

a long-time user of Cubase, developed by the Hamburg-based Steinberg, while German digital guitar amps are being used on tours by major acts as disparate as German hard rock band Rammstein and U.S. jazz musician Pat Metheny. Moreover, a Berlin company called Native Instruments is a worldwide leader for sample libraries that supply everything from obscure Asian instruments to a complete orchestra. “It would be interesting if big international companies were to use the expertise that exists here,” says Wendt.

Fine-tuned expertise

Christoph Kemper is head of the Kemper company, which makes guitar amps with individual digital profiling (a technology he has a worldwide patent on). His clients include bands like Depeche Mode and Coldplay. “German companies have very high standards – there is a real eye for detail, so I think customers feel like they're being taken seriously,” he says. “I think that's what has made a lot of providers into market leaders.” Kemper points out that his industry often struggles to find investors because of the comparatively high level of knowledge required. But that hasn't stopped foreign companies from investing in or entering the German market. Japanese firm Korg, manufacturer of electronic synthesizers and audio processors, has

INDUSTRY INSIGHTS

Music in Figures

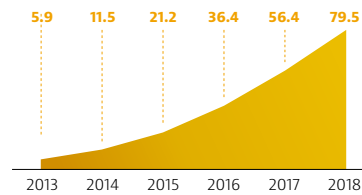
Total revenue from musical instruments sector in Germany (2019)¹⁾



Turnover in Germany of musical instruments, music equipment, pro audio and sheet music in 2018: **ca. €1bn**

Year-on-year change: **+6%**

Music streaming since 2013: Number of streamed pieces of music (in billions)²⁾



1) Source: SOMM – Society of Music Merchants; 2) Source: GfK Entertainment

start-ups are based [in Germany], especially in Berlin and Munich. That is why we are working closely with actors like the industry association MusicTech.”

So, what does the future hold? The personalization trend in the music tech industry reaches beyond professionals and is now focused on removing the barriers to creativity. There are a plethora of apps that allow people to make music without any classical training, or indeed instruments. Matthias Strobel, president of MusicTech Germany, points to a major development in software that uses algorithms to recreate frequencies that people otherwise stop hearing as they age and creates a fully personalized and optimized listening experience. It sounds like sci-fi, but it’s a reality in Germany.

recently expanded operations in Germany, Yamaha has acquired Steinberg, and U.S. microphone specialist Shure this year opened its second German office in Berlin.

“The German tech market plays a key role in the industry,” says Abby Kaplan, Shure’s vice president of global retail sales. “It’s why we continue to build our presence in this important market. Being a member of the House of Music community in Berlin has many benefits for us. It strategically expands Shure’s European business, allows for collective inspiration, and places us directly in the heart of Berlin’s vibrant creative scene.”

Gérôme Vanherf of the Belgian seed investment fund LeanSquare (which has invested in Berlin start-up MOD Devices, amongst others), is also enthusiastic. “A lot of great

Dalton Tennant, aka D10, is the musical director for the Canadian rapper Drake’s current touring outfit. He integrates Native Instruments’ hardware and software into a live setting. Native Instruments is a world-wide leader for sample libraries.



Photo: Native Instruments

From Guangdong to Germany

A leading Chinese medical technology company is opening a dialysis equipment manufacturing plant in Mecklenburg-Vorpommern.



Photo: guifang jian

Guangzhou, the capital of Guangdong Province, is an important industrial and commercial location in China.

in China' quality is so-so, or even worse," says Wei. "Everything 'Made in Germany' has a good reputation." That's what brought Biolight to Mecklenburg-Vorpommern. According to Gabriel Flemming, senior manager for healthcare at GTAI, Biolight is part of a growing trend.

"More Chinese companies are investing here to satisfy a demand in China for products 'Made in Germany,'" Flemming says. Production facilities in Germany also give foreign firms a foothold in Europe's largest medtech market.

A growing market for dialysis

Although Biolight is best known for patient monitors, the company also makes dialysis machines and products and systems used to treat patients whose kidneys can no longer remove toxins from their blood. Around 1.4 million patients worldwide require regular dialysis – a 67-billion-euro market that is expected to grow. At the heart of the process are dialyzers – tubes containing tens of thousands of hollow fibers lined with microscopic holes that filter blood. As Biolight already sources most of its dialyzer fiber from Med-Tec (one of the few companies in the world with the expertise to make it), a joint venture seemed like a good fit. Biolight would have manufacturing facilities near one of its main suppliers, and its dialyzers would be 'Made in Germany.' Med-Tec, meanwhile, would gain a direct partner in China, one of the world's fastest-growing markets for dialysis products. "It's new for us to work with a Chinese company in Germany," says Med-Tec CEO Jens Sieder.

Biolight's factory facilities are nearing completion, and the joint venture currently has nine German employees. Dialyzer production is scheduled to start in early 2020, beginning with prototypes for regulatory approval and sales demos.

Guangdong **Biolight Meditech** hopes to capitalize on Germany's global reputation for high-quality products by opening its first European manufacturing plant in the country. To do so, the Chinese medical equipment company has partnered with Med-Tec, a German manufacturer based in the northern German state of Mecklenburg-Vorpommern. Together, they're opening a 10-million-euro factory in Laage, producing a key component to treat patients with kidney disease.

Based in Guangdong, Biolight is one of China's top three medical equipment manufacturers of its sort, with some 1,000 staff and

more than USD 100 million in annual revenue. Not content to limit itself to the Chinese market, Biolight has branched out and now sells to 130 countries. But it's still dwarfed by medical equipment giants like Philips and GE Healthcare, whose established reputations and billions in revenue give them a huge advantage in Western markets. To expand, Biolight is focusing on less developed countries and smaller hospitals. "Above all, we want to be growing and international," says Gary Wei, head of Biolight's joint venture in Germany. "There's still room for growth in niche markets." But initially Biolight encountered a roadblock: "Many customers believe 'Made



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Your Nexxt Partner

The online platform nexxt-change makes it easy for investors to search for German companies up for sale. Foreign companies can also discover SMEs and family businesses that are looking to partner up.

Angelika Sielmann (left) was looking for someone to take over her company. She was introduced to the nexxt-change platform by Petra Maskow (right), head of business development at the Rhein-Erft branch of the Cologne Chamber of Industry and Commerce.

When looking for companies to acquire, would you consider an online matching service? In Germany, so-called platform partnering is common. For example, Dennis Wronski used nexxt-change to look for a company to buy. He came across a traditional company called MABA Spezialmaschinen, with more than 30 employees. The former owner, Ingrid Weinholt, was keen to sell her business and they quickly came to an agreement. Nexxt-change matches potential investors with German companies looking for a buyer.

Run in part by Germany's Ministry for Economic Affairs and Energy, nexxt-change thoroughly reviews every advertisement before publication and vets the companies placing them. For foreign investors, the platform offers up bona fide opportunities to take over German companies with established business models and a foot already in the market.

Finding a partner online

There are currently over 6,000 advertisements from companies who are seeking partners, and investors can message the owners via the platform. If the company owner is interested in further discussion, he or she contacts the investor, and the two of them can start sales negotiations. If investors do not find a suitable company straight away, they can also submit a request specifying what kind of company they are looking for, what qualifications they have and how much they want to invest.



A lack of German language skills is not a barrier to doing business. If required, Germany Trade & Invest (GTAI) can help foreign investors formulate a purchase request in German and post it on the platform.

Germany has a very broad and prosperous *Mittelstand* (the small to medium-sized business community or SMEs), and only about half of these businesses are passed on to family members, so there are numerous opportunities for buyers. Only 29 percent of SME owners sell their companies when they retire, while 10 percent hand them over to an employee. According to the research institute for German SMEs, the IfM Bonn, there

are 8,700 entrepreneurs in Germany looking to sell their business to a successor outside the family and the company. And this figure is predicted to increase, mainly because the German population is ageing. Thus, many excellent companies are currently on the lookout for a buyer or successor.



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Removing Barriers

Investing in Germany's future has rarely been easier. Lawmakers recently passed forward-thinking legislation that will usher in a wave of new opportunities for investors, both domestic and foreign.

The new legislation is a big deal for all investors. The changes amount to nothing less than an attempt to overhaul Europe's biggest economy, preparing it for the challenges posed by climate change, energy transitions and demographic shifts. For anyone interested in investing in Germany right now, an in-depth knowledge of these laws is a must. The new measures have been anticipated for a long time and are the fruit of lengthy and complex negotiations between the two government parties and various ministries. They focus primarily on three areas: climate protection, skilled labor immigration and restructuring the country's coal regions. As Germany decarbonizes its economy, the laws will help IT specialists and care workers to move in and revitalize its coal-dependent regions.

Significant public funds via tax breaks and direct investment will be made available to businesses to attract direct investment. As always, the devil is in the detail: Investors will need to familiarize themselves with the laws to know where to take advantage.



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The German government is investing heavily in electromobility infrastructure, particularly charging stations. Pictured: An electric car charges up.



Photo: Markus Kirchgessner/iaif

Climate Package

The so-called climate package is designed to coax the economy toward 'greener' sectors while protecting businesses during the transition. The law assigns flexible greenhouse gas budgets to different industries over the next decade. There will also be a carbon pricing scheme – an increasingly common phenomenon – which will entail new opportunities in the energy, auto, agriculture and construction industries. These measures will be complemented by increased state investment in carbon-storage technology.

Opportunities



The construction industry will receive support to carry out **energy-efficient renovations of apartment blocks**. Tax deductions will offset costs for insulation and replacing old heating systems and windows by up to 20 percent.



The automotive industry will receive incentives to **transition to electric cars**. For instance, state allowances for company cars with battery-driven or plug-in hybrid engines have been extended until 2030, and there will be a tax reduction for company e-cars. There will also be major state investment in electric mobility infrastructure, specifically in charging stations.



Public transport will receive more money from the state: EUR 86 billion will be invested in rail networks alone over the next decade.

Skilled Immigration Act

German business associations have been popping champagne over the introduction of this law on March 1, 2020. With unemployment reaching new lows, several sectors have struggled with a shortage of skilled personnel in recent years – care workers, IT specialists, nurses and craftsmen are in particular demand. The Skilled Immigration Act will reduce the bureaucracy that has made it difficult for companies to get their preferred recruits into Germany. One of the key changes will be the elimination of the dreaded *Vorrangprüfung*, which required German authorities to prove that no EU citizen was available for a given job.

Opportunities



IT specialists are much sought-after in Germany, which is why the new law contains special clauses to allow them to settle even without training as long as they have worked in the industry. This will ease the labor situation for German IT companies.



The research and development departments of big industrial players in Germany are likely to expand, as scientists around the world take advantage of the easier bureaucratic rules.

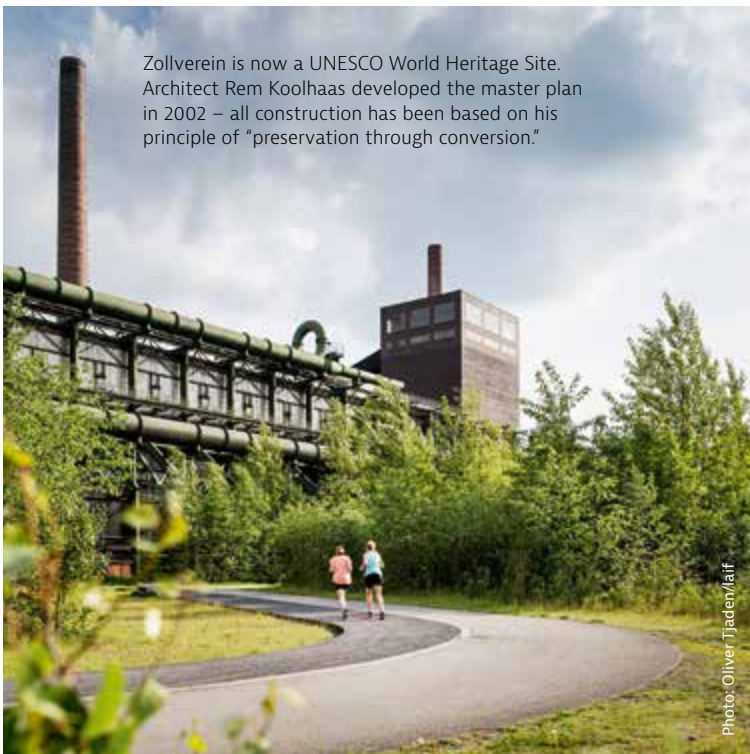


Germany's carer industry depends heavily on workers from Poland and other central European countries. The new law will make it easier for German care home managers to employ people from "third countries" outside the EU. Major recruitment drives are likely to result, as Germany's population ages.



A resident is attended by Yingwei Yang from China, one of five new geriatric nurses at the Curanum nursing home in Cologne.

Photo: Tim Wegner/laif



Zollverein is now a UNESCO World Heritage Site. Architect Rem Koolhaas developed the master plan in 2002 – all construction has been based on his principle of "preservation through conversion."

Photo: Oliver Tjaden/laif

Structural Change for Coal

The purpose of the restructuring program hammered out by the so-called Coal Commission (officially, the Commission on Growth, Structural Change and Employment, or KWSB) is to support the regions of Germany traditionally dependent on the coal industries as the country implements its transition to non-nuclear, renewable energy sources. From now until 2038, federal resources promoting innovation and growth will be pumped into the eastern areas around Leipzig, western areas near Cologne, and other regions to compensate for expected job losses.

Opportunities



The KWSB recommendations aim to expand Germany's renewable energy capacity to 65 percent of the market by 2030 without incurring extra costs either for companies or consumers. That won't be possible without major state investment in renewables.



A further measure will see government **investment encouraging power stations** to be more energy-efficient by switching their combined heat and power generation to gas rather than coal. Gas suppliers are likely to comprise a larger share of the market.



The wholesale **restructuring of Germany's energy supply** is likely to put more pressure on the safety of critical infrastructure. Cybersecurity firms protecting power stations from hackers will see a boost.

Celebrating Entrepreneurial Spirit

Who will be the chosen few of 2020? That's the difficult question facing the jury of this year's German Entrepreneur Award (GEA). Last year's winners were characterized by a strong social purpose as well as the right formulas for success.

The award is Germany's most prestigious prize for up-and-coming businesses. Handed out every year since 2002 by Stern magazine, German broadcaster ZDF, the carmaker Porsche and the Sparkasse network of banks, with support from the German Ministry of Economic Affairs and Energy, it recognizes fledgling companies who show outstanding promise in the categories "Start-Up" and "Rising Star."

The three finalists for the company awards will receive expert advice and support from the four heavyweight sponsors of the prize, plus access to the prize's alumni network and a healthy dose of prestige, which will be sure to attract the attention of investors.

"The German Entrepreneur Award is one of the most important forums in Germany for shining a spotlight on business innovation among fledgling companies," says Germany Trade & Invest's managing director of investor acquisition, Achim Hartig. "For winners, it can also be a springboard to take a young company to the next level. The GEAs are a useful indicator to foreign investors about young companies in Germany worth keeping an eye on."

Major lift for a bionic fledgling

The shortlist represents a broad spectrum of companies and individuals, but the winners are often companies that have both the potential to help society and the prospect of turning a profit. "The GEA is important because it shows millions of people that it's exciting to be an entrepreneur and that you get recognized if you do something successful," said German Economy Minister Peter Altmaier

at last year's award ceremony in July. "We also need to assist these people with coming up with the right business models and plans, dealing with bureaucracy and getting financing. But the first thing is to recognize them – that's an important part of our entrepreneurial culture."

The 2019 Start-Up award went to Augsburg company German Bionic, which produces exoskeletons that help industrial workers to do heavy lifting (more on this topic in the next issue of *Markets Germany*). "The German Enterprise Award is an insti-

German Entrepreneur Award Winners 2019

→ see on the right

tution," said German Bionic cofounders Peter Heiligensetzer and Armin G. Schmidt on receiving the prize. "Just being nominated is like being given a knighthood." The 2019 runners-up were innovative logistics company Cargonexx, which improves efficiency through self-learning algorithms, and precision measurement specialists Swabian Instruments for their ingenious invention, the Time Tagger.

Joy for a toymaker

The Rising Star prize for more established young companies was presented to Düsseldorf-based Boxine, which makes cuddly toy figures that play CDs of audio fairytales and

music for children. The runners-up in this category were collaboration Factory, which develops "breathing" software for managing highly complex projects, and cutting-edge online marketer OMR.

"The GEA network is the *Who's Who* of German enterprise, and we look forward to profiting from its expertise," said Boxine cofounders Patric Faßbender and Marcus Stahl at the ceremony. Meanwhile, a special Lifetime Achievement award was given to Alfred Theodor Ritter, who rescued the Ritter Sport chocolate company from economic difficulty while making it ecologically and socially sustainable.

And last but not least is the prize for school initiatives. Last year, it went to the LUVAQ team from the western German town of Geisenheim for their ingenious ideas on how to provide clean drinking water for developing countries.

It's not easy for companies to get nominated for a GEA, let alone win one. Any company, including foreign-owned ones, located and creating jobs in Germany is potentially eligible. However, candidates need to be nominated by a committee of 300 experts selected from companies, universities, government and venture-capital funds. Nominees are currently being evaluated, and the jury will whittle the shortlist down to the top three by April. The 2020 award ceremony will take place on September 8 in Berlin.



Further information:
www.deutscher-gruenderpreis.de/en/



Photo: Boxine GmbH

Boxine *Patric Faßbender, Marcus Stahl*

Tonies is a new and child-friendly way of listening to audiobooks and music. The player – a cuddly cube or toy that can be taken to bed – is proving a runaway success with parents. Founders Patric Faßbender and Marcus Stahl posted a staggering €60m in turnover in 2018 despite being in a highly competitive market.
→ www.tonies.com



Photo: Dirk Brunecki

collaboration Factory *Rupert Stuffer*

Collaboration Factory's "breathing" software offers an adaptable solution for project management for the *today's digital* era. Rupert Stuffer recognized that conventional methodologies were not meeting the current increasingly complex business processes and set up the company in 2014. By 2018 it had a turnover of €10m.
→ www.collaboration-factory.de



Photo: Dirk Brunecki

Cargonexx *Rolf-Dieter Lafrenz*

CEO Rolf-Dieter Lafrenz set out to solve the problem that cargo trucks drive around empty 40% of the time – he developed an award-winning logistics platform that uses self-learning algorithms to optimize efficiency in the shipping industry. Cargonexx works with 8,000 hauliers and reported a threefold increase in volume in 2018.
→ www.cargonexx.com



Photo: GBS German Bionic Systems GmbH

OMR/Ramp 106 *Philipp Westermeyer*

OMR is a new kind of digital media enterprise that combines seminars, events, journalism and entertainment. Cofounder Philipp Westermeyer started giving seminars on digital marketing, which became so popular that they became the OMR Festival. Today, it attracts more than 50,000 visitors to Hamburg. Founded for just €25,000, OMR turns over double-digit millions.
→ www.omr.com



Photo: OMR19 Julius Schrank

German Bionic *Peter Heiligensetzer, Armin G. Schmidt*

German Bionic's exoskeleton Cray X supports the wearer's lower back when lifting heavy loads – it can absorb up to 25kg of pressure – thereby reducing the risk of workplace injuries. Founders Heiligensetzer and Schmidt set up shop in 2017 and brought Cray X to market last year.
→ www.germanbionic.com




Photo: Dirk Brunecki

Swabian Instruments *Helmut Fedder, Michael Schlagmüller, Markus Wick*

Swabian's Time Tagger is a multichannel time-to-digital converter that monitors input signals in real time based on quantum research. The company turned over €1.2m in 2018, two years after its founding.
→ www.swabianinstruments.com

The view from Paris

The GTAI Paris office is located near the famous Eiffel Tower in the 15th arrondissement near the Javel metro station. Every day the office receives enquiries from export-oriented French companies wanting to know how they can gain a foothold in the German market.

 GTAI Paris, 18 rue Balard,
75015 Paris, France

Vive la France!

Internationalization is on the cards for many French companies, observes Markus Hempel from the Paris office of Germany Trade & Invest (GTAI). As France's closest neighbor, Germany is often the first port of call for overseas operations.

Mr. Hempel, last year you started working at GTAI Paris as an investor recruiter. How has it been so far?

MARKUS HEMPEL: I was really surprised at how much France has changed in recent years. You can feel a completely new dynamic here. This is partly due to the government, which is on a drive to reform. The economy has gained new confidence as a result, and business is now expanding beyond French borders. There's a great interest in Germany, for example. The first few months were also very exciting personally: I have been seeing Paris from a completely different vantage point with my four children.

France is Germany's largest neighbor and the two countries enjoy a close relationship. Do you still need to explain to your French clients why they should consider investing in Germany?

HEMPEL: It's true that most French people know a lot about Germany and many French entrepreneurs and business managers are of course interested in the country. Germany is often the first choice when French businesses start going international. Nevertheless, or precisely because of that, there is a pressing need for discussion. There are still huge cultural differences between the two countries, and of course there is the language barrier.

What do your clients want to know about Germany?

HEMPEL: They often specifically ask how they can gain a foothold in the German market through carefully placed investments.



»You can feel a new dynamic.«

Markus Hempel started working at the GTAI office in Paris in the summer of 2019 and has been facilitating French investment in Germany since. He is well equipped for the role, having studied in both Germany and France and worked in France for several years. Additionally, his wife is French.

There is also a high level of interest in how small and medium-sized enterprises work – the owner-managed German companies. They are often very attractive business partners for French companies.

Why are the French attracted to Germany as a business location?

HEMPEL: Export-oriented companies in particular want to invest in Germany. Not just because of its large sales market, but because a German location makes expansion into Eastern Europe much easier. Companies value the fact that Germany offers a secure investment environment, and we are regarded as punctual and reliable. Also, I keep hearing that business partners in Germany are very open to cooperation. It is usually no problem for a French company to arrange a meeting with a German company.

Many French companies are operating in Germany across a range of sectors. Which sectors are attracting the most interest from investors at the moment?

HEMPEL: The sectors where there are congruencies between France and Germany and the potential for reciprocity. Also the digital and business services sectors, where there are many French players. At the moment, environmental technology, medical technology, mechanical engineering and ICT are particularly active.

The IT sector in France is experiencing robust growth. Can you tell us why?

HEMPEL: There is a lively start-up culture here. Being an entrepreneur in France is now considered sexy. But many of these up-and-coming entrepreneurs don't want to restrict themselves to the French market and are focused on becoming active internationally as quickly as possible – first and foremost in Germany.



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What's 'Small Talk' in German?

Germans have a reputation for being scientific but rather humorless. But is this cultural stereotype true? Fiona Evans, U.S. consul general in Düsseldorf, considers the relationship between her countrymen and their German business partners.

It's often said that the Germans don't really "do" small talk. But, as Fiona Evans found out, there are lots of opportunities you can use to break the ice in Germany.

The United States and Germany enjoy a strong trade and investment relationship. There are lots of reasons why: the robust rule of law and protections of intellectual property in both our nations, for example, and the advanced technologies produced by both. But I truly believe it is personal interactions that grease the wheels of commerce and that Germans have a singular advantage when developing relationships with American business partners.

German reliability is probably paramount in the minds of most Americans. It is no secret that German products are honored for their precision and reliability, but a reliable



»Germans are in fact experts in small talk.«

*Fiona Evans,
U.S. consul general in Düsseldorf*

business partner can open many additional doors. It might sound simple, but adhering to timelines, respecting meeting times and focusing on the business at hand allows for more productive discussions and shows your American partner that you mean business.

After a year in my position as U.S. consul general in the Rhineland, it is clear to me that the Germans also know how to relax. Whether it is Carnival or simply a national holiday, the Rheinlanders make the most of their personal time. Americans are hard workers, taking relatively little vacation, but it is during the after-hours conversations on the golf course or in a restaurant, where a lot of business gets done. The German attitude toward taking pleasure in life is as welcome along the Mississippi as it is along the Ruhr.

The German people's knowledge of the U.S. is a huge advantage. When I was in language training, I found it funny when my instructor told me that there is no real German

translation for "small talk." Nonetheless, I've had plenty of opportunity while chatting with people at trade fairs, receptions or in my personal time to engage in light conversation with Germans and to observe how they interact with their American contacts. In my view Germans are in fact experts in small talk.

Last year, I co-led the German delegation to the U.S. government's annual foreign direct investment summit and saw first-hand how German attitudes, style and know-how make business deals happen on both sides of the Atlantic. It is therefore no wonder to me that the U.S. is the leading job creator in North Rhine-Westphalia and that Germans are some of the largest investors in the U.S.

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