

MARKETS

GERMANY

3/19

Virtual Surgery Intelligence (VSI) from apoQlar. Located in Germany, the company specializes in mixed and augmented reality imaging techniques.

DETECTION / Condylus occipit

BONE FRACTURE / Angulus mandibu

SMART HOSPITALS

German healthcare facilities are at the forefront of digital transformation. Day-to-day operations will be revolutionized by high-tech innovations.

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Location Germany:

30 years after the Wall, the six eastern federal states are prospering

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Engineering:

What the future holds for a nation of engineers and inventors

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Magdeburg's 'Port of Science' is set to become a major research cluster

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FOCUS

VR surgery

HoloLens smart glasses are just one innovation that will change daily life in hospitals.

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E-MOBILITY



Blazing Saddles

Cycling is booming and electric bicycles, both imports and exports, are one of the biggest drivers of growth.

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TECHNOLOGY

Greening the Future

The *Energiewende* is revolutionizing the German energy market and generating plenty of opportunities for investment.

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Trade Fairs in 2020

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— The Digital Magazine

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Order number: 21110

Cover: ©apoQlar GmbH



on the basis of a decision
by the German Bundestag



»We all want our hospitals to be as up-to-date and intelligent as possible. In today's world that means digitalization.«

Dear Reader,

Sooner or later all of us will need healthcare, so we all want our hospitals to be as up-to-date and intelligent as possible. In today's world that means digitalization. Our title feature, 'Smart Hospitals,' shows how Germany is leading the way in digital health with innovators like apoQlar. The Hamburg company has teamed up with Microsoft, among others, to deliver 'smart glasses' that give surgeons virtual 3D views of patients before and during operations. That's just one of the many innovations in Germany that are making the prospect of 'going under the knife' a little less scary.

One way to stay healthy is cycling. But not every rider wants to provide the entire pedal power needed to get from A to B. It's no wonder then that electric bicycles – both imports and exports – are all the rage in Germany. As our piece 'Blazing Saddles' explores, the number of e-bikes sold in Germany rose from 380,000 in 2012 to a whopping 980,000 in 2018.

The *Energiewende*, Germany's transition to sustainable power sources, is also good for everyone's wellbeing. 2019 saw a number of records set in regard to the amount of electricity generated from renewable sources in Germany. Our report 'Greening the Future' examines the country's changing energy infrastructure and the opportunities it's opening up for foreign companies.

Dr. Robert Hermann, CEO

Email: invest@gtai.com

ONE TO WATCH

Photo: Thomas Rabsch/iaif



Adam Hill, Fussball-Experience

Growing up on a British army base in Münster, Scotsman Adam Hill developed a passion for football and competed in the amateur leagues. Years later, he settled in Düsseldorf, and in 2018 he revived his childhood dreams by launching the Fussball-Experience. The self-funded venture uses the 'beautiful game' to inspire and motivate young people by taking them on 'insider' tours of Germany's Bundesliga clubs and stadia.

"Football gave me so much in terms of developing life skills and dealing with success and failure," says Hill. After many years of working as a management consultant, he traveled to Central America to help underprivileged kids, which he found he "enjoyed a lot more." On returning to Germany, he saw

a business opportunity and a chance to do some good. "The U.K. Premier League promotes itself so well but German clubs have some serious catching-up to do," he says. He now has relationships with six major clubs and a growing client base of international schools in Düsseldorf, which is home to 600 Asian companies and their families. The next innovation will be "organizing international tournaments for kids, especially in deprived areas, and women's tournaments." Hill, who sees himself as a "global citizen," believes in breaking down cultural barriers: "Traveling changes the way you think. If people learned more languages, there would be less divide. Communication is our greatest challenge."

Quick facts

Name Adam Hill

Age 39

Nationality German/Scottish

Company name

Fussball-Experience

Founded October 2018

Based in Düsseldorf

Industry sports/education

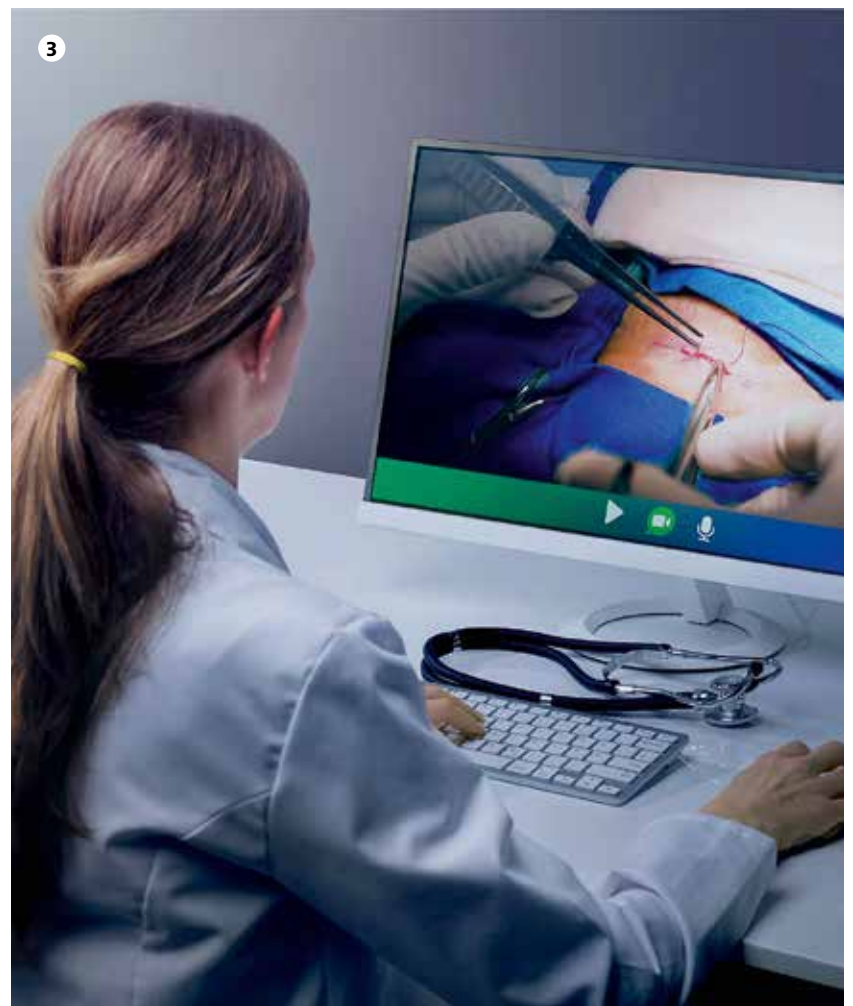
Number of employees 5



www.fussball-experience.com

apoQlar Virtual surgery

1 Two surgeons wearing Microsoft HoloLens glasses perform telesurgery assisted by VSI (Visual Surgery Intelligence). Using mixed/augmented reality, naturally rendered 3D images are uploaded to improve orientation and precision. 2 If a question arises, the surgeon can call a colleague or specialist (who has the surgeon's field of vision on their screen) to confer and assist with diagnosis. 3 VSI Telesurgery makes it easier for medical professionals to share information. It assists in more accurate diagnoses, increases the safety of surgical interventions and supports education and training. 4 Natural rendering is a visualization method that makes magnetic resonance imaging (MRI) and computed tomography (CT) look more natural and realistic. Slices and renders are colored and given depth to generate an easily recognisable, photo-realistic image of even the finest tissue structures.



Welcome to the Smart Hospital

Day-to-day life in medical centers will be completely transformed by digitalization in coming years. German hospitals are at the forefront of the digital transformation, the healthcare market in Germany is booming and foreign investors are flocking.

The surgeon's focus is as sharp as his instruments. He is preparing for a procedure to remove a cerebral tumor in a patient's brain – a complicated operation that will take hours. There are no monitors or computers in the operating room. Instead the doctor is wearing HoloLens – 'mixed reality' smart glasses produced by Microsoft. Hidden behind the dark lenses is intelligent computer software that allows the surgeon to look into his patient three-dimensionally before and during surgery. Activated by voice command, the glasses show CT or MRI images of the patient created prior to surgery and then projected onto the lenses.

Virtual surgery is an emerging field that will change the practice of operations. "We assume that soon every doctor will wear a



»We can hardly wait for the new generation of HoloLens. It will open up even better ways to perform virtual surgery.«

Sirko Pelzl,
apoQlar CEO

HoloLens Mixed Reality device," predicts Sirko Pelzl, CEO of apoQlar. The Hamburg-based start-up is partnering with Microsoft and distributes HoloLens devices to hospitals in Germany and to foreign countries such as Singapore and Thailand. ApoQlar has already equipped seven hospitals in Germany with its Virtual Surgery Intelligence (VSI) solution, including Essen's *Universitätsklinikum* and the *Marienkrankenhaus Hamburg*. "These glasses could completely replace computers and monitors in the OR (operating room)," Pelzl says. VSI costs start at EUR 1,000 a month. The fee includes the HoloLens, the software and server performance. In addition, after two to three years, apoQlar will exchange the glasses for a newer version. Virtual surgery is just one example of how



»With every surgical intervention, you have to balance risk versus benefit. Artificial intelligence helps us make more accurate predictions.«

Andreas Bollmann, senior rhythmologist at the Leipzig Heart Institute and CEO of Leipzig Heart Digital

digitalization could improve medical care for patients, doctors and nurses alike. New technological possibilities are entering the market at a rapid pace. By the year 2021, all Germans are to have an electronic medical record that stores all medical data compiled from physicians and clinics. There are also highly innovative medtech companies like apoQlar driving change. Thus, it's not surprising that many overseas investors are taking a major interest in the German healthcare sector.

While critics of digitalization in healthcare fear that the hospitals of the future will have less human interaction and increased anonymity, the benefits outweigh the concerns. New technologies provide greater efficiency and therefore reduce costs within the entire healthcare system. Consulting firm McKinsey estimates that digitalization in the German healthcare sector could have cut around EUR 34 billion of total health expenditure in 2018 – a potential saving of 12 percent. Paperless data-storage solutions like the electronic medical record promise to deliver the biggest cost reduction, some EUR 9 billion. Online interactions between clinics and patients, algorithms that support physicians'

DATA MANAGEMENT

No paper, no problem

The University Medical Center Hamburg-Eppendorf was the first clinic in Europe to introduce a hospital-wide electronic patient filing system, paving the way for paperless clinical procedures.

Since its foundation in 1889, the University Medical Center Hamburg-Eppendorf (UKE) has been one of the leading clinics in Europe. In 2011 it lived up to its vanguard reputation when it became the first clinic in Europe to introduce a hospital-wide electronic patient file. By 2021, all patients in Germany are to have an electronic medical record, but implementation has been slow except at UKE: The hospital stores patient data centrally so it can be accessed anytime from anywhere in the hospital by doctors, therapists and nurses. Not only is treatment more efficient, but the prescription and documentation of medication is easier when it is automated and paperless. Thanks to the electronic patient file, a robotic system packages 12,000 individual doses of medication for patients at the clinic's pharmacy each day. In the hospital ward, nurses check patients' wristbands before administering the medication. That maximizes safety.

decision-making, automated workflows and patient self-service are other ways to cut costs, McKinsey says.

But cost advantages aren't all that makes the digitalized hospital a must. Patients can also look forward to greater information thanks to new applications that can help them achieve their health goals and that support doctors in making more accurate diagnoses. For example, data from wearables or smart watches can uncover irregularities in a patient's health, which can then be analyzed by intelligent algorithms. The roles of doctors and nurses will also change. As machines perform an increasing number of daily, time-consuming tasks such as compounding drugs and searching for irregularities in diagnostic images, doctors will have more time to interact with patients. Moreover, their overall workload will diminish. So fewer mistakes will be made.

Trendsetting in Essen

Essen's *Universitätsklinikum* is a state-of-the-art German hospital that aims to become a model of digitalization – indeed, digitalization is at the very core of its corporate goals. The hospital is currently piloting smart al-

FACTS & FIGURES

Digital health trends

gorithms that perform routine work in radiology: checking images from CT scans and evaluating screenings for signs of cancer. The algorithm is a form of artificial intelligence that is fed with data and is constantly learning. The more data, the better the results. The hit rates in this pilot phase are high: metastases in cervical cancer can be detected at an early stage with 95 to 97 percent accuracy.

Even the time-consuming task of preparing drugs in the university hospital pharmacy is done by a robot. The intelligent machine picks up the prescription, weighs and mixes the ingredients and then produces the drug. A human pharmacist checks to ensure the mixture is correct.

Robots are also at work in the biobank of the clinic, where blood, body fluids and tissue samples from patients are stored. In the past excess material was thrown out, but it can now be processed by a machine for use in further research. The machine fills remnants of blood or urine into small plastic containers. Further personal data such as age, sex and medical conditions is also preserved. In this way, an ever-expanding digital memory is being created to help researchers at the hospital and other institutions.

Less travel for cardiac outpatients

Cardiac patients will be big beneficiaries of the smart hospital. The frequency of their heartbeats and the general condition of their cardiovascular system can be recorded by tiny sensors inserted underneath their skin, thereby significantly reducing the number of hospital visits needed. The sensor automatically passes on the data via a small transmitter in the patient's home to hospitals and doctor's offices. This information is then evaluated by patients' physicians who can consult with cardiologists to determine the best treatment.

Sensors like this are "already common practice in German hospitals," says Andreas Bollmann, senior rhythmologist at the Leipzig Heart Institute and CEO of Leipzig Heart Digital – a subsidiary of Leipzig Heart Center, which is part of the Helios Kliniken group. "Processing the data, feeding it into

64%

of German managers are convinced that AI will **fundamentally change** Germany's healthcare system¹⁾

€187bn

the value of the **digital health market** by 2020, from electronic records to intelligent instruments²⁾

16%

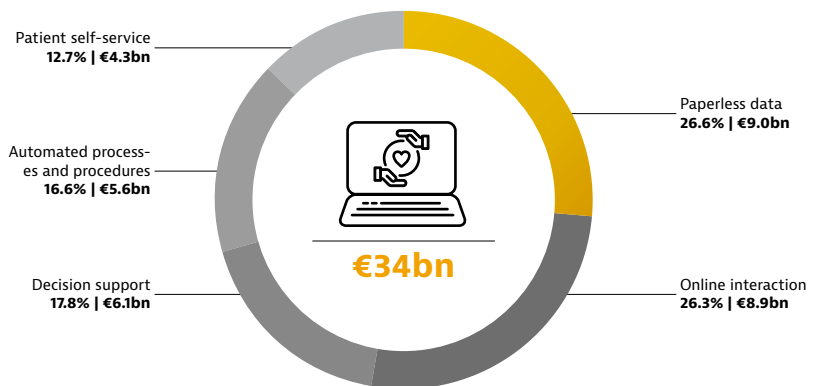
the compound annual growth rate in revenue of German **medical technology** companies up to 2028³⁾

90%

of German doctors see **digitalization** as a big opportunity for the healthcare system and hospitals in general⁴⁾

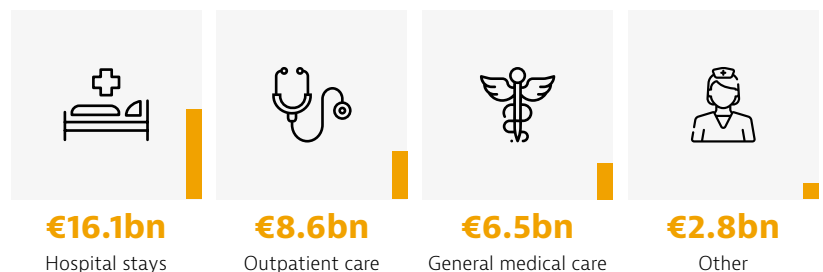
Huge savings potential

The German healthcare industry could have saved €34bn in 2018 through digitalization, according to McKinsey.⁵⁾



Digital rewards

German hospitals stand to reap great rewards from digitalization, especially economically.⁵⁾



1) Source: PwC; 2) Source: Roland Berger; 3) Source: "Gesundheit 4.0" Spectaris industry association; 4) Source: Bitkom; 5) Total savings €34 billion, source: McKinsey&Company

databases and drawing conclusions – that’s the real challenge,” Bollmann says. Since 2015, the Leipzig Heart Institute has established a reputation as a pioneer in cardiovascular clinical research. It is currently the largest cardiovascular clinical research facility in Germany. In 2018 the Leipzig Heart Institute raised EUR 2m for research and published over 200 scientific studies.

Bollmann is currently researching machine learning in the context of atrial fibrillation ablation, a routine operation performed on cardiac patients to treat atrial flutter. Last

FACTS & FIGURES

€16bn

amount hospitals could save through increased efficiency via digitalization

Source: McKinsey

year, he developed the SAFER system, short for ‘HelioS Atrial Fibrillation ablation rEg-istRy.’ The system draws upon data from 29 clinics within the Helios Group to minimize the risk of complications during the procedure. Currently the data set contains more than 28,000 procedures from 2010 to 2019. “This makes it the largest German register of atrial fibrillation ablations and allows us to create variables for quality assurance,” says Bollmann.

Bollmann was also part of the June 2019 ‘Healthcare Hackathon’ organized by the



Pierre-Michael Meier

»Hospitals are becoming smart hospitals.«

Pierre-Michael Meier is the general manager of *Entscheiderfabrik*, a think tank for hospital managers, and is involved in the European Association of Hospital Managers (EVKM). He strongly believes that clinics should develop new digital business models in order to stay competitive and keep up with innovations in healthcare.

Mr. Meier, what course do hospitals have to chart today in order to prepare for the massive change digitalization has set in motion?

Hospitals are facing major disruption to their traditional business models and the challenge of having to react appropriately. Many digitalization projects, new digital tools and applications are welcomed as they bring clinics clear benefits and added value. But only the hospitals that actively and positively take advantage of these opportunities will increase their potential and ultimately be successful. Data management, i.e. health information management, is the key to success.

Why is data management so important?

Health information management systems ensure that all data can be captured efficiently by all actors and used across system and sector boundaries. Without such data platforms, hospitals cannot seamlessly exchange data between individual digital health records and their own patient records or efficiently use data from new digital assistance systems. When budgets are tight, the digital hospital can secure revenues and effectively shape processes while being assured of data protection and data security.

What are the challenges facing hospitals?

Because clinics are structurally underfinanced, it is difficult for them to handle new technologies and investments. At the same time, the lack of skilled workers is becoming more critical, as is pressure from union-driven wage increases. Health insurance funds are placing ever higher demands on the services provided by hospitals. In this environment, hospitals will only be able to continue to operate successfully as ‘smart hospitals.’ To achieve this, they will not only have to digitalize individual processes but also rethink their overall business models and develop new digital services.

What does that mean specifically?

So far, hospital managers have concentrated on three typical factors that have to be controlled in order to provide high quality services in a cost-efficient way: surpluses, capacity utilization and investments. In the digital age, a new trio must be coordinated and delivered: quality, information exchange and financing. The digital hospital has to revolve around patients. Hospital managers who want to keep pace with this development must network with other decision-makers and with IT and organizational experts. It is not just about adapting to individual technologies or new applications. The entire business model of hospitals must change. Hospital managers should therefore be asking themselves whether a digital agenda is embedded in their corporate strategy or not.



Photo: Stefan Finger/iaif

In the biobank at Essen University Hospital, up to 1.2m samples are stored fully automatically and cooled at minus 80 degrees Celsius. Here medical assistant Alexandra Heidemann sends the samples to to be refrigerated.

KEY INDUSTRY EVENTS

Healthcare fairs

BIO-Europe, November 11–13, Hamburg

Europe's largest partnering conference for the global biotech industry turns 25 this year. BIO-Europe 2019 expects 4,300 attendees from 60 countries and 2,300 participating companies. GTAI is giving a tour of key biotech innovation clusters in Germany before the event (November 6–10). GTAI tour info → <https://bit.ly/2YClxEx>
 BIO-Europe info → <https://bit.ly/2YwZe4V>

Medica, November 18–21, Düsseldorf



WORLD FORUM FOR MEDICINE

DÜSSELDORF, GERMANY
 18–21 NOVEMBER 2019

www.medica.de

Member of MEDICAlliance

MEDICA is a must for leading healthcare companies. International visitors are invited to discuss business opportunities with GTAI at Hall 15 Booth L30.
 → www.gtai.com/medica

University of Mainz and supported by the Federal Ministry of Health. The object of the event was for healthcare professionals and entrepreneurs, working together in teams of 18, to find solutions to challenges currently facing hospitals. The task for Bollmann and his team was to use machine learning to design models that allow for better characterization and classification of atrial fibrillation. Using this process, they were able to draw conclusions about the length of hospital stays and the risk of serious complications during the procedure.

Revolutionizing preventive care

If Bollmann's team's findings make it to market, they could revolutionize prediction and preventive care. The method developed during the Hackathon might lead to personalized risk forecasting. "Before a procedure, we inform patients about their risk," Bollmann

explains. "To evaluate the risk, we use average values. However, the risk of a somewhat healthy 50-year-old is different from that of an 80-year-old with severe comorbidities." Using special software, physicians could enter data such as age, gender and previous illnesses and then calculate the individual risk of the patient.

This is just one of many examples of how digitalization will likely improve healthcare outcomes and patient satisfaction in the hospital environment. It may be some time before systems like the one developed by Bollmann and his Hackathon colleagues are implemented, but the future is already within sight.



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 GTAI experts for healthcare

Healing Architecture

It has long been known that the form of hospital rooms influences patient wellbeing. Now this concept has a name: 'healing architecture.' A new U.S. military hospital under construction at Ramstein Air Base is a prime example.



The new NATO hospital at Ramstein Air Base in western Germany will be the largest American military hospital outside of the U.S. With an area of approximately 137,300m² and a height of two multi-storey car parks, it will accommodate 5,000 rooms and 40 specialized clinics.

optimized to increase people's wellbeing. GTAI supported HOK in finding a partner in Germany that specializes in hospital construction – Stuttgart-based HWP Planungsgesellschaft. Together they formed the joint venture HOK/HWP and won the bid for the Ramstein facility. Located next to the U.S. military airport, the one-billion-euro 'Rhine Ordnance Barracks Medical Center Replacement' (ROBMCR) is currently being developed and should be finished by the year 2022. The scale of the project is huge: The hospital will include 5,000 rooms, 40 specialized clinics and nine operating rooms.

Supporting recovery

The challenge is to fulfill the many military-specific requirements while staying true to the principles of healing architecture. "We have created a large atrium with lots of sunlight," Thomas Quigley, the director of HOK Healthcare Practice, says. "German building codes support patient-friendly environments. They strongly regulate light and ventilation – both of which benefit patients." The way rooms are laid out can also help patients in their recovery. For example, waiting rooms can be divided into quiet zones for privacy and more lively areas for social interaction, perhaps even with background music. The traditional vast, anonymous hospital is outmoded and being replaced by architecture that has a positive effect on the people within it.

Back in the 19th century, Florence Nightingale, the famous British nurse and social reformer, laid out a vision of hospital rooms that were bright and airy, full of sunlight and with views of nature. Today, a number of scientific studies show that Nightingale was right. Functionality and efficiency should by no means be the only criteria used in either exterior or interior hospital architecture. The effect of environment on patients is critical.

The buildings we spend most of our time in shape our wellbeing, even more so when

we are sick and weak. Of course, architects are not doctors – they can't save lives with their designs – but they can help support the work of physicians and nurses. The basic idea of healing architecture is to put the needs of the patient ahead of mere functionality, thereby helping them recover.

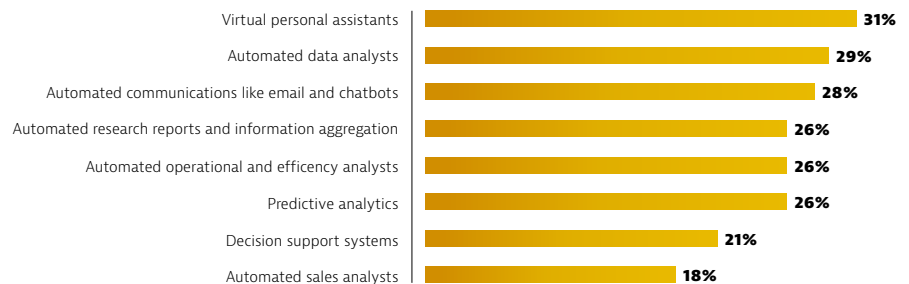
HOK Architects, one of the largest planning offices in the world, specializes in healing architecture. Using scientific data, HOK develops designs for patient-friendly clinics inspired by nature, suffused by natural light and both acoustically and climatically

Intelligent Revolution

The healthcare industry is charging forward when it comes to artificial intelligence applications and attracting investment globally. Germany's research institutes are among the world leaders in this field.

SMART HEALTH

Healthcare managers see great opportunities in AI: Here are the applications with the most potential.



The healthcare industry is undergoing a sea change some observers are already comparing to the discovery of penicillin. Today's revolution, however, has been triggered not by a single, ground-breaking invention but by a multitude of smart digital technologies and their application to medicine. Above all, two trends are driving the change: big data and artificial intelligence (AI).

Breakthroughs in sensor technology combined with ever greater processing power make it possible for increasingly large amounts of patient health data to be recorded in real time. Information can now be automatically collected, transmitted and evaluated. It can also be incorporated into electronic health records and used by medical professionals or smart apps.

AI searches for relevant information

Artificial intelligence in the form of self-teaching, pattern-recognition software can filter out health-relevant data from this mountain of individual information. The applications compare this data with other medical findings, for example from imaging procedures such as X-rays or computer tomography, analyze them in light of medical literature and recent studies, and then make diagnoses and recommendations for treatment. Smart algorithms also help to discover and develop new drugs and therapies faster and more efficiently.

The development of concrete applications for AI in medicine is swift compared to other industries. Great leaps in performance and quality of care can be achieved if medical specialists and research personnel are able to access relevant up-to-date information quickly and analyze it with the help of smart assistants.

Strong on research

In Germany today, institutes aligned with the German Research Center for Artificial Intelligence (DFKI) and the 29 research clusters of the Fraunhofer institutes are working together with private companies to turn the theory into reality. With five sites around the country, the DFKI is currently the biggest AI research center in the world in terms of number of employees and volume of external funds.

Japan-Germany Industry Forum

This year's conference on December 3 in Tokyo focuses on AI in healthcare. Japanese companies are invited to learn how AI is shaping the medical sector and to meet potential industry partners.
→ www.gtai.com/jp-industryforum

€6bn

estimated annual global market value of AI systems in healthcare in 2022¹⁾

¹⁾ Source: Frost & Sullivan

Importantly, machines are not being used to replace doctors and nursing staff. On the contrary, smart data analytics and AI apps are revolutionizing processes and procedures in hospitals and surgeries to help physicians.

With medical professionals in short supply around the world, and an aging population putting greater pressure on healthcare systems, the need for smart helpers will grow exponentially. Assisted by self-teaching assistants, physicians can not only maintain but improve quality, while patients will benefit from faster and better treatment.



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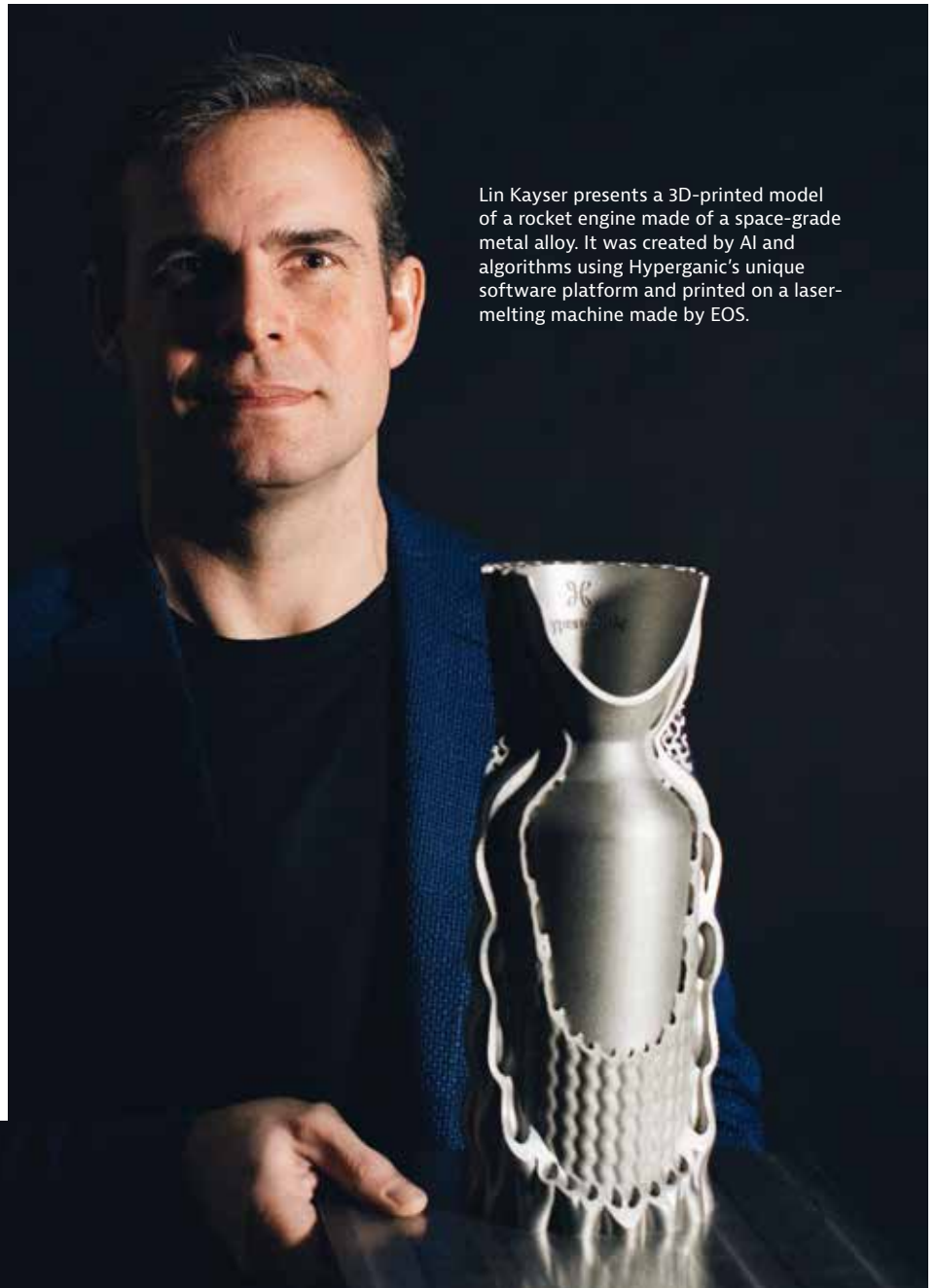
Additive Printing

Back to the Future

Revolutionizing production with 3D technology

Lin Kayser, the co-founder of Hyperganic Technologies, sees himself following in the footsteps of the great explorers and pioneers. The serial entrepreneur's new project is based around an algorithm that mimics evolution in the natural world. Specifications are entered into a computer; it does the calculations and feeds them into a 3D printer, which then spits out the finished part within a few hours. The system can be applied to a sneaker or a train drive. Kayser believes 3D technology has the potential to change the future of production in the same way Microsoft or Apple changed computing, or the industrial revolution paved the way for mechanized production. "If we get it right," says Kayser, "we can repeat the German boom of the 19th century." 46-year-old Kayser has a strong track record of innovation to back up his bold claims: Eight years ago he sold his first start-up to Adobe, and after that he organized an expedition to the Amazon.

www.hyperganic.com



Lin Kayser presents a 3D-printed model of a rocket engine made of a space-grade metal alloy. It was created by AI and algorithms using Hyperganic's unique software platform and printed on a laser-melting machine made by EOS.

Photo: Hyperganic Technologies AG

Environmental Protection

Tossable Tableware

A biodegradable alternative to plastic



Success, the old saying goes, is being in the right place at the right time. For Indian-born entrepreneurs Paramjit Kohli and Padmaraj Pattanashetti, the place is Bremen and the time is now. As the European Commission considers how to reduce plastic waste, the duo behind BlumBio Solutions have come up with a line of disposable tableware made of just corn starch and a bioplastic bonding agent. The low-cost, eco-friendly solution – including plates, bowls, mugs and cutlery – is heat-resistant up to 120°C and has already been certified by the U.S. Food and Drug Administration (FDA).

Aerodynamics

Star Struck

Compact rockets for small satellites



Need a rocket engine? Munich start-up Isar Aerospace Technologies, founded last year, has set its sights high – it aims to become 'Europe's SpaceX.' Founders Josef Fleischmann, Daniel Metzler and Markus Brandl have come up with a high-performance engine for mini-launcher and second-stage apps. It has 75 kilonewtons of thrust, making it capable of bringing 600 to 1,000-kg objects into low Earth orbit. For propellants, it uses liquid oxygen and hydrocarbons. The engine is ideal for use with today's smaller satellites, and Isar hopes to lower the barrier to space access.

www.isaraerospace.com

Renewable Energy

Waste Not, Want Not

Wafers provide affordable solar power



Not all wafer margins are thin ones – as the flourishing Freiburg start-up NexWafe knows. The company was founded in 2015 by experts formerly associated with the Fraunhofer research institute and other prestigious institutions. It specializes in the monocrystalline silicon wafers used in solar cells. NexWafe produces wafers with virtually no waste, known as 'kerf.' The wafers account for around 40 percent of the cost of solar modules, and NexWafe believes it will be able to dramatically undercut the competition in terms of price. The new wafers are produced using chemical vapor-phase epitaxy rather than the conventional method. Early demonstrations of the product have convinced stakeholders of its effectiveness. NexWafe was named one of the 40 best European high-tech start-ups at the 2017 HighTech Venture Days exhibition in Dresden.

www.nexwafe.com

E-mobility

Electric Autobahn

Electricity cables power transport vehicles



Germany has opened its first 'eHighway' – a 6km stretch of autobahn near Frankfurt along which e-trucks can draw power from overhead cables. The project is being funded by Siemens and the federal state of Hessen. Trucks are restricted to speeds of 90km/h, but the potential benefits are huge: Siemens estimates that transport vehicles will save EUR 20,000 in fuel costs for every 100,000km, and 6m fewer tons of CO₂ would be emitted if 30 percent of German highways were electrified. Siemens envisions the system – under trial until 2022 – connecting ports and cities.

www.siemens.com



Photo: Sono Motors GmbH

Sono Motors unveils a prototype of the 'Sion', a mass market, solar-powered electric car, in Munich.

Green Electromobility

Sun Power on Wheels

An all-electric car with solar panels

There are plenty of car makers seeking to utilize green energy, but a new player is taking things a step further. Munich-based start-up Sono Motors has designed a car with 248 solar panels embedded into its roof, hood, rear and sides, which can provide enough electricity per day for 34km of no-cost, zero emissions driving. Together with its lithium-ion battery, which is sold or rented separately, the low-frills five-seater offers a maximum range of 250km.

The 'Sion' will be the first mass-produced electric car with solar panels when it enters production in late 2020. There are already over 10,000 pre-orders for the affordable e-car, which will cost EUR 25,500. As the automotive suppliers ElringKlinger and Continental will supply the batteries and motor/drive unit, this will be a joint 'Made in Germany' effort.

www.sonomotors.com

New Technology

Cool Idea

An electricity-free fridge



Domestic white goods – fridges, cookers and washing machines – account for half the average household's electricity usage a year. A Berlin-based start-up called Coolar has come up with a solution for reducing our footprint at home: a fridge that uses warmth rather than electricity. Externally-circulating water is exposed to solar-generated heat which then transfers that energy to silica gel. The principal is similar to the cooling effect of sweat on human skin. The idea was developed by co-founder Julia Römer on her university course in engineering. The prototype

contains neither batteries, refrigerants nor lubricants that are harmful to the environment. The company, which was founded in May 2016, is still taking its first steps but hopes to be mass-producing refrigerators within five years. At the same time, Coolar will be developing applications for transport cooling. The company hopes the technology could also provide a solution for medicine and food storage in regions without reliable electricity.

www.coolar.co

30 Years After the Wall



Three decades ago, the Berlin Wall – the enduring symbol of the Cold War – was opened, and the process of reunifying West and East Germany began. Today the six eastern states are full of success stories and unique business opportunities.

November 9, 1989 marked an end and a beginning: the opening of the Berlin Wall, the conclusion of the Cold War and the reunification of Germany. The challenge of reintegrating the two halves of the country has proved enormous, and there has been no shortage of criticism when things have gone wrong. Nonetheless, Germany's political and economic reunification has largely been a success – in the past 15 years alone, the GDP of the former east has risen by more than 44 percent to EUR 356 billion.

Christian Hirte, the government's commissioner for the 'new federal states,' says that eastern Germans should be proud. "Today the eastern German states have an economic power comparable to many regions in France or Britain," Hirte explains. "If we remember where we started thirty years ago, the development has been impressive."

The blossoming landscapes promised by Chancellor Helmut Kohl back in 1989-90 may have taken time to put down roots and grow, but grow they have. Each of the six federal eastern states – Mecklenburg-Vorpommern, Thuringia, Saxony, Saxony-Anhalt, Brandenburg and, of course, Berlin – have developed in different ways.



Berlin Burgeoning Biotech

The capital of reunified Germany may be famous for its IT and other start-ups, but the Berlin business ecosystem is by no means restricted to bearded hipsters hacking away at laptops in cafés.

Case in point: **JPT Peptide Technologies**. This biotech company has become a market leader in its sector, employing some 100 people. Peptides are critical reagents to diagnose diseases such as cancer or infectious diseases and to develop effective, ideally personalized treatments targeting the immune system of patients.

The company attributes part of its success to its location on the Adlershof Campus in eastern Berlin, which is run by the Humboldt University, also in the east. "This loca-

tion has numerous advantages, beginning with the support we've received over the years from the campus management and the possibilities for cooperating with other biotech companies," says JPT managing director Holger Wenschuh, who was himself born and bred in East Germany. "Connections to the city's universities are especially important, allowing us to recruit personnel from their chemistry and biology departments."

Brandenburg Revving Up with Rolls

When you hear the words **Rolls-Royce**, you probably don't immediately think of Brandenburg. But the small village of Dahlewitz in the eastern German state is the spot where the famous British technology heavyweight chose to locate the headquarters of its German airplane-engine subsidiary.

The company was able to build on existing expertise when it established the site in 1990. Close to 3,000 people work there. Mirko Quednau, for instance, cut his teeth with the East German state airline Interflug. Today he's team leader of the training division in Dahlewitz. "We now hire

apprentices who were born between 2000 and 2002,” he says. “It’s fascinating to work with people who only know the Wall from history books.” Quednau cites the presence of well-qualified and keen people, universities, a very supportive regional government, the airport and autobahn connections as factors making Brandenburg a high-power business location.



Mecklenburg-Vorpommern Nautical by Nature

Mecklenburg-Vorpommern has not only the largest inland lake in Germany but also the longest (1,905 km) coastline. So it’s not surprising that many companies there have connections to the sea. A good example is **Liebherr-MCCtec** GmbH, which manufactures a large variety of maritime cranes with a lifting capacity of up to 5,000 tons.

The foundation stone for the Liebherr location in Rostock was laid in 2002 and production began only three years later.

“The connection to the sea is a decisive advantage.”

Since then, the location has grown steadily and commands a market share of more than 50 percent in some areas of the maritime industry. “The decisive advantage is the connection to the sea and its logistical possibilities,” says Liebherr Rostock’s managing director of finance, Steffen Pohl.

“Here our cranes can be transported directly by ship to any part of the world.” Pohl is obviously proud of his region, adding that “other people come to Mecklenburg-Vorpommern for holidays – I live and work here.”

Eastern Germany
Each state has developed in its own unique way.





Saxony An Inventive Family Business

Not many firms in the world can claim to be unique, but **Von Ardenne** from the Saxon capital Dresden is one of them. The company, which specializes in vacuum coating for the glass, photovoltaic and energy industries, takes its name from one of Germany's leading twentieth-century inventors, Manfred von Ardenne (1907–1997).

Von Ardenne's business was one of the few private enterprises allowed in the Communist east, where, with no recourse to government subsidies, it learned to survive in a hostile business environment. After the demise of German socialism thirty years ago, Von Ardenne flourished. COO Pia von Ardenne-Lichtenberg, Manfred's granddaughter, says the company's success would have been impossible elsewhere.

"We employ physicists and engineers who grew up and were educated in Saxony," she says. "There are many research institutions and universities here. We couldn't imagine advancing our technology anywhere else in the world." Today Von Ardenne turns over around EUR 280 million a year and employs around 1,000 people in Dresden and across its five subsidiaries worldwide.

Saxony-Anhalt Software Solutions from a Small City

Businesses in eastern Germany tend to be smaller than in the west, which can be an advantage to ambitious start-ups. Take **COMAN Software**, which was founded in 2018 in the town of Stendal, Saxony-Anhalt. It provides a software solution for monitoring and digitalizing construction projects in automotive plant engineering, making them more efficient.



COMAN already counts some of the world's largest carmakers among its customers, and the company is well on its way to becoming the market leader. Its impressive start attracted EUR 1.2 million of venture capital from the federal state of Saxony-Anhalt.



That funding allowed COMAN founder and Saxony-Anhalt native Sven Kägebein (right) to return home and expand his business in the tranquil surroundings of Stendal. The company already has 14 employees and continues to grow. Kägebein's partner Timur Ripke (left) comes from West Berlin, but together, the two entrepreneurs have their sights firmly set on the prospects of the future and not the divisions of the past. "I look forward to the day when people no longer talk about East and West, but just about Germany," Kägebein says.

Thuringia Uniting Past and Present

There is a stereotypical account of reunification that relates how western Germans invaded the east, shutting down business-

es and ordering easterners around. But Thuringia provides a great example of cooperation and building on traditional eastern strengths.

For nearly thirty years the **Fraunhofer Society**, headquartered in Munich, has worked with companies like optics giant ZEISS in eastern German Jena. "The Fraunhofer Society looked around early on in eastern Germany for places with applied research potential that could benefit businesses," says Fraunhofer Institute for Applied Optics and Precision Engineering IOF Director Andreas Tünnermann. "One was Jena with its special emphasis on optics and photonics based on the area's traditional industrial strength in those areas. We started in 1992. Our beginnings were humble – with only a few employees and a budget of the equivalent EUR 2 million a year. Today we have 300 employees and a budget of around EUR 45 million."

At present some 180 companies in Jena operate in this sector and employ 15,000 people, mostly university graduates, making it a shining example of the economic potential in Germany's east.



You can find out more about the economic success of the eastern federal states and companies located there in our video '30 Years of the Fall of the Wall' at: www.gtai.com/30years



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Full Speed Ahead

An exciting new 'Port of Science' is being built near the university district in the historic trading city of Magdeburg. With overseas investors already taking advantage, it is on course to become one of the largest research clusters in Germany.

One of the Port of Science's main attractions is the 3D Mixed Reality Lab 'Elbedome' at the Fraunhofer Institute for Factory Operation and Automation (IFF).

There's something big happening in Magdeburg. The capital of the state of Saxony-Anhalt will soon be home to one of the largest research clusters in the country. Spanning an area the size of 46 soccer fields, the proposed 'Port of Science' will provide a home for seven research institutes and create over 450 jobs. The regional government is supporting the initiative, also in the context of marketing campaign 'Center of Excellence – Saxony-Anhalt', and it is expected to set a new standard. Soon, the diverse and vibrant city and harbor on the river Elbe will serve as a center for innovation and knowledge with space for residential use, services, leisure and tourism.



»We are thrilled at the Port of Science's extraordinarily successful development into a 'science city' in Magdeburg.«

Michael Schenk,
director of the Fraunhofer IFF

The infrastructure of the southern part of the port has already been developed, and a further EUR 150 million will be invested in the initiative over the next few years. Foreign partners are already discovering the potential of the hub: companies such as the Shenyang Sino-German Siasun Education and Technology Group, a spin-off of the Chinese Academy of Science and subsidiary of Siasun Robot &

Automation. Founded in 2000, the business has its headquarters in Shenyang in northeast China and produces industrial, mobile and service robots. Siasun has planned an initial investment of EUR 20 million and, in addition to the training center it has acquired in nearby Schönebeck with 40 staff, it will create 20 jobs in the Port of Science.

Siasun needed a central location for its European expansion plans, but the Port was specifically chosen because it is an "outstanding research and training location," explains Cunyan Fan, CEO of Siasun Education. Siasun's offices will be near the Fraunhofer Institute for Factory Operation and Automation (IFF) with its Virtual Development and Training Centre (VDTC). "In close cooperation with GTAI, the Investment and Marketing Corpo-

ration Saxony-Anhalt (IMG), the city of Magdeburg and the Fraunhofer Institute, we have received very good support for our investment project and can continue to rely on this partnership for our future plans," says Fan.

Siasun has lofty ambitions for the Magdeburg site: work is about to start on a robotic service center for the European market. The Chinese corporation's presence at the Port is another step in establishing Magdeburg as an international research hub for robotics and artificial intelligence. Fraunhofer is also investing in the site with the construction of a new Center for Cognitive Adaptive Work Systems.



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Blazing Saddles

The number of electric bikes sold in Germany has doubled since 2014. While most of these are imports, the global demand for high-value German e-bikes is growing considerably and the market is diversifying.

- 1 The 2019 VELO trade fair at Berlin's Tempelhof Airport featured cycling races with a legendary Raisin Bomber in the background.
- 2 The 'Shark' zero-emissions e-bike makes the perfect little people carrier.
- 3 Close-up of a Bosch lithium-ion rechargeable battery that powers the pedelecs.
- 4 The U.S. brand Lime was one of the first transport rental companies to launch dockless e-bikes in a number of global cities.



Sometimes new trends can be hard to spot. When it comes to the German cycling market, the trend is hard to ignore. At this year’s VELO bicycle trade fair in Berlin, for instance, the hottest products were ones riders don’t necessarily have to pedal. “It’s gotten so that some visitors complain that e-bikes are the only things on show here,” said a representative for the venerable German cycle manufacturer Kreidler.

With people trying to change their behavior to live more sustainably, the bike business in Germany is booming – 80 percent of German households now have at least one cycle – and electric bikes, hybrids and pedelecs are a major part of that growth story.

The turnover of e-bikes in Germany has been steadily increasing for a decade, reaching sales of 980,000 units in 2018. That was up dramatically from 720,000 the year before. Most of these pedelecs are manufactured abroad: e-bike imports to Germany reached a record 880,000 in 2018, compared with 640,000 in 2017. The value of the entire German cycling market in 2018 was estimated at EUR 3.16 billion.

Market picking up speed

At the beginning of 2017, 3.1m German households (6.1 percent of all households countrywide) had at least one electric bicycle – twice the number recorded in 2014. The spectrum of products on sale in Germany is vast, with prices ranging from EUR 750 up to EUR 5,000 or more. David Eisenberger, communications director at German Bicycle Industry Association, says pedelecs are “a driver of turnover and innovation.”

“More than four million bicycles were sold in 2018, and roughly a quarter of them were e-bikes – an annual increase of 36 percent,” Eisenberger says. “In the long-term, a market share of 35 percent for e-bikes is entirely realistic. That underscores the significance of this category of bikes for the German bicycle industry.”

Many foreign companies are already taking advantage of this business opportunity. Cycling heavyweights like Taiwan’s Giant and Cannondale from North America have a sizeable presence on the German market. But

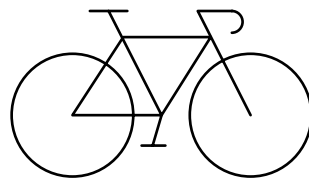
FACTS & FIGURES

€3.1m

German households with at least one electric bicycle in 2017 (twice the amount recorded for 2014)

Hot wheels

Number of electric bikes sold in Germany



980,000
2018



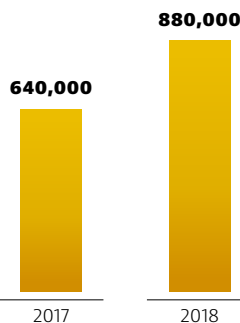
535,000
2015



380,000
2012

On your bike!

Number of electric bikes imported to Germany



Source: ZIV

smaller companies such as Babboe (Netherlands), BH (Spain) and Greenbikes (Israel) have also found niches for themselves.

The leading country exporting bikes to Germany is Vietnam, followed by Holland. China is subject to punitive tariffs on finished e-bikes because of illegal subsidy allegations, but companies like Bafang remain heavily engaged in the bike parts market. So why are German cycle manufacturers letting their foreign competitors get the drop on them? The answer is they aren’t. Germany also has a very healthy export market for pedelecs. 440,000 German e-bikes were exported in 2018, up from 290,000 the previous year. As a general rule, Germany exports relatively high-value products while it imports more economical ones.

Geared for growth

Whether targeted at the domestic or foreign markets, many German bicycle makers are now promoting their electric models. In addition to Kreidler, German household name brands like Stevens, Hercules and Kalkhoff are now pushing sales for pedelecs on their websites and in their advertising campaigns.

There is every reason to expect the German e-bike market, both imports and exports, to keep expanding as concerns about climate change and global warming from CO₂ emissions grow globally.

E-bikes and pedelecs are also a way of alleviating pressure on roads in increasingly crowded cities. Germany’s transportation ministry boldly declares on its website that “Cycling is booming” and has made the promotion of e-vehicles a major policy focus. Local authorities are taking a similar tack. Berlin, for instance, has passed a groundbreaking mobility law to encourage dramatic increases in cycling as part of the city’s push to become CO₂-neutral by 2050.

Not all current or potential pedal cyclists are willing (or able) to supply the horsepower needed to travel anything more than short distances. Thus, pedelecs and electric cycles will remain an effective and stylish option for those who don’t want to break too much of a sweat getting to work, doing the school run, or going shopping.

Greening the Future

The German energy market is undergoing radical change in line with the government's initiative to transition to sustainable energy. The electricity infrastructure is expanding rapidly, generating numerous opportunities for foreign suppliers.

Enapter builds clever electrolyzers that can convert electricity into hydrogen. In 2018, the Thai company opened an office in Berlin and is set to start mass production in Germany. Thomas Chrometzka, Enapter's head of strategy, says the location was a natural choice for the company: "Germany is a pioneer because of its energy revolution and offers ideal conditions for us."

Germany is in the midst of the so-called *Energiewende* (energy transition), the overhaul of its electricity supply. In 2022, the last nuclear power plants are due to be taken off the grid. By 2025, up to 45 percent of the electricity is to come from renewable sources: wind, sun, water and biomass. According to a recent evaluation by the Fraunhofer Institute for Solar Energy Systems, around 41 percent of Germany's electricity already comes from renewable sources. But Germany still needs intelligent infrastructure to ensure that the *Energiewende* succeeds.

One of the biggest challenges, for example, is compensating for weather-related fluctuations in energy production. Wind energy also has to be transported from the north to the south of Germany. These demands open up opportunities for companies in various sub-sectors: software and hardware manufacturers and producers of energy storage

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€5.5bn

Sales of energy storage systems in Germany in 2019 – for both domestic and commercial use

45%

of Germany's electricity will come from renewable sources – wind, sun, water and biomass – by 2025

4m

The estimated demand for public charging points for e-cars in Germany in 2050

Source: German Energy Storage Association (BVES), Federal Ministry for Economic Affairs and Energy, Fraunhofer Institute for Energy Economics and Energy System Technology

devices, for instance. And because Germany is increasingly focusing on electromobility in the wake of the energy revolution, the charging infrastructure for e-cars is also a growing market.

The first of these sub-sectors involves the expansion of the electricity network itself. Intelligent power grids, or 'smart grids,' help to identify and prevent bottlenecks in energy distribution in timely fashion. In 2016, the German government passed a law to support the digitalization of the energy system and set a target to digitalize all electricity meters and connect them to the Internet by 2032.

Opportunities for growth

There are a number of entry opportunities in Germany for companies that develop software for controlling smart grids. The Italian IT company Prosume, which produces software for smart meters, is one firm trying to gain a foothold in the German market. "There are many small distribution network operators who want to organize their own infrastructure," says Alex D'Elia, co-founder of Prosume's parent company Mangrovia. "This makes Germany an attractive location. Thanks to intelligent grids, utilities and grid operators, we can see not only how much electricity is generated but also what quantities of electricity consumers demand at what

time. This enables dynamic electricity pricing that can vary within a day.”

Storage, allowing energy to be conserved for periods of low production, is a second growth market. Home storage is about to become widespread. For a long time, lithium-ion batteries were considered too expensive for domestic usage, but in recent years their price has fallen from EUR 400 per kWh of storage capacity to EUR 107 per kWh. The market research company EupD Research predicts that there will be 8 million such storage units in private households worldwide by 2030. With around 125,000 installed home storage units, Germany is already the largest sales market.

A third market with bright future prospects is charging station infrastructure for

The share of renewable energies within total electricity production in Germany has steadily increased over the past decade.

electric cars. By the end of 2018, there were 150,000 e-cars in use on German roads, and as of mid-2019 there were more than 20,000 public charging stations for them – a yearly increase of 50 percent. The number of charging stations will continue to rise thanks to a government subsidy programme to support the infrastructure. The target is to get at least ten million electric vehicles on German roads by 2030. Companies that offer charging column hardware or billing systems will also find a wealth of opportunity in Germany.



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E.ON's Arkona Offshore Windpark in the Baltic Sea is powered by 60 turbines of the Siemens Gamesa Wind Power SWT series, with a total output of 385 MW. Pictured here with substation AB00.



BeST in Class

Berlin's multi-award-winning Charité Hospital is establishing an OP simulation and training center and education project for healthcare professionals. The center, called BeST, is looking for industry partners and is open to working with overseas investors.

Flight simulators have long been an integral part of pilot training. Now, simulation is playing an increasingly important role in healthcare. Berlin's Charité University Hospital (recognized as Germany's best hospital for the seventh year in a row in 2018) was a pioneer in Germany

Human patients will be replaced by computer-controlled mannequins, 3D-printed models or even actors.

when it opened its first simulation center in 1999. And Charité is currently building a brand-new facility called BeST, the Berlin Simulation and Training Center, which will be one of the most advanced in Europe. The EUR 12 million project forms part of a comprehensive EUR 80 million modernization of the Charité campus in the heart of Berlin. The new 13,000m² (140,000 square feet) BeST facility will replace the current simulation center and is due to open in 2020.

Simulation centers facilitate the rehearsal of emergency scenarios and interventions and can increase the efficiency of operations, as is otherwise impossible in everyday hospital life. Crucially, they also accelerate the adoption of new techniques and drugs. The

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€12.3m

the cost of the BeST project to facilitate the rehearsal of emergency scenarios and operations

€80m

the cost of modernizing the Charité campus, a 13,000m² site in the center of Berlin

7,000

the maximum number of participants who can undergo training every year

Charité center will house a state-of-the-art operating theater, a delivery room, a hybrid operating room with latest X-ray technology examination rooms, and a specially equipped emergency room.

Surgical simulation training

Computer-controlled mannequins, 3D-printed plastic models and, in some cases, actors will take the place of real patients. Operations can be simulated in virtual reality, and real-life body parts (from deceased donors, for example) can also be used. The center estimates that in a year it will be able to run up to 600 training days with between six and 60 participants, allowing up to 7,000 trainees to take part.

BeST will work closely with CAT, the hospital's surgery and anatomy training center, where operations on human tissue are carried out. Another important part of the overall concept is the 'Industry and Clinic Meeting Point,' a forum where new medical technologies and products can be discussed, and where developers and clinics can find suitable cooperation partners. BeST will enable new products to be developed, tested and brought to market under real-life conditions.

Many medical-technology companies have already expressed interest in partnering with the project. For foreign companies working in the medtech sector, the Charité initiative represents an outstanding opportunity to introduce innovative solutions through research and development partnerships in Germany.


Trade Fairs in 2020

Hardly a week goes by in Germany without a trade fair, business sector conference or other meeting of economic minds. 2020 will be no exception, with scores of events scheduled to take place around the country. Here's a chronological list of some of the most important dates for your calendar.

 **January 17–26**
International Green Week, Berlin
Food, agriculture and horticulture

 **February 7–11**
Ambiente, Frankfurt
International consumer goods

 **February 11–13**
E-World, Essen
Energy industry

 **March 2–3**
CCW Call Centre World, Berlin
Customer service and call centers

 **March 4–8**
ITB, Berlin
Tourism

 **March 10–12**
Logimat, Stuttgart
Logistics

 **March 10–12**
Energy Storage, Düsseldorf
Energy storage


 **March 24–26**
Altenpflege, Hannover
Health care for the elderly

 **March 31–April 3**
Analytika, Munich
Biotechnology

 **April 1–3**
ICBC, Berlin
Cannabis products

 **April 20–24**
Hannover Messe, Hannover
General industry

 **April 21–23**
DMEA, Berlin
Digital health

 **May 4–8**
IFAT, Munich
Environmental technologies

 **May 13–17**
ILA, Berlin
Aviation

 **June 17–19**
Smarter E, Munich
Energy

 **June 16–19**
Automatica, Munich
Automation and robotics

 **September 22–25**
WindEnergy, Hamburg
Energy

 **September 22–25**
Security Essen, Essen
Security

 **September 23–26**
RehaCare, Düsseldorf
Health Care

 **September 24–30**
IAA, Hannover
Automotive

 **October 6–8**
IZB, Wolfsburg
Automotive parts

 **October 13–17**
Fakuma, Friedrichshafen
Plastics

 **October 26–28**
BIO Europe, Munich
Biotech, pharmaceuticals and finance

 **November 10–13**
Formnext, Frankfurt/Main
Additive manufacturing and 3D printing


 **November 16–19**
MEDICA, Düsseldorf
Medicine

 **December 1–3**
Food Ingredients Europe, Frankfurt am Main
Food

 **December 1–3**
Health Ingredients Europe, Frankfurt am Main
Health

The German Hub

San Francisco's Silicon Valley attracts the top tech talent from around the world. The new GTAI-supported co-working space will help German companies thrive in this hyper-competitive and disruptive environment by supporting knowledge sharing, collaboration and enhanced networking opportunities.

 101 Montgomery Street, Suite 2050
San Francisco, CA 94104



Silicon Valley's German Hub

In March, a very special new co-working space opened in San Francisco: the German Hub. *Markets Germany* asked the GTAI representatives on site, Angelika Geiger and Heiko Steinacher, about this exciting project.

Seven German organizations have come together to form a new office community in the Silicon Valley metropolis. Why did they do this?

ANGELIKA GEIGER: Previously there was no central point of contact in San Francisco for either German companies or American ones that want to become active in Germany. This new concept provides an opportunity for synergies. For example, I work with energy and IT companies across North America, and I'm glad to share my insights on industry trends



»Invest in your network – you will be repaid in the long run.«

Angelika Geiger,

GTAI's San Francisco invest representative
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with the other Hub partners. On the other hand, I can learn directly from colleagues in the Hub about developments in Bavaria, Baden-Württemberg and northern Germany.

Which organizations are represented in the German Hub?

HEIKO STEINACHER: In addition to the GACC

West (Representative of German Business for the Western United States) there is our organization Germany Trade & Invest, Invest in Bavaria, the NGIO (Northern Germany Innovation Office), the Ministry of Economic Affairs of Baden-Wuerttemberg, the Technical University of Munich and the tax consulting firm Rüter und Partner. Nobody likes to work in isolation; we all profit from open exchange.

What concrete benefits does this co-working space have for customers and participants?

GEIGER: The German Hub brings federal and regional business developers closer together. If I can inspire a company to choose Germany, and Bavaria emerges as a possible location, I can work directly with my Bavarian colleagues in the German Hub. Sharing knowledge, ideas and important contacts is the Silicon Valley mindset – if you invest in your network, you will be repaid in the long run. That philosophy is shared among all of the German Hub participants, and we all benefit.

What is special about the business environment in San Francisco?

STEINACHER: The San Francisco Bay Area accounts for about 40 percent of total U.S. venture capital investment and about one-seventh of all U.S. patents. The environment is very innovative and disruptive. We can see that disruption, the replacement of existing technologies and services through innovative new ones, everywhere. It creates

alliances that would have been previously unimaginable, such as that of Volkswagen and Microsoft for the development of the Volkswagen Automotive Cloud. Keeping up



»The Bay Area accounts for 40% of all U.S. venture capital.«

Heiko Steinacher,

GTAI's San Francisco trade representative
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with these trends is essential for Germany to avoid falling behind. During his visit to San Francisco in early July 2019, the Federal Minister for Economic Affairs and Energy, Peter Altmaier, made it clear that he wants to rev up the transition to future technologies like artificial intelligence and machine-learning. The German Hub wants to actively accompany, support and promote such processes.

GEIGER: Silicon Valley attracts top talent from all over the world. It is exciting to work in such a creative atmosphere. But since no single one of us can possibly partake in all of the learning and networking opportunities available, members of the Hub gain from the experiences of the others.

German American Collaboration

Emilio Brahmst, director of Germany Trade and Invest's (GTAI) Chicago office, uses his industry expertise to promote Germany in the U.S. Midwest.

What is your background and how did you join GTAI?

EMILIO BRAHMST: After studying engineering in Berlin, I went to Detroit to work as a consultant in the automotive industry. I analyzed many manufacturing processes at domestic auto makers and their suppliers while at the University of Michigan and later at two other employers. After 10 years, it was time to move on. I started an MBA program in Chicago, and I got in contact with Germany Trade and Invest, which was looking for a candidate to cover the automotive sector. It was a perfect fit, and I think it is a strength of our service that we have strong industry expertise in the sectors we consult in.

What are the key industries in your region for foreign direct investment?

BRAHMST: The American Midwest is generally characterized by strong manufacturing, food and service sectors. We also have several clusters. For example, most domestic car makers and their suppliers are headquartered in Michigan. Chicago is the third largest metro area in the U.S. and home to a variety of very large corporations that represent a cross-section of our industries. Interestingly, I tend to find most investors in areas where Germany is strong as well, such as advanced manufacturing.

What information do companies seek about Germany?

BRAHMST: Many of our clients are small- to mid-size companies and they usually



»We focus on emerging growth areas.«

Emilio Brahmst's job is to attract investment to Germany, and he has assisted many U.S. and Canadian companies with FDI projects in the automotive, machinery and other sectors. He regularly speaks at industry events. He is an engineering specialist with a Masters in Engineering in Manufacturing from the University of Michigan and a Masters in Engineering and Machine Construction from the Technical University of Munich.

need information on how to establish and run a business in Germany. As a result, we dispense a variety of information on these topics. Some companies also seek industry-specific information in order to complement their own analysis. Also important is our site selection service where we work with the investor and with our partners in Germany on the state or city level to find the best possible investment location.

How do you work with the German American Chamber of Commerce and the German Consulate in Chicago?

BRAHMST: Aside from regular exchanges, we are often present at one other's events. It turns out that our networks are very mutually beneficial. We also share resources. The Chamber may help us organize events. Or we might assist them by supporting trade missions. The cooperation can even extend to colleagues in Germany: for example, our expert in automotive lightweighting recently participated in the visit of a Chamber delegation to our country.

What are your goals for the next 12 months?

BRAHMST: We will try to be proactive with respect to trends by focusing on the emerging growth areas within our industries. And we will increase our efforts with regards to automation equipment for machinery, ingredients for food and autonomous technologies for the automotive sector.



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Engineering Change

Dr. Volker Kefer, president of The Association of German Engineers (VDI), argues that Germany owes its reputation as a technical and manufacturing powerhouse to its engineers. However, engineers must train across disciplines to stay on top in the era of digitalization.

Collaboration across different technical disciplines, retraining and upskilling are essential if German engineers are to remain on top in the age of digitalization.

Germany is the land of engineers, inventors and innovators. Pioneers like Gottlieb Daimler, Robert Bosch, Werner von Siemens and Ferdinand Porsche had an enormous impact on Germany in their time, and their legacy lives on today. Engineers are still a driving force of the country's economic growth, contributing over EUR 220 billion to the value of the economy – more than any other occupational group.

Goods and services 'Made in Germany' are respected worldwide. The label is a guarantee of quality, reliability and precision. Germany owes its reputation as a leading lo-



»Engineers are still the driving force.«

*Dr. Volker Kefer,
president of The Association
of German Engineers (VDI)*

cation for technical know-how to its excellent engineers. Yet while German techies are drivers of digitalization and new business models, they also have to broaden their own skills base and gain interdisciplinary qualifications if they are to perform a variety of functions



and meet the challenges presented by the digital transformation.

The Association of German Engineers (VDI) is committed to bringing universities and industry even closer together. The education agenda within the engineering sciences has always focused on practical applications and work with R&D departments. The fast-moving dynamics of digitalization demand that even qualified engineers regularly retrain and acquire new qualifications. So cooperation between industry and academic institutions is critical.

As a nation of engineers, Germany offers optimal conditions for foreign companies to invest. Last year, it attracted almost

1,000 production and technology projects from overseas investors.

Germany's SMEs are just as important as the global market leaders. They will be responsible if Germany takes the lead in technologies such as robotics, smart medicine or 3D printing. And last but not least, the country's central location plays a decisive role for foreign companies looking to invest. Germany offers prosperous regional metropolises, supported by stable infrastructure and a robust political and legal environment. The interaction of high-quality education, research investment and a central location forms the basis for Germany's future success.

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