

MARKETS

GERMANY

2/18

THE CLUSTER REPUBLIC

Germany's strong economy is built on its network of "clusters" – groups of firms and research institutions with a common focus that use their regional proximity to support each other and to innovate.

This striking pavilion in the courtyard of the University of Stuttgart was made from carbon fiber-reinforced composites by SGL Group, part of the MAI Carbon Cluster.

Automotive:
The electric vehicle (EV) industry gets ready for mass market penetration

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Entertainment:
Gaming in Germany is experiencing a period of exponential growth

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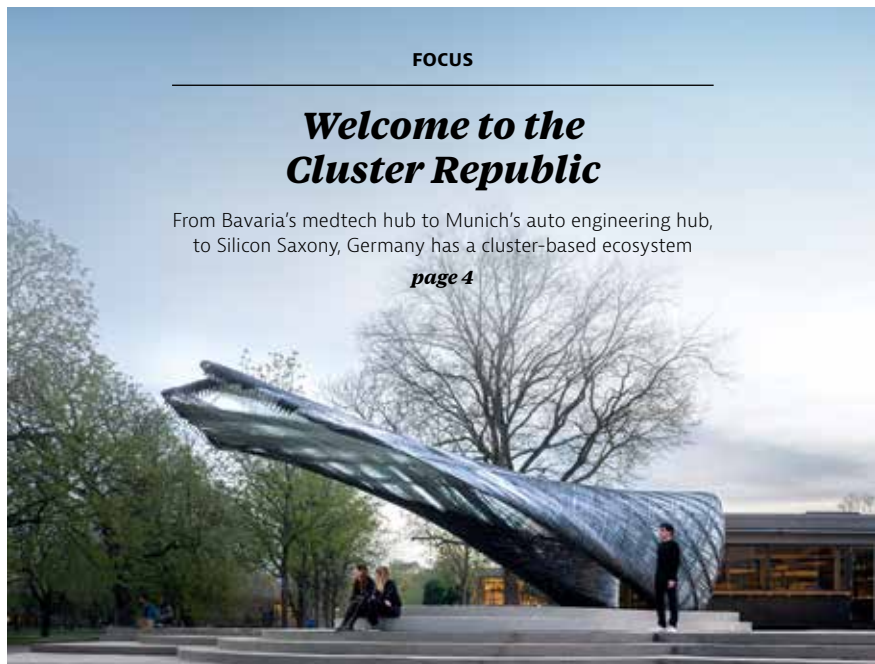
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Platform development for the Internet of Things reaches the next level

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Welcome to the Cluster Republic

From Bavaria's medtech hub to Munich's auto engineering hub, to Silicon Saxony, Germany has a cluster-based ecosystem

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Game On

With multiple niches and a growing "middle-youth" user base, the virtual gaming industry is offering real returns

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How the Technical University of Munich cooperates with the corporate sector

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»This issue introduces Germany's leading clusters; foreign entrepreneurs share their experiences and offer tips.«

Dear Reader,

Are you looking to develop – or redevelop – your products, work closely with top scientists, join a network of highly innovative companies, or perhaps even find the ideal partner or buyer? All this is possible in one of Germany's top clusters. In this issue's "Focus" story, *Markets Germany* introduces Germany's leading clusters, while foreign entrepreneurs share their experiences and give tips on how to benefit from the "Cluster Republic."

You can't hope to earn money just by playing in Germany's gaming industry, where competition is extremely fierce. But with games sales of €2.13 billion, Germany is Europe's largest market. That alone would be reason enough to be present in the industry there, but there are also highly trained game developers, outstanding infrastructure and moderate overall costs making an investment worth looking at more closely.

Finally, with big plans, massive investments and a market worth billions, e-mobility in Germany is gaining momentum. *Markets Germany* looks at how international investors can best benefit from the "Auto-transition."

Dr. Robert Hermann, CEO

Email: invest@gtai.com

ONE TO WATCH

Photo: Gordon Welters/iaif



Matan Beery, CEO of Akvola Technologies

While working on a research project for his PhD in chemical engineering at the Technical University (TU) of Berlin, Matan Beery hit upon an idea that he thought had great commercial potential. "We were looking into techniques for seawater pre-treatment because desalination is so expensive," he recalls. "We developed a low energy technology for cleaning seawater." Coming from Israel (Haifa), where water engineering is key to the country's survival, Beery is "sensitive to the topic of wastewater and conservation." He goes on: "Freshwater resources are draining out. The planet has a closed

water cycle – the answer is either desalination or reuse." The question of how to reuse wastewater in an energy-efficient way is one of the biggest challenges of the 21st century.

Making use of the TU's business innovation center, Beery and his MA assistant were able to pull together a business plan, which helped them secure pre-seed government funding to develop a pilot using water from the River Spree. "The technology, which is based on a ceramic membrane, is chemically and thermally robust, so we began to focus on industrial wastewater". The AkvoFloat™ was born.

Based in Berlin, Akvola now serves the oil and gas, metalworking and refinery markets in central Europe and boasts clients such as ThyssenKrupp, Siemens, Daimler and BP. The next territories to break into will be China and India, where they are "20 years behind" in wastewater management. Beery's passion for discovery, which began as a child playing in his grandmother's chemistry lab, and his undergraduate preoccupation with finding environmental solutions, have brought him a long way.



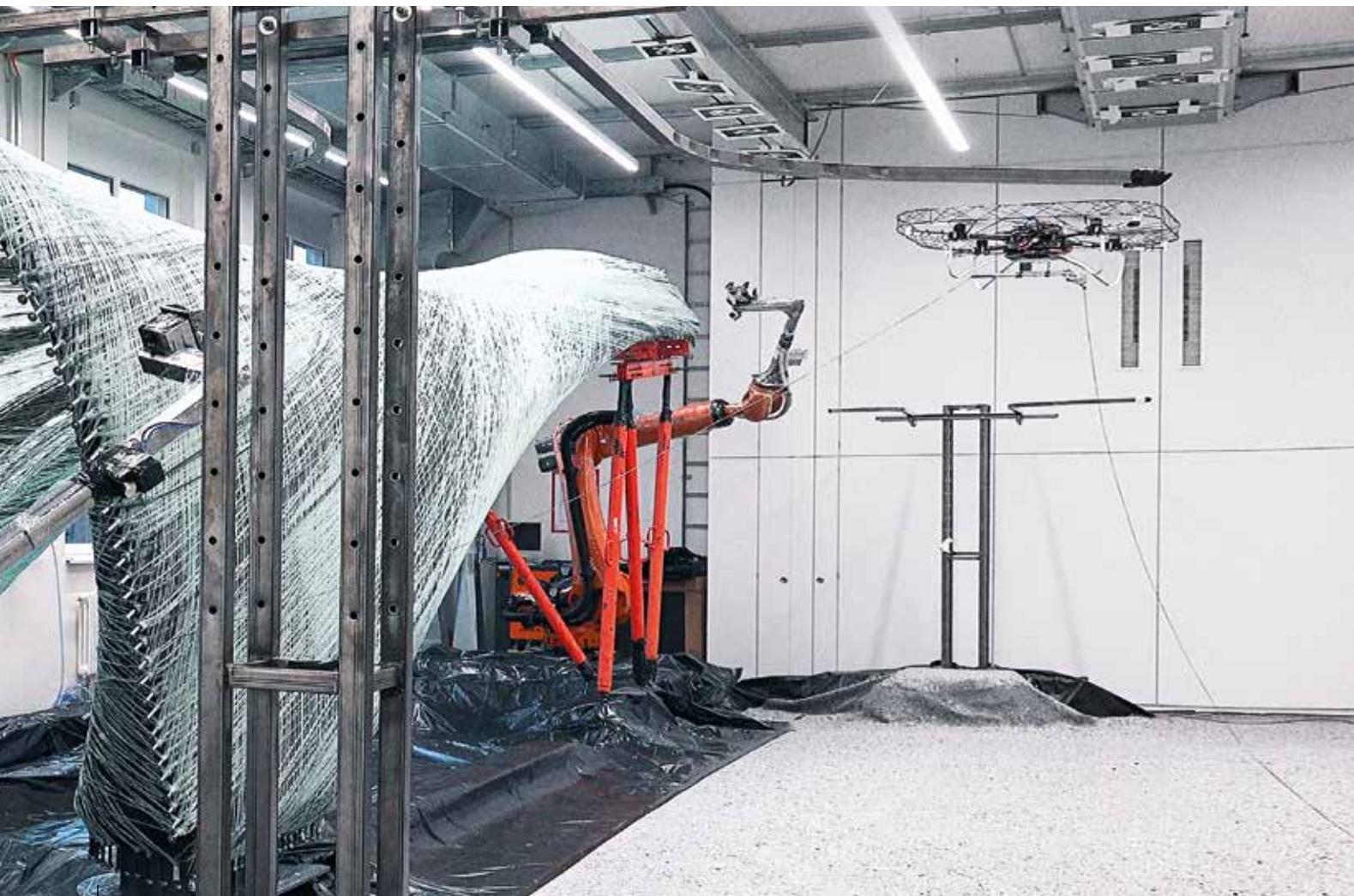
www.akvola.com



Photo: ©ICD/ITKE Universität Stuttgart

Welcome to the Cluster Republic

Clusters are groups of firms and research institutions with a common focus that use their proximity to provide mutual support and work towards shared aims. These high-tech hubs are ideal entry points for foreign companies that want to innovate.



Fabrication of a pavilion made from carbon fiber-reinforced composites is underway, using fiber-winding robotic arms and an autonomous drone “weaver.” For this commission for the University of Stuttgart’s Institute for Computer-Based Design, SGL Group was tasked with delivering 104 kms of SIGRAFIL® 50k carbon fiber. The design technology was modeled on the larvae of the apple leaf moth, which spins its cocoon on apple tree leaves using long threads.

It all began with beer and pretzels. Jim Walls, CEO of OrthoMedex, a young U.S.-based orthopedic implant company, had traveled to Cambridge, Massachusetts, to attend a gala evening for a delegation of German scientists and entrepreneurs who were visiting the area’s Life Science Cluster in an effort to encourage high-tech U.S./German collaboration.

“The evening proved well worth my travel,” says Walls, who was looking for partners and a suitable location for his company to develop a new bioactive glass for orthopedic applications. Over beer and pretzels, he met Heike Walles from the Fraunhofer Institute

»The Medical Valley cluster is not only professionally equipped, it also has an entrepreneurial vibe to it that I enjoy when on site.«

Jim Walls,
CEO of U.S.-based medtech startup Orthomedex LLC

for Interfacial Engineering and Biotechnology, a renowned German research hub, who was traveling with a delegation of the Medical Valley medtech cluster from southern Germany. “I left the discussion thinking Ms. Walles seemed very interested in what OrthoMedex was attempting to accomplish; or was that simply my entrepreneurial exuberance?”

Bavaria's innovative medtech hub

Eighteen months later, Jim Walls is himself a member of the Medical Valley cluster. OrthoMedex’s German subsidiary will begin work on a research project with the Fraunhofer Institute for Silicate Research in spring

2018 with other medtech companies from the cluster and researchers from Yale University Medical School. "At the same time, we use the facility and location within the Medical Valley cluster for launching new implants in Germany and the EU," explains Walls. "The cluster is not only professionally equipped, it also has an entrepreneurial vibe to it that I enjoy when on-site." The cluster, which is situated in northern Bavaria, has world-class academic and research institutions nearby, lots of early-stage medtech startups as well as established medium-sized companies. The global headquarters of Siemens' healthcare business is just down the street. "To me, the cluster possesses a small-town Boston-like

FACTS & FIGURES

58%

of companies in German clusters say that their economic situation is better than the sector average.

Source: Clustermonitor Germany

ambiance", says Walls. "A small, manageable academic community with lots of young people doing exciting things."

Investment opportunities in clusters

Throughout Germany there are numerous regional networks that bring together large companies, SMEs and startups, which then pool resources with local research institutes and universities toward a common goal: to develop innovative products and services for the global market. "The diverse research and development infrastructure these innovation ecosystems offer in Germany is unique," says Gabriel Flemming, Senior Manager in the Chemicals and Healthcare



*Thomas Mader,
Head of Automation and Controls at GEA Group*

»We couldn't have done it by ourselves.«

Thomas Mader, Head of Automation and Controls at GEA Group, talks about the leading-edge cluster "It's OWL", which is revolutionizing food production processes using intelligent technology. Since 1893, German technology supplier GEA has been building food processing machines for the food industry, and now serves several industries including pharmaceutical, chemical and marine. Three years ago the company's engineers joined forces with its cluster partner Fraunhofer IEM to develop a system based on machine learning.

Mr. Mader, tell us about the technology you developed?

For the past three years, GEA has been working on what we call an intelligent separator. Centrifugal separators separate solids and liquids by centrifugal force. Together with Fraunhofer IEM, which is also a member of the cluster, we have developed a software system based on machine learning that detects anomalies in the machine's operation and compensates for these automatically. The machines are usually monitored by an expert who controls and operates the system and fixes errors as necessary. Traditionally, the engineer is required to monitor the machines regularly, but this demands the full attention of the engineer who could be used elsewhere. This costs money and can result in production delays.

How does the technology work?

The system collects data about the condition of the separator through sensors. If the system detects certain abnormal patterns, it intervenes without the assistance of an engineer. The AI-based system also ensures process security in future. The intelligent separator is currently a first-of-its-kind prototype. We believe there is huge market potential.

How did you collaborate with cluster partner Fraunhofer IEM?

We shared both the coordination of the project and the implementation of the actual technology. We are experts in mechanical engineering but it was Fraunhofer that provided the data-science expertise. They taught us how to analyze datasets and together we created a great model for how to leverage these technologies in our future portfolio. In the long term, we really have to focus on being more data-driven and hire more data scientists ourselves. And this is where the cluster with its many partners comes into play: we all share our experience and knowledge to tackle the challenges ahead.

FACTS & FIGURES

Cluster crunching

team at Germany Trade & Invest (GTAI). Since the aim of the clusters is to develop products and services for the world market, the companies in these networks are particularly interested in foreign members joining and participating in the cluster activities, he says. "That's why German clusters are an ideal starting point for foreign investors to gain a foothold in the German market and find partners for innovation projects and product development."

Foreign companies will find cooperative, pragmatic development partners here. "Science is not being conducted here for the sake of science; it is about bringing products and innovations to market maturity efficiently and at the highest level," says Flemming. "Companies from abroad will find in the clusters an infrastructure of suppliers, potential customers and world-class partners for research and development. There is a lot of potential for new synergies." "The German clusters are strongly supported by the German government. Specific programs even fund international research and development partnerships. The clusters are open to foreign members and actively seek partners from abroad to help them innovate on future issues."

Making waves in Industrie 4.0

As one example, Günter Korder, Managing Director of the high-tech cluster "It's OWL," is looking for foreign investors interested in getting involved in the network of innovative companies. The cluster pools the resources of global market leaders in mechanical engineering and the electrical, electronics and automotive supply industries, as well as internationally-renowned, cutting-edge research institutes. "We are one of the leading clusters in Europe on the topic of *Industrie 4.0*," explains Korder. "This is because medium-sized industrial companies have traditionally engaged in very close cooperation. The cluster management meetings are attended by the heads of the participating companies and university presidents, as opposed to just the project managers. The cooperation has a very high strategic significance for all the companies involved. Many of the companies in northwestern Germany



8,500

companies work together in Germany's top 100 innovation clusters¹⁾

€120m

in internationalization funding will be spent by 30 German clusters starting in 2018.²⁾

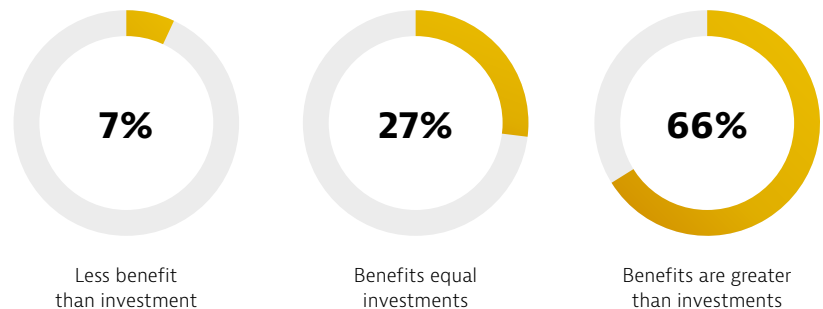
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high-tech clusters form a network that works on current topics such as artificial intelligence, new mobility and smart infrastructure.³⁾

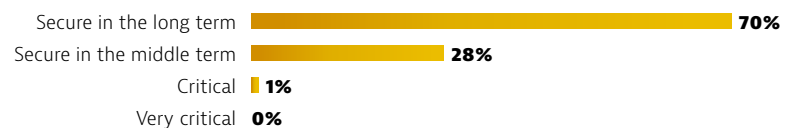
€360m

has been invested by the German Federal Ministry of Education and Research (BMBF) to support 15 leading-edge clusters since 2008⁴⁾

Monetary benefit to cluster players in relation to investment in the cluster⁵⁾



Financial sustainability of German clusters⁶⁾



Types of cooperation between German clusters and foreign clusters⁷⁾



1) Source: go-cluster/clusterplattform.de; 2) Source: BMBF; 3) Source: www.de-hub.de; 4) Source: BMBF publication "Deutschlands Spitzencluster"; 5) Source: Clustermonitor Germany; 6) Source: European Secretariat for Cluster Analysis (ESCA); 7) Percentage of competence networks and clusters in Germany, Source: Clustermonitor Germany.

Leading clusters in Germany

Germany has many clusters, each with a different industry focus (e.g. micro-electronics, aviation, or life sciences) but all sharing a common format. In these regional networks, large companies can be found working with startups, SMEs and local universities or scientific institutes to develop innovative products and services for the global market.



1

It's OWL

Founded: 2012
Location: Paderborn (head office), Bielefeld, Gütersloh
Members: 180+, e.g. Beckhoff Automation GmbH & Co. KG, Miele & Cie. KG, GEA Westfalia Separator Group GmbH
Research facilities: i.a. University of Bielefeld, University of Paderborn, Fraunhofer Institute
Industries: machinery & equipment, automotive engineering, electrical & electronics industry
Research focus: *Industrie 4.0* and intelligent technological systems

2

MAI Carbon

Founded: 2012
Location: Augsburg (head office), Munich, Ingolstadt
Members: 120+, e.g. Audi AG, BMW AG, SGL Group
Research facilities: i.a. Fraunhofer Institute, Augsburg University of Applied Sciences, Munich University of Applied Sciences
Industries: materials processing, automotive engineering, aerospace
Research focus: carbon-fiber-reinforced plastics, lightweight design

3

Silicon Saxony – Cool Silicon

Founded: 2000
Location: Dresden (head office), Leipzig, Chemnitz
Members: 300+, e.g. Infineon Technologies Dresden GmbH, GLOBALFOUNDRIES, X-FAB Semiconductor Foundries AG
Research facilities: i.a. Dresden University of Technology, Fraunhofer Institute, Leibniz Institute for Solid State and Materials Research Dresden
Industries: microelectronics, information and communication technology, mobile communications
Research focus: nanotechnology, smart systems

4

EMN European Medical Valley

Founded: 2010
Location: Erlangen (head office), Nürnberg, Würzburg, Bayreuth, Bamberg
Members: 160+, e.g. Bio-Gate AG, e.Bavarian Health GmbH, medi GmbH
Research facilities: i.a. Fraunhofer Institute, Friedrich-Alexander-University Erlangen-Nürnberg, TITV Greiz – The Institute for Special Textiles and Flexible Materials
Industries: healthcare, medical engineering
Research focus: healthcare

5

Life Science Nord

Founded: 2004
Location: Hamburg, Lower Saxony (head office) and Kiel, Schleswig-Holstein
Members: 500+, e.g. Basler AG, Beiersdorf AG, Philips GmbH, Evotech AG, Sanofi
Research facilities: i.a. Kiel University, Hamburg University of Technology, Fraunhofer Institute
Industries: medical engineering, biotechnology, life sciences, innovative medicine
Research focus: biotechnology

6

Hamburg Aviation

Founded: 2008
Location: Hamburg
Members: 150+, e.g. Airbus Operations GmbH, Lufthansa Technik AG, Hamburg Airport, Henkel, Schenker Deutschland AG, Hutchinson Aerospace
Research facilities: i.a. Hamburg University, German Aerospace Center (DLR), Hamburg Center of Aviation Training
Industries: aviation
Research focus: aircraft construction, airlift systems

7

Forum Organic Electronics

Founded: 2008
Location: Heidelberg (head office), Karlsruhe, Darmstadt, Mannheim
Members: 30+, e.g. BASF, SAP, Merck
Research facilities: i.a. Universities of Karlsruhe, Heidelberg, Darmstadt, and Mannheim, Karlsruhe Institute of Technology
Industries: electronics and photonics, nanotechnology, biotechnology, information and communication technology, environmental sciences
Research focus: organic electronics

8

WAB

Founded: 2002
Location: Bremerhaven (head office), Bremen, Berlin
Members: 350+, e.g. Deutsche Windtechnik AG, GE Grid GmbH, Hanseatic Power Cert GmbH
Research facilities: i.a. German Aerospace Center (DLR), Fraunhofer Institute, Bremen University, Siemens
Industries: wind energy, maritime industries
Research focus: wind energy, onshore and offshore

»With our locations in Silicon Valley and Silicon Saxony, we are part of the two most powerful industry clusters worldwide for our sector.«

Gregory Waters, President and CEO of semiconductor company
Integrated Device Technologies (IDT)

→ are so-called “hidden champions,” meaning they are hardly known to the general public but are world market leaders in their sector or market niche.

The cluster’s members are currently looking for partners for artificial intelligence (AI) projects. “We have already identified the first companies, scientists and investors we would like to work with in the United Kingdom, China, Finland and Canada,” says Korder. “Our model of close research cooperation on future topics such as *Industrie 4.0* and artificial intelligence has generated a lot of interest there.”

Saxony’s “Silicon Valley”

Silicon Saxony is another highly successful and internationally active cluster. The network has more than 320 partners in the semiconductor, electronic, microsystems and software industries, several of which are international companies. The PEER Group is a Canadian systems integrator that serves the global semiconductor, photovoltaic and other high-tech industries. The company currently generates more than 40 percent of its annual turnover at its branch office in Dresden.

The capital of Saxony has attracted a number of high-profile international investors, including UAE-owned semiconductor manufacturer Globalfoundries, which is investing €1.5bn in the expansion of its Dresden site over the next three years to increase its local production capacity by 40 per cent. The U.S.-based semiconductor company Integrated Device Technology (IDT) became a

member when it invested more than \$300m (€243m) in the acquisition of the Dresden-based company ZMD in 2015. IDT’s U.S. headquarters is situated in the Silicon Valley cluster in the San Francisco Bay Area. ZMD’s location within the German cluster was a major factor in the investment decision, says IDT’s CEO Gregory Waters: “With our locations in Silicon Valley and Silicon Saxony, we are part of the two most powerful industry clusters of the world.”

Dresden has been a location for technology since the days of East Germany. “Since reunification we have followed this tradition,” explains Frank Bösenberg, Managing Director of Silicon Saxony Management. Many billions of euros in public funding have flowed into the high-tech region, the research and educational institutions, and

the infrastructure of the semiconductor cluster since the 1990s. The investment has paid off. The Technical University of Dresden has earned a worldwide reputation for excellence in engineering and natural sciences and its graduates provide the cluster with a qualified labor pool. The researchers from local Fraunhofer research institutes carry out practical research on strategically important topics in the industry.

“Foreign investors often buy into established companies or startups in order to benefit from the high-tech skills of the cluster employees, especially the well-trained German engineers,” says Bösenberg. Silicon Saxony has an industry-wide reputation for its outstanding specialist staff training resources and availability, excellent scientific infrastructure, and broad base of suppliers and service providers. While Silicon Saxony might be exceptional in terms of its singular achievements, it is not unusual: it is a typical example of a successful German cluster.

FACTS & FIGURES

€600m

in government funding has been invested in Germany's leading-edge clusters over the last decade.

Source: BMBF



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Carbon-fiber Musclepower

The groundbreaking cluster MAI Carbon set itself the ambitious goal of developing carbon fiber-reinforced plastics that could be mass-produced by 2020. Here's how its members are revolutionizing production processes to reach that target.

Back in 2012, the cluster MAI Carbon set out an ambitious eight-year plan. The Managing Director Tjark von Reden had just received €40m in funding from the German Federal Ministry of Education and Research (BMBF). The investment raised the profile of MAI Carbon as one of the most innovative and elite clusters in the country, and its goal to produce carbon fiber-reinforced plastics suitable for mass production provoked interest from across the industry.

Although carbon fiber-reinforced plastics are now a key component in the production of lightweight products in the aerospace industry, they are not yet suitable for mass production. They still lack the process security, short cycle times and economic scalability necessary to become a go-to material in the automotive and engineering industries. To achieve their goal, the cluster members realized they needed to bring about multiple innovations along the supply chain: they had to revolutionize the production process.

Redesigning and recycling

"We really needed to cut production costs and reduce production cycle times," says von Reden. The cluster identified multiple projects, each one being realized by a handful of members working together. Von Reden

MAI CARBON: HARD FACTS

€80m

total funding received by
MAI Carbon to date

35

ongoing projects in the field of
carbon fiber-reinforced plastics

20

new companies join the ambi-
tious cluster every year

120

more than 120 partners, includ-
ing BMW and Airbus Helicopters

60%

waste reduction in the last six
years across the production cycle

coordinates and supports the different projects, tracks their progress and evaluates the results – that so far have been more than satisfying. "We have made progress much faster than we expected," he says.

In the last six years, the network has managed to reduce waste by about 60 per cent on average for different production processes. "When we started working on the project, 30 to 50 per cent of the fibers were tossed during the production process," he says. "We now have new processes that reduce waste to less than ten per cent and are much faster, which saves a lot of money."

The cluster was able to cut costs significantly, especially in the final stage – the finishing of fiber composites. To make this happen, six cluster members – cutting expert Hufschmied Zerspanungssysteme, Airbus Helicopters, BMW, The Institute of Structures and Design, The Corporation for Diamond Products and carbon specialist Schunk Kohlenstofftechnik – worked on the MAI ProCut project for three years. With funding of €2.1m, they created a milling head that is of high quality and economically efficient. Whereas traditional milling heads consist of hundreds of small diamond pieces that work like sandpaper, the newly-developed technology has a diamond-coated defined cutting edge that cuts as sharp as a knife due to its



Photo: Hans-Bernhard Huber/laif

Carbon fiber production in progress at the Technical University Munich, Garching, showing the interweaving and bundling of the carbon fibers. The technology is used widely in aerospace production and in multiple applications including shock absorbers, suspension in bikes and vehicles, and in advanced industrial production processes.

special geometry. This not only cuts costs but also saves energy. “Fiber production needs a lot of energy. We therefore aim to reduce cycle times to improve our ecological footprint as we go,” says von Reden. “With MAI Enviro, we conducted our own studies that showed the MAI Carbon projects reduce the ecological impact significantly.”

Asian members take an active role

The pace of progress is impressive: as soon as one project is finished, the next starts straight away – there are currently 35 projects underway. Furthermore, the cluster is growing: about 20 companies join each year. One of the latest additions to the network is Chinese automotive specialist KDX, a subsidiary of the Beijing-based carbon specialist Kangde. In 2016, KDX invested in the MAI Carbon-region and opened an R&D site just

south of Munich. Since the summer of 2017, it has been an active member of the cluster. “KDX made it very clear that they see high potential in the region,” says von Reden. “We are bringing about innovation constantly. So it is only logical for carbon specialists such as KDX and Kangde to want to be part of it.”

KDX may be the first Asian member but it is not the only foreign company to play an active role in MAI Carbon. In August 2018, Japanese chemical company Toray Industries will open a research facility close to Munich. U.S. companies such as Boeing and European businesses such as Faurecia are also part of the cluster and operate subsidiaries in Munich and Augsburg respectively.



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Aerospace beats all competition

Worldwide sales of carbon composites by industry in 2016 (in billions of US dollars)

11.7

Aerospace & defense

2.4

Automotive

1.6

Wind power

1.4

Sports & recreation

0.4

Constructional engineering

1.9

Others

Automotive sector growing

Quantity of carbon fiber-reinforced plastics processed for the European automotive industry through 2020 (in 1,000 metric tons)

34.19

2018

47.36

2019

59.05

2020

Demand for carbon composites increases

Forecast of demand for carbon fiber-reinforced plastics worldwide through 2022 (in 1,000 metric tons)

124

2018

156

2020

194

2022

Source: Carbon Composites, Novev, ANP Management Consulting

Aerospace

Networks in Orbit

Making constellations of mini satellites

There's plenty of room in space for big satellites, but you still have to get them there. So the smaller, lighter and cheaper the satellite, the more you can do. A start-up recently launched in Würzburg is aiding efforts to minimize satellite size, mass and cost. S4 ("Smart Small Satellite Systems"), a spin-off of the Zentrum für Telematik, produces complete, custom-made pico-satellite systems – often in the standardized CubeSat size – as well as advanced components and subsystems, such as for handling data, determining altitude and for use in telecommunications and earth observation. In addition to offering testing and development facilities, it can also realize formations of several mini satellites that can act as a sensor network in orbit, as well as networking devices across the world. The S4 can therefore bring the Internet of Things to remote locations, such as mines and oil platforms.

www.s4-space.com



The mini cube satellite "Uwe 3" was launched using a Russian rocket from the test lab of the University of Würzburg on February 19, 2013, and has been orbiting the earth ever since. The purpose of the extra-terrestrial project is to provide data and practical training for students.

Photo: © dpa

Food FDI

Going Nuts in NRW!

Turkish FMCG brand builds on success in Germany

Another tale of Turkish success in North Rhine-Westphalia (NRW): Tadim, the country's leading packaged nuts and dried fruits brand, expanded abroad for the first time in 2014, setting up a production facility in Emsdetten. Since then, the family-run firm based in Gebze has invested around €7m in the plant, which exports to Europe, the U.S. and Canada. In just two years, annual sales have reached €12m. Now Tadim is investing an additional €12m into building a bigger production hall and office complex to boost output and increasing its presence on European store shelves.

www.tadim.com

Modern Mobility

Hey! Coming My Way?

Ridesharing e-shuttles to debut in Hamburg

The world's first on-demand zero-emission shuttles will be hitting the streets of Hamburg in late 2018 as part of a collaboration between MOIA, a mobility startup owned by the Volkswagen Group, and the city's public transport company. Customers order a minibus on a smartphone app, which then uses a pooling algorithm to combine passenger requests and calculate the fastest, most efficient routes. The Volkswagen-built electric shuttles can comfortably fit six passengers, travel 300km, and reduce traffic and pollution. The fleet is expected to grow in Hamburg in 2019 and then spread to other cities.

www.moia.io

Green Innovation

Just Add Water

Urban farming for the freshest fish

ECF Farmsystems has set up a novel urban farming system in Berlin, in what used to be Europe's largest malt house. While one area houses tanks full of tilapia, a 1,000 sqm greenhouse holds endless rows of basil plants – and both are sold at local stores. Unlike most aquaponics systems, this one boasts two water circulation systems, allowing each to be set at the optimal pH value and the plants to be fertilized without harming the fish. The fish circuit provides water, CO₂ and nitrates to the plant circuit, and the plant circuit supplies oxygen in return. This allows for a 70 to 90 per cent reduction in water use and for the fish to be raised without antibiotics. The company is now installing turnkey systems elsewhere, such as in Brussels, the future home of Europe's biggest aquaponics roof farm.

www.ecf-farmsystems.com

Digital Health

Diagnosis by “Dr. Smartphone”

New app combines healthcare and AI

Thanks to a new technology marrying tele-medicine and artificial intelligence, the days of “self-diagnosis by Google” may now be over. Using a chatbot interface (which has led some to dub it the “Alexa of health”), the Ada app helps users narrow down what might be ailing them. After asking about symptoms and other health data, it matches the information with earlier cases and supplies possible explanations. U.K. customers can also pay an extra fee to be put in contact with a real doctor, who will review the assessment, discuss it by phone and even issue prescriptions. Alternatively, the app can recommend the right doctor for the patient to visit with the pre-diagnosis. The Berlin-based startup is also collaborating with top research institutions to improve the app's diagnostic intelligence.

www.ada.com

Renewable Energy

Power to (and from) The People

Sharing sunshine peer-to-peer

The German startup gridX is combining the power of small rooftop solar installations across Germany to help energy prosumers make more money and consumers get green energy at a fair price. The company's small gridBox allows private homeowners with solar panels to save money by intelligently and efficiently monitoring, storing and using the energy they generate. More importantly, the company acts as a digital power broker, helping prosumers sell any excess energy – at a fair price – to others across Germany via the national grid using the gridX (for “grid exchange”) platform. The founders of the company, based in Munich and Aachen, hope their decentralized, peer-to-peer system of distributing green energy will make them the largest energy provider in Europe – without even owning a single power plant.

www.gridx.de

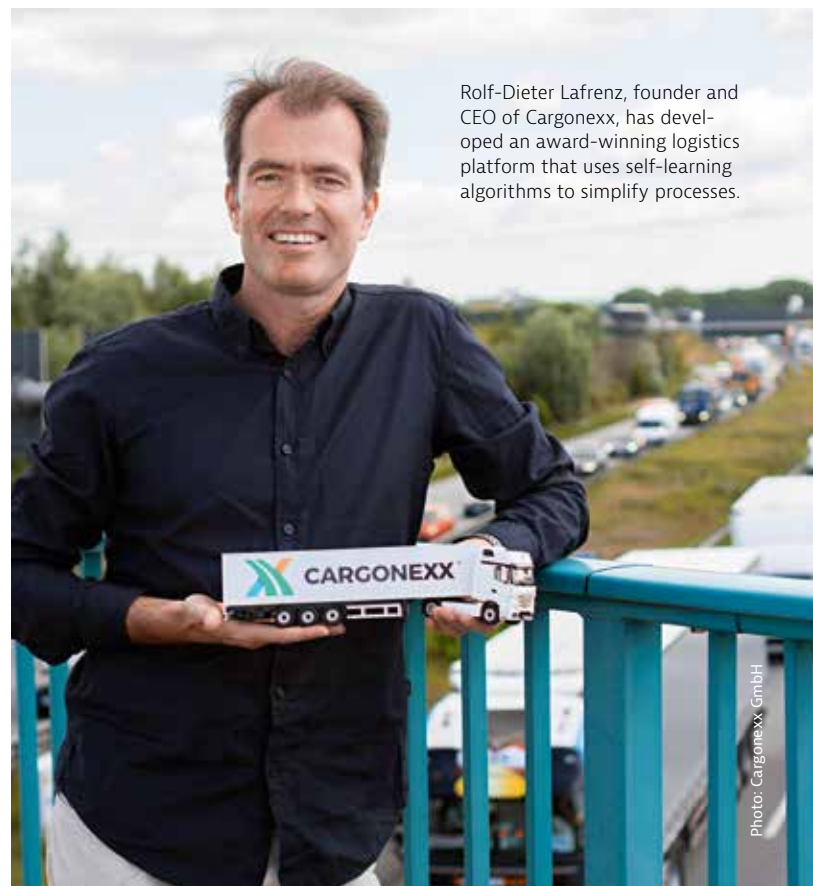
Smart Logistics

Brokering Truck-cess!

Algorithm finds right carrier at the right price

Less traffic, greater logistics efficiency and cleaner air are just some of the benefits to be enjoyed as online matchmaking finally arrives in the trucking world. Hamburg-based Cargonexx has developed a digital platform that simplifies the steps that freight forwarders and carriers have to take to get a shipment from A to B. The technology uses self-learning algorithms to analyze a range of data – be it on freight type, dimensional weight, traffic or weather – and can then predict spot market prices for individual loadings in milliseconds. Freight forwarders can enter a shipment request and instantly receive quotes at the calculated price. If they accept, Cargonexx then automatically asks carriers in its network if they will take the job. With its free brokering system, the startup has brought more than 3,600 companies and 60,000 trucks into its network – and won a truckload of awards in the process.

www.cargonexx.de/en



Rolf-Dieter Lafrenz, founder and CEO of Cargonexx, has developed an award-winning logistics platform that uses self-learning algorithms to simplify processes.

Smart Thinking

The eastern German cities of Leipzig and Dresden joined the country's digital hub initiative in 2017 to focus on smart systems and smart infrastructure. After just one year, Saxony's de:hub has attracted some impressive partners and is open to foreign investment.

The Digital Hub Initiative was launched in November 2016 by the Federal Ministry for Economic Affairs and Energy (BMWi) to promote digitization across key industries. Twelve interlinked digital hubs ("de:hubs") were founded, each focusing on different areas of expertise according to the strengths of each region. Their broad aim is to promote cooperation among established companies, startups and local research and educational facilities, to further the development of innovations for the digital age. The underlying idea is that clusters will emerge and cross-fertilize with other industries within the hub.

In 2017, one of the digital hubs was awarded to the cities of Leipzig and Dresden in the eastern German state of Saxony. The partners have different but complementary emphases in smart systems (Dresden) and smart infrastructure (Leipzig) and will collaborate across the R&D value chain.

Leipzig – fashioning a smart future

Just one hour south of Berlin, the city of Leipzig is home to many well-known corporations, startups and research institutes in the fields of energy, eHealth and "smart cities." It offers foreign companies and investors a perfect mix of excellent research facilities and a powerful business network

SAXONY'S DE:HUB

One hub, multiple opportunities

Dresden



Operator: Smart Systems Hub Initiative in Dresden

Partners: the Saxon State Chancellery, Silicon Saxony, 5G Lab, HighTech Startbahn, Globalfoundries, the City of Dresden, Infineon Technologies, Smart Systems Campus Chemnitz etc.

Focal points: hardware, software, connectivity components, smart systems, IoT platform, application-based solutions, IoT ecosystems

Leipzig



Operators: the City of Leipzig and SpinLab – The HHL Accelerator in Leipzig

Partners: AOK PLUS, VNG Group, Leipziger Gruppe, European Energy Exchange, enviaM, Porsche, Arvato Systems, DELL, conjenergy, HL Komm

Focal points: energy, smart city, e-health

made up of established companies and innovative startups.

Launched in 2017, the Leipzig Smart Infrastructure Hub is coordinated by the City of Leipzig in conjunction with SpinLab, a joint venture of the internationally-renowned *Baumwollspinnerei* (Cotton Mill) cultural center and the HHL Leipzig Graduate School of Management. SpinLab mentors startups, helping them to find office space, technology partners and, crucially, financial support (a new VC fund has been created). The hub opens doors to an international business network and to leading investors.

Netzwerk Energie & Umwelt (Network for Energy and the Environment) – or NEU for short – is a key support network within the hub. NEU brings together 75 organizations under the umbrella brand *Energiemetropole Leipzig* (Energy Metropolis Leipzig). The Association for Promotion of the Healthcare Industry (VFG e.V.) is another important partner. VFG promotes cooperation between local companies and international players, with the aim of making Leipzig a leading center for medicine and clinical practice.

It is still early days for the Leipzig hub, but some foreign companies are already investing in startups: Seventure Partners from France in Webdata Solutions and Lecturio; Rockaway Capital from the Czech Republic in Invia.



Sensape Chimp is an interactive infotainment system that uses artificial perception to interact with customers or passersby in a creative and engaging way. It was developed by Sensape, a startup that benefited from Spinlab's accelerator programme.

Dresden – harnessing the potential of the Internet of Things

The vision of Dresden's Smart Systems Hub is to become a global center of excellence in the Internet of Things (IoT). The initiative aims to build a strong network that integrates hardware, software and connectivity, in order to develop the basic technologies that will digitize industry and support *Industrie 4.0*. Since October 2016, the Smart Systems Hub Initiative – a task force that includes the State of Saxony, Dresden's City Hall and Technical University, Silicon Saxony, a renowned trade association for the semiconductor, electronic, microsystems and software industries, and the Fraunhofer Institute for Electronic Nano-Systems – has been working hard to establish the hub, acquire partners and attract investment. Key industrial partners of the Smart Systems Hub are SAP, T-Systems MMS, Globalfoundries, Infineon and National Instruments.

With the ultimate goal of achieving digital transformation, Dresden's "Smart Systems Hub – Enabling IoT" will bundle expertise in the three key areas and devel-

op a software platform that is standardized, secure and globally accessible. The hub will foster a business ecosystem that will give Dresden an edge in the highly competitive field of IoT design and applications. The ini-

The ultimate goal of the de:hub is to achieve digital transformation

tiative will provide long-term support for key industries, especially microelectronics, with a primary focus on SMEs.

The Smart Systems Hub offers interested parties – investors, entrepreneurs and managers – a guided tour or "Trail." Each Trail is

organized by a hub partner to demonstrate innovative applications, technologies and business models for digitization in specific fields, with the aim of promoting knowledge exchange and collaboration between stakeholders inside and outside the hub.

Foreign investors welcome

Saxony's de:hub is still at an early stage, but as it develops, a wide range of opportunities will open up for foreign investors. While the current players are mainly German, foreign partners and startups are most welcome, says SpinLab's Eric Weber. "Whether a startup joins one of the hub's accelerators to get a soft landing into the German market, or whether an established corporation wants to exploit the technological competences of hub's partners, we are always open to international partners." One example is the U.S.-based computing giant DELL, which is exclusively supporting the Smart Infrastructure Hub in Leipzig.



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Game On

The gaming industry in Germany is enjoying exponential growth, driven by diversification of platforms and new niches, as well as a surge in “middle-youth” players. With investment opportunities opening up across multiple niches, the virtual world offers real returns.

Gaming enthusiasts queue outside Gamescom 2017, the world's largest computer game fair on the grounds of Koelnmesse, Cologne. This year it runs from August 21 to 25.



The world of investment is full of references to gambling and game theory: you “hedge your bets,” you “stick or twist” but ultimately you will have to “back your horses.” It’s an inherently risky business and strategies may be taken to their end game or abandoned mid-way. The gaming industry in Germany, however, is actually one of the safest bets for investors looking for relatively quick wins, new levels of excitement and high prizes.

Germany is Europe’s largest gaming market with over 34 million computer or video gamers – a number growing by the minute – and it has seen a greater surge of online games than any other European country. Statistical data also dispels the notion that this is solely a market for bored teenagers and geeks: the average age of a German gamer is 35, while the fastest-growing (and biggest) group of players is the 50-plus bracket, according to statistics from the former *Bundesverband für Interaktive Software* (BIU) for 2016. It’s a huge market of willing customers who are ready and waiting to be entertained, and is full of niches to be explored and new values to be created.

Rapid market developments

Perhaps in response to this – and befitting an industry that can hardly be regarded as niche any more – the two industry associations, BIU and GAME, merged at the end of January under a new moniker: “game – the German Games Industry Association.” “It is a historic day for the German games industry as a whole,” says Felix Falk, Managing Director of the new organization. “The forward-looking merger of the two associations unites the industry, enabling us to advocate jointly, and therefore even more persuasively and powerfully, for the interests of the entire German games industry.”

Those interests are significant. Germany has the most internet users in Europe and the largest physical population, and therefore holds significant potential for more business. Its mobile device market is also growing rapidly: traditional sales of physical or downloaded games accounted for 63.2 per cent of revenues in a €1.9bn market in 2015, according to game. The German games market is founded on a winning combination of moderate costs, excellent infrastructure and a large talent

FACTS & FIGURES

€2.13bn

turnover from games software sales (including in-game purchases) in Germany in 2016

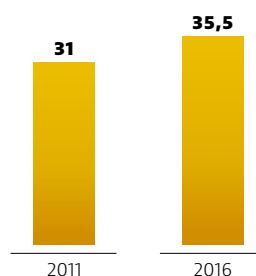
Users of digital games in Germany



Which devices players in Germany use



Average age of players in Germany



Source: BIU

pool of technology specialists, which is why Germany’s digital hubs in Berlin, Hamburg and Munich are attracting so many innovative startups. But it’s the multiple niches that exist within this market, and the opportunity to create new high-value ones, that make Germany so appealing to investors and international gaming companies. The more people play and interact, the more value-creation opportunities are generated within the game development world. It’s an industry that is capable of sustaining exponential growth.

Sales of apps and items drive growth

Game apps are one of the greatest drivers of growth in the computer and video games industry, as well as in the mobile ecosystem of smartphones, tablet, app stores and the mobile internet. The market for in-game purchases and “item selling” such as more lives, unlocked levels and virtual equipment was worth €562m in 2015, up from €209m two years before. While the PC remains the top gaming platform, game estimates that the number of gamers on smartphones increased by 14 per cent between 2014 and 2016, while the number of tablet gamers increased by 44 per cent over the same period.

“Gaming and related services is actually a bigger market in Germany than, for example, the movie industry,” says Oliver Wilken, Digital Economy Manager at Germany Trade & Invest. “Germany attracts international gaming companies with its highly-skilled and internationally-minded workforce, its state-of-the-art IT infrastructure and government support, as well as numerous gaming industry events, such as the world-renowned Gamescom in Cologne in August.”

“Casual gaming, social gaming and free-to-play MMO (massively multi-player online) games are driving this growth. The increasing number of smartphones in Germany has resulted in greater demand for mobile games – and it has opened up completely new customer groups.”



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The New CEBIT

CEBIT 2018 has redesigned itself to earn the title of Europe's leading festival for digitization and business innovation. This June, Hanover will welcome entrepreneurs, digital leaders and foreign investors from around the world.

CEBIT, one of the world's leading IT trade shows, is reinventing itself this year with the aim of becoming Europe's leading platform (bringing together the three elements of conference, exhibition and festival) for digitization and business innovation. CEBIT organizer Deutsche Messe has teamed up with the digital industry to rebuild the event from the ground up, while still presenting a wide-ranging look at digital technology in the modern world.

In addition to rescheduling the event in June and boasting an overall new look, CEBIT will unveil a new mix of themes and formats, including exhibits, conferences and networking events, which will cover all aspects relating to the digitization of business, the public sector and society. The revamped show promises to offer international IT decision-makers in particular an experience like never before.

This year, several international companies will be presenting real-world solutions and technologies that industrial users need in order to successfully digitize their operations.

The new CEBIT is divided into four main sections:

d!conomy – dedicated to the digitization of business and government.

d!tec – focusing on the digital future, emerging technologies, disruptive business models and new value-creation networks.

d!talk – a conference program covering diverse economic, political and social issues revolving around digitization.

ABOUT CEBIT

The festival where the future is now



The inventor of SpotMini and founder of Boston Dynamics, Marc Raibert, will be coming to CEBIT 2018 with his four-legged robot companion, to give a keynote address on June 12.

CEBIT takes place in Hannover from June 11 to 15, 2018. The five-day trade fair starts on Monday, June 11, with a conference and media day (registration required). The exhibition and festival starts on Tuesday, June 12. CEBIT expects even more exhibitors and visitors than last year, when more than 3,000 exhibitors from 70 nations showcased their innovations to 200,000 visitors. This year, in addition to the Internet of Things and AI, the topics will include blockchain, augmented and virtual reality, security, future mobility, drones and humanoid robots.

CEBIT is Germany's most important IT event, reflecting the country's leading role in the sector. Germany's IT market has continued to grow steadily over the past three years and is forecast to rise 2.9 per cent in 2018 to €79.3 billion.

→ www.cebitt.com

d!campus – “the beating heart of the show,” offering immersive experiences in digital technology, entertainment, opportunities for one-on-one interaction and street food.

“It's going to be more fun and entertaining, more astonishing, brighter and bolder, and open up new vistas like never before – at times even in an intentionally provocative way,” says Deutsche Messe Managing Board member Oliver Frese. The show will be “a lead-generating powerhouse, delivering win-win outcomes and added value” for participating companies and organizations, he adds. CEBIT is also making a major effort to target the “Generation Y” crowd, which Frese says is “now surging onto the marketplace, brimming with confidence and bright new ideas.”

Representatives of Germany Trade & Invest will attend and be available for any inquiries. “Nowhere else do we have the opportunity to talk to such a vast selection of companies of the digital economy, build up our network in ICT and learn about new trends in one place,” says Isabel da Silva Matos, Senior Manager, Investor Consulting at GTAI.



Interested in meeting us at CEBIT?

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Machines in Flow

Germany is one of the largest markets for the Internet of Things applications and is experiencing an upsurge in platform development, which will enable yet further diversification. From an investor perspective, is now the right time to jump into the IoT?

The Internet of Things (IoT), which enables connectivity and data exchange between objects, machines and production plants, is one of the most significant trends in industry. To facilitate the use of IoT in multiple fields, developers are creating platforms that allow companies to design their own applications. For example, manufacturers will be able to remotely monitor their facilities and equipment, in order to increase operational efficiency.

Last year, one in three industrial companies invested between five to ten per cent of annual revenue in IoT apps. Worldwide spending on IoT is estimated to reach some €650bn this year. And by 2025, McKinsey say, IoT tech will add as much as €3 trillion in value to networked factories.

As one of the largest markets for IoT applications, Germany is seeing an increase in platform development that is creating dynamic opportunities for domestic and foreign investors. "Businesses increasingly see

»The IoT is no longer a story of future growth... but about the here and now.«

Harriet Green,
General Manager of Customer Engagement
and Education at IBM's Watson center



Volvo has teamed up with Microsoft to bring HoloLens to its customers, a groundbreaking hologram technology that will allow users to explore the inner workings and features of their vehicles.

IoT as a growth driver with a view to greater customer proximity, new services and business models," says Asha-Maria Sharma, Senior Manager of Investor Consulting at Germany Trade & Invest. "Further investments, for example in IoT platforms and IT infrastructure, will follow."

According to Bernd Gross, CEO of IoT software provider Cumulocity, which originated in California and is now part of Germany's Software AG, pre-packaged IoT solutions are facilitating the trend away from costly and time-consuming in-house and tailor-made solutions. IBM last year opened its global Watson IoT headquarters in Munich – a significant investment. Microsoft has also chosen Germany as the base for its third IoT and Arti-

ficial Intelligence (AI) Insider Lab, after opening facilities in the U.S. and China. "As the world becomes more digitized and connected, the opportunity for businesses to transform has never been more real," says Harriet Green, General Manager of Customer Engagement and Education at the IBM Watson center. The IoT "is no longer a story of future growth. It's a story about the here and now, and the outcomes speak for themselves," she adds.



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Vive La e-Volution!

The e-mobility industry in Germany is on course for mass market penetration by 2020, with production, R&D and supporting technologies ramping up to meet that target. Is now the perfect time to invest?

A CETOs electric car (modelled on an Opel Corsa) charges at a tourist rental station in Welzow, near Brandenburg. Initiated by Brandenburg Technical University, the e-SolCar project has made e-cars available to tourists since 2013.



»We decided to choose Germany as the first stop on our roadmap to entering the European market.«

Simon Hou, COO and co-founder of XCharge

The expansion of the e-mobility industry is a priority for the German government. As part of the country's environmental policy, there is a push to rapidly increase the number of electric vehicles (EVs) on the road by 2020. The federal government is ploughing hundreds of millions of euros into research and development, infrastructure projects and subsidies for car buyers. Meanwhile car manufacturers are bringing more and more models to market. The opportunities for investors in the industry have never been better.

The *Nationale Plattform Elektromobilität* (NPE), which set out plans to convert the automobile market to electric, is on course to achieve mass market penetration of the e-mobility industry by the target date of 2020. The public subsidies available to car buyers total €1.2bn. A further €300m is being spent on upgrading e-mobility infrastructure over the next three years: €200m for DC charging, which can fully charge vehicles within minutes, and €100m for AC charging stations, which are slightly slower. The generous tax breaks for EV owners include zero-rated vehicle tax for ten years and income tax breaks on charging cars while at work. EVs will also account for 20 per cent of the government's fleet of vehicles by 2020.

Boost to EV infrastructure

These measures address the main impediments to the wider use of e-vehicles, particularly the shortage of charging stations and low supply of Li-Ion batteries. The extra investment will see the number of AC charging points in Germany rise from 7,100 to 70,000 by 2020, while the amount of DC charging stations will increase from 300 to around 7,000 over the same period, according to NPE research. Plugs and sockets for e-vehicles are also being standardized, which will keep consumer costs down.

Among the overseas firms attracted to invest in Germany are XCharge, a Chinese producer of charging points for EVs and cloud-based charging software. It opened its new European HQ in Hamburg last December, having sold more than 20,000 charging points

in China. "We decided to choose Germany as the first stop on our roadmap to entering the European market," says Simon Hou, COO and co-founder of XCharge. "Germany has a long and successful history of development in the automotive industry. Most of today's best car brands were born here. There are top technical and management talents here that we are looking to develop. There are also favorable policies at both national and local levels to stimulate the growth of e-mobility and renewable energy industries – policies that are friendly to international companies."



André Kaufung CEO & Managing Partner, CharIN

CharIN e.V. was founded by ten OEMs and charging station manufacturers in 2015. Headquartered in Berlin, the association now has more than 110 members and represents 17 of the top 20 car brands worldwide.

What are the biggest opportunities for CharIN?

We have global co-operation with multinational members, as well as a market imperative for fast and safe charging systems for e-mobility and inductive charging. Charging infrastructure for all applications will play an essential role in the uptake of EVs.

How do you work with foreign companies?

Our local offices share regional developments and challenges with members. Working in groups, our members debate the current challenges and develop common requirements regarding different topics, such as charging infrastructure.

How can new companies get involved?

Members are invited to join focus groups, participate in position papers and discuss requirements for global charging standards. Membership details are available on the CharIN website www.charinev.org.

Germany leads Europe's "e-Volution"

German Original Equipment Manufacturers (OEMs) are also fully backing the "e-Volution." In 2015, there were 30 different EV models on the market, a further ten were added in 2016 and all have huge plans for the next three years. Volkswagen alone is looking at introducing 20 new e-models by 2020, while BMW plans to produce a plug-in-hybrid version of every major model on the market.

"Germany is Europe's leading production and sales market in the automobile industry," says Stefan Di Bitonto, Senior Manager of Automobile Industries at GTAI. "There is a resolute attitude to promoting e-mobility here, as it is an integral part of the bigger picture of Germany's environmental policy. The focus is moving away from pilot programs toward the creation of a nationwide e-mobility infrastructure and sustained business models to form a viable alternative to petrol and diesel engines. This requires investment, but creates a huge opportunity for private companies to stake a claim in an industry heading for a period of explosive growth."



Further information:
www.gtai.com/charging-infrastructure

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Federal Ministry
for Economic Affairs
and Energy

on the basis of a decision
by the German Bundestag

Hello to Green Hydrogen

The green hydrogen economy in Eastern Germany is a key element in Germany's plan to transition to renewable energy sources by 2020. The HYPOS cluster demonstrates how hydrogen can be a safe, cost-effective and widely-used energy carrier.

The Fukushima nuclear disaster in March 2011 changed the course of Germany's energy policy by cementing the government's decision to phase out the country's reliance on nuclear power. But even before Fukushima, legislation was put in place in 2010 to support the *Energiewende* (Energy Transition), which resulted in a huge expansion in renewable energy sources, particularly wind power. But this, in turn, created an unforeseen problem: what to do with the surplus power produced?

Hydrogen Power Storage & Solutions East Germany (HYPOS), a cluster of German companies and research institutions including Siemens, Linde and the Fraunhofer, Max-Planck and Leibniz Institutes, promotes the use of surplus energy from wind farms and solar parks to produce hydrogen (H₂), which is then fed into the chemical delivery pipelines, natural gas grid and electricity supply networks in eastern Germany. The aim of this groundbreaking project is to make safe, green hydrogen a widespread, cost-effective energy carrier and reduce dependence on fossil fuels. The project is partly funded by the German government, and has funding totaling €45m for the next four years.

H₂: a clean, green solution

Hydrogen, which can be generated by splitting water into hydrogen and oxygen molecules through electrolysis, is an underused energy carrier. It is not only environmentally friendly but, unlike electricity, can be easily

stored and later converted back to electricity or heat. It can also be used in mobility and as an industrial raw material. "Hydrogen can be used to produce plastics, fuels and precursors for the cosmetics industry – in fact anything for which petroleum-based systems are used today," says Ralf B. Wehrspohn, deputy CEO of HYPOS and Director of the Fraunhofer Institute for the Microstructure of Materials and Systems (IMWS) in Halle.

***H₂ can be used
to produce
anything that
petroleum-based
systems can.***

Saxony-Anhalt has been a pioneer in the development of renewable energy projects: every second kilowatt hour generated in the state now comes from wind, sun or biomass. With an annual hydrogen-generation capacity of approximately six billion cubic meters – mainly still through conventional hydrocarbon processes – the region's infrastructure provides excellent conditions for HYPOS. It

includes the electricity and chemical flow grids in Leuna and Schkopau, and a large gas storage facility in Bad Lauchstädt. Researchers in Leuna are also investigating using electrolysis to split water into H₂ and oxygen on an industrial scale.

As half of the energy generated by these sustainable technologies is sold outside the state as surplus, the H₂ economy provides a significant boost to the region. "We have the power here, we convert it into H₂, and then we can supply our chemical chain directly and no longer need to purchase petroleum and natural gas from more distant regions," Wehrspohn explains.

Since its inception in 2013, the HYPOS network has grown from seven to over 100 members today. It operates as a platform for the exchange of knowledge on production, transport, storage and utilization of green hydrogen. It's still early days, but HYPOS aims to produce green H₂ economically and safely by 2020, when it could be used in hydrogen fuel cell cars, domestic heating, in industrial applications and also to compensate for fluctuations in solar or wind energy generation. These and other benefits, such as ease of transportation, make it a potential game-changer in the transition from fossil fuels to renewable energy sources.



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Collaboration on Campus

The Technical University of Munich cooperates more closely with the corporate sector than any other German university. While the students benefit from hands-on training, companies get ideas for innovative products and new technologies.

In August last year, the American entrepreneur Elon Musk caused a flurry of excitement when he posted a video on Twitter. The 26-second clip makes the viewer feel quite dizzy: as the camera moves faster and faster along a neon-lit tunnel, the lights flicker wildly, until the ride suddenly ends. The camera was attached to a maglev train (a “Hyperloop” in technical jargon), powered by an electric motor. The capsule reached up to 324km/h – a record for a Hyperloop capsule. The prototype, which was developed by students of the Technical University of Munich (TUM), will help to revolutionize travel: one day these capsules could carry people to their destinations at speeds of around 1,200km/h.

The sky’s the limit for the students of TUM, who aspire to solve the problems facing humanity by developing the key technologies of the future. In order to prepare students for the challenges ahead, the TUM cooperates with a large number of companies, many of which come from overseas. “Such cooperation offers advantages for both sides,” says Thomas Hofmann, Vice President of Research and Innovation at TUM, who coordinates several joint ventures between German and foreign companies.

The synergistic relationship that exists between industry and many of the top sci-



Manfred Schwarz
»Elon Musk congratulated me: that was my highlight.«

While studying mechanical engineering at TUM, Manfred Schwarz and his fellow students developed a Hyperloop capsule for the U.S. entrepreneur Elon Musk.

Mr. Schwarz, how did you get to work with Elon Musk?

Musk organized a competition to build a working Hyperloop prototype. More than 1,000 teams entered worldwide but we presented the most persuasive concept and won the competition.

How long have you been working on the capsule?

About a year. We developed and tested the individual parts in Munich. However, we didn’t know if they would work together because we didn’t have a test tube, so we sent the parts to the U.S. and assembled them there. During the test run, the capsule accelerated to a speed of 324km/h, more than any capsule before. Only then did we know that one year’s work has paid off. Elon Musk was standing next to us as our capsule set the speed record.

How did that moment feel?

Outstanding. Musk congratulated us all and shook hands with us. That was my personal highlight.

entific universities in Germany is one of the reasons why it is an excellent international research location. The TUM follows two different models for collaboration – “Contracts for Work and Services” and “Research and Development Agreements.” With the former, companies pay an upfront fee for a clear university assignment, then the students measure or test components, collect data and evaluate it. With the R&D agreements (more common), the university and its partners mutually agree on the research topic and the timetable for delivery, with the option of renewal. The university typically provides the laboratories, where the students either work alone or in concert with company employees. In both cases, the university ensures the results are not compromised, i.e. companies cannot specify fixed goals or influence the outcome.

A win-win partnership

Through this kind of cooperation, the university can offer its students hands-on training and real-world experience. The corporate partners in turn benefit from ideas for new business opportunities and new and improved products. Furthermore, connections are made with talented students who could later graduate to become valuable employees.



Photo: picture alliance/AP Photo

SpaceX CEO Elon Musk congratulates the winning team of the Hyperloop Pod Competition II at SpaceX's Hyperloop track in Hawthorne, California. The student team "WARR" from Munich's Technical University won the contest with a peak speed of 324km/h.

The US giant General Electric (GE) is one of TUM's biggest partners. Since 2004, students have been working with GE on a project to design and build more efficient gas turbines for use in aircraft, in the pumping stations of oil and gas pipelines, or to drive battle tanks. In 2016, TUM opened a new laboratory with GE on campus and the costs (€15m) were shared between the company, the university and the state of Bavaria. For GE, the financial outlay has already paid off: TUM has developed a 1,300hp (horse power) engine for the company that consumes 20 per cent less fuel than older models. This engine will soon become the standard for small business aircraft including, for example, the Cessna Denali made by U.S. manufacturer Textron.

Through years of successful collaboration with the corporate sector, the university has developed professional standards and

WHAT'S THE BIG IDEA?

Innovating together

In Germany, cooperation between universities and companies is widespread. "Not only do large companies work together with universities, but also SMEs," says Mathias Winde from Stifterverband, a unique organisation with over 3,000 members which brings companies of all sizes together with foundations, donors and private individuals, to drive improvements in the fields of education, science and innovation. For example, since 2009, the Technical University of Darmstadt in Hesse has been working closely with the railway operator Deutsche Bahn on IT security and environmental protection within largescale construction projects. The University of Cologne also cooperates with several companies such as the international pharmaceuticals company Bayer Healthcare.

business models to make the contracting process easier. The university's main concern is to secure its rights: students must be able to write about their work and publish the result, perhaps in the form of a doctorate. From the companies' perspective, they must gauge in advance which areas are suitable for collaboration and sharing (for example, where trade secrets are involved, the university may not be the right partner). Cooperations work best where companies want to explore and open up new business areas. "It's important for the TUM to work with its partners on an equal footing," Hofmann points out. The principles of the university are published on its website for the benefit of potential partners.



Further information:
www.tum.de/nc/en/tum-business/industry-liaison-office

Northern Highlights

Historically, Finland and Germany have strong relations and a similar business culture, making them natural business partners. Marc Lehnfeld, Director of Germany Trade & Invest's Helsinki office, talks to us about working with Europe's northeast territories.

The annual startup event Slush in Helsinki, Finland, (December 4 to 5, 2018) attracts international start-ups and investors to the Nordic country.

GTAI's northernmost overseas office in Helsinki has been run by Marc Lehnfeld since 2016. It surveys market activities for Finland, Estonia, Latvia and Lithuania and is the first contact point for local firms interested in expanding to Germany. The close cooperation between GTAI, the German-Finnish Chamber of Commerce (AHK) and the German embassy boosts Germany's visibility in the northern territories.

Mr. Lehnfeld, how would you characterize the Finnish economy?

MARC LEHNFELD: In Germany, Finland is well-known for its sauna culture, beautiful nature and large forests. The forest industry is still the country's largest export sector but the chemical, mining and metal industries also play an important role. Nokia is once again Finland's largest company and IT is still an important field with many startups entering the market.

What attracts Finnish investors to Germany as a business location?

LEHNFELD: Germany is the largest European economy and that means a lot to Finnish companies, whose home market consists of only 5.5m inhabitants. Also, Germany is a technology market with important target sectors like the automotive, chemical, machinery and metal industries. Many Finnish IT companies offer competitive products and services for Germany's fast-growing IoT segment. Finnish companies appreciate the similar business culture and the historically strong relations.

How can GTAI support Finnish companies that want to invest in Germany?



And does GTAI cooperate in this field with partners like the AHK?

LEHNFELD: Being a public organization, GTAI is a trusted partner of Finnish companies and institutions. We can identify the best locations within Germany for the investor and deliver valuable information about the regulatory framework and available incentives, all free of charge. In particular, the AHK promotes our services and is an important gateway for us. Through our close cooperation, we also advise the Chamber's customers on their investment plans in Germany – usually the second step after a successful market entry.

What was the most important investment by a Finnish company in Germany last year?

LEHNFELD: It is hard to name just one, but we advised IT company Arcusys and artificial intelligence company DAIN Studios on their business set-up in Germany. But one of the most significant investment projects is Finnish energy company Fortum's recent acquisition of 47 per cent of Uniper shares.

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Germany's Image in the U.S.

Over the course of ten years in my professional roles for GTAI, acquaintances and business partners have shared many anecdotes, opinions and stereotypes about Germany. Ask most Americans what they think about Germans, and you just might be surprised.

As an American, born half German/half Egyptian, I am enjoying the unique opportunity to live and work in Washington D.C., a diverse and multicultural metropolis in the United States. In sharp contrast to my affiliation with the Middle East, it has been extremely pleasant, particularly in the last six to eight years, to introduce myself as half-German in the U.S. Smalltalk at business functions with American counterparts typically consists of stories of their German ancestry or travel and work in Germany. The positive stereotypes praise the eco-conscious, reliable, organized and high-tech Germans as well as their great beer, fast and desirable cars, and their famous Oktoberfest celebrations. There is a clear admiration for this society, which also embodies great organizational skills, punctuality and a sound infrastructure.

This impression and image of Germany was confirmed by the market research institute GfK and their political consultant Simon Anholt in November 2017. According to his study, Germany has the best reputation worldwide and has surpassed the U.S. as well as other countries in many different aspects. The study illustrates that Germany's image is no longer solely based on its strong economic power. Germans are highly respected and admired around the globe and Germany has become an attractive and desirable destination to do business.



»Germans are much admired«

Omar Oweiss is Director of Investor Consulting at Germany Trade and Invest's Washington, D.C. office. He currently focuses his attention on North American companies interested in international expansion within the chemicals, life sciences and services industries.

Cross-cultural currents

While it may seem that Germany is promoting itself as an attractive investment destination, there are some issues and concerns that come up. German labor laws are perceived as highly restrictive to American counterparts, who are more accustomed to the American hire-and-fire mentality. Higher taxes, a lack of tax breaks and their views on personal and vacation time rankle with some U.S. entrepreneurs. In the U.S., the concept of "work-

life balance" is not as sacred as in Germany. Americans typically have only two to three weeks off per calendar year. They are amazed by the amount of vacation days in Germany, and also notice the differences in employee rights, such as parental leave.

Furthermore, I am occasionally surprised that some entrepreneurs do not recognize Germany as a "European hub." Potential investors might be well-informed about the German economy and the legal framework, but often fail to recognize Germany as a place from which one can access the large European market. Additional information and persuasion is sometimes needed.

On the other hand, you do not need to convince Americans about the top quality of German products. They enjoy an excellent reputation – not even the Volkswagen (VW) diesel emissions scandal of 2015 could shake the American public's confidence in German brands. Of course, it's important to note that the resolution offered to U.S. customers who were affected by faulty VW vehicles was substantially better than in many other countries. But the fact remains, if someone wants to buy quality products, the "Made in Germany" seal is highly sought after.



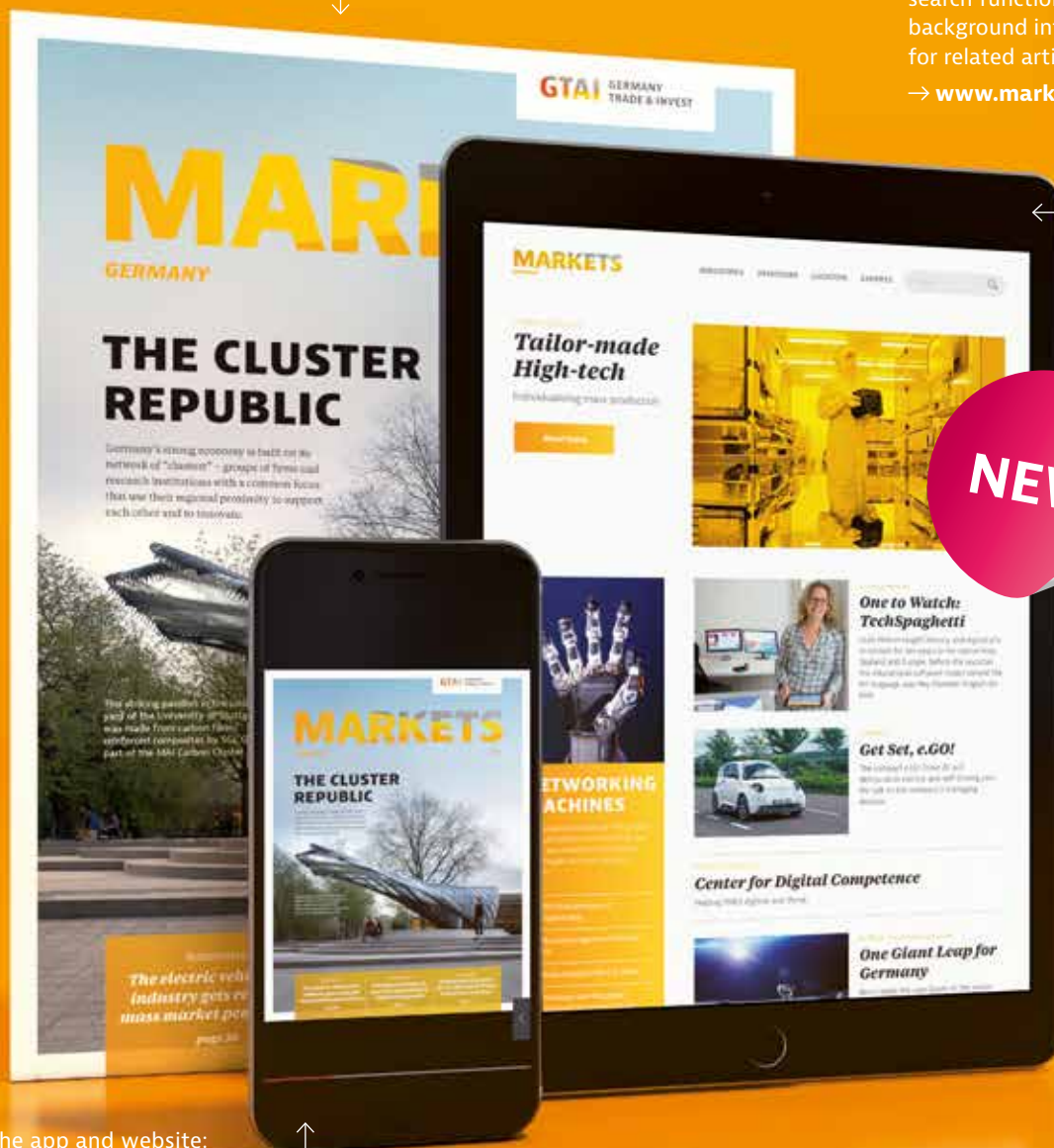
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