August 20, 2018

OrthoMedex Featured in GTAI's 'The Cluster Republic'

GTAI GERMANY TRADE & INVEST

OrthoMedex is pleased to announce that its international research collaboration with the Medical Valley was highlighted in the GTAI journal – MARKETS. The featured article: *The Cluster Republic* focuses on Germany's regional network of technology-based small manufacturing enterprises that synergistically collaborate with large research institutions.

Jim Walls, OrthoMedex's Founder, commented: "The German government recognizes Bavaria's Medical Valley as a National Cluster of Medtech Excellence. The GTAI article highlights how OrthoMedex, Medical Valley EMN – a medtech incubator, and Germany's Fraunhofer Institute, developed an international orthopedic implant research collaboration. The project exemplifies Medical Valley's willingness to reach around the globe to broaden its medtech 'cluster' of excellence."

The GTAI article follows:

GTAI GERMANY TRADE & INVEST

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
page 20

Entertainment:
Gaming in Germany is experiencing a period of exponential growth
page 16

Technology:
Platform development for the Internet of Things reaches the next level
page 19

Photo: ©ICD/ITKE University of 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 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?"

»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

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

FACTS & FIGURES

58%

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

Source: Clustermonitor Germany

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.

Photo: GEA Group

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 →

FACTS & FIGURES

Cluster crunching

8,500
companies work together in Germany's top 100 innovation clusters[1]

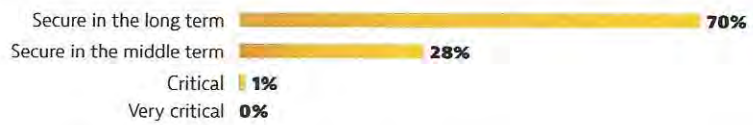
€120m
in internationalization funding will be spent by 30 German clusters starting in 2018.[2]

12
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 2008[4]

Monetary benefit to cluster players in relation to investment in the cluster[5]

Financial sustainability of German clusters[6]



Types of cooperation between German clusters and foreign clusters[7]

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. microelectronics, 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. Universitites 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

Contact:
gabriel.flemming@gtai.com
GTAI expert for Chemicals & Healthcare

jerome.hull@gtai.com
GTAI expert for Electronics & Microtechnology

asha-maria.sharma@gtai.com
GTAI expert for Industrie 4.0 and IoT

claudia.gruene@gtai.com
GTAI expert for Machinery & Equipment and Industrie 4.0