

What's Next

Connecting People and Technologies

FERCHAU 

// Industry 2040

Germany must reinvent itself as an industrialised nation. The question is how?

Nº 10

// Playing catch-up

AI development »made in Europe«

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// Transformation? It's happening!

Interview with our Chairman Frank Ferchau and CEO Alexander Schulz about the drivers and goals of transformation at FERCHAU

Nº 04

01-2025

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Dear readers,

We have frequently reported in our customer magazine on transformation and disruption – now we ourselves are a part of it. We have been implementing our own change since the beginning of 2025 after an intensive planning phase. On the one hand, FERCHAU has aligned its structures and processes to four service lines in order to better meet the requirements of all our customers. On the other hand, our shareholder Frank Ferchau, who has always welcomed you here, has taken on the role of Chairman.

That's why after nine years as COO, you see me here today as the new CEO of FERCHAU – and as a resolute optimist. The reason: even though Europe may be going through a difficult phase, not every sector is going badly by a long chalk, and the German Government's financial package is also radiating to our foreign subsidiaries. In the light of the current pressure for change on the economy, many organisations are also focussing on new areas where they see potential.

My optimism focuses on topics such as future-proof energy generation, mechanical and plant engineering, sustainable production processes, the

broad field of life sciences and infrastructure: from traffic routes to robust networks of fast Internet and satellites. On top of this, there are also the many innovation clusters, for example for drones, AI, quantum computing or IT security – from Europe for Europe and with enormous economic profitability.

We have brought together some of the developments that are possible in these segments – and thus in tomorrow's economy – in this issue's »What's N3xt«. We report on the energy of the future, the performance principle in companies and technologies which enable people and machines to work better together: exoskeletons, AI in factories and IT tools to give service field technicians the best possible support.

We are ready for these innovations, transformations – and the disruptions for the good! I am therefore delighted that you share the FERCHAU optimism and that together we can get the economy moving again.

Yours,

Alexander Schulz

People, Process & Technologies

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»Transformation? It's happening!«

2025 is a year of change at FERCHAU: Chairman Frank Ferchau and CEO Alexander Schulz are facing the challenges of their respective changed roles. At the same time, the group has been given a new name and undergone structural adjustments. The course has been set for the transformation into a successful future. Frank Ferchau and Alexander Schulz explain to us in a comprehensive »What's N3xt« interview what drives them, where they want to go and how they are going about it.

Nº 04

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LEGAL NOTICE #10 | Issue 01-2025, Circulation: 900, 6th year of publication

PUBLISHER FERCHAU GmbH, Steinmüllerallee 2, 51643 Gummersbach, Phone +49 2261 3006-0, Fax +49 2261 3006-99, zeitung@ferchau.com, ferchau.com

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Bespoke restructuring:

»Transform yourself before someone else does it!«

We made a lot of changes at FERCHAU in 2025 and looked to the future: Frank Ferchau is now Chairman, Alexander Schulz has been appointed CEO, and the group's name and structure have been given a new focus.

Demanding change is easy. But what is it like to be a driver and an important part of the transformation? And what's more, in the midst of an industrial crisis? Frank Ferchau and Alexander Schulz outline in this interview what drove them to change and the goals they have set themselves. ➔



»As Chairman, I can now tackle the tasks that I previously could not have given the focus they needed while I was involved in day-to-day operations: strategic initiatives and further development projects.«

Frank Ferchau



Mr Ferchau, you have handed over the baton to Alexander Schulz. Why at this precise moment?

FRANK FERCHAU: It was always clear to me that this time would come sooner or later – and some major factors in 2024 all came together: On the one hand, we had to take the next structural step in the organisation to create the basis for further growth. On the other hand, we wanted to open up opportunities in the company to the younger generation. We had to make a significant transformation to achieve that.

What exactly did you initiate?

FERCHAU: We have a new structure that is not centred on managing partners, but on external management. This calls for different checks and balances, so a different system was needed. That is why we have created new positions in the course of this transformation, which give more responsibility to younger colleagues in their 40s.

You yourself have switched to the role of chairman – what will your duties be?

FERCHAU: As Chairman, I can now tackle the tasks that I previously could not have given the focus they needed while I was involved in day-to-day operations: strategic initiatives and further development projects – for example, around internationalisation, digitalisation and AI.

How will you personally shape this new role?

FERCHAU: It's not as if Alexander and I have become different people since January. Our change is a fluid process, in which we keep in close dialogue – and in which, above all, the perspectives shift. I myself am aiming for an American-style chairmanship – with the chairmanship of a supervisory board and no operational activities.

Mr Schulz, you have been with the company since 1997, COO since 2016, and now CEO. Do you tick differently from the company owner?

ALEXANDER SCHULZ: We have reorganised responsibilities between us with a clear demarcation of roles: I focus on the operational business and head the management board. In doing so, I act – as Frank puts it – as a bridge builder. Because the great leverage we now have is that the board members now share the corporate responsibility. Our new, streamlined, non-overlapping and transparent structures support me in this. On this basis, all the decision-making groups must jointly take an overview and act together.

Will you change the industry focus or realign the organisation?

SCHULZ: Yes, the change fundamentally affects our organisation. We are – and this has grown historically – focused on regions and postcodes. We have already resolved this in recent years and switched our focus to individual customer segments. Now, however, we are implementing this approach company-wide and, from within the four new divisions, offering customised products and technologies.

Why are you redesigning your organisation now?

SCHULZ: Frank and I analysed the growth processes, identified the stumbling blocks and developed a far-reaching solution: a total restructure. It was also clear that we were both the driver and bottleneck in the management in the previous structure, so we designed the new »multi-shoulder principle«.

Mr Ferchau, you implore your employees to embrace the transformation with courage – which emotions move you yourself?

FERCHAU: These structural deliberations took place in 2019. The Covid situation interrupted our process, but could not prevent us from continuing with our plan. Because I had the goal of leaving this company structure, which was built around me, at the age of 60. In addition, there was no economic wave in sight that would carry our ship upwards and onwards without intervention on our part. So it was clear to me that we needed to breathe life into the new approach. A new approach in the sense that FERCHAU will become an independent legal entity free from operational influence from a founding family member – and can thus secure jobs and promote further business development even in difficult economic times. In this respect, I was not being courageous, but simply thinking rationally and doing my job.

Mr Schulz, do you have customer contact as CEO – or what exactly is your connection to the market?

SCHULZ: I have worked in sales and in our branches for almost 20 years, and I get enormous energy from exchanging ideas with customers, employees and applicants. This is the only way to improve processes and understand decisions. I therefore aim to spend 20 per cent of my time in discussions. As CEO, I clearly see it as my job to above all be directly involved in supporting our largest customers.

You have defined ambitious long-term growth targets. Why?

SCHULZ: We are a group that competes with the biggest players. Our customers rightly expect us to meet their requirements in an international context – including with Romanian and Indian services. This makes it viable for us to invest in complex IT structures. Therefore, once the current economic situation has recovered, we are aiming for a the long-term workforce of 20,000. Not as an end in itself, though, but as a guarantee of being able to provide our service.

FERCHAU: I see it the same way as Alexander does. In addition, only growing companies are attractive for new talent, as that is where they see the best career prospects. The top ten in our industry cover just 27 per cent of the total market in this country. We therefore need to identify the market potential, develop it and then put forward attractive offerings accordingly.

Is the current economic situation different from the dot-com or financial market crisis?

SCHULZ: Whilst it may sound harsh, the current crisis, in my view, has been predictable and overdue: we emerged from a boom in which companies started getting fat. Now we have to recognise that products can be made anywhere in the world at our level – only cheaper. So we have to compete on a global scale, and that is a hard lesson that must bring about significant change. But it will make us more future-proof. I'm quite sure of that.

FERCHAU: In this respect, the crisis differs from its predecessors, which primarily affected other sectors or focused on the USA. Similarly, the car industry's structural crisis in the 1990s was triggered by Japanese manufacturers pushing into our home market. Today, our country is also experiencing infrastructural problems – and the challenges of tomorrow, digitalisation, space travel and mobility. Which of those future topics is Germany still ahead in today? Instead, we face structural tasks, demographic challenges, social problems, Europe-wide security issues. In all of this, we remain focused on ourselves: FERCHAU is a driver of innovation in engineering and IT, which is triggered when companies need to make change a reality. ➔

In your experience, where does the change have to start?

FERCHAU: If we are going to maintain our standard of living, we have to ask ourselves how we can initiate innovations with a part-time society: changes take up a lot of working time! Another challenge is how to boost innovation and openness to develop patents – here, indeed, we are stagnating whilst China's patent filings are soaring. And we must also face up to the unpleasant questions of the ecological challenge and avoid saying 'no' or remaining vague. I'm all about developing real, achievable visions: we have to look forward, in the direction of travel, and not just focus on the rear-view mirror.

Why is it so difficult to get the German innovation engine going again?

FERCHAU: If we want to make a difference, we need technology openness, to accept mistakes, and entrepreneurship. We must also reward people for embarking on the quest for new solutions and challenging existing structures. That's why it's all about more openness to change. This is all the more difficult in an ageing society; innovations are driven forward mainly by people between the ages of 18 and 30. Other countries, such as France and Poland, are more adept at moving forward. Maybe you have to stimulate the imagination and get excited about the solutions of tomorrow as early as pre-school.

Mr Schulz, in which area do you see the most important lever for more innovation and ingenuity?

SCHULZ: I see the greatest potential in the digitalisation environment. The Schwarz Group, for example, is a pioneer that is setting up its own software and service portfolio in a highly competitive market – including the data centre infrastructure. It shows that you can implement exciting IT products with little effort in a short time. This is a huge opportunity for young people to make a difference and need to be communicated more so that the AI train does not pass us by.

The AI keyword: how do you at FERCHAU embrace AI?

SCHULZ: We set up our own unit to drive IT and AI innovation in 2022. One goal is to dock AI to process steps in the company with a view to relieving employees' workload in application management or onboarding, for example. AI also offers huge potential for better efficiency in our administrative activities. Another goal is to speed up dialogue through our customer portal.

Mr Ferchau, what strategy do you have in near and offshore regions?

FERCHAU: We are continuing to expand internationalisation and the European network will become even more fine-meshed. We currently generate approximately 10 per cent of our turnover outside of Germany, the strongest markets being Austria and Spain. But France is also developing extremely well, which makes me very proud. Our strategy is to approach the market with an open mind and define a minimum turnover size, distinguishing between organic growth and acquisitions that depend on regional conditions. For example, prices of acquisitions in India are high at the moment, and we would not expand there.

Mr Schulz, do you expect more Indian companies to enter the European market?

SCHULZ: There are many opportunities from the Indian perspective to offer technology services worldwide, even if they have focused on Germany over the past 10 years. Right now, India's gaze is on Poland and Spain – perhaps America, too, because technological developments are gathering pace there. I doubt whether the companies will adapt their business model: the customer has project planning offices, but engineering is still carried out in India.

FERCHAU: The internationalisation of the market is positive for us, because many opportunities are opening up for us for new customers. Warsaw is one of these hotspots, thanks to the Google and Intel development centres, as well as the shared service centres of Western service companies. A united Europe also offers us many business opportunities.

SCHULZ: What's more: I sense a special spirit in our overseas subsidiaries, a new beginning, also supported by the motivated, young professionals. This will enrich our entire company – and if we succeed in spreading this mindset throughout our country, new perspectives will develop.

What does your restructuring – the four divisions – mean for your customers?

SCHULZ: Our customers now receive a completely customised offer for every requirement, one which has been developed by a team of specialists and embraces our entire portfolio – from the support by our technical employees, to the technological solutions provided by freelancers, to the services around personnel procurement and recruitment. That's why our restructuring is also called »One Voice« – many different disciplines working towards a common goal.



»Our customers now receive a completely customised offer for every requirement, one which has been developed by a team of specialists and embraces our entire portfolio.«

Alexander Schulz

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Cover

FERCHAU: I use the image of the fruit harvest in an orchard. Until now, we were trying to pick our bananas, cherries and grapes using one and the same machine. Now we will use a specific device for each fruit. This is better for the perennials, trees and vines – and for the total yield.

What is the internal impact of all this?


FERCHAU: To keep the analogy going: up to now, the management has been responsible for repairing the harvester. Now not only do we have three efficient devices, but also three teams of mechanics to ensure operational capability. This is complex – the machines have a mix of common and unique parts – and everything has to be slickly coordinated. That is why we have developed a decision-making structure that shoulders this task in a team.

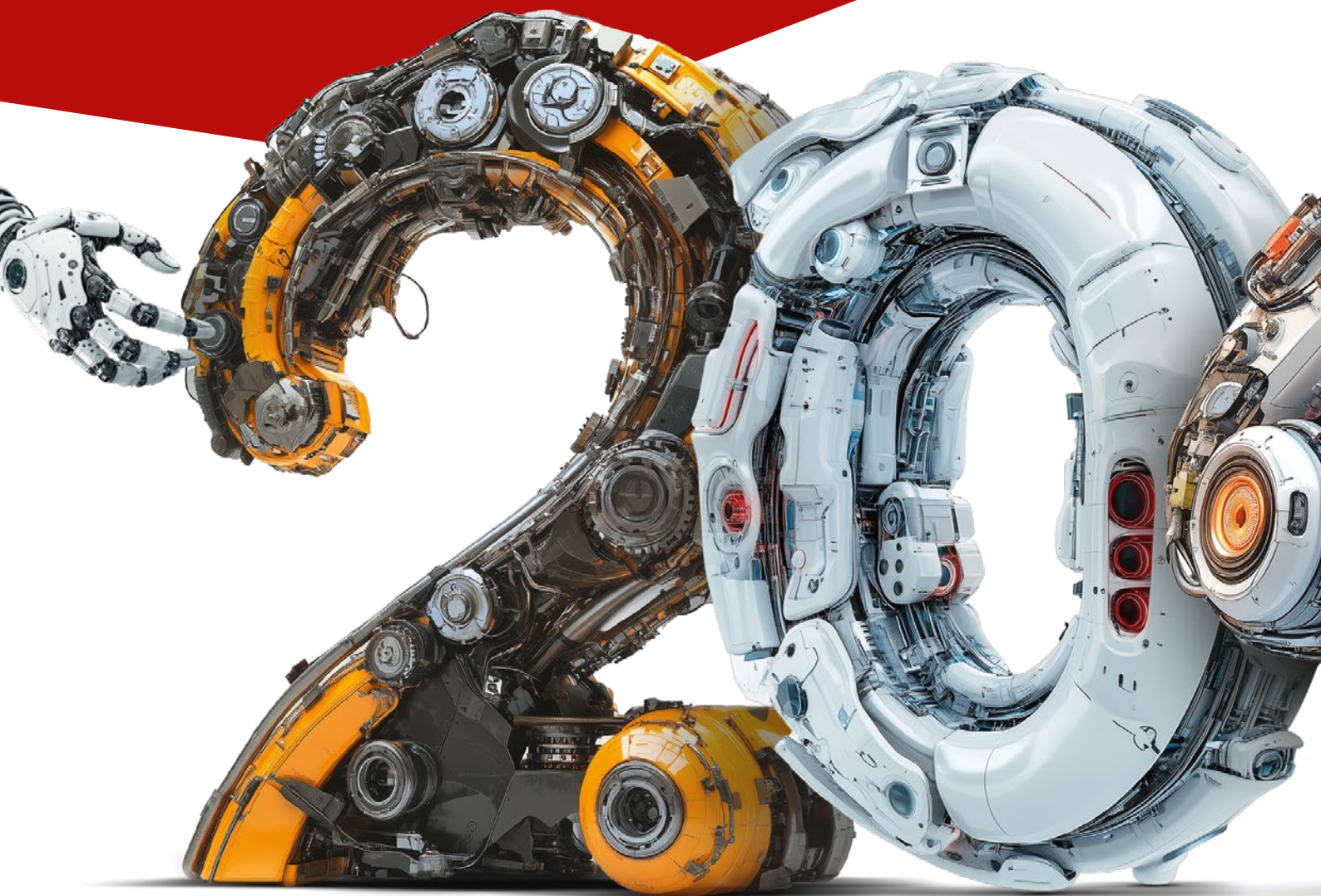
SCHULZ: That's why the meetings are now, to continue the metaphor, fruit-specific, focused and effective.

Mr Ferchau, what do you wish for your successor?

FERCHAU: That he stays just as he is – a cool guy: but with a thick skin when it is needed to pursue our interests resolutely. And sensitivity to guide our company towards the future with satisfied customers and employees. I hope that he will succeed in remaining a happy man in this balancing act.

Mr Schulz, what do you wish Frank Ferchau?

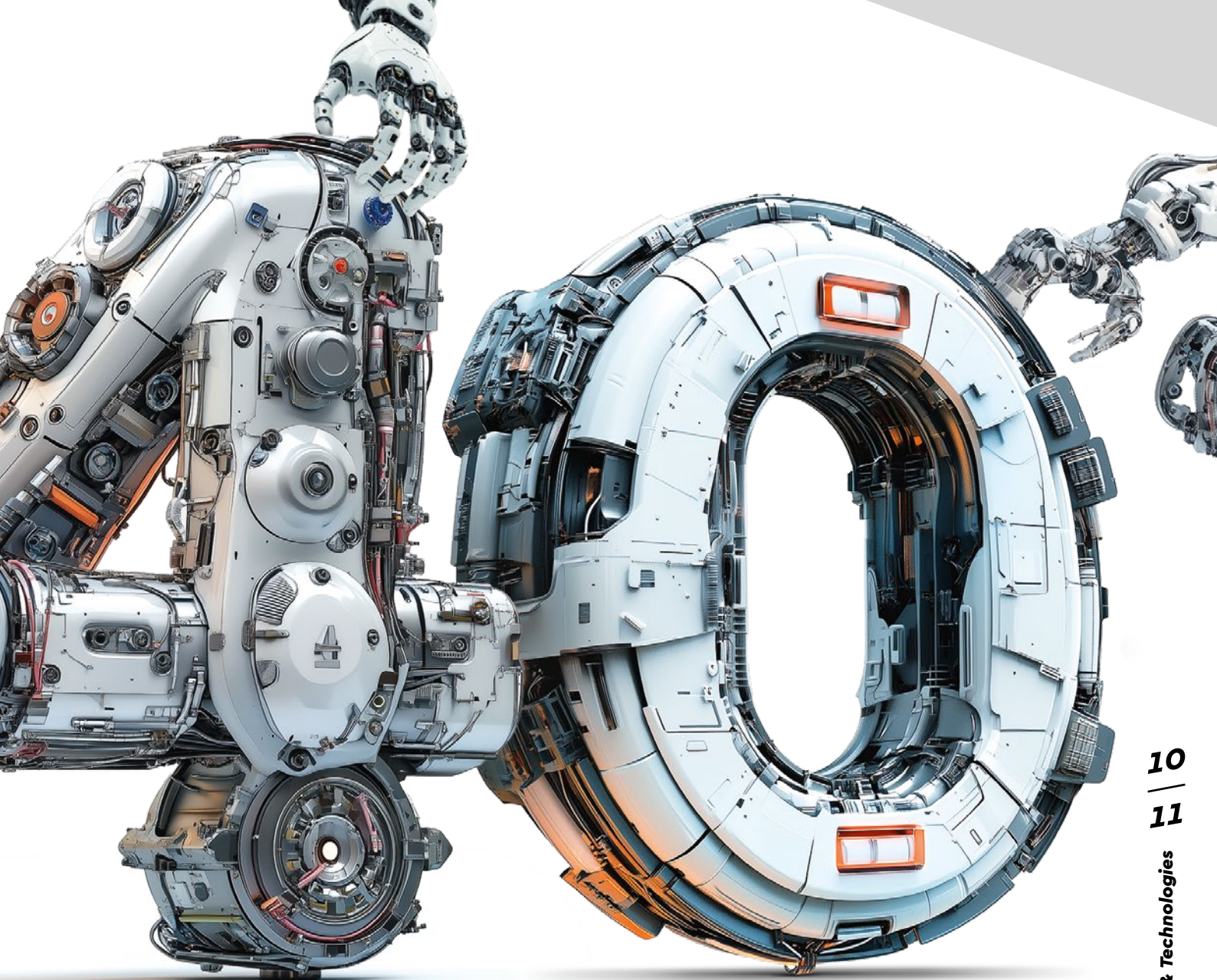
SCHULZ: I hope that he will take it one step at a time in his new role – and that we will work together in a spirit of trust. To this end, he should definitely maintain his strategic drive and his uncanny ability to translate abstract challenges into images! These are his great strengths, from which we will also benefit in the future! 



Industry 2040

The great industrial transformation

 **TEXT** Uwe Küll



Industry in Germany must reinvent itself. That is what the experts say. The opportunities are there: for example, in energy technology, more intelligent automation, and medical technology. But to exploit it, you need more courage to take risks and faster digitalisation.

»Business as usual« is not an option for the European economy, and especially not the German one. The BDI study »Transformation Paths for Germany as an Industrial Nation« already makes it clear in the title that something needs to change for the German economy to return to the track of success. The report, co-authored with the Boston Consulting Group, calls for action: Germany must reinvent itself as an industrialised nation. If this succeeds, growth opportunities of more than **€ 15 trillion revenue in 2030** will open up in new markets. To put it into context: Germany's gross domestic product in 2024 amounted to around €4.3 trillion.

The experts assess that the German economy is well positioned in the fields of energy technologies, industrial automation and life science to build up new industrial value added. Despite a shortage of skilled personnel, competent personnel in engineering occupations are just as much a part of the benefits of the location as is the high level of technological leadership in many different areas – from mechanical engineering to medical technology. ➔

Established global market leaders in the automotive and pharmaceutical sectors as well as renowned research and innovation institutions bring the necessary financial resources and expertise to a successful transformation. And Europe's pioneering role in global climate protection makes its home market an incubator for the development of globally successful climate technologies. MAN Energy Solutions is currently delivering an example of this in Helsinki in the form of the world's largest air-to-water heat pump. Finland's capital saves **26,000 tonnes of CO₂ annually** with the 33 megawatt plant. Clean energy is also the order of the day in the Ruhr region: in Oberhausen, Air Liquide operates a new **20 megawatt electrolysis plant** for producing renewable hydrogen. The plant supplies the key Rhine and Ruhr industries with the climate-neutral energy source via a pipeline.

Making the energy transition cheaper

At the same time, however, German industry is suffering from the high energy prices resulting from the energy transition. Can this dilemma be resolved? Yes, says the »Getting the Energy Transition on Track« study by BDI and BCG, in which German Economic Institute (IW) also participated. Among other things, it calls for faster electrification of transport, industry and heating in buildings, as well as expanding renewable energies and the hydrogen economy. A total of 20 recommendations for implementing the energy transition more cost-effectively could help to save more than €300 billion by 2035. This includes, for example, eliminating expensive underground cables. Jens Burchardt, partner at BCG and co-author of the study, says: »In the electricity sector, cutting emissions and costs is not a contradiction.



**Prof Dr-Ing
Thomas Bauernhansl**

»There is enough innovation potential in mechanical engineering for a bright future.«

Jens Burchardt

»In the electricity sector, cutting emissions and costs is not a contradiction.«

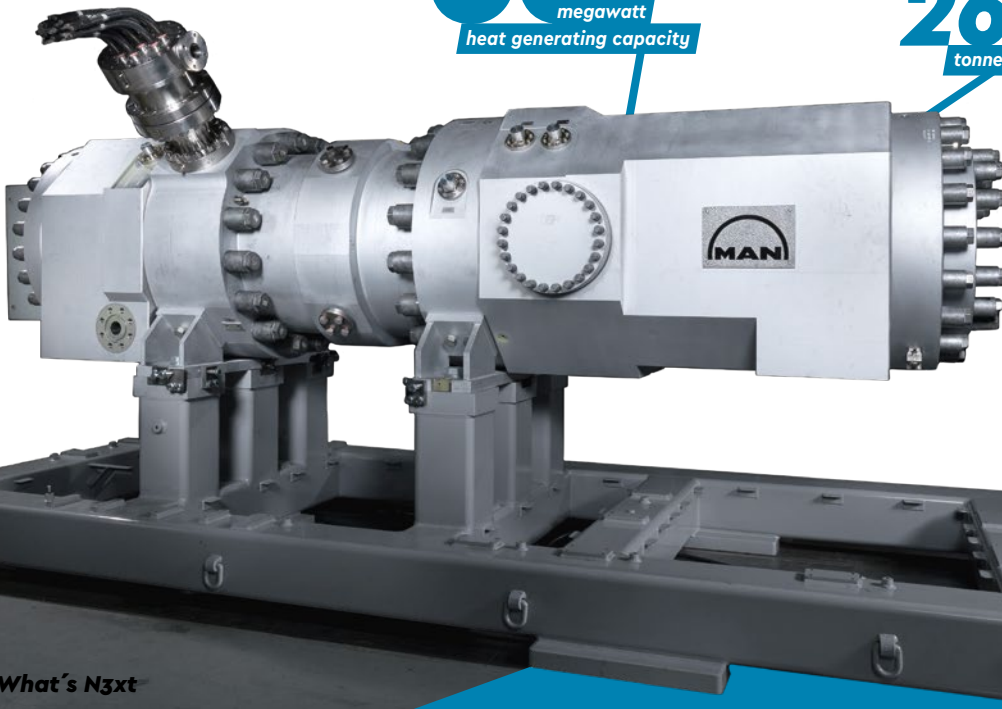
With better coordination and planning, the energy transition could become more than 20 per cent cheaper over the next ten years – with emissions falling at the same time.« We could therefore even see electricity prices falling again.

Cognitive robotics is coming

And what about the digital transformation in the manufacturing industry? The next big thing here is integrating artificial intelligence (AI) into physical systems, especially humanoid robotics. It will give a powerful boost to industrial development, says Prof Dr-Ing Thomas Bauernhansl, Head of the Institute of Industrial Manufacturing and Management IFF at the University of Stuttgart. For example, AI could lead to gripping systems that mimic the action of the human hand soon being used in combination with conventional robots in series production.

33
megawatt
heat generating capacity

26.000
tonnes of CO₂ savings
annually

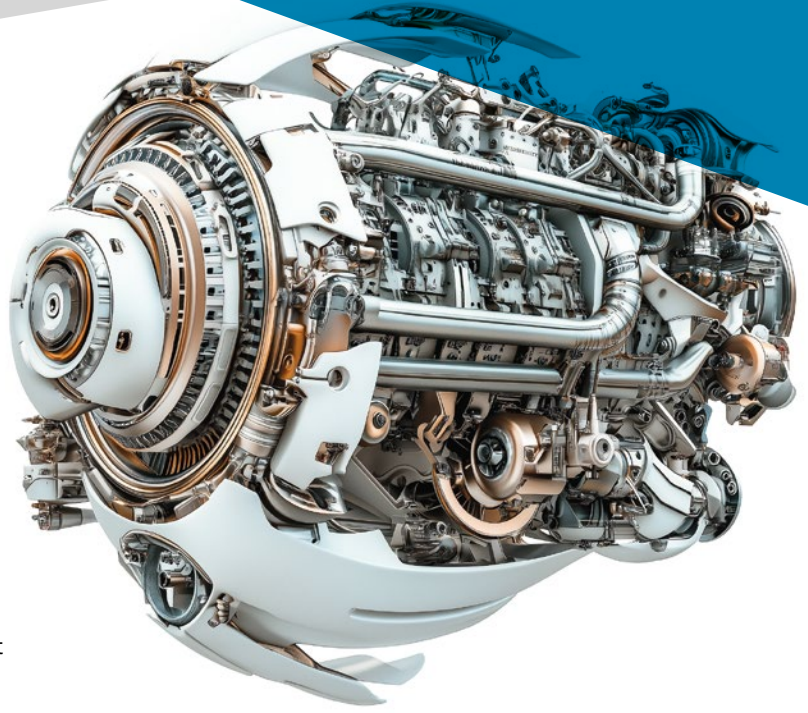


**The world's largest
air-to-water heat pump**
is scheduled to go into operation
in Helsinki during the 2026–2027
heating season.

Mercedes-Benz, for example, is currently testing the Apollo model, which is to work in production and logistics in the future. At the same time, a number of German start-ups, including NEURA Robotics, Wandelbots and fruitcore robotics, are driving forward intelligent automation in production and logistics. Cognitive robotics is the trend where AI and sensing capabilities enable robots to work with humans. At the same time, companies are using AI in many areas, from research and development to quality assurance, to accelerate processes.

»One size fits all« does not fit

But is the German economy even able to manage the digital transformation if American and Chinese providers such as Amazon, Google, Microsoft and Alibaba dominate the global cloud market? »Yes«, says Bauernhansl, »because we are talking about very diverse, often complex processes that prevent the classic IT solutions from USA-based companies from being able to scale in the way they are used to. Nobody manages to connect all a factory's machines and provide their data in the cloud whilst respecting technical and data protection requirements between the first and second breakfast.« Because every machine is a bit different – »one size fits all« does not work here. Rather, it is important to create digital platforms that meet the high European security and data protection standards, especially those in Germany. And to offer the opportunity to individually adapt the infrastructure to the processes of the providers of niche solutions – including, and especially, when using AI. Bauernhansl sees the STACKIT Cloud from Schwarz Digits as a promising solution for digital sovereignty in this area. SAP is also one of the hopefuls of the German economy. After all, in 2024



the software provider returned to the top 100 in the world as Europe's most valuable publicly traded company. The Walldorf-based company's AI strategy played an important role in this. In general, AI development in Germany and Europe is in full swing. This can be seen not only by the seven new AI factories in the EU. Many »made in Europe« applications are at least as important. Read more in the article **»Europe is catching up«** on page 18-19.

Mechanical engineering remains a key industry

Bauernhansl sees the fact that the many hidden champions that make up Germany's industry will continue to be needed in the future as being beyond question: »The world needs more and more sustainable systems that last a long time and whose components can be run economically in cycles.« The same applies to renewable energies, new forms of nutrition, such as meat from 3D printing, innovative medical technology and technologies for processing material flows. These developments call for a completely new generation of special machines with enormous market potential: »Here, mechanical engineering has a bright future. There is plenty of room and potential for innovation.« ➤

Harnessing and promoting the existing potential

As Bauernhansl points out, German mechanical engineering still provides a large number of technology leaders in various branches of industry. »Irrespective of whether we're talking about individual components or entire machines: We have specialised knowledge in many technologies. And we have a great research landscape both at universities and at non-university institutions. These are things that we can throw into the mix.« A major challenge is the shortage of skilled workers. AI and higher productivity cannot solve the problem alone. »We need to awaken young people's enthusiasm for technology.« Acceptance of innovations such as biotechnologically produced proteins, gene therapies or vertical farming is just as important. So that German companies can also sell these solutions in Germany.

More courage for risk

The professor calls for more courage in financing start-ups. Here, the enormous potential of institutional investors remains largely untapped. The reason: compared to other forms of investment, they must allocate too high a proportion of equity capital to their risk investments. This must change if entrepreneurial risk is to be

promoted more strongly again. »It is about unleashing the innovation giant that is Germany, for that is what we are, through smart deregulation.«

There is certainly no shortage of ideas. Companies from Germany registered significantly more inventions with the German Patent and Trademark Office (DPMA) in 2024 than in the previous year. The **number of domestic patent applications rose to 40,064.** This represents an **increase of 4.0% compared to 2023.**

In the field of digital technologies, domestic companies also caught up in 2024 compared with the previous year. Here, **German registrations increased by 6.6% to 4,494 published registrations.**



The capacity for innovation is there

The example of TRUMPF shows that German companies are capable of innovation based on their own tradition. Since it was founded in Stuttgart in 1923, the company has changed from a »mechanical workshop« to a laser expert via the classic metal processing plant and today produces innovative EUV exposure systems for the semiconductor industry, in cooperation with ZEISS and ASML. »Anyone who now wants to set the course for successfully writing industrial history in 2040 must be prepared to continue to change«, concludes Bauernhansl from this and many other examples, which he knows from his own experience.

Staying adaptable also means developing and cultivating new virtues. This includes an agile organisation, team-orientated working and flat hierarchies.

This is the only way to bring innovations to market quickly enough to remain globally competitive. ■



NUMB3RS

1 GIGAWATT¹

NEW WIND POWER OUTPUT ENTERED THE NETWORK IN THE FIRST QUARTER OF 2025

This is an increase of almost **40 PER CENT** compared to the spring of the previous year. In addition, more than **4 GIGAWATTS** of equipment have been newly approved – the highest spring level ever. And that the third quarter in a row that it's happened.

Thrust for
wind energy

»2025 has the potential
to be a record year for
expansion and approvals.«

Bärbel Heidebroek
President of the German Wind Energy Association
(Bundesverband WindEnergie e.V. – BWE)

Charging infrastructure 2035²

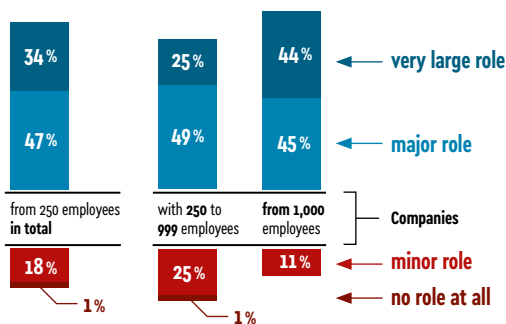
Electric mobility is growing.

**MORE THAN
1 MILLION**

PUBLIC RECHARGING POINTS

could therefore be needed by 2035.
This was determined by the National
Charging Infrastructure Coordination
Centre in its »Scenarios for Market
Ramp-up«.

»What role do innovations play for your core business?«⁴

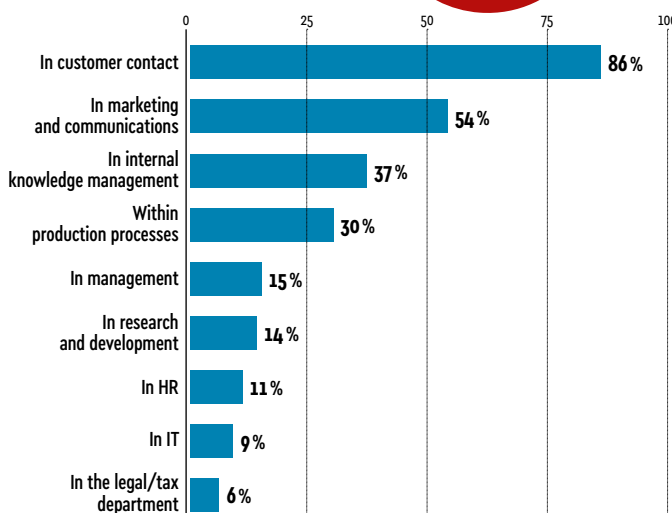


Basis: Federal Republic of Germany,
companies with 250 or more employees

In 4 OUT OF 5 INDUSTRIAL COMPANIES
innovation plays a major role for
the core business.

AI usage? YES, PLEASE!

In which business areas
are you planning to use AI?³



Basis: Companies planning to use AI (n=239),
multiple mentions possible

Sources: 1) BWE, 2) NOW GmbH, 3) Bitkom Research 2025, 4) BDI

With apps, AI and smart glasses

Service technicians of the future – how digital tools revolutionise and accelerate work

TEXT Alexander Freimark



Qualified service personnel for plants and machines have little spare capacity and the average age of technicians is rising. The solution: companies can use digital tools to quickly pool expertise, information, and instructions and increase productivity. The tools of the future include knowledge-transfer platforms, AR glasses, and AI.



Eric Brabänder
Chief Product Officer
at software company Empolis

In recent years, service technicians have become a scarce commodity, because more and more experienced »firefighters« are leaving their companies due to retirement – and with them, their accumulated knowledge vanishes. This applies to all technical fields of work from skilled trades to industry. »Demographic trends, changing work and travel preferences and increasing demands on digital skills have triggered a perfect storm«, notes the consulting company Roland Berger in a study on the »Service Workforce Crisis.«

Simplifying and accelerating services

Companies are working hard to reduce technician workloads and get tasks done faster, both on-site and remotely. **It is crucial to transfer the necessary information at the right time to the right people in the process,** reports Eric Brabänder, Chief Product Officer of the software company Empolis from Kaiserslautern. For example, the robot manufacturer KUKA has imported over 1.4 million documents such as machine manuals, documentation, decision trees and data into a digital platform so that service technicians and customers can quickly find the information that is relevant to them. Conventional tablets are used as the end device.

KUKA is by no means an exception. Every well-known industrial equipment supplier from Siemens to Festo, Bosch and ABB, as well as many smaller specialists offer platforms for the global transfer of data, information

and knowledge. It is also about working towards a future goal of achieving »autonomous operation« of machines and factories. As well as the increased productivity of the technicians, benefits include stronger customer loyalty through fast and efficient service as well as new business models, for example with pay-per-use of machines and plants.

Secure channel communication

In addition to information transfer, it is also about supporting service technicians' communication, Brabänder explains. »Experts today exchange problems and solutions via messenger services such as WhatsApp, but often without functions that are important for professional use.« These include anonymisation, translation, search for synonyms, securing the quality of information, reusability or data security and data protection. »If customer data and information is communicated via social media, service technicians and their management are skating on thin ice.«

AR – the future right in front of your eyes

However, a lot is happening – not only in the applications themselves, but also on the end devices. The future is probably in augmented reality (AR) glasses which superimpose relevant information directly into the operator's field of vision. This frees up people's hands to carry tools or equipment.



AR glasses have been in use for a long time in the data centre sector, reports Oliver Lindner, who equips data centres worldwide with IT management software for the company FNT. **»Even if these are often still at the pilot project stage, we are getting ever closer to hands-free support.«**

Technological progress through glasses

Smart glasses display the next order, scan barcodes, display routes in the data centre as arrows or take photos for documentation. »You can also use glasses to make video calls and connect external service providers and suppliers,« reports Lindner. Technological progress is making the glasses lighter and better. They started using Google Glass ten years ago, recalls the data centre expert: »Great to wear, but the battery was flat after 30 minutes and the resolution was too

low.« However, more recent models from Facebook (Orion) or Xiaomi as well as smart glasses such as RealWear Navigator 520, Vuzix M400 or XREAL 2 are a totally different ball game. Lindner's forecast for the new generation: »I think that parcel drivers are among the first users, because they have to react quickly and have their hands free.«



Oliver Lindner

Data centre expert at FNT

Smart glasses in industry

And glasses in industry? Although Eric Brabänder from Empolis describes himself as a fan of smart glasses, he is sceptical about the conditions under which they have to be used: »Dust, oil and sensitive glasses are only compatible together on shop floor to a limited extent.« Added to this are the costs, the radio infrastructure in the production hall and clear security protocols for the use of cameras. »There are many pilots, but productive use of smart glasses in industrial service is somewhat hesitant.« Brabänder, on the other hand, sees more potential in virtual engineering and in enabling service staff. Instead of shutting down a costly scanning electron microscope and jetting in experts from all over the world to train people, international teams simply learn on a virtual device.

AI – the next level of services

However, artificial intelligence will become the strongest driver for remote services. It can automatically evaluate the images of cameras in large machines and plants and sound the alarm, but also efficiently analyse the bundle of information in knowledge databases and significantly shorten the search process for technicians, Brabänder reports: »The use of AI will significantly improve services in mechanical and plant engineering – despite demographic change.« Therefore, it is important in the future that knowledge databases, AR glasses and AI systems work in perfect harmony with humans.

THE AI RACE



**EUROPE
IS CATCHING
UP**

The image features three male sprinters in mid-stride. The runner in the center is wearing a USA jersey with a bib that reads 'USA' and 'BOSTON BRUNN'. The runner on the left is wearing a dark jersey with 'EUROPE' visible. The runner on the right is wearing a dark jersey with 'CHINA' visible. Below the runners are stylized, brush-stroke representations of the European Union flag (blue with yellow stars), the USA flag (stars and stripes), and the Chinese flag (red with yellow stars).

ChatGPT and other large language models from the USA have given AI a powerful boost around the world. Then China came along with DeepSeek. Europe's AI evolution seemed completely left behind. But the catch-up is underway.

 **TEXT** Uwe Küll

»Europe has heard the wake-up call.« This is how the experts at the German Research Centre for Artificial Intelligence (DFKI) phrased it after the AI Action Summit in Paris. The EU Commission announced there that it would provide €200 billion in support for AI in Europe. At the same time, it increased the number of AI factories that support industry and science in developing AI solutions from 7 to 13. Companies specialising in AI development can use their computing capacity free of charge. The supercomputers are available to other industries on a pay-per-use basis. This form of cooperation has already proven its worth at the High-Performance Computing Center Stuttgart (HLRS). Companies such as Porsche and ebm-papst rely on the HLRS supercomputers and its AI applications for complex calculations. ebm-papst uses the »Hawk« supercomputer in particular for high-resolution aeroacoustic simulations. Porsche buys AI time to detect anomalies in crash tests faster or to accelerate the development of metamodels.

How industry benefits from AI

DFKI presented a whole range of AI applications for industry at this year's HANNOVER MESSE. For example, AI-based monitoring for 3D printing that improves production quality, reduces waste and thus saves material. A testing station was created at DFKI in cooperation with KÖSTLER GmbH, a manufacturer of airbag hinges made of textile fabric, that uses image processing and machine learning to automatically sort textile nets according to quality and detect faulty parts at an early stage.

AI has a role beyond such specific applications in a demonstrator developed by the European research project RICAIP (Research and Innovation Centre on Advanced Industrial Production). A cooperative system of two KUKA robots autonomously dismantles different types of electric batteries, replaces components and re-assembles the now usable battery modules into new units. They can be used as stationary large batteries for households or companies. The solution's key feature is a piece of planning software developed by the project partner CIIRC at the Czech Technical University in Prague which compares available resources with machine functions and independently creates the production sequence – with no need for manual programming or configuration. The system illustrates the potential of AI in automated retrofitting of multi-component products, also transferrable into other areas. This highlights the opportunities that closer international cooperation in Europe offers.

New start for LLMs made in Europe


The stars of AI development in recent years are the Large Language Models (LLMs) behind ChatGPT and similar tools. There is a particular need here for solutions that deliver better results with relatively fewer spoken languages than is the case with the most widely used AI models. The goal of OpenEuroLLM is to remedy this deficiency. The project, involving 20 European research institutions, companies and high-performance data centres, develops Large Language Foundation models for commercial, industrial and public services. The German partners include the research institutes ELLIS, Fraunhofer IAIS, Forschungszentrum Jülich and the companies Aleph Alpha and Hellamind. By working together with open technologies based on previous European projects and large databases as well as pilot LLMs, the project aims to improve Europe's competitiveness and technological sovereignty.

Don't miss the boat!

A recent study by the digital association Bitkom confirms that German companies are receptive to AI applications: The vast majority (82 per cent) of respondents agree that AI will be crucial for the competitiveness of German industry in the future. Not only that: 42 per cent of German industrial companies already use artificial intelligence in their production process. A further third (35 per cent) are pursuing such plans. However, almost half of the respondents (46 per cent) see the risk that German industry will miss the boat on the AI revolution. This scenario is suggested by EU figures that indicate that only 13.5 per cent of companies have implemented AI.

AI giga factories are coming

Reason enough, then, to push ahead with the development of the AI infrastructure. For example, with »AI giga factories«. These large-scale facilities contain around 100,000 high-performance chips. To put it into context: JUPITER, Europe's first Exascale supercomputer, has approximately 24,000 graphics processors that enable computing power of up to 70 ExaFLOPS. ExaFLOP systems can perform more calculations in one second than a standard PC could manage in several years. However, JUPITER will not develop full capacity until 2026. Nevertheless, companies and other institutions can already register projects for which they would like to use the European AI factories' capacities. The offer applies not only to AI start-ups, but also to healthcare, energy, education, climate change and the environment, media and culture, the public sector, finance and insurance.



Exoskeletons are especially helpful when working above you and with heavy tools.

More power through exoskeletons

Exoskeletons are designed to support people when the work is physically demanding. Some of them are already in use, but there is much that research can still achieve. What potential is there for the labour market in the powersuits?

Whether balancing heavy suitcases at Nuremberg Airport, machining components in the mechanical engineer K+G Wetter's production department or lifting patients in Bavarian clinics – individual exoskeletons already support employees in a wide variety of work areas. The Bundeswehr is also testing prototypes of exoskeletons, for example in the field tank depot in Wunstorf. The soldiers have to lift 100-kilo pipes. The intelligent power suits are intended to cushion such heavy loads and ensure ergonomic working.

Downtime could be reduced if more ergonomic working prevents injuries – and business profitability increased. After all, production downtime can lead to considerable financial burdens. Every unproductive hour in the automotive industry costs \$2.3 million. The statistics on job losses in the German economy in 2023 show that exoskeletons could have an influence here: musculoskeletal disorders formed the most common cause of all absences due to illness at 19.5 per cent. This is caused by physically strenuous or strenuous postures and lifting heavy objects. According to the Federal Statistical Office, this affects a quarter of all people in employment in Germany.

But can exoskeletons actually facilitate strenuous activities? And would this enable people to do hard work for longer and in better health? TU Graz has investigated these questions in the ExoFitStyria project working with eleven companies. The team examined 14 different activities that arise in warehouse work in order logistics, welding and autogenous flame cutting, and in industrial painting. The project team examined the electrical activities of the muscle fibres via electromyography (EMG) to measure how much the muscles are stressed. Thin needle electrodes are inserted through the skin.

Superpower through exoskeletons? The answer is not a clear yes or no. Feedback from the test subjects was mixed. They found the exoskeletons very helpful in some areas. But in other activities, the work aids provided only minor relief or even proved to be a hindrance. **»The exoskeletons were felt to be most helpful when working overhead with heavy tools and raised arms – both static and dynamic«**, says Matthias Wolf, who led the study at the Institute of Innovation and Industry Management at TU Graz.

The test subjects were also very satisfied with the back systems during logistical activities within a movement radius of five metres, he reports. They found the exoskeletons somewhat cumbersome during large and slow arm movements, for example during painting from the ceiling to the floor. It worked well upwards, but in the downward movement the exoskeleton worked from shoulder height against it and obstructed the wearers. Another criterion was that if the job profile included many secondary activities that did not require support, the exoskeleton performed less well. Even where it supports the main activity well, it can hinder other tasks, explains study director Wolf.

Despite the mixed results, Matthias Wolf of the TU Graz is convinced that the assistance systems will help with physically demanding work in the future: »Technologically, exoskeletons have the potential to make work easier in the long term.« However, the head of the ➔



Matthias Wolf

Assistant Professor and Head of Working Group for Industry Management at TU Graz



In Germany, companies such as Otto Bock HealthCare (see photo), German Bionic, Festo and many start-ups develop and sell exoskeletons.


There are active exoskeletons with electric drive and passive models without it. The US market research institute Spherical Insights estimates that the global market for exoskeletons will grow rapidly and is expected to exceed \$41.48 billion by 2033, with an annual growth rate of 42.17 per cent from 2023 to 2033.

Industry Management Working Group acknowledges that there is still room for improvement. This refers to many design and organisational aspects. One example is in comfort. In some cases, the systems press against the body or the wearers sweat while wearing them. But acceptance also has a part to play: what do colleagues think of it? »That's another big challenge«, admits Wolf. Add to that the cost – companies need to be able to afford the systems. Passive systems can be found from €2,000 upwards. Active models with electric motors cost from €40,000. Regulation, occupational safety and standardisation are also still to be discussed in the context of exoskeletons.

The mechanical engineer K+G Wetter in Biedenkopf-Breidenstein is one company that is already focussing on the positive aspects of exoskeletons. Their employees in production lift, carry and process hundreds of machine components every day. Even with all the digitalisation and new technologies, physically demanding activities in production are still part of everyday work. Some workers have been using two different exoskeleton models since 2023: one specifically for overhead work to relieve the shoulders, for example when grinding or polishing different components. A second model is designed to support the lower back when loads are being carried by hand.

The medium-sized company provides a total of seven powersuits in production. They provide support to the employees purely mechanically without electric drive.

This relieves the strain on muscles, ligaments and joints during production of the butchery machines which weigh in the tonnes. This is ensured by springs, rails and weights in the exoskeleton, all of which absorb the stresses that are generated.

The extent to which they can contribute to less absenteeism in companies will become apparent when the systems are rolled out across the board. At the moment, it is important to first develop an understanding. Although some exoskeletons already support daily work, the majority of applications are research and pilot projects. There are seven models at K+G Wetter, used by around 100 employees. At the RoMed clinics in the Rosenheim district, ten nurses benefit from the assistance systems. Will the power suits be a standard part of work clothing in the future? They certainly could be. 



**Germany likes to present itself as a meritocracy.
Those who perform well will get their reward – that's the promise.
But is this equation still true? And how do you measure
performance? A plea for a new definition of performance.**

Recession, plant closures, emigration: Germany's economy is in crisis. »Performance must pay off again«, is the mantra-like plea repeated from politicians, top managers and association heads these days. An important lever in this context is less tax on overtime and more flexible working arrangements. But what about the willingness of employees in Germany to perform – and how can they be motivated to reach new peaks of performance?

Performance is difficult to define and measure

The concept of performance has always been a contentious term. Who has the final say in interpreting what is considered good performance? A mechanical, technical understanding of performance has prevailed for a long time – with the idea of measurable quantities. But office and knowledge work is much less easy to quantify than assembly line work. In recent years, it has become increasingly recognised that performance is to a large extent a subjective assessment – and strongly depends on the sector and occupational group in question.

Professor Dirk Sliwka of the University of Cologne observes that companies are switching between individualistic and collective approaches. While methods such as »Management by Objectives«, 360-degree feedback or employee rankings usually look at the performance of individual employees, the performance of entire departments can be assessed through team development discussions or the use of team KPIs.

Both approaches present challenges. Individual systems can increase individual performance, but are strongly influenced by the subjective perception of superiors and can jeopardise team spirit in the event of misjudgements. Collective systems, in turn, promote teamwork but can reduce motivation, for example, if top performers feel unfairly remunerated or others coast along in the slipstream of high performers and hide in the shadows. Dirk Sliwka advocates not being guided by fashion waves when choosing the method – and instead to find a good balance that best individually fits the respective corporate culture.

Bonus systems have surprisingly little effect

The question of the extent of the influence of money on human motivation has also always been a matter for debate. Dirk Sliwka conducted a field experiment with a retail chain to investigate how individual bonuses affect the willingness of employees to perform – which produced some surprising results. While simple employee dialogues boosted profits enormously, this fell as soon as bonuses were offered in the discussions.

What is performance?

Performance equals work multiplied by time.

Most people can still rattle off this formula from physics class more or less in their sleep. But the formula's clarity belies the fact that it cannot be easily applied to the working context. How does a plump overtime account affect your performance, just as a creative flash of mind born within a millisecond can?

»Performance is always a construction«, says

Antoinette Weibel, organisational and trust researcher at the University of St. Gallen. Unlike at the workbench, where performance differences can be quantified by unit numbers and hours worked, this is rarely the case for knowledge workers in management, administration, research and development or the creative sector. Most of these jobs lack measurable quantities that prove performance differences. »Rather, we humans negotiate with each other what kind of performance we value highly – and which we don't«, explains Antoinette Weibel.



»I believe facets such as helpfulness, assumption of responsibility or the courage to disagree are missing from current definitions of performance.«

Prof Dr Antoinette Weibel

Sliwka's explanation: money affects the nature of human exchange. As soon as the feedback discussions touched on possible bonus payments, problems were kept quiet. Other studies, too, have now shown that bonus systems work less well than was long believed.

Last but not least, the generational change on the labour market influences the performance debate. While older workers equate the term with hard work, discipline and loyalty, Generation Z sees this as more including meaningfulness and social influence above all else. Demands have also changed: While older employees aspired to company cars and their own offices, many junior employees now demand a four-day week, work-life balance and working from home.

Success at work is also important to the young

But is that also why the young are less willing to perform? Studies show that this narrative thread does not hold true. According to an Allensbach study, it is important for two thirds of Generation Z to have professional success, similar to the number among millennials. A recent survey by software company Qualtrics indicates that Gen Z workers are even more likely to perform than older groups of workers. Almost two-thirds (65 per cent) of employees aged 27 and under are committed at work. The figure is only 57 per cent in the previous generation, and among baby boomers 59 per cent.

What could a new definition of performance look like that all employees identify with? »We have to ask ourselves what kind of performance we actually mean«, says Prof Dr Antoinette Weibel from the University of St. Gallen. »I believe facets such as helpfulness, assumption of responsibility or the courage to disagree are missing from current definitions of performance«, says Weibel. However, these are at least as important as discipline, the amount of overtime worked or the number of training courses provided – but they are more difficult to quantify.

More attention on the person

How can the dilemma of lack of measurability be resolved? Antoinette Weibel advocates paying more attention to keeping a human eye on the individual employees and their development, instead of relying on seemingly objective indicators. »To do this, managers certainly need a lot of life experience, but also a good education«, says Antoinette Weibel. They would have to enter into ongoing dialogue with the employees and hold regular development talks. Where can you

make good use of your potential, where are there still areas for development? What are you missing that would help you work well? »For me, the question of performance also includes the question: What kind of business is actually good for people?«

Weibel and her colleagues have written a manifesto for human-centred performance management. Instead of bonuses and league tables, it would be better to rely on joint growth. Rather than control and service according to regulation, freedom and development. Adequate remuneration through living wages is the basis for successful work, as is the fair distribution of profits. »People should not be understood primarily as exchangeable resources«, says Weibel. »If every employee's development is prioritised through continuous support, team excellence and corporate success will follow as a matter of course.« ■

Methods for rating performance and performance review

Management by Objectives (MBO): In this method, measurable and realistic goals are agreed (as far as possible) between managers and employees which is reviewed annually or every six months.

360-degree feedback: A person receives feedback from different groups and stakeholders – from supervisors, colleagues, employees and sometimes also customers – to enable a holistic assessment of competencies, behaviour and performance.

Department KPIs: Collective performance indicators such as turnover, cost reduction or innovation rate are measured at department level and used for team performance assessment.

Team development talks: As part of joint team reflections, achieved milestones are analysed and problems identified in order to continuously improve team processes.

Hybrid approaches: Most people combine collective undertakings and individualistic methods of performance measurement to create a comprehensive picture.



FERCHAU Austria

Process automation in medical technology

How **FERCHAU Austria's Center of Competence IT supports a medical technology company in automating production.**

»Manufacturing automation in the medical technology industry is no walk in the park«, says

Florian Raffl, Senior Software Engineer and Consultant at FERCHAU Austria. »After all, companies must comply with the strict Medical Devices Ordinance requirements«, he adds. No wonder: the quality of implants, prostheses, surgical instruments and laboratory or diagnostic equipment can have a direct impact on people's health and well-being. On top of this, small series and a wide range of variants are part of everyday life for the mostly highly specialised manufacturers. This calls for highly flexible automated processes.

At the same time, it is important to ensure both efficiency and quality and speed of the manufacturing processes. **»Standard software can barely cope with reconciling these sometimes contradictory requirements and at the same time meeting the strict Medical Device Regulation (MDR) requirements.«**

This is where FERCHAU Austria comes in with its Center of Competence IT (CoC IT). The medical manufacturer commissioned the CoC IT to program a customised solution. »Of course we use standard technologies«, Raffl emphasises. Finally, the software used must be clearly documented – as must the entire production process. C# is used as a programming language because it has robust security features and a stable development environment. »C# is also well suited for integration with different systems and devices, which is a basic requirement in many of our customer projects«, explains Raffl.

At the software level, it is especially important to interact with the Hydra order management system. Hydra provides APIs for this. The newly developed software integrates the various machines with connectors meeting the OPC/UA standard

or SECS/GEM and provides an overview of the status of all stations over the entire system. At the same time, it uses its process management module to ensure that all data relevant to the respective work step is transferred to the individual machines. Machine completion or error messages are dealt with in a similar way.

A major difficulty lies in the technical specificity of some of the manufacturer's products. A particularly complex procedure is used to test them in the ongoing process, in which even slight delays can falsify the test result. Therefore, whenever there is a deviation in the process, its possible effect on the test station must be checked at other points and corrective actions initiated if necessary. This is the only way to minimise errors and downtime across the entire production line.

The complexity of the task is increased by the fact that the infrastructure for the automated process is still under construction. Specifically, this means that both the type of machines used and the exact sequence of work steps can vary. »Each component in the automated production line must meet the medical technology industry regulatory requirements. Testing and demonstrating this delays the procurement process«, says Raffl. Agile procedures are essential for automation to proceed quickly when developing the control software. Kanban boards, two team meetings per week and brief dailys – project manager Raffl relies on simple but effective organisational techniques to manage the complexity of the project. The FERCHAU man benefits from his own many years of experience in a telecommunications company.

At times, up to four FERCHAU employees in a team of up to six support the company with certified software skills as well as with



Florian Raffl

Senior Software Engineer
and Consultant
at FERCHAU Austria

industry insight, operational readiness and open communication. **»We understand the requirements and needs of the company and its processes. We not only use technology, but also explain the potential it has. On this basis, we can not only carry out tasks, but also provide methodological advice. This helps the customer to save time and money and makes our work even more interesting and accountable«,** says Raffl, delighted. He is adamant: »Individual automation applications are a clinching competitive factor for production companies. And not only in medical technology.«



Dr-Ing Holger Duda from DLR knows what real flying must feel like for pilots.

Testing and optimising innovations

How DLR simulates the future of flying

 **TEXT** Alexander Freimark

The AVES (Air Vehicle Simulator) simulator center of the German Aerospace Center (DLR) is located in Braunschweig. The FERCHAU company RST has contributed two simulators – for a research jet and for a passenger cabin. **Dr-Ing Holger Duda, Head of the Department of Flight Dynamics and Simulation at the DLR Institute of Flight Systems, explains in our interview how simulations prepare the aviation of tomorrow.**

Dr Duda, you have been running the simulations at DLR for 20 years. What is it that fascinates you so much about the topic?

DLR's goal is to represent real flying in the simulator as closely as possible to real life. The task is technically extremely demanding and therefore also hugely exciting. Finally, it must manage to bridge the gap between mathematical abstraction in programming and pilots' actual feelings. Simulators are designed to convince the subconscious that it is piloting a real aircraft. But as a pilot myself, I have to say: real flying is also very fascinating.

Have you ever forgotten you are sitting in a simulator on a test flight?

This deep immersion, getting completely engrossed, rarely happens, but it does from time to time. I once flew the Frankfurt to Hamburg route in a simulator, and when I got off it I was already mentally preparing for the return flight that I thought I would be doing shortly. Usually, however, it is done under great stress – when a bird strike is simulated and an engine fails. Then it goes down in an extreme flying attitude, the system shakes and everything gets very loud. Even experienced pilots feel a certain amount of tension.

How do you make the simulators shake?

In 2013, we put a system into operation in which we can install various simulators. This air vehicle simulator, called AVES, is like a large sphere on six moving legs. The system allows movements in all directions and can realistically adjust the attitude. There is a system of nine projectors on the inside that provides pilots with a 240-degree field of view through their windows. Depending on the application, different simulators can be installed in the sphere. The facility is unique anywhere in the world in terms of the science.

What kind of research projects are running in the DLR simulators?

This depends on the customers and what they need. Sometimes they are aircraft manufacturers such as Airbus or Embraer, sometimes manufacturers of avionics systems. We also have PhD students who carry out their studies with us, which later leads to specific research projects. The best example is the »Low Noise Augmentation System« project, or LNAS for short, in which pilots are supported with a display to extend the landing flaps and landing gear at the ideal time. As a result, the aircraft become quieter during descent and consume less fuel.

You test innovations. What are the most important technical trends in aviation?

From our point of view, it is still reducing environmental pollution through consumption savings and new energy sources such as hydrogen. However, the efficiency of fuels is not enough; new aircraft designs are also being discussed. One example is the flying wing, which does not have a real hull, but is a »blended wing body«. However, less drag also entails a lot of research, from flight characteristics to evacuation.

Can you give a specific example of where your simulators are necessary?

Flying wings have fewer windows per passenger, so a virtual exterior view has been developed, which is displayed to passengers via monitors. RST has provided us with a cabin module for the AVES motion simulator, which allows us to carry out tests on people to see how a particular flight affects them. For example, movements of the windowless aircraft and image signals must be precisely coordinated so



A simulator for research pilots

In 2023, RST delivered simulator hardware components to DLR. It was an original Dassault Falcon 2000LX cockpit, which was completely refurbished. DLR uses a business jet of this type to conduct research projects in Braunschweig, for example on flight physics, flight control and flight guidance. From RST's perspective, as well as the authentic replication of the cockpit, it was above all the faithful behaviour of all mechanical components that mattered. Active steering force systems were installed, which are controlled by the software and provide the corresponding feedback to the pilots.

that there is no time delay. And if you are a passenger sitting far out in the wing, you will feel much stronger forces when the aircraft turns than if you were in the middle of the plane.

One approach to saving energy could be the slender wing. What simulations are you doing here?

The classic example of the slender wing is the glider with a reduced drag. However, the wing also becomes very elastic, creating new vibrations. In the cabin simulator, we test how this affects passenger comfort, while pilots in the cockpit simulator feel the handling and flight characteristics of the slender wings. The targeted feedback from the participants keeps the development heading in the right direction.

And which innovative system will current aircraft see the benefit from?

Lidar sensors are not only an issue in autonomous cars, but also in aviation. They look about 100 metres forward and can detect turbulence. We use the simulation to explore counter steering to mitigate the effect of turbulent air. This also applies to the invisible wake vortices from other aircraft, which should not be flown into. They can be several kilometres long and can easily knock smaller aircraft off track.

You have procured two simulators from RST, in addition to the cabin module also a cockpit simulator for the DLR research aircraft. What were your main concerns?

This was a simulator for a Dassault Falcon 2000LX, a business jet for our research projects in Braunschweig. RST separated the cockpit from a real aeroplane laid up in America, shipped it to Rostock and rebuilt it faithfully – with pedals, control columns and seats. Covid-19 and the supply bottlenecks caused delays, otherwise the project was within budget and to the quality commissioned. This is not to be taken for granted, because each simulator is a one-off item. We develop the specifications, and many changes, including subsequent adjustments, depend on the complex implementation. It is essential therefore that the supplier takes a solution-orientated approach to their work.

***Passenger testing
in the cabin simulator***

No window seat? Unthinkable for some passengers. Windowless jets can bring benefits for airlines and designers, however: less fuel consumption, less weight and new aircraft structures, by way of example. DLR uses the RST cabin simulator to test under real-world conditions how passengers react to a virtual exterior view and how images and flight movements can be synchronised. The cabin with original seats, luggage racks, controls, displays and air conditioning can accommodate up to 16 passengers; they get to experience all flight movements such as take-offs, landings and turbulence authentically.



***What would make for the ideal simulator?
What would you wish for?***

We need simulators that replicate the aircraft or helicopter in the best possible way to answer the research questions. They should also be very flexible in terms of technical redesign. The simulator is adapted for each customer and each order. Sometimes it affects the avionics, usually the software is reimplemented. Although airlines also have very high quality simulators for training, we are more flexible. ➔

Get to decarbonisation faster

Industrial energy rethought

 TEXT Uwe Küll

Heaten high-temperature heat pumps convert waste heat into emission-free process heat for industrial companies. An engineering team from FERCHAU is helping to drive decarbonisation forward.

Processes in paper production, food production and the chemical industry require temperatures of up to 200 degrees Celsius. Conventional production of such items has so far released vast quantities of greenhouse gases. There is therefore an urgent search for alternatives. The start-up Heaten from Remscheid has good news. **»The HeatBooster heat pump uses waste heat sources such as the water vapour released during paper production and efficiently converts them into valuable high-temperature heat – as water or steam with temperatures of up to 200 degrees Celsius«**, explains Matthias Veltman, Vice President of Engineering at Heaten. The benefits are obvious: significantly lower energy consumption and lower CO₂ emissions will reduce costs in the future. **»Our piston-based technology sets standards in terms of performance, efficiency and adaptability. HeatBooster heat pumps have already managed over 40,000 operating hours under real operating conditions«**, says Matthias Veltman. Soon, Heaten plans systems with a heat output of 1 to 8 megawatts. Systems can be individually adapted to the heat demand of companies and expanded modularly – up to 50 megawatts – by combining several models.

Development of high-temperature heat pumps is challenging, because the materials have to withstand high thermal and mechanical loads. It is also important to design all components efficiently, modularly and in a maintenance-friendly way for economically sustainable use.

The experts from FERCHAU provide answers here. They provide support in design, mechanical design and project management. A key function for engineers is to dimension components and create design drawings. An engineer from FERCHAU has also set up the project management system for the start-up.

Markus Lenz

HR Manager at Heaten



FERCHAU currently supports the growing company with six specialists. They bring to the table knowledge of CAD systems such as CATIA V5 and PLM applications as well as expertise in the field of thermodynamic simulation. Heaten values the technical expertise, flexibility and experience of working with FERCHAU. **»The cooperation helps us to bring our solutions for the decarbonisation of industrial processes to the market more quickly. And that is crucial in our dynamic future market«**, emphasises Markus Lenz, HR Manager at Heaten.



**»If we want to
change something
we need openness
to technology, tolerance
of mistakes and
entrepreneurship.«**

— Frank Ferchau