Engineering Change

Annual Report October 2016 – October 2020

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Left to right:
Henrik A. Schunk, VDMA Vice President
Carl Martin Welcker, VDMA President
Karl Haeusgen, VDMA Vice President

Dr. Bernd Scherer, Member of the VDMA Executive Directorate
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ENGINEERING CHANGE

Dear Members, Dear Friends of Mechanical Engineering,

“Engineering change” is the promise the VDMA is making to its members with this annual report. The past four years have clearly shown how important it is for us to drive transformation forward with great determination and an openness to innovation. After all, the world has changed much faster than we could have imagined at the start of my term in office. In positive ways, as the many new applications for digitization show, for instance the widespread success of the OPC UA machine language and the rapid introduction of 5G technology. But also sadly all too often in negative ways: The past few years have been characterised by trade wars, protectionism, developments that drove the EU to the brink of an existential crisis and repeated state regulations that restrict entrepreneurial activity. And now we must all come to terms with the consequences of the most serious pandemic in centuries. It’s a truly Herculean task!

In such a challenging environment, transformation is the only way to remain competitive and successful. The VDMA’s job is and has always been to provide direction, light the way, create a network for its member companies and constantly provide information in a broad-based manner. Numerous examples in the following annual report showcase the many different areas in which the VDMA is working. And we could list many more. But one thing is sure: The VDMA will continue to stand by your side in the coming years and do all it can to support you in preserving mechanical engineering as the most important industrial sector and strengthening its position in world trade.

With best regards,
Carl Martin Welcker
VDMA President

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INSPIRE –
For a custom-made member service.

The VDMA is the mouthpiece of the German mechanical engineering industry, a guide for its members and the sector's largest networking organisation in Europe. In order to be able to successfully undertake all these tasks and offer its members genuine added value, the VDMA repeatedly questions its own work – and is therefore in constant flux! After all, even the work of an association profits from digitisation because this offers an opportunity to act faster, with greater precision and more individually. In the age of digital communication, the VDMA's member companies expect it to put all its collective know-how at their employees' disposal in a custom-made manner.

Based on this insight, countless conversations with members to determine their needs as well as the many workshops it has run, the VDMA has developed a comprehensive change programme with an ambitious goal: to prepare the VDMA for the interconnected digital future, while at the same time ringing in a cultural change. "INSPIRE – Together. Better. OneVDMA": This is the leitmotif under which, through a multitude of projects large and small, the VDMA is improving its services for its members, expanding its network and enhancing the public face of mechanical engineering. Although INSPIRE has clear goals, the programme has not set any target dates. That's because a volatile, digital world will require constant transformation.

Amongst other things, INSPIRE involves significantly stronger interdivisional collaboration within the VDMA in order to focus on topics rather than structures. Mechanical engineering companies have long been thinking along the entire value-adding chain. The VDMA must therefore likewise provide assistance along the entire chain. In doing so, the association's expertise must be bundled much more across boundaries because the know-how of one VDMA branch often no longer suffices.

INSPIRE
TOGETHER. BETTER. ONE VDMA.

The INSPIRE motif will also be reflected in the association's central point of contact: the VDMA.org website. The new internet platform – OneVDMA – will guide users to the required information in a faster, more targeted way. Individual, tailored enquiries will also be enabled, as will search results that cover the breadth and multifaceted nature of a particular issue. By networking knowledge, topics are being made available from different specialist perspectives. Information and services are provided in a standardised manner in order to give members a better, more uniform experience.

INSPIRE will also change the culture within the VDMA. After all, change must begin within the workforce so that the association can be an even better partner for its members. VDMA staff therefore attend "special workshops" at which they can consider possible future services. "INSPIRE talks" present ongoing projects, which are then discussed with colleagues from other divisions. A redesigned intranet – the VDMA Workplace – offers every VDMA employee an opportunity to constantly keep abreast of developments and also exchange ideas and experiences across boundaries, including colleagues at field offices. "Change agents" from within our own ranks are operating as ambassadors for a new culture at the VDMA with the aim of promoting agile working and dissolving rigid project structures. No longer is a single VDMA unit responsible in the eyes of the customer for the success or failure of an undertaking. The association must be impressive as a whole. The coronavirus crisis provided a perfect example of this: All VDMA branches pooled their know-how to create a coronavirus information page in record time, which was then made available to users as an overall package. Tens of thousands of users and page impressions are visible proof of the successful implementation of OneVDMA.

Last, but not least, INSPIRE is also ensuring that one of the VDMA's core tasks isn't changing, but actually being strengthened: The digitisation of many processes will eventually make more time available to provide members with personal support. After all, even in a digital world, the true power of a network lies in the strength of its individual links.

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“Change only benefits those who are prepared for it.”

Louis Pasteur

The industry needs room to breathe.

How much carbon dioxide does a mechanical engineer produce in a year? Not his company or his products, but rather the person himself or herself. Let's work it out: The CO_2 content of exhaled air lies at a relatively constant 4%. At rest, the average adult breathes 16-20 times a minute. Each breath has a volume of 400-600ml. That makes approximately 9l/min. and thus CO_2 output of about 0.7g/min. or 380kg per annum. That is not much really and almost negligible compared to the CO_2 emissions that even a single mechanical engineer can cut with his or her entrepreneurial activity and use of innovative technology.

After all, mechanical engineering plays a significant role in reducing and avoiding emissions that are harmful to the environment. More and more companies are seeking to reduce their carbon footprint. The main task for the VDMA in this respect is to advise them and tackle political hurdles such as overregulation. We offer our members a comprehensive range of consultancy services to help them on the road to becoming climate-neutral companies – a journey we provide end-to-end support with. In doing so, the VDMA encourages a shift that is market-based and technology-neutral. We promote understanding for industrial development and investment cycles so that, for example, disruption like that in the automotive industry is socially and economically acceptable. Only in this way can innovation be effective and enable the development of market opportunities.

With regard to climate change and climate policy, our members currently benefit from the proactive work of the VDMA in three areas in particular: on the issue of CO_2 pricing, of energy efficiency networks, and of Power-to-X, which the VDMA is promoting as a key technology for the energy transition and lobbying politicians about. We know where and how a possible move towards climate-neutral raw materials and fuels will affect industry. Through its work, the VDMA plays a significant role in ensuring that climate issues are now an integral part of the political agenda. Within the framework of the BDI's Climate Paths for Germany Study, the VDMA employed its comprehensive solution know-how to create awareness that industrial emissions can be reduced drastically. From what specific results in the aforementioned three areas do our members benefit today?

By presenting a dedicated suggestion for sensible CO_2 pricing, the VDMA has driven forward the debate on a market economy-based framework for the energy transition: An assessment of CO_2 pricing conducted by "Forum Ökologisch-Soziale Marktwirtschaft"on behalf of the VDMA was successfully marketed in the political arena through press and PR work. We want pricing that acts as an economically efficient guiding mechanism which shifts the impact of energy sources towards climate-friendly technologies. This steering effect offers mechanical engineering a competitive framework and reduces the regulatory risk of in-depth political intervention. The key findings of the assessment are that the existing evaluation of the impact of energy sources must be redesigned in a revenue-neutral manner based on their carbon content, that we need an entry-level price of approx. EUR 110 per metric ton of CO_2, and that fuel must become more expensive and electricity cheaper.

"Our industry accepts responsibility. With the Committee on Climate and Energy Policy we position the mechanical engineering industry as a solution provider."

Dr. Daniel Chatterjee, MTU/Rolls-Royce

The VDMA sees Power-to-X (P2X) as a key technology for the energy transition. The mechanical engineering sector supplies many of the components necessary for the successful use of P2X technology, from power (e.g. wind energy) to X (production technology) for applications. How then can P2X be established successfully on the market? What business models should it use? And what should politicians do in order to be able to use P2X for the energy transition? The VDMA's Power-to-X for Applications working group – which currently has more than 100 members from the mechanical engineering, automotive and petroleum industries as well as allied sectors – has the answers. No other P2X platform covers the entire value-adding chain as extensively. What is more, close cooperation with other trade associations enables us to speak with a single voice both in Brussels and in Berlin.

However, that is not all that the VDMA addresses. It is already working on other climateneutrality projects on behalf of its members. The study "Green Tec Creates Green Business", conducted jointly with the Boston Consulting Group, examined the growth opportunities for German mechanical engineering companies using climate-neutral technologies.

On the road to climate-neutral production, the VDMA has also drawn up a practical guide that provides its members with clarity. Together with First Climate Markets AG, it is also developing practical tools for addressing these challenges, from introducing emissions reporting and procuring green energy to questions about potential compensation and the disclosure of climate and sustainability data.

Some 500 VDMA employees around the globe are working on behalf of its members. Together they breathe out 190,000kg of CO_2 a year. However, it is clear that our work reduces or avoids many times that amount, not least through the efforts of our members, whom we thus give more room to breathe.

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“We shall require a substantially new manner of thinking if mankind is to survive.”

Albert Einstein

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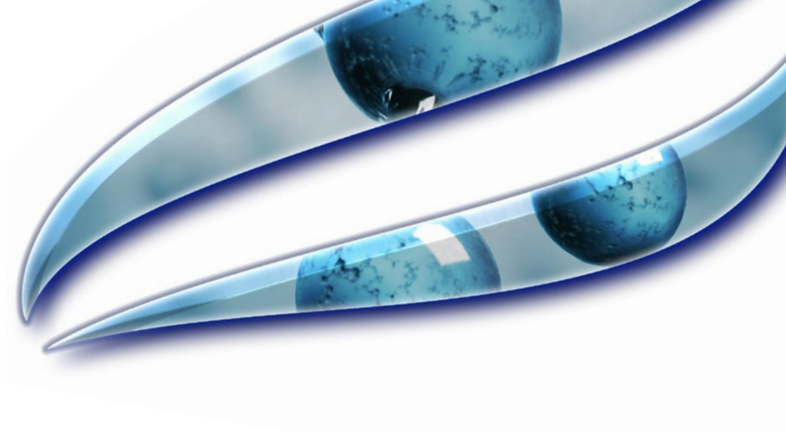

Mobility begins in the mind.

When Bertha Benz set off on her legendary first trip from Mannheim to Pforzheim in a motor-driven vehicle in August 1888, she primarily needed to be brave and determined. Before she could ring in the age of the automobile and thus change the entire world, she first had to convince herself that she could manage the incredible distance of 106 kilometres. Mobility requires technology, but it begins in the mind. That's as true today as it was 132 years ago because we will continue to be mobile tomorrow and the day after tomorrow. The only question is how. It's still anyone's guess how the people of the future will travel and what energy will drive their vehicles. Take the car, for example: Fuel cell vehicles offer many technical advantages, but they still remain relatively expensive exotic creatures on our roads.

„The transformation of mobility opens up ecological and economic opportunities. Mechanical engineering is shaping this future."

Wilhelm Rehm, ZF Friedrichshafen

There is therefore still plenty of room to manoeuvre and lots of work to do on automobile – and indeed all other forms of – mobility. The VDMA is at the forefront of these developments. That's because mechanical engineering has closer ties to the auto industry than most other sectors, and it provides decisive impetus. The value creation and employment potentials of electromobility in particular are enormous for our members, be it in cars, commercial vehicles or mobile machines, as well as for battery production and with regard to reuse and recycling. In addition to the change in the products of mobility, the VDMA also actively accompanies the shift in business models through networking, trend monitoring and research platforms, as well as by drawing up possible future scenarios. However, the VDMA also promotes its members' interests in the political arena, primarily by lobbying for greater technological openness. It is also working to put Power-to-X (the switch from green electricity to other energy sources) on the political agenda and promote networks like the Collective Industrial Research (IGF) programme.

Because the VDMA networks and supports companies across the sector with regard to mobility, its members benefit extensively from its wide-ranging activities: Precompetitive research projects conducted within the framework of the IGF generate findings that secure competitiveness and innovative strength. As a trade association, the VDMA also brings together both users of production technology (e.g. with regard to mobile machines, agricultural engineering and mining) and the suppliers of such technology (machine tools, automation, robotics, etc.) in order to address the issue optimally. This makes mobility accessible to small and medium-sized companies in particular in all its breadth. In addition, the VDMA supports value creation processes and employment potentials from the perspective of industrial policy, addressing the topic politically in a targeted manner to stress the central importance of mechanical engineering for future mobility. This enables members to avoid insecurity, identifies opportunities and increases potentials.

The issue of the change in mobility has already been addressed at the mechanical engineering summit and at various congresses and trade fairs. The associated initial survey, 'Drive in Change,' raised awareness about the topic significantly within the industry and was presented at sector and regional associations within the framework of the parliamentary debate on electromobility. The follow-up study teased out the potentials of fuel cell technology. The Battery Production sector group has organised successful roadshows in Europe, Asia and America. Through working groups like VDMA Fuel Cells and Power-to-X for Applications (P2X4A) as well as research associations like the FVV and FVA, the VDMA has networked the auto industry, suppliers and production equipment manufacturers. The foundation of the cross-sector P2X4A group in particular met with great interest from within the industry.

Finally, the reorientation of the VDMA electromobility forum and its rebranding as #XMOTIVE clearly shows the direction in which mobility is going. A global shift in mobility means a global potential for mechanical engineering companies. As a technology pioneer, the industry must work together with the VDMA to assist the auto industry with its transformation and help it develop further. Only if suppliers and plant manufacturers have mature production networks and are connected industry-wide within the VDMA the production of mobility can be maintained in the future. Just as Bertha Benz had to steel herself for her ambitious undertaking, the entire industry is now clearly facing an enormous challenge: creating mobility with a carbon-neutral footprint. The concepts for this already exist. What we need now are courageous people who are willing to set themselves the task of turning this new mobility into reality.

* https://www.statista.com/topics/3213/electric-mobility-in-europe/, aufgerufen am 30.11.2019

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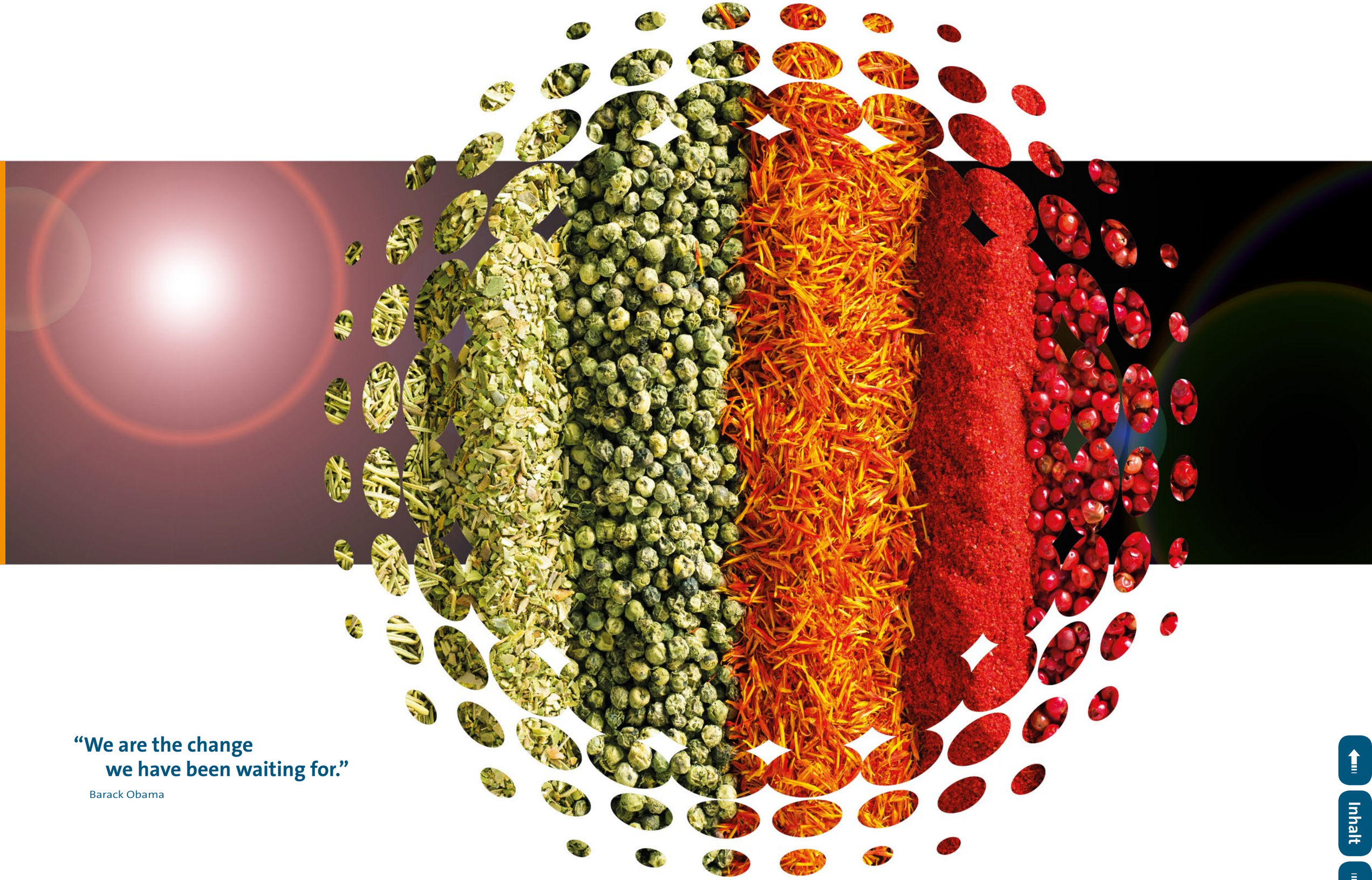

“We are the change we have been waiting for.”

Barack Obama

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Free trade vs. protectionism: the ability to act requires freedom to do so.

The Berlin Wall came down more than 30 years ago. At the time, people around the globe celebrated a fundamental human need: freedom. Unfortunately, walls are back in fashion again, be they physical or in terms of trade. Walls along the border with Mexico, trade walls between the US and China and also more generally in the minds of the overanxious. The world is closing its borders.

“The free flow of international trade in goods and services is vital for our company with its homebase in Dresden.”

Markus Rustler, Theegarten-Pactec

Around the globe, more and more countries of all political and social persuasions are falling back on protectionism and thus restricting our most precious commodity: freedom. They are turning their backs on free trade and close off their markets. More protectionism means less choice in the affected countries and fewer opportunities for exports by foreign companies. This constitutes a direct existential threat for export-oriented industries like mechanical engineering, and no sector in Europe is as export-oriented as mechanical engineering SMEs. With exports making up about 80% of their sales, these companies rely on open markets. More than 600,000 jobs depend directly on exports. Although the single European market still remains the most important export market, 90% of worldwide growth is taking place outside the EU. Whereas major industrial companies can use local production to overcome the protectionist measures imposed by individual countries, small and medium-sized mechanical engineering firms lack the manpower and financial resources to do likewise.

For this reason, no other trade association is working harder and more effectively than the VDMA to encourage free trade. We constantly and emphatically promote the needs and interests of our members. Our primary goal (because it is essential for survival): as much free trade as possible, maintaining access to as many export markets as possible and open up new ones wherever and whenever possible. We want to ensure that our strongly export-oriented members have free access to markets. To this end, our main tool is continuous political lobbying, including monthly visits by federal parliamentarians to VDMA member companies to discuss free trade and active foreign-trade policy.

The VDMA is demanding that decision-makers adopt active industry-friendly foreign trade policies aimed at overcoming the export hurdles facing mechanical engineering firms. Our key issues include the EU Posting of Workers Directive: Sending highly qualified specialists abroad is an important way in which SMEs in particular can secure their exports. After all, many of them have no distribution networks of their own in the various export countries. The VDMA therefore works with the European Commission and EU member states to reduce bureaucracy significantly and improve the Posting of Workers Directive in the mechanical engineering industry’s favour. Another urgent demand by the VDMA is for amendment of the Employment Directive. The VDMA is calling for long-term visas that would make it easier for companies to train qualified customers and staff in Germany as part of courses lasting 3-12 months. This would also help companies be more agile on foreign markets in the future and thus strengthen exports.

Greater competitiveness through less foreign trade-related red tape: Here too, members benefit from the VDMA’s efforts. The trade association is fighting for more efficient customs procedures. Growing export delays are damaging exporters’ reputations and generating unnecessary expenses for them. With the aim of finding a tailor-made and non-bureaucratic solution for export financing, the VDMA is demanding that SMEs are provided with simpler Hermes cover (so-called “small tickets”) for orders worth less than EUR 5 million. Up to now, only a handful banks offer export financing for small tickets. Should they still be unable to cover the needs of SMEs cost-effectively, benchmarking with other countries should be used.

The successes in Berlin are having an impact on the industry. The VDMA has managed to get small-ticket export financing included in the current coalition agreement. The topic has even been adopted by individual political parties, for instance in the liberal Free Democrat’s election campaign. Many of the topics in the VDMA’s list of demands for “active foreign trade policies” can also be found in a 9 April 2019 position paper of the parliamentary CDU/CSU group, entitled ‘Strengthening German foreign trade: Defending open markets and free trade.’ To ensure the issue is addressed during debates, within working groups and at sessions of the German Bundestag, the VDMA is also raising public awareness about the social and economic relevance of free trade.

To send a clear message about open borders and against new walls, the VDMA and its member companies initiated the joint “Thanks, free trade” campaign on social media. This demonstrated how free trade improves the everyday lives of people both in Germany and in the countries to which Germany’s capital goods industry exports. The campaign was also an open invitation to discuss the matter with the VDMA and with one another. More than 20,000 fans and over a million interactions on Facebook show that the campaign has been taken seriously in public and by politicians.

To be the voice of free trade: that‘s the central task of the VDMA for its members and to ensure they can conduct their export business with as few hurdles as possible. Because free trade requires freedom of action. Without old walls – or new ones.

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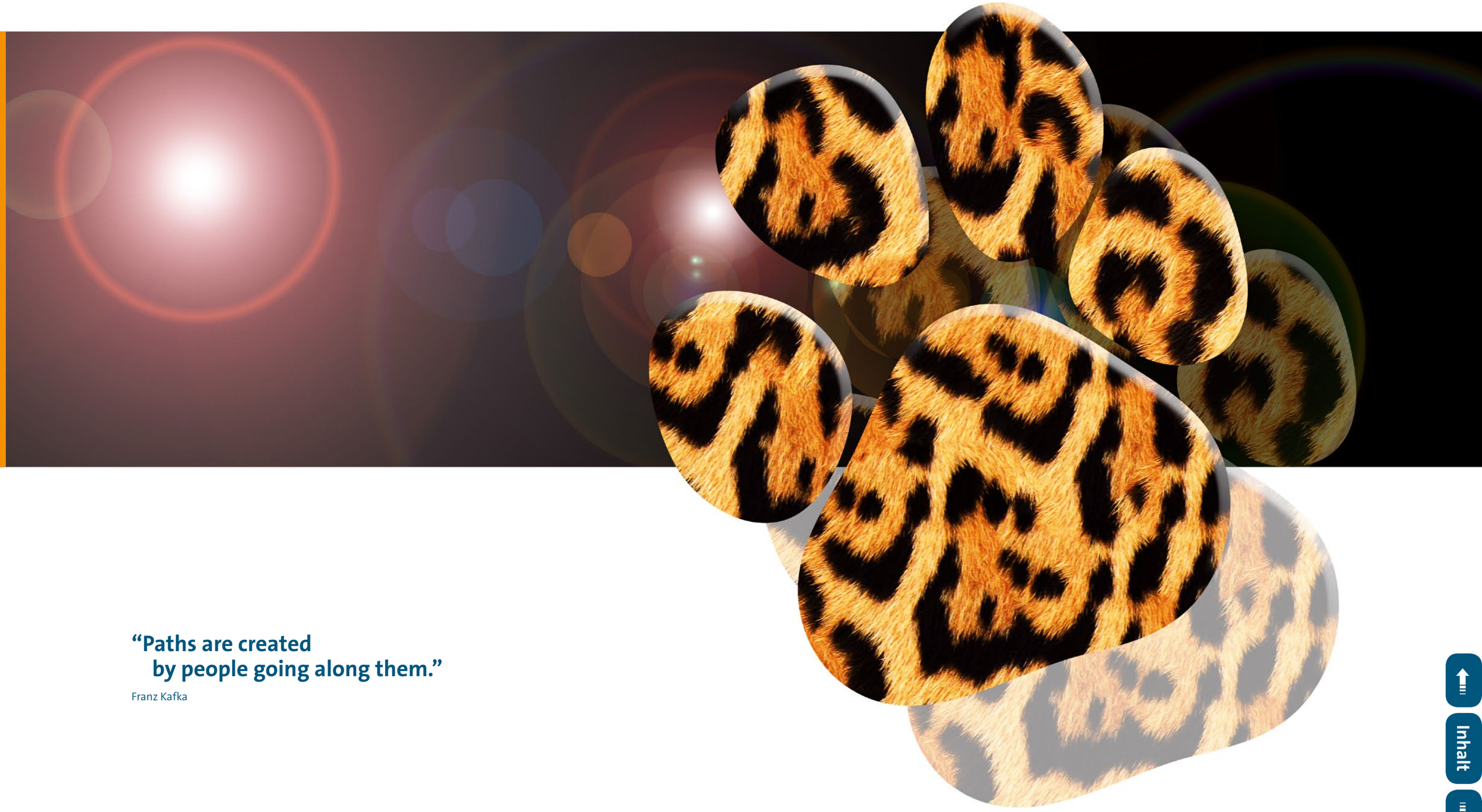

“Paths are created by people going along them.”

Franz Kafka

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Where's Walter? Working for the VDMA in Africa.

In the late 1980s, the English illustrator Martin Handford published his first children's book under the title 'Where's Wally?' Subsequent German versions of the books renamed him Walter. The task for readers of these books is simple: They must find the cleverly concealed main character in a variety of situations within elaborate and indeed challenging pictures packed with hundreds of people. It's not always easy, but always exciting. The African market is somewhat like one of these bustling, dynamic pictures: a colourful and varied hustle and bustle filled with countless people and opportunities to do business. You just need a keen eye to spot them. The VDMA has already done a great deal to pave the way for its members in Africa.

"Don't believe that Africa is waiting for us! Young Africans implement new value chains and products - with or without us!"

Karl Haeusgen, HAWE Hydraulik

Africa countries offer strategic market opportunities to VDMA member-companies. On that premise, companies that already have access to the right contacts and networks, have secured a significant competitive advantage over their rivals. Due to increased demand for consumer goods among Africa´s budding middle class, many African countries - more than ever before - are keen on incubating home-grown value creation. Rather than continuing to export raw materials and import finished products, the current focus is to create products domestically. That requires a collaborative effort between industry and experts. Unfortunately, the necessary requisite skill-set to train the workforce and staff of local industry, is still lacking. If the mechanical engineering industry is to establish itself in Africa, service and after-sale experts will be needed locally – not to mention, qualified craftsmen who can operate, service and repair equipment. This is exactly where VDMA comes in. After all, only a few trade associations have robustly discovered the huge potentials of the African market, are aware of their members´ vocational training capabilities and can rightly combine the two for the benefit of the relevant African countries and its members.

The Fachkräfte für Afrika initiative offers members a wide range of opportunities for actively shaping vocational training onsite. This way, member-companies can easily expand into the African markets: gain tangible market penetration while overcoming their fears and the usual tendency to become risk-averse.

To this end, the VDMA is working in Nigeria, Botswana, and Kenya together with African partners with a view to establishing centres that offer member-companies wide-ranging training options. Modular and dual vocational education and advanced training are available. The extensive vocational training experience of VDMA members, delivered with the seal of German quality, has proved to be a major competitive advantage in Africa. The direct involvement of member-companies and their technical equipment makes the trainings practical, original and of unrivalled quality. So far, the VDMA has recruited about 45 companies to contribute equipment and staff, develop teaching materials, and to implement the training component of the initiative, with great success!

In addition to promoting trainings for craftsmen , the VDMA is also establishing networks – both between governments of African countries and the German government and between companies in these countries. As result, our member-companies are becoming house-hold names on the African market while also sustaining the revered reputation of the German mechanical engineering industry. At the same time, companies can gain pioneering status for technical standards and improve their international competitiveness. For instance, by conducting the first „makeathon" in southern Africa, the VDMA and its member, ITQ, were able to position German mechanical engineering as a driving force for industry 4.0 and present the association as a catalyst for transformation into a modern industry.

The federal government of Germany and of course, His excellency the German president, have also taken interest in VDMA´s activities in Africa. One example of our success story of involvement in Africa, is highlighted in our member-company – HAWE Hydraulik – winning the Carl-Duisberg Society´s German Entrepreneurship Award for Development. This accolade and the launch of a training centre in Botswana, by German President Frank-Walter Steinmeier, allowed mechanical engineering SMEs to position and present themselves as important and innovative partners for job creation on the African continent. It is indeed a key economic as well as political factor for providing and preserving sustainable employment opportunities in Africa as it is in Europe. This development is also being supported by Elke Büdenbender; the president's wife and the project's patron.

Expectedly, the excellent reputation that mechanical engineering enjoys among politicians will also continue to grow in Africa – since the VDMA helps its members find and train suitably qualified staff, regardless of the challenging business environment in Africa. VDMA will continue to build and sustain a strong network in Africa, as we are convinced that the future depends on networking.

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“Everything in life that we really accept undergoes a change.”

Katherine Mansfield

How to find the right contacts in Berlin and Brussels.

In order to understand why VDMA staff get on so well with politicians in Brussels and Berlin, it’s worth looking at attachment theory. This psychological theory considers the connections people develop with their partners in relationships, for example, and helps explain why some relationships last, while others fall apart. This in turn can also help us understand why some people always fall in love with the wrong type of person. The three most common types of attachment are secure, anxious and avoidant. Anxious and avoidant people don’t suit one another: The more one person seeks proximity, the more the other edges away. However, if one of the partners exhibits secure attachment behaviour, it works out. The VDMA is therefore not only one of the safest partners of the mechanical engineering industry, but also maintains excellent connections to a variety of politicians.

The coronavirus crisis in particular showed how important such a network is. Amongst other things, pressure from the VDMA ensured that the use of short-time work was extended. The German government’s overall aid package in support of companies was based on close feedback from industry associations. In Brussels too, we are a much sought-after consultant on coronavirus issues.

The repeated changes in the underlying political conditions in recent years at both the national and European level have had a palpable impact on the activities of the VDMA’s member companies. This wouldn’t be a problem if political decisions consistently strengthened the competitiveness of the mechanical engineering sector. However, whenever decisions are taken that could have a negative impact on the industry, the VDMA reacts immediately in its members’ interests. The aim is to help shape the underlying conditions in such a way that companies can act optimally and their products can be successful on the market. The VDMA keeps an overall perspective, while at the same time setting the course in specific fields of interest. In this, the safety of products and their energy efficiency are just as important as tax incentives for research that cut the cost of investment in research. You might think this would be easy or straightforward for politicians. However, decision-makers are often exposed to very differing interests and therefore not always of the “right” opinion with regard to the sector. The VDMA has therefore developed close, trusting and stable relationships with decision-makers over many years and thus earned itself a reputation as a goal-oriented interlocutor with strong opinions. This allows us to work alongside our members to ensure that the voice of the mechanical engineering industry is heard in political debates and ensure that decisions are as favourable as possible for all our members.

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Numerous successes in key areas attest to the fact that the members of the VDMA profit from our close ties to political decision-makers. When Economics Minister Peter Altmaier published his draft industrial strategy, the VDMA actively contributed to the debate by expressing numerous points of criticism, especially with regard to repeated political intervention, for instance to control mergers. Most of these points were subsequently adapted in the industry's favour in the final version of the strategy, and have even been implemented in part. Small and medium-sized companies can also rely on us defending their interests. In addition to the industrial strategy, the Economics Ministry has also presented its own SME strategy, which the VDMA successfully influenced, for instance with regard to safeguards for exports by small and mid-sized enterprises (small tickets) in particular. These small tickets are the product of negotiations between industry representatives and the minister, in which the VDMA raised the issue.

On the topic of free trade, the VDMA likewise cannot be ignored as the sector's voice in the political arena and the media, partly because free trade has become a priority for us, especially following the collapse of talks over the TTIP.

Since the EU has exclusive responsibility for trade policy, the VDMA maintains very strong ties with the European Commission General Directorate for Trade and the MEPs responsible for trade issues. Indeed, the Commission explicitly seeks out the VDMA's expertise and opinion whenever new free-trade agreements are negotiated or they are about to be concluded. In this way, the VDMA can provide data and estimates of whether and how mechanical engineering exporters can benefit from the planned agreement. It thus has an enormous impact: The VDMA's efforts played a not unsubstantial role in the conclusion of the free trade agreement with Mercosur states. The VDMA is present in Brussels as a constant interlocutor for EU institutions in order to prepare important trade-related decisions that affect mechanical engineering. In this way, the VDMA raised awareness within the European Commission and among MEPs about the difficulties of posting staff to other European countries.

With regard to the highly topical issue of EU climate policy, the VDMA managed to become actively involved in the discussion on its members' behalf and insist that increased environmental protection be balanced, ambitious and aligned with the market economy.

Amongst other things, this resulted in a joint stance with the ZVEI on the governance system of the energy union and the position paper 'Key recommendations for a transition into a low-carbon economy.' Both were brought into the political arena through PR work and in particular face-to-face meetings with EU parliamentarians and Commission staff.

"Politics is a lot of hard work! Therefore small and mid-sized businesses have to stick together. We are the pronounced voice of the mechanical engineering industry."

Carl Martin Welcker, Alfred H. Schütte

The issue of the circular economy has been at the top of the EU's political agenda since 2015. The VDMA has been contributing to the decision-making process from the outset, for example as part of the Circular Plastic Alliance, set up by the European Commission. The Circular Plastic Alliance brings together public- and private-sector stakeholders from plastics value-adding chains to encourage voluntary initiatives and commitments for increasing the use of recycled plastic. This ensures that the VDMA always keeps the "bigger picture" in mind for its members in order to quickly recognise and promote possible recycling-related business models for the mechanical engineering sector under the auspices of "circular economy 4.0".

In the past, digitisation was seen mainly from a consumer perspective. It has since been introduced into the political debate through many conversations, events and statements as a topic of relevance for industry. Demands for a domestic market for industry 4.0 have since been adopted by both the European Commission and the European Parliament. The VDMA has also been active with regard to Artificial Intelligence (AI), where it successfully introduced the key distinction between consumer and industrial products in debates and has thus far been able to prevent EU legislation that would restrict the use and application of AI in industrial contexts.

In other words, no matter how challenging a topic may be or the type of connection VDMA representatives have with their interlocutors on European political committees, these representatives establish a functioning and stable relationship in which even contentious issues can be raised immediately, discussed constructively and solutions can be found that are to everyone's benefit.

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“Changes must not only be initiated by the top management, they must also begin there.”

William Wiggenorn

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The workplace of the future.

Working conditions on spaceships are often a key theme of science-fiction films and TV series. So how will people (and androids) work in the coming 50, 100 and even 1000 years? How will they use machines? And how will these function? The answers remain contradictory. In Star Trek – Next Generation, for example, mankind has got rid of money. Everyone is appreciated as a value-creating individual and works without pay. The real currency is each person's personal reputation, which they develop through their thirst for knowledge. Everything would be perfect, were it not for enemies like the Borg; a collection of man-machines whose only task is to align and enforce conformity in others, turning growth into an end in itself without any deeper meaning.

"The exchange within the VDMA has inspired me to look at processes from a new perspective and to improve my ‚tools of trade'."

Tanja Spieß, Gebr. Becker

Hopefully it won't come to this. Nevertheless, it's worth thinking ahead because demographic shifts and digitisation will have a noticeable effect on both the labour market and the world of work in the future. The mechanical engineering industry must prepare for this transformation today – for the benefit of members, employers and employees, politicians and society as a whole. The VDMA supports this transformation. We monitor the labour market, recognise trends early on, notify and advise our members – particularly SMEs – and launch transformative projects and initiatives for labour 4.0. As part of this, we also enter into dialogue with politicians and trade unions at an early stage. The mechanical engineering network within the VDMA is a driving force for digitisation, both with regard to technology and in its duty as the largest industrial employer.

According to the leadership trend barometer, the most urgent task is to transform corporate cultures in order to increase innovativeness. This process for changing the way we work in the digital age is supported by the VDMA in many ways: through surveys, workshops, (cooperative) advice on transformation, practical examples and close collaboration with consultancies and the scientific community. Recent achievements are pointing the way: The VDMA has successfully established the political debate about labour 4.0 at the national level. Its lobbying is paying off, especially with regard to the underlying labour-market and employment conditions, as well as through successful statements on legislation on our members' behalf, for instance about temporary work and the inflow of skilled workers. The "Ausbildung 4.0" campaign raised awareness about labour 4.0 among politicians, trade unions and companies. Numerous publications featuring examples of good practice help our companies with implementation.

In association with the Corporate Learning Community (CLC), the VDMA has also introduced a new type of event for its members: the bar campus format. The 100-200 participants can then use this format themselves within their own organisations. Regular conferences and congresses on labour 4.0, leadership 4.0, HR and innovation management as well as innovation cultures, comprising both theory and practical examples, ensure that members are always kept abreast of developments. VDMA workshops on innovation, change and creativity techniques are well attended. Many new job categories – from innovation manager to business developer – attest to the fact that mechanical engineering is changing.

Vocational training is also moving forwards: In the space of just 18 months, 11 training professions within the metalworking and chemical industries were adapted to the demands of digitisation for industry 4.0 as part of a joint "agile procedure" conducted together with IG Metall, Gesamtmetall and the ZVEI. New training ordinances have been initiated, including for IT professions. The Nachwuchsstiftung Maschinenbau, a foundation which promotes education in mechanical engineering, has developed continuing training in industry 4.0. subjects for use by trainers and vocational school teachers. The industry is thus preparing for the future!

It may well be some time before we have fully-automated spaceships manned by unpaid Star Trek crews. However, we are already thirsty for knowledge and determined to make the world a better place. To this end, the VDMA's network of members has its eyes firmly on the future of work and especially mankind. Through engineering. And science rather than fiction.

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“What we don’t change will change.”

Erhard Blanck

“Good morning, Mr. Robot!”

Can robots teach preschool children? Even the European Union is considering the possibility. From 2016 to 2018, the European Commission funded a research project within the framework of the EU’s Horizon 2020 aid programme, in which humanoid NAO robots were tasked with teaching 4- to 6-year-olds a foreign language. The result: although the children successfully learnt vocabulary with the aid of the NAO, they did just as well on a tablet. So robots aren’t quite ready to revolutionise our education. However, education is revolutionising robots – at least, if the VDMA has its way.

In spite of the unstoppable digitisation within mechanical engineering, people will remain the key factor in the industry‘s survival for a long time: passionate, motivated and excellently trained people. The recruitment and training of young talent as well as the training of existing staff will therefore continue to be decisive in determining our members’ economic success. However, demographic change could lead to a shortage of skilled workers and specialists, at least in the medium term. One of the VDMA’s most important tasks is therefore to find such people for its members and create a framework in which they can be trained. All the activities of the VDMA Educational Policy department and of the Nachwuchsstiftung Maschinenbau are contributing to this through sector-wide networking and excellent connections to institutions of higher education and politicians. The manifold education-related activities of the VDMA and its members are concrete evidence of the credibility of our industry: The mechanical engineering sector takes education and training seriously and gets involved.

The members of VDMA benefit from this at several levels. The activities of the VDMA start with motivating young people while they are still in school, where the teaching of technology must be strengthened, and maths must be taught in a far more job-oriented way. The VDMA therefore asked its member companies to submit maths assignments based on real examples. The renowned Klett publishing company then chose and edited 25 of these questions, and made them available to teaching staff through its website. Some 55,000 downloads confirm the project’s popularity.

With the aim of making the recruitment of the next generation of workers more effective, the VDMA operates talentmaschine.de, a job-portal for members that also provides good practices and guidelines for recruiting young people.

More than 1000 companies have already used the platform. The website informs schoolchildren and students about career opportunities in the fascinating forward-looking mechanical engineering sector, and helps them find apprentice positions and internships. The VDMA is also active in training apprentices of its member companies to become mentors for other young people. So far, more than 500 trainees from 210 member companies act as mentors.

“Well-trained young talents are the key for future success. VDMA-services such as talentmaschine.de help us to find them.”

Stefan Munsch, Munsch Chemie-Pumpen

The Nachwuchsstiftung Maschinenbau, in which the VDMA is involved as a partner, has proven to be a successful model. The aim is to keep trainers and vocational school teachers abreast of new topics like digitisation and industry 4.0. To this end, two large, publicly-funded projects were developed and implemented in North Rhine-Westphalia and Baden-Wurttemberg. Through a learning platform – the Mobile Learning System (MLS) – the Nachwuchsstiftung enables trainers to assign their trainees exercises and assess their progress. The MLS covers the theoretical foundations, meets the requirements of the new training regulations and prepares participants for their final exams. Extremely high demand from VDMA members proves that they are working hard towards securing their future staffing needs.

Within vocational training, the VDMA and the social partners have succeeded in integrating the topics of digitisation and industry 4.0 into the training regulations for metalworking and electrical occupations and thus make these professions future-proof – all within an “agile procedure” and in just 18 months! They then did likewise for the IT occupations. According to the motto “Good higher education, fewer dropouts,” our Maschinenhaus project is working to increase the number of graduates in mechanical engineering, electrical engineering and computer sciences. In collaboration with more than 50 institutions of higher education, the VDMA has run more than 250 on-site workshops to improve teaching and help young people complete their studies. This created a unique higher education network that provides our member companies with various ways for connecting with higher education establishments, while at the same time attracting more young engineers to the sector.

The training of skilled workers and specialists for the mechanical engineering industry will remain a core issue for the VDMA in the years ahead. The idea that robots will soon provide the required specialist and human characteristics is probably just a pipe dream. An EU survey with NAO showed that mechanical teachers still lack key skills, such as the ability to ensure discipline in the classroom.

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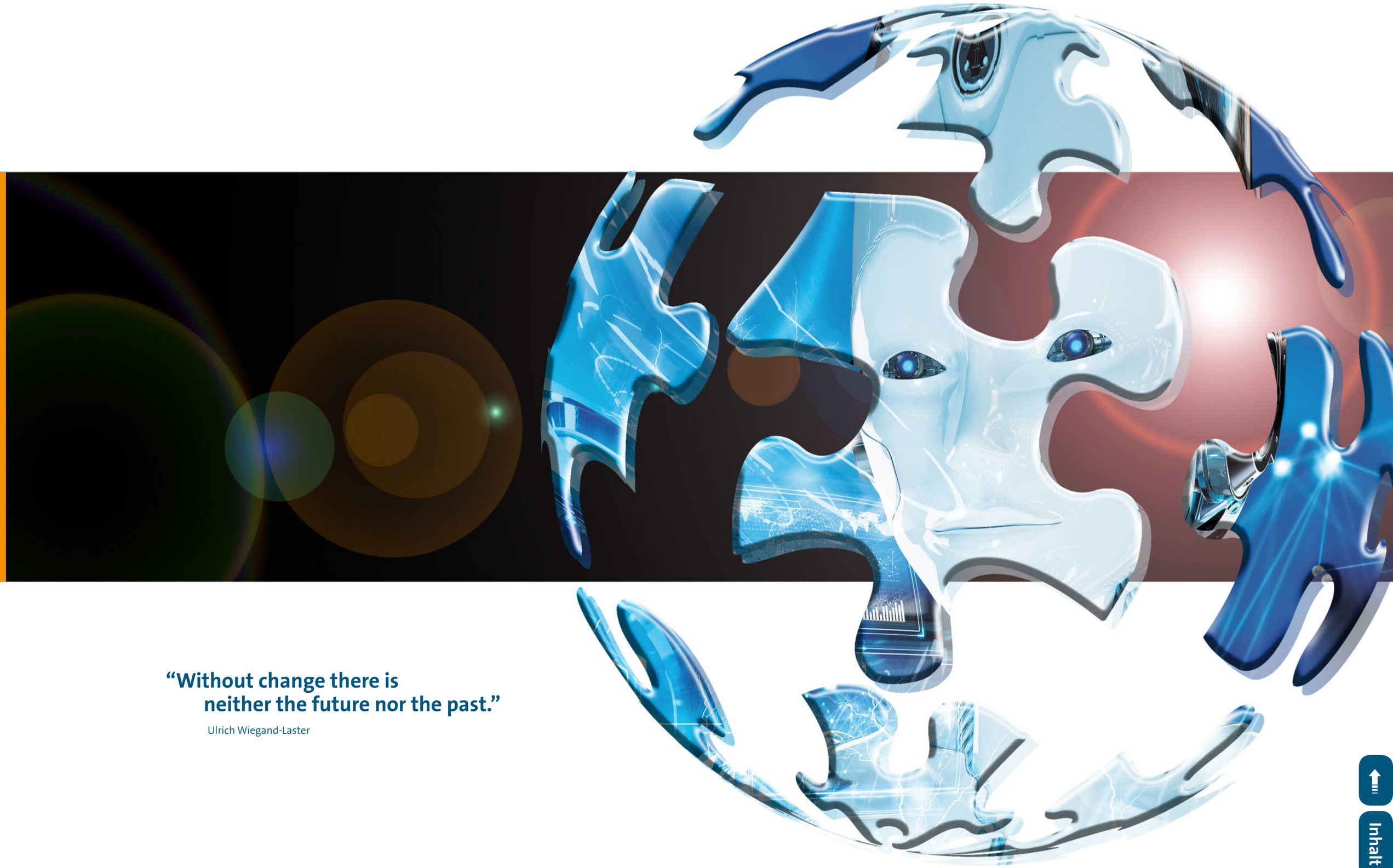

“Without change there is neither the future nor the past.”

Ulrich Wiegand-Laster

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Unbeatable: Artificial Intelligence and Machine Learning.

In November 2019, Lee Se-dol – the South Korean 18-time Go world champion and the only person ever to beat the computer program AlphaGo at his chosen game – announced his retirement from professional competition. His reason: even as the number one player, he could never again be the very best because the program had become unbeatable. So can machines be as clever and creative as humans? That may the fever dream of certain filmmakers, but today's machines are still a long way off this goal, and Artificial Intelligence (AI) is only just starting to find its way into factories. Machine Learning, a subset of AI, is already a reality, and more and more companies are using this technology.

"Artificial Intelligence – especially medium-sized companies must not lag behind in this field. One has to focus on intelligent technologies."

Markus Günther, INFORM

In this, machines are fed sophisticated algorithms that enable them to learn independently and thus optimise their performance. Thus far, the most famous and successful approach has been predictive maintenance. Here, a multitude of data gathered during production is used to predict problems with a machine early on and tackle them in a planned way – before the customer's production has to be suspended unexpectedly and mostly inconveniently.

It's already clear that AI will one day be a key technology in efforts to secure and expand mechanical engineering's global innovation leadership in the digital world. Artificial Intelligence can optimise production processes. Integrated AI solutions are being used to add intelligent functions to machines. New business models are arising. In short, AI is a key building block for mechanical engineering products and processes and thus in securing and increasing competitiveness. It is therefore a core issue for the VDMA.

Since the founding of the VDMA expert group in July 2017, the VDMA has worked within this decisive field to enable its members to be in the best possible position with regard to AI and Machine Learning. The subject is being addressed step by step, including surveys on the use of AI in mechanical engineering, guidelines and quick guides. This gives companies easy access to the subject, practical advice from experts and tips on how they can start using such technologies themselves. Short videos showing possible applications are also being used to continuously expand the pool of information available to members. The best example of this is Machine Learning 2030, the first scenario survey. Here, projections were drawn up to tease out possible developments within mechanical engineering and increase awareness of changes. The VDMA's newly-developed quick guide supplements this consideration of potential scenarios with concrete examples of the use of Machine Learning in operation as well as the technical implementation thereof.

However, the development of Artificial Intelligence is not taking place in a vacuum. It is even being discussed intensively in the political arena. That's why the VDMA is fighting in all the relevant political committees in Germany and at the European level for regulations that take workers' concerns seriously while at the same time giving companies the freedom to introduce AI into their production processes and/or products, create test fields and learn from mistakes.

VDMA members therefore have a decisive competitive advantage through direct networking that enables a broad-based exchange of experiences: Thanks to the structure of the VDMA, all the relevant groups for mechanical engineering, automation and IT can be involved quickly and simply, for example via the sector associations VDMA Software and Digitalization and VDMA Electrical Automation or the Future Business competence center. By taking a comprehensive view of the topic from the perspective of digitalization, research, law, education and politics, the VDMA ensures that AI is kept in mind in all its divisions and activities. This collaboration generates synergy effects with great proximity and provides practical action recommendations. Everyone at the VDMA agrees that Artificial Intelligence has an enormous potential, be it for new business models with data-based value-added services, more efficient use of materials and energy, faster decision-making and production processes or in supplying answers to the challenges presented by both the scarcity of natural resources and climate change.

So will we have clever, creative machines in the future? That is certainly on the horizon, as confirmed by the example of AlphaGo and its considerably more powerful successor, AlphaGo Zero. At least in terms of board games, machines have long surpassed their human competitors. The rapid pace of development of AI is unstoppable. The VDMA and its member companies must therefore harness this intelligence for the benefit of the mechanical engineering industry. And it is comforting to know that, in this sphere at least, the learning machines will work alongside humans rather than against them.

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“Either you find a way or you make one.”

Hannibal

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If machines could talk … humans could learn a lot.

“OPC UA forms the basis for Smart Factory and allows for digital services that make customers’ products and manufacturing processes sustainably better.“

Kai Kerber, Frech

In 1887, the ophthalmologist Ludwik Lejzer Zamenhof invented a new universal language. His aim was to promote international understanding and maybe even provide a gateway to world peace. He called his language Esperanto. It was a nice idea that if everyone spoke the same language, information could be passed on without friction loss, inaccurate translation or misinterpretation. The results were somewhat modest: Although Esperanto is now the most widespread planned language, English mostly remains the lingua franca. However, the many misunderstandings in communication between governments, cultures and companies show that this isn’t an ideal solution.

In contrast to Esperanto, the “universal machine language” OPC UA is an enormous success. So whereas an ophthalmologist and many linguists were unable to develop and establish an artificial and globally adopted universal language, VDMA members have had precisely that at their disposal for some time – albeit only for machines, not for people. The aim is to allow efficient and problem-free information exchange across all machine interfaces. The VDMA functions as the central human interface that makes it all possible. After all, if machines are to be able to communicate directly with one another across national borders and irrespective of their manufacturer, the participating companies must first develop a suitable vocabulary.

Because of its technological breadth across the entire mechanical engineering industry, the VDMA can offer its members a neutral, cross-sector and, most importantly, precompetitive platform. This generates comprehensive synergy effects through the exchange of best practices, increases efficiency through central coordination and offers support from working parties within the sector associations. Many different domain-specific working groups with similar applications can swap ideas and experiences and cooperate much more closely. The standards are communicated through clear, transparent and compliant processes. Thanks to its international presence through its foreign offices, the VDMA is ensuring that the issue of OPC UA and the jointly developed standards are known worldwide and involve international manufacturers and users. Customers around the globe can now be addressed via the universal machine technology interface (umati), the only way a new global language can be established.

After all, change is only possible if many clever minds gather around the same table, exchange ideas and speak with a single voice. The VDMA is this voice; the mouthpiece that speaks this universal language. The OPC Foundation sees the VDMA in the role of a globally leading central organisation for drawing up OPC UA companion specifications (detailed sector-specific additions to the OPC UA standard) for the entire mechanical engineering industry.

When using OPC UA as the interface standard, control data for machines is structured and defined in information models. This standardises the exchange of information from the shop floor to the cloud, thus making it simpler, more secure and, most importantly, manufacturer-independent. This is beneficial for forward-looking applications like Machine Learning. The ultimate aim is to enable the seamless interconnection of machines, irrespective of their manufacturer and operating system. OPC UA technology and companion specifications enable devices and services to communicate with one another. In short, machines around the globe can understand each other, even if they use highly specialised technical jargon or speak a local “dialect.”

But what use is it to humans if machines can communicate more easily? Mechanical engineering already profits from OPC UA and the associated cooperation within the framework of the VDMA. In addition to precompetitive dialogue with other companies and users, it is primarily the opportunity to be actively involved in developing interfaces that is decisive for participants. That‘s because the companion specifications satisfy the unique features of each sector, while at the same time potentially reducing the number of interfaces of their respective products and enabling companies to take part in the undertaking as a whole. Plug & work also significantly cuts the work involved in getting machines and systems up and running. OPC UA has already laid the foundations for downstream applications like condition monitoring, predictive maintenance, AI-tools and remote control.

But that‘s just the beginning. It still has plenty of potential for joint and, most importantly, successful further development of the issue in the months and years ahead. Countless sector-specific interface standards can be replaced. The next big step will involve a number of cross-sector interfaces that will be established under the heading “OPC UA for Machinery.” This is the only way to enable manufacturer-independent communication along the entire value-adding chain and the further integration of international manufacturers and users.

Companion specifications must be agreed for most of the VDMA’s 36 sector trade associations. Plug & work must be implementable for the entire manufacturing industry. Some machines and systems in previously closed production environments must be able to be integrated across sectors in the future. Last but not least, the digital transformation is demanding that all information be easier to use for data-driven business models. The VDMA’s network therefore still has plenty to do. However, the groundwork has been laid, the crucial dialogue between members is at full swing and participation is increasing.

It’s pretty amazing that a machine language is prompting everyone involved to talk to one another across all borders and boundaries and in spite of their different interests. Some 500 companies are already on board. Aside from industrial users like the auto industry, international sector committees like EUROMAP, CEMAFON and EUMABOIS have also been roped in. Even the Chinese market has started adopting the standards. Welcome! Let’s talk to one another! Because nothing is more valuable than to be understood and listened to. The same applies to machines.

Roughly a few hundred thousand people around the globe still actively speak Esperanto. However, we can safely say that OPC UA will in future enable far more than a few hundred thousand machines – and ideally all of them – to communicate. As such, it will be the first truly internationally binding universal language. La estonteco povas veni!*

*Esperanto for “May the future come!”

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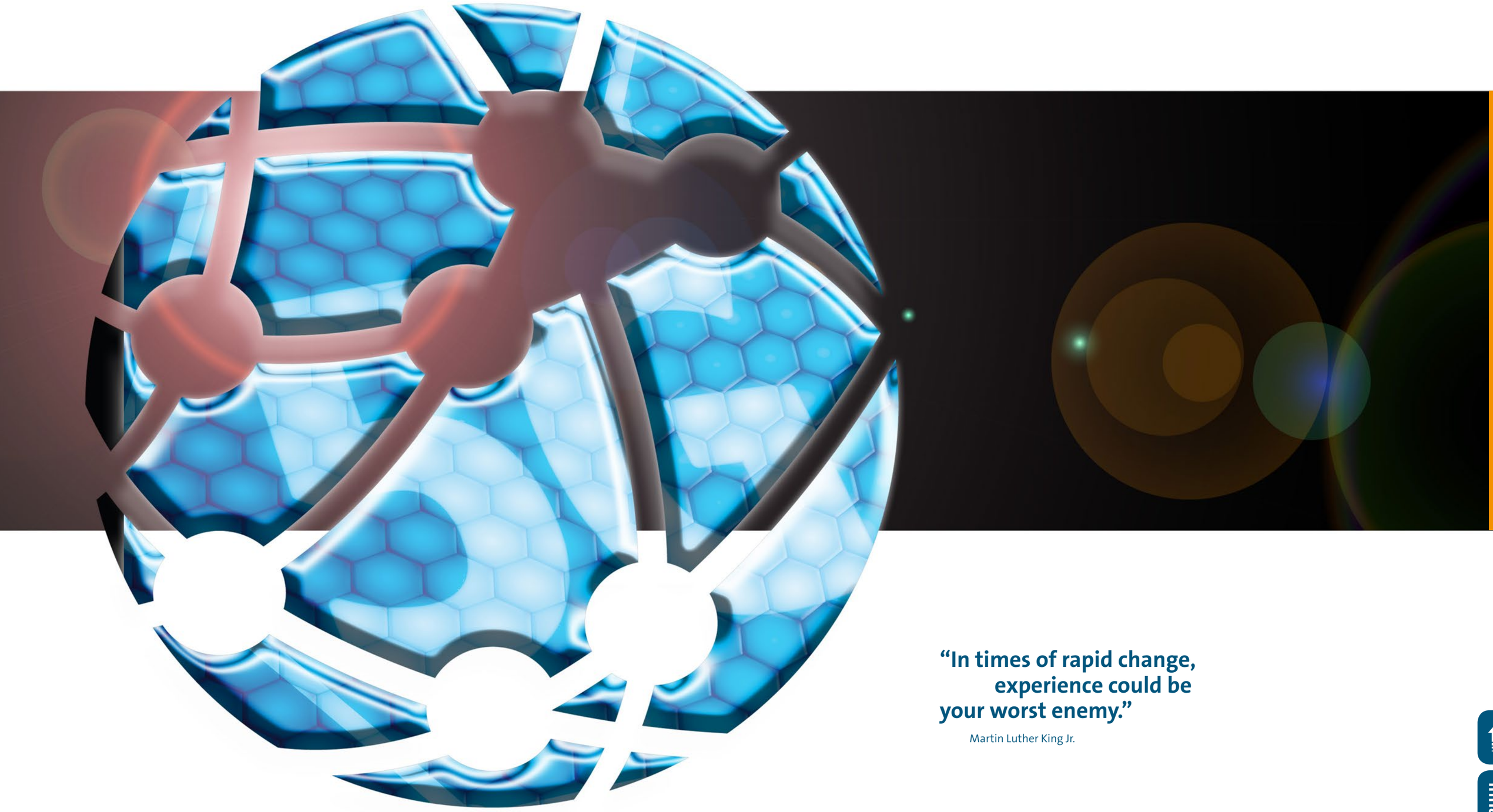

“In times of rapid change, experience could be your worst enemy.”

Martin Luther King Jr.

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Faster and better with 5G.

South Korea topped the 2015 OECD Science, Technology and Industry Scoreboard in terms of the number of university graduates in natural science and engineering. In 2019, – for the sixth year in succession – South Korea also ranked first in the Bloomberg Innovation Index of the world's most innovative nations. So it's hardly surprising that, on 5 April 2019, South Korea became the world's first country to provide nationwide coverage using the ultrafast mobile phone standard 5G. This put it in the forefront once again as an enviable pioneer in a technology with enormous importance for the future. Since then, other countries have also been keen to move at lightning speed.

"5G is the ideal complement to wired data networks and brings more flexibility into the Smart Factory."

Ralf Moebus, U.I. Lapp

The first phase of Germany's 5G implementation, in 2019, therefore employed eMBB (enhanced mobile broadband) capability almost exclusively for transfers of extremely high data volumes. Work has also been apace on two other capabilities: uRLLC (ultra-reliable low-latency communications) will urgently be needed for autonomous vehicles and industrial automation, for example, by providing very short response times. While mMTC (massive machinetype communications) is a key factor for the networking of industrial production for the Internet of Things, enabling a very high number of end-use devices within a network. In November 2019, the German Federal Network Agency launched an application procedure for local 5G campus networks in the 3700-3800Mhz frequency range. The use of these mobile frequencies – while ensuring compliance with the strict specifications for machine-to-machine communication in industrial applications – is enabling the mechanical engineering industry to drive forward the development of innovative industrial services, production processes and products that require real-time communication.

All the necessary general conditions must therefore be created as quickly as possible together with representatives from the worlds of politics and society. For this reason, the VDMA backs lobbying for private 5G frequencies and fair frequency-utilisation fees. Most importantly, however, it supports companies in exploiting the developmental potential offered by 5G. Only then can they establish themselves as industrial pioneers and retain their competitive edge in the future. Another important element for VDMA members is how 5G can be integrated into their products and what innovative solutions this enables. Here too, the VDMA plays an important role as a networking organisation and information disseminator.

However, the decisive factor in the success of the 5G network is local availability. The VDMA is working particularly hard to ensure that small and medium-sized enterprises in rural areas have access to a full-cover supply network. That's why it must already be possible to establish 100% network coverage for all companies with the aid of 4G technology, which 5G must then be able to build upon. This will enable the mechanical engineering industry to remain competitive internationally in development, production and services.

In order to identify pressing issues and discuss solutions with members, industry representatives, the general public and politicians, the VDMA organises topic-based events, brings together decision-makers and develops guidelines. This also includes trade fairs like the 5G CMM Expo on 5G-connected mobile machines, which was held in cooperation with Deutsche Messe AG in October 2019 and brought together hundreds of participants with speakers and startups. The aim of this event was to ensure that Germany hosts the world's leading trade fair on the networking of mobile machines and mobility – an important application for 5G technology – and thus put the mechanical engineering industry in a leading position once again.

The VDMA 5G user group was set up in May 2019 to raise awareness within the sector about the issue of 5G by providing a platform on which all relevant 5G stakeholders could exchange ideas on every aspect of mechanical engineering. Decisive know-how on issues like "5G for industry," "non-public networks" and "the networking of mobile machines" is designed to make our members leaders in the application of 5G. The "5G in mechanical engineering" guidelines and the developed use cases are designed to support VDMA members with information on relevant issues, such as 5G services for industrial applications, infrastructure, production and products, for their search for new 5G-based business and operating models.

Of course, the VDMA also sends a clear signal in its central role, namely lobbying on behalf of its network: A letter from member companies to several federal ministries, the Federal Chancellery and various members of the German parliament stressed the importance of private 5G frequencies and fair frequency utilisation fees. The VDMA has also maintained lively and constructive contact with the Federal Network Agency for some time. Cooperation with associations like the ZVEI (5G-ACIA), VDA (5GAA), VCI and DBV has already generated six joint statements. Collaboration with research establishments like the Fraunhofer IIS and centres of excellence has had a decisive positive impact on the competitiveness of the mechanical engineering industry. Last but not least, the VDMA offers its members numerous training sessions, courses and seminars to assist them in introducing 5G.

The competition over global leadership in innovation and networking can now move to the next level. Incidentally, one country has always been close behind South Korea in the aforementioned rankings. That country is Germany. And the latest figures look even rosier.

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“Change is a door that can only be opened from within.”

French saying

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Future Business:
A machine that predicts the future.

In 1895, as science and technology were developing at an almost exponential rate in Europe and the United States, H.G. Wells published his futuristic novel 'The Time Machine.' In this, an inventor builds a device that enables him to travel as far forwards and backwards in time as he wants. A time machine that lets you look into the future is the dream of all theoretical physicists and historians. And probably also of quite a few mechanical engineers. That was reason enough for the VDMA to start exploring what lies ahead.

VDMA's Competence Center Future Business is globally unique – developed especially for researching the future of mechanical engineering. Its mission is clear to assess the confusing variety of complex topics for the next two decades, and filter and process those of them, which are most beneficial for VDMA members and the entire sector. Aside from technical developments, we are monitoring social, economic, ecological and regulatory trends as well as disruption, asking: What is relevant? What is overrated? Are there any business fields that have not been discovered yet? Where do threats lurk? In what direction is mechanical engineering moving overall and within the various customer segments? And what new networks will we need in the years ahead?

VDMA Future Business is in a better position to make such judgements than many other organisations: Our strength lies in the collective intelligence of the VDMA, its member companies and research institutions. The Future Business taskforce bundles the know-how of more than 50 VDMA experts in various departments, sector and regional associations. It enables comprehensive collaboration on all future-related topics across association boundaries, offering an example of best practice for VDMA's INSPIRE programme. More than 30 areas of the VDMA are networked for Future Business and backed up by collaboration with partner networks of trend analysts and startups. We are the think tank for mechanical engineering: We think ahead in order to provide companies with a basis for their planning. We also create the necessary attention and publicity for the future of the entire sector.

With great success: Our expertise and services are in high demand. Our offers enable us to reach mechanical engineering companies of all sizes. Our methods and tools have already proven their worth and are constantly being developed further. In addition to trend scouting, foresight and roadmapping, our services for members also include the expansion of value creation networks. This in turn is supported by the strengths of production research and the involvement of research organisations with direct product pipelines.

The list of specific results and advantages for our members is impressive and makes us optimistic for a strong future. VDMA corporate foresight employs integrative approaches and networked thinking as strategic tools for forward planning and innovative processes within companies, from foresight to insight and thus preparedness. To this end, we hold two meetings a year at which we provide our members with methods and best practices as well as hands-on training in workshops, e.g. with digital innovation journeys and makerspaces. Our Startup-Machine division brings mechanical engineering firms in touch with appropriate startups. This is matchmaking with relevance for mechanical engineering! Trends can thus be transformed into new technologies and products in an agile manner, while companies can learn new ways of working.

"Success comes when good preparation connects with the right moment. This is exactly what Trendscouting combined with Foresight supports."

Dr.-Ing. Heinrich Schäperkötter, Schaeffler

Our trend radar lists more than 160 trends that are relevant to mechanical engineering, categorised in an easily understandable format. Seventy trend cards enable our members to quickly grasp complex issues – from climate protection and digitisation to quantum technology and the biologisation of industry. As such, they have become trendsetters themselves. In the meantime, many member firms have begun to develop their own company-specific trend radars. Studies forecasting possible scenarios in 2030 and beyond offer compact, yet comprehensive information, use cases and recommended action for companies. Surveys pointing to alternative scenarios for megatrends with far-reaching consequences for mechanical engineering have already been conducted in the following areas: Artificial Intelligence and Machine Learning, materials of the future, climate change and Power-to-X, autonomous supply chains, and circular economy 4.0. "Retropolation" – i.e. looking back to the present from a possible future – enables companies to engage in specific roadmapping and set their strategic agendas. The same applies to VDMA: New VDMA groups and areas of activity, such as "Machine Learning" and "Power-to-X for Applications," have been developed in a targeted manner.

Among other things, the coronavirus pandemic has taught us the importance of reliable measurement data. In September 2020, Future Business presented its future study entitled 'Progressive Measurement and Testing Technology 2030.' The results are to be taken up under the motto „The largest machine in the world" – at CERN in Geneva; the place where the origins of the universe and of matter are being researched with probably the most precise and advanced measuring technology in the world. And setting the course for the physics of tomorrow. So maybe there is a kind of time machine after all.

Of course, it is obvious that VDMA cannot predict exactly what lies ahead for mechanical engineering in the next 100 years. However, it is already preparing its members for almost all eventualities and strengthening them so that their future business will be successful. After all, they don't need to build H.G. Wells' time machine. But they will be building the machines of the future, definitely.

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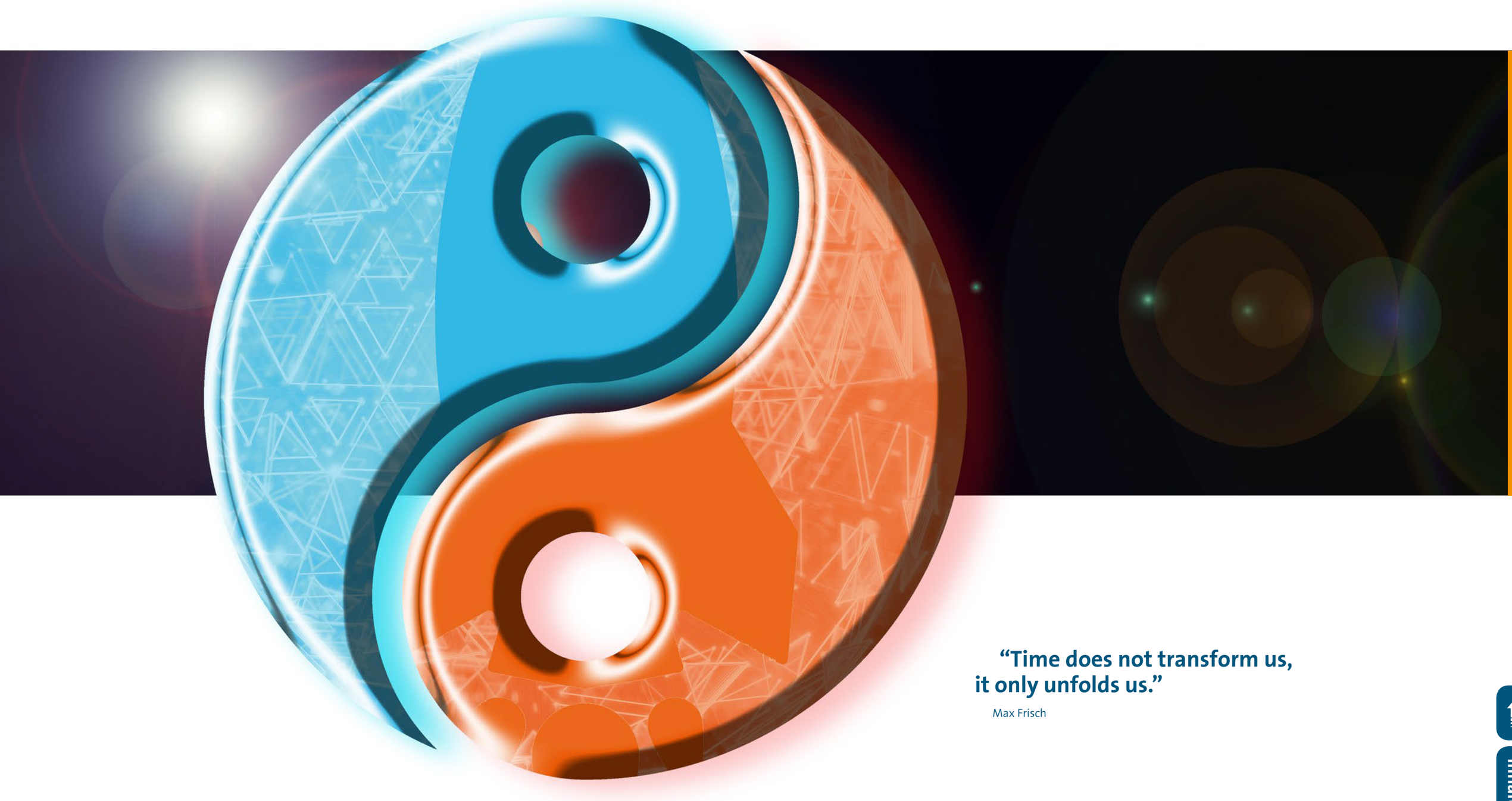

“Time does not transform us, it only unfolds us.”

Max Frisch

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Every 11 minutes, a mechanical engineer falls in love.

If only it were that easy to find the perfect partner and fall head over heels in love! Those apocryphal 11 minutes immortalised by ads for an online dating portal may be hard to prove empirically. But the market for online dating and dating apps continues to grow. That's because the digital realm enables people to make contact quickly, anonymously (at least initially) and with lots of potential partners. It's nothing new that successful matchmaking requires an intermediary. People have always sought help to find love. The only question is how successful a particular approach can be. What is clearly a promising approach to dating in the Internet age can also be applied to business. And for exclusively serious motives.

VDMA Startup Machine matches mechanical engineering companies with creative digital startups. In so doing, the VDMA Startup Machine offers several unique industry-specific features: sector-specific know-how and networks. That's because VDMA is at the centre rather than the periphery of the industry.

Mechanical engineering firms are attractive customers for startups, they offer a way to develop innovations through a partnership of equals. Nevertheless, a survey of members found that only 42% of the mechanical engineering firms that collaborate with startups have the resources needed to conduct startup scouting themselves. This is where the VDMA comes in. Startup-Machine has been connecting members with suitable startups since the middle of 2017. This strategically important cooperation offers both sides an enormous potential: We open up new horizons for mechanical engineering firms, opportunities to shape their future and their competitiveness. At the same time, we give startups access to Europe's largest network of our important industry.

Through its startup scouting VDMA identifies startups of relevance for the machine making industry, globally. To this end, the Startup Radar project with AtomLeap searches for the trending startup topics for mechanical engineering and identifies young companies around the world that are active in these fields. In fact, it is an industry-wide unique navigator for engineering companies through the international and diffuse startup scene!

We provide opportunities for startups and companies to meet and continually communicate. Together with the VDMA's trade sector and regional associations, Startup Machine offers wide-ranging matchmaking and dialog formats for networking, establishing contact and exchanging experiences with promising young companies and the startup-friendly mechanical engineering community.

We also reveal successful strategies for collaboration with mechanical engineering startups and derive sector-specific recommendations. As an innovation driver, Startup Machine gives the industry new formats for collaboration with founders and startups. Whether ideas competitions or hackathons: we test the extent to which these are suitable for mechanical engineering and inspire innovations. And last but not least, as the industry's mouthpiece, we carry the importance of cooperation between companies and startups into the press, politics and the startup scene.

"Startups break up our thought patterns. They are a building block on the way to the future!"

Dr. Matthias Vesper, Rolls-Royce Power Systems

We are proud of the achievements of VDMA Startup Machine. The study 'Startup affinity and strategies in mechanical engineering,' for example, showed that mechanical engineering companies cooperate extensively with startups and have a particularly strong affinity for startups compared to other industries.

The VDMA Startup Radar has identified the relevant startup trends around the globe as well as the startups with the greatest potential for mechanical engineering. This led to a report that included market trends and a longlist of more than 3000 startup contacts for VDMA members.

But that's not all: In 2019 alone, VDMA Startup Machine matched VDMA members with more than 300 startups and young entrepreneurs interested in founding companies. One highlight of its activity was a hacking engineering project conducted together with the Fraunhofer Society. Within the successful hackathon format, outlines of specific solutions to numerous challenges facing VDMA members were generated in just 48 hours. At a startup summit, best-practices presentations and panel discussions considered successful approaches to collaborating with startups, while an exhibition presented the best startups in the Fraunhofer network. This series of events is only one of many networking formats offered to members by VDMA Startup Machine and relevant sector and regional associations.

Any company that seeks to be a leader cannot overlook startups. More than two-thirds of the companies surveyed by VDMA presume that startups will have an impact on the sector's economic success over the next three years. Demand for the Startup Machine's services is growing continuously. It has thus become an indisputable success factor in VDMA's network of members. And further proof of our most important goal: bringing people together and exchanging ideas.

We admit that we can't (yet) guarantee that the two sides will fall in love within 11 minutes. However, this would also be reckless. After all, VDMA Startup Machine is about more than merely a good feeling between startups and companies. It's also about good business for both sides – as well as a stable, fruitful relationship.

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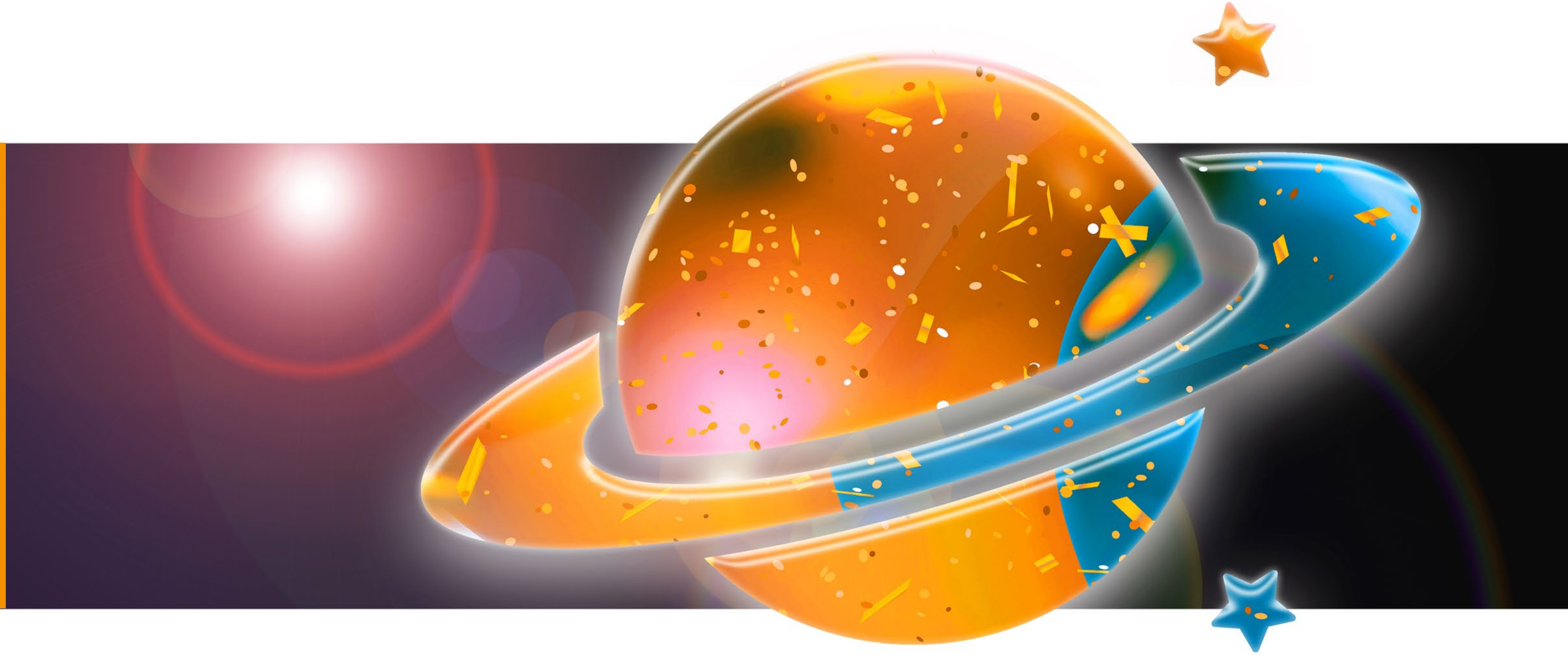

“If you really want to change something, you mainly need passion.”

Dalai Lama

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125 years together means a great deal.

Often enough, when a person reaches a high age, somebody gives a speech in praise of him. His special human qualities, business acumen and sense of family as well as his good deeds on behalf of society are eulogised. Only rarely is recognition shown for the people around him, people who achieved great things precisely because the jubilarian encouraged or was there for them. In 2017, though, we saw a jubilee with such a perspective: the 125th anniversary of the VDMA, an event that focused primarily on the success of its members.

“The great anniversary year with the speech given by Federal President Steinmeier as a highlight has proven: The mechanical engineering industry and its association are world class.”

Dr. Reinhold Festge, Haver & Boecker

Ever since its foundation, on 15 November 1892, the VDMA has been the voice of the mechanical engineering industry towards politicians and the general public, the sector’s network, the meeting point at which competitors can together discuss the future of the industry. A source of information for the entire industry.

It goes without saying that such traditions are binding. In its anniversary year, a multitude of events, publications and a brand-new website demonstrated the extraordinary importance that mechanical engineering has had and will continue to have in our lives.

As part of this, the VDMA extensively presented and honoured the strength of the companies in this sector and their contribution to the economy. One highlight was a gala evening in Berlin in October 2017, which included an address by German President Frank-Walter Steinmeier. The next month, on 15 November, a special memorial was held at the trade association’s birthplace in Cologne. Regional events also took place in Stuttgart, Hamburg, Leipzig, Wiesbaden and Munich, as well as a festive evening in Brussels.

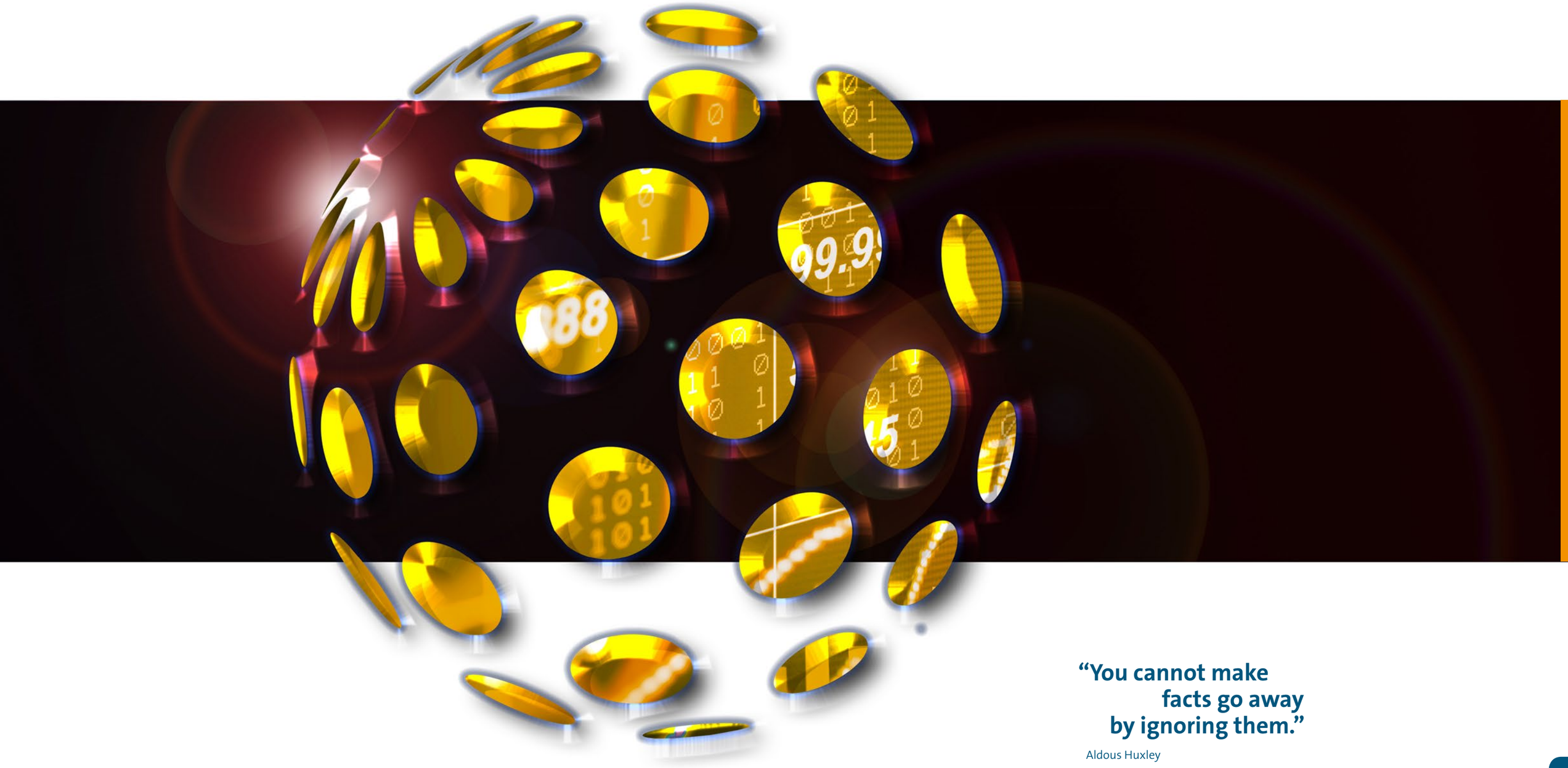
Numerous communication measures raised awareness about the issue among the general public, from an interactive interdisciplinary webpage entitled “Humans-Machines-Progress,” an image film of the same name for the entire mechanical engineering sector and an anniversary book, to a timeline of 125 years of the VDMA, which is now at display in the foyer of the VDMA building. The aim of all the events and statements was to honour the enormous contribution mechanical engineering and its trade association make as a networking organisation; an important part of the search for solutions to mankind’s greatest challenges.

125 YEARS VDMA
HUMANS | MACHINES | PROGRESS

However, the VDMA members also profited directly from the various activities in the anniversary year. Countless on-site events provided in-depth information about the network and its links to national and regional policymakers and the EU under the headings “125 years of VDMA” and “Humans-Machines-Progress.” The new image film about and for the mechanical engineering industry is freely available to all members to be used as a tool in their marketing and communications activities. The strength of the trade association, demonstrated outwards on behalf of its members, has further enhanced public perception of the mechanical engineering industry as a problem-solver and a guarantor of the future. Last but not least, the involvement of many companies in these events strengthened the sense of unity felt among VDMA members, which is appreciated and expected on all sides.

No anniversary would be complete without the community that surrounds the celebrant. We would therefore like to take this opportunity to thank all our members once again for the tireless efforts that have made a very special industry successful worldwide. We at the VDMA are proud to assist you in this endeavour.

Inhalt

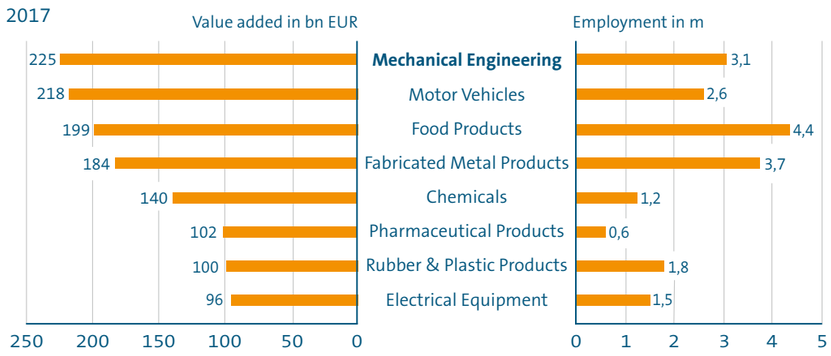


“You cannot make facts go away by ignoring them.”

Aldous Huxley

Inhalt

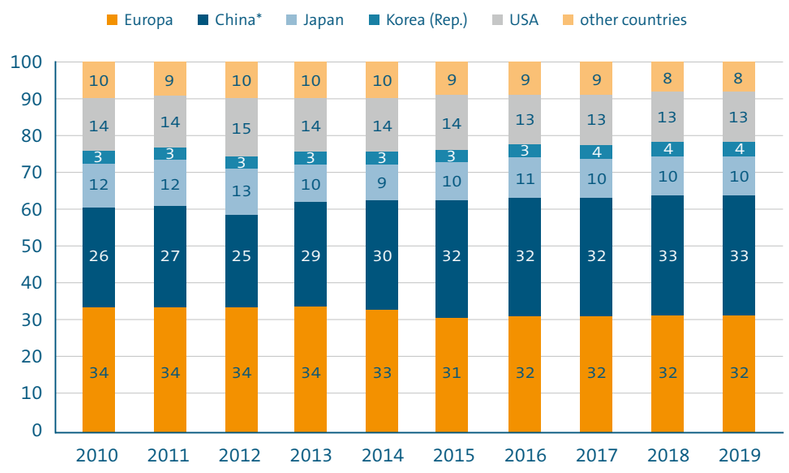
The largest industries in EU27 plus UK



Source: Eurostat (2-digit NACE rev.2 codes), Macrobond, VDMA

Structure of machinery turnover by main producers
Global turnover value in 2019: 2,665 bn. Euros

Shares on world machinery turnover in percent

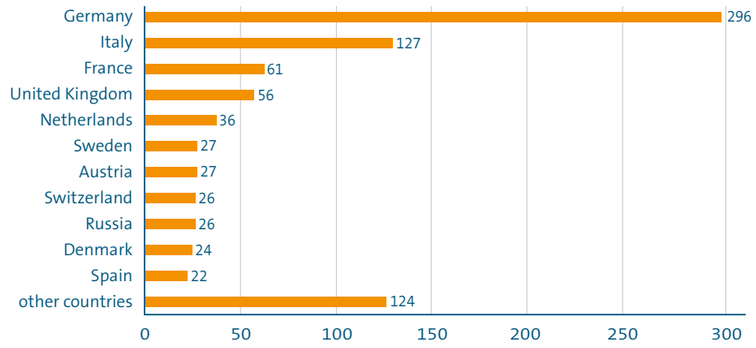


* from 2012 onwards data from NBS China, not comparable with previoous years.

Source: VDMA estimations based on Nationale Statistics CMIF, Eurostat, UNIDO

Europe: Turnover in mechanical engineering
Total turnover (estimated): 851 bn EUR

2019, In bn EUR, estimated

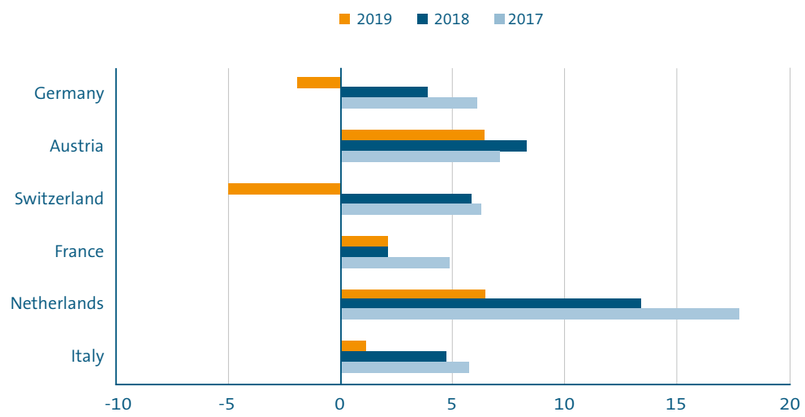


Mechanical engineering according NACE rev.2 chapter 28

Source: Eurostat, National Stastical Office, UNIDO, VDMA estimations

Turnover in mechanical engineering
in the TOP-6 countries of origin of VDMA member companies

yoy, %, nominal



Mechanical engineering according NACE rev. 2 chapter 28

Source: Eurostat, Macrobond, VDMA

Inhalt

“Changers are those people who swim against the tide.”

Vera Simon

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Foreign Trade
Business Advisory
Educational Policy
Finance and Controlling
Human Resources
Informatic Technologies
Information Technology
Internal Administration
Communications
Membership Management
Standardization
Legal Services
Taxes
Technical, Environmental Affairs and Sustainability
Unit Transport
Insurance
Economics and Statistics

Political representation

Berlin Office
European Office in Brussels

VDMA International

Brazil
- São Paulo

China
- Beijing
- Shanghai

India
- Bangalore
- Kolkata
- Mumbai
- Delhi/Noida

Iran
- Teheran (until 20.03.2020)

Japan
- Tokyo

Austria
- Vienna

Poland
- Warsaw

Russia
- Moscow

Trade associations

Waste Treatment and Recycling Technology
Air Handling Technology
Power Transmission Engineering
Valves
Lifts and Escalators
Building Control and Management
Construction Equipment and Plant Engineering
Printing and Paper Technology
Electronics, Micro and New Energy Production Technologies
Electrical Automation
Fire Fighting Equipment
Fluid Power
Materials Handling and Intralogistics
Large Industrial Plant Manufacturing
Woodworking Machinery
Compressors, Compressed Air and Vacuum Technology
Plastics and Rubber Machinery
Agricultural Machinery
Measuring and Testing Technology
Metallurgy
Mining
Engines and Systems
Municipal Equipment
Food Processing and Packaging Machinery
Power Systems
Precision Tools
Pumps + Systems
Cleaning Systems
Robotics + Automation
Welding and Pressure Gas Equipment
Security Systems
Software and Digitalization
Textile Care, Fabric and Leather Technologies
Textile Machinery
Process Plant and Equipment
Machine Tools and Manufacturing Systems

Inhalt

Working groups and forums

Teleservice User Forum
Additive Manufacturing working group
Fuel Cells working group
Earth-Moving Machinery working group
Large Industrial Plant Manufacturing working group – CIMAC Germany
Hybrid Lightweight Technologies working group
Industrial Drone Solutions working group
Maintenance Building Technology (AIG) working group
Agricultural Machinery working group
Lasers and Laser Systems for Material Processing working group
Machines in Construction – MiC 4.0 working group
Marine Equipment and Systems working group
Medical Technology working group
Organic and Printed Electronics Association (OE-A) working group
Power-to-X for Applications working group
Wind Industry working group
#XMOTIVE Forum
Technical Building Equipment Forum
Glass Technology Forum
Industry 4.0 Forum
Climate and Energy Forum
Mechatronics Forum
Mobile Machines Forum
Photonics Forum
Process Measurement Technology Forum
Process Technology Forum

Regional subsidiaries

Baden-Württemberg
Bavaria
Central
North
North Rhine-Westphalia
East

Central committees, working groups and steering committees

Ad hoc group Cyber Security
International Accounting working group
Product-related Environmental Protection worldwide working group
Accreditation working group
Posting of Employees working group
Labor Law working group
Occupational safety working group
Chief Digital Officer working group
China working group
Compliance Management working group
Controlling working group
Corporate Responsibility working group
Embargo working group
Export Financing working group
Intellectual Property Rights working group
Industrial Security working group
Information Security working group
Engineering working group
Customer Service working group
Income Tax working group
Market Communication working group
Human Resources working group
Press and Public Relations working group
Production working group
Quality & Management working group
Risk Management, Compliance & Auditing working group
Taxes in Large Industrial Plant Manufacturing working group
Control Technology working group
Material Policy working group
Tax Compliance working group
VAT working group
Transfer Prices working group
Customs working group
Foreign Trade committee
Strategy & Corporate Governance committee
Procurement and Materials Management committee
Research and Innovation committee
Macroeconomic Issues committee
Information Technology committee
Climate & Energy committee
Marketing committee
Public Procurement committee
Environmental Policy committee
Contract Law committee
Education committee
Artificial Intelligence expert group
Platform Economics expert group
Technology Policy steering committee
Legal Affairs committee
Tax committee
Transport & Logistics working group (large industrial plant manufacturing)

Service companies

DIN-Normenausschuss Maschinenbau (NAM)
DIN-Normenausschuss Werkzeugmaschinen (NWM)
Fachbetriebsgemeinschaft Maschinenbau e. V.
Forschungskuratorium Maschinenbau e. V. (FKM)
Maschinenbau-Institut GmbH
Printpromotion GmbH
VDMA Services GmbH
VDMA Verlag GmbH
VDMA-Gesellschaft für Forschung und Innovation (VFI) mbH
VSMA GmbH

International committees and working groups

Airconditioning and ventilation technology/ refrigeration technology
European Committee of Heating, Ventilation, Air Conditioning and Refrigeration Manufacturers (EUROVENT)

Power transmission engineering
Comité Européen des Associations de Constructeurs d'Engrenages et d'Eléments de Transmission (EUROTRANS), Management: VDMA

Lifts
European Lift Association (ELA), Management: ELA, Belgium

Building control and management
European Building Automation and Controls Association (eu.bac), Management: VDMA

Construction machinery and processing technology
Committee for European Construction Equipment (CECE), Management: CECE, Belgium

Plant Engineering
European Ceramic Technology Suppliers (ECTS), Management: VDMA

Fire Fighting Equipment
The European Committee of the Manufacturers of Fire Protection Equipment and Fire Fighting Vehicles (EUROFEU), Management: bvfa

Printing and paper processing machinery
International Federation of Printing Industry (Global Print), Secretariat: APTech, USA

Liquid pumps
European Association of Pump Manufacturers (EUROPUMP), Management: ORGALIM, Belgium

Fluid power
Comité Européen des Transmissions Oléohydrauliques et Pneumatiques (CETOP), Management: VDMA

Conveyor technology
European materials handling federation (FEM), Management: ORGALIM, Belgium

Foundry machinery
The European Foundry Equipment Suppliers Association (CEMAFON), Management: VDMA

Large industrial plant manufacturing
The European Committee of Large Plant Manufacturers (EUROPLANT), Management: VDMA

Woodworking machinery
European Federation of Woodworking Machinery Manufacturers (EUMABOIS), Management: ACIMALL, Italy

Compressors, compressed air and vacuum technology
European Association of Manufacturers of Compressors, Vacuum Pumps, Pneumatic Tools and Air & Condensate Treatment Equipment (PNEUROP), Management: ORGALIM, Belgium

Plastics and rubber machinery
European Plastics and Rubber Machinery Association (EUROMAP), Management: VDMA

Inhalt

Agricultural machinery
CEMA aisbl - European Agricultural Machinery, Management: CEMA, Belgium

Mechanical engineering, electrical and electronics and metal technology
Orgalim, Belgium

Engines
European Engine Power Plants Association (EUGINE), Management: VDMA

Pumps + Systems
European Association of Pump Manufacturers (EUROPUMP), Management: ORGALIM, Belgium

Robotics
International Federation of Robotics (IFR), Management: VDMA

Thermo process technology
The European Committee of Industrial Furnace and Heating Equipment Associations (CECOF), Management: VDMA

Turbines
European Association of Gas and Steam Turbine Manufacturers (EUTurbines), Management: VDMA

Vacuum technology
European Vacuum Technology Association (EVTA), Management: VDMA

Combustion engines (engines, turbines)
International Council on Combustion Engines (CIMAC), Management: VDMA

Process technology
European Committee for Process Equipment and Plant Manufacturers (EUCHEMAP), General secretariat: VDMA

Packaging machinery
Confederation of Packaging Machinery Association (C.O.P.A.M.A), General secretariat: FME/GMV, Netherlands
European Packaging Machinery Association (EUROPAMA), General secretariat: VDMA

Weighing instruments
Comité Européen des Constructeurs d'Instruments de Pesage (CECIP), Management: VDMA

Roller bearings
Federation of European Bea ring Manufacturers' Associations (FEBMA), Management: VDMA

Laundry and dry-cleaning technology
European Working Group for European Textile Care Technology (ETCT), Management: VDMA

Toolmaking
International Special Tooling and Machining Association (ISTMA), Management: CEFAMOL, Portugal

Machine tools
European Association of the Machine Tool Industries (CECIMO), Management: CECIMO, Belgium
Cutting tools, clamping technology
European Cutting Tools Association (ECTA),
Management: VDMA

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Messer Cutting Systems GmbH, Groß-Umstadt (until June 2017)
Max Wilhelm Schenck,
A. MANNESMANN MASCHINENFABRIK GmbH, Remscheid (until October 2017)
Albert Schenk,
OSMA – Aufzüge Albert Schenk GmbH & Co. KG, Osnabrück
Karl Friedrich Schmidt,
accelcon Consulting, Heusweiler
Dr. Harald Schrimpf,
PSI Aktiengesellschaft für Produkte und Systeme der Informationstechnologie, Berlin
Dr. Michael Schulte Strathaus,
F. E. Schulte Strathaus GmbH & Co. KG, Fördertechnik – Dichtungssysteme, Werl
Henrik A. Schunk,
SCHUNK GmbH & Co. KG, Spann- und Greiftechnik, Lauffen am Neckar
Stephan Seifert,
Körber AG, Hamburg (from February 2018)
Dr. Stefan Spindler,
Schaeffler Technologies AG & Co. KG, Herzogenaurach
Dr. Norbert Stein,
VITRONIC Dr.-Ing. Stein, Bildverarbeitungssysteme GmbH, Wiesbaden (until September 2018)
Martin Sträb,
Güdel AG, Langenthal (until June 2018)
Dr. Werner Struth,
Robert Bosch GmbH, Gerlingen (until March 2017)
Bernd Supe-Dienes,
Dienes Werke für Maschinenteile GmbH & Co.KG, Overath (from November 2018)
Dr. Markus M. Tacke,
Siemens Gamesa Renewable Energy, ES-Zamudio (until June 2020)
Christian Thönes,
DMG MORI AG, Bielefeld (from January 2017)
Christian Traumann,
MULTIVAC Sepp Haggenmüller SE & Co. KG, Wolfertschwenden
Dr. René Umlauft,
Rittal GmbH & Co. KG, Herborn (from January 2020)
Michael Unger,
Balluff GmbH, Neuhausen a. d. Fildern (until November 2018)
Dr. Eberhard Veit,
4.0-veIT GbR, Göppingen (from January 2017)
Günter Veit,
VEIT GmbH, Landsberg
Holger Weidmann,
Krautzberger GmbH, Eltville
Dipl.-Ing. Axel Weidner,
MANKENBERG GmbH, Lübeck (from September 2018)
Ingrid Weinhold,
MABA Spezialmaschinen GmbH, Bitterfeld-Wolfen (until October 2018)
Dr.-Ing. Thomas Weisener,
HNP Mikrosysteme GmbH, Schwerin (from September 2017)
Gerd Weissenfels,
IBEDA Sicherheitsgeräte und Gastechnik GmbH & Co. KG, Neustadt (from May 2018)
Carl Martin Welcker,
Alfred H. Schütte GmbH & Co. KG, Köln
Christian Wendler,
Lenze SE, Aerzen
Friedrich-Wilhelm Wentrot,
NABERTHERM GmbH, Lilienthal (until March 2019)
Monika Witt,
TH. WITT Kältemaschinenfabrik GmbH, Aachen
Dr. Manfred Wittenstein,
WITTENSTEIN SE, Igersheim (until July 2020)
Dirk Wittkopp,
IBM Deutschland Entwicklung GmbH, Böblingen (from November 2016)
Dr. Joachim G. Wünning,
WS Wärmeprozesstechnik GmbH, Renningen (until February 2018)
Martin Zaindl,
MAN Truck & Bus Deutschland GmbH, München
Stefan Zecha,
Zecha Hartmetall-Werkzeugfabrikation GmbH, Königsbach-Stein (from June 2019)

Executive Directorate
Executive Director:
Thilo Brodtmann
Deputy Executive Director:
Hartmut Rauen
Members of the Executive Directorate:
Naemi Denz (until September 2019)
Dr. Bernd Scherer
Dr. Ralph Wiechers

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Chairperson of the supervisory board: **Karl Haeusgen,** HAWE Hydraulik SE, Aschheim/München
André Hagen, Frankfurt am Main
Dr. Wolfgang Hastenpflug, Siemens AG, München
Maximilian Schneider, Brückner Group GmbH, Siegsdorf

Central committees, working groups and steering committees

Ad hoc Gruppe Cyber Security
Contact: **Thomas Kraus**

International Accounting working group
Chairperson: **Alexander Jürn**, Basler AG, Ahrensburg
Contact: **Jörg D. Scholtka**

Product-related Environmental Protection worldwide working group
Contact: **Svenja Heinrich**

Accreditation working group
Contact: **Dr. Sarah Brückner / Sören Grumptmann**

Posting of Employees working group
Chairperson: **Philipp Ullrich**, Freudenberg Business Service GmbH, Weinheim
Contact: **Monika Weltin**
Labor Law working group
Contact: **Fabian Seus**

Occupational safety working group
Contact: **Thomas Kraus / Svenja Heinrich**

Chief Digital Officer working group
Contact: **Volker Schnittler**
Managing Director: **Prof. Claus Oetter**

China working group
Contact: **Oliver Wack**

Compliance Management working group
Chairperson: **Meinhard Remberg,** SMS GmbH, Hilchenbach
Managing Director: **Christian Steinberger, Dr. Ralph Wiechers**

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Controlling working group
Chairperson: **Thomas Marotz,** KORSCH AG, Berlin
Contact: **Jörg D. Scholtka**

Corporate Responsibility working group
Contact: **Judith Herzog-Kuballa**

Embargo working group
Chairperson: **Manfred Endres,** Schaeffler AG, Herzogenaurach (until 31.12.2019),
Berta Körte, Oerlikon Textile GmbH & Co. KG, Remscheid (from 1.1.2020)
Contact: **Klaus Friedrich**

Export Financing working group
Chairperson: **Michael Hannig**,
Voith GmbH & Co. KGaA, Heidenheim
Contact: **Dr. Susanne Engelbach**

Intellectual Property Rights working group
Chairperson: **Ingrid Bichelmeir-Böhm**, Schaeffler Technologies AG & Co. KG, Herzogenaurach and **Dr. Stefan Wolke**, thyssenkrupp AG, Essen
Contact: **Daniel van Geerenstein**

Taxes in Large Industrial Plant Manufacturing working group
Chairperson: **Karl Seeleitner**,
KRONES AG, Neutraubling
Contact: **Monika Weltin**

Industrial Security working group
Chairperson: **Bernd Gehring**,
J.M.Voith SE & Co. KG / DSG, Heidenheim
Contact: **Steffen Zimmermann**

Information Security working group
Chairperson: **Rolf Strehle** ,
J.M.Voith SE & Co. KG / DSG, Heidenheim
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Engineering working group
Contact: **Felix Prumbohm**

Customer Service working group
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Contact: **Peter Thomin**

Income Tax working group
Chairperson: **Frank Bub**, SIEMENS AG, München
Contact: **Florian Schmidt**

Market Communication working group
Contact: **Thomas Roggel**

Human Resources working group
Contact: **Sven Laux, Andrea Veerkamp-Walz**

Press and Public Relations working group
Contact: **Holger Paul**

Production working group
Contact: **Felix Prumbohm**

Quality & Management working group
Chairperson: **Dr. Jörg Dehmer,**
Bosch Rexroth AG, Würzburg
Contact: **Dr. Frank Bünting**

Risk Management, Compliance & Auditing working group
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Contact: **Jörg D. Scholtka**

Control Technology working group
Chairperson: **Claus Kühnl**, PHOENIX CONTACT Electronics GmbH, Bad Pyrmont
Contact: **Birgit Sellmaier**

Material Policy working group
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Contact: **Svenja Heinrich**

Tax Compliance working group
Contact: **Florian Schmidt**

VAT working group
Contact: **Ulrich Meißner**

Transfer Prices working group
Chairperson: **Kathrin Grimm**,
KRONES AG, Neutraubling and
Florian Wiebecke,
Brückner Group GmbH, Siegsdorf
Contact: **Monika Weltin**

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GEA Westfalia Separator Group GmbH, Oelde
Contact: **Friedrich Wagner**

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Managing Director: **Bianca Illner**

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Geschäftsführerin: **Bianca Illner**

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SINGULUS TECHNOLOGIES AG, Kahl am Main
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Contact: **Dr. Jörg Friedrich**

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Contact: **Guido Reimann**
Managing Director: **Prof. Claus Oetter**

Platform Economics expert group
Contact: **Volker Schnittler**
Managing Director: **Prof. Claus Oetter**

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ThyssenKrupp AG, Essen
Managing Director: **Dr. Sarah Brückner**

Legal Affairs committee
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Managing Director: **Christian Steinberger**

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Managing Director: **Dr. Ralph Wiechers**

Transport & Logistics working group (large industrial plant manufacturing)
Contact: **Ingo Elste**

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Benedikt Preker, LAMBDA Gesellschaft für Gastechnik mbH, Herten
Valerie Degenhardt, Martin GmbH für Umwelt- und Energietechnik, München
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Dr. Urs Herding, Herding GmbH Filtertechnik, Amberg
Udo Jung, TROX GmbH, Neukirchen-Vluyn
Dr. Nabil Abou Lebdi, Ventilatorenfabrik Oelde GmbH, Oelde
Thomas Rippert, Rippert Anlagentechnik GmbH & Co. KG, Herzebrock-Clarholz
Jörg Straßburger, Viessmann Kühlsysteme GmbH, Hof
Andreas von Thun, BerlinerLuft. Technik GmbH, Berlin
Christian Weiser, A-HEAT Allied Heat Exchange Technology AG, AT-Wien, Tochter: Güntner GmbH & Co. KG, Fürstenfeldbruck
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Power Transmission Engineering
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Christian Wendler, Lenze SE, Aerzen
Managing Director: **Hartmut Rauen**

Valves
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Andreas Dornbracht, Aloys F. Dornbracht GmbH & Co. KG, Iserlohn
Rupprecht Kemper, Gebr. Kemper GmbH + Co. KG, Olpe
Rolf Kummer, Armaturenfabrik Franz Schneider GmbH & Co. KG, Nordheim
Martin Leser, Leser GmbH & Co. KG, Hamburg
Managing Director: **Wolfgang Burchard**

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Klaus Gerhards, WITTUR GmbH, Wiedenzhausen
Udo Hoffmann, OTIS GmbH & Co. OHG, Berlin
Ralph Hübschmann, Hübschmann Aufzüge GmbH & Co. KG, Korbach
Björn Kollmorgen, Kollmorgen Steuerungstechnik GmbH, Köln
Lutz Leurs, Niggemeier und Leurs GmbH (Juniorenvertreter), Bottrop
Wolfgang Nothaft, MEILLER Aufzugtüren GmbH, München
Dr. Meinolf Pohle, Schindler Deutschland AG & Co. KG, Berlin
Hans Sacherer, thyssenkrupp Elevator (CENE) GmbH, Essen
Martin Schmitt, Aufzugswerke M. Schmitt + Sohn GmbH & Co. KG, Nürnberg
Dennis Schönweitz, GS electronic Gebr. Schönweitz GmbH, Rheine
Sascha Seiß, KONE GmbH Aufzüge und Rolltreppen, Hannover
Managing Director: **Sascha Schmel** (until June 2020), **Dr. Peter Hug** (from July2020)

Building Control and Management
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Heinz-Eckard Beele, IMI Hydronic Engineering Deutschland GmbH, Erwitte
Karl Heinz Belser, Johnson Controls Systems & Service GmbH, Leinfelden-Echterdingen
Heike Dirmeier, Oppermann Regelgeräte GmbH, Leinfelden-Echterdingen
Martin Hardenfels, WAGO Kontakttechnik GmbH, Minden
Markus Hettig, Schneider Electric GmbH, Ratingen
Mario Lieder, Johnson Controls Systems & Service GmbH, Berlin
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Stefan Pfützer, SBC Deutschland GmbH, Neu-Isenburg
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Michael van Well, DEOS AG, Rheine
Martin Will, Kieback&Peter GmbH & Co. KG, Berlin
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Managing Director: **Dr. Peter Hug**

Construction Equipment and Plant Engineering
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Chairperson: **Franz-Josef Paus,** Hermann Paus Maschinenfabrik GmbH, Emsbüren
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Prof. Dr. Sebastian Bauer, Bauer Maschinen GmbH, Schrobenhausen
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Fabian Festge, HAVER & BOECKER OHG Drahtweberei andMaschinenfabrik Oelde
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Siegfried Glaser, Glaser FMB GmbH & Co. KG, Beverungen
Werner Glatz, Herrenknecht AG, Schwanau
Marco Guariglia, Liebherr-Werk Biberach GmbH, Biberach
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Klaus Kiefer, LISSMAC Maschinenbau GmbH, Bad Wurzach
Dr. Stefan Klumpp, HAMM AG, Tirschenreuth
Martin Knötgen, Putzmeister Holding GmbH, Aichtal
Christian Krauskopf, Volvo Construction Equipment Germany GmbH, Ismaning
Robert Laux, BOMAG GmbH, Boppard
Martin Lehner, Wacker Neuson SE, München
Dr. Alexey Levin, Dr. Schulze GmbH, Wilnsdorf
Stephan Oehme, FL Smidth Pfister GmbH, Augsburg
Dr.-Ing. Christian Pawlik, JOSEPH VÖGELE AG, Ludwigshafen
Johann Sailer, GEDA-Dechentreiter GmbH & Co.KG, Asbach-Bäumenheim
Erich Sennebogen jr., SENNEBOGEN Maschinenfabrik GmbH, Straubing
Marco Steinberg, Allmineral Aufbereitungstechnikg GmbH & Co.KG, Düsseldorf
Joachim Strobel, LIEBHERR-HYDRAULIKBAGGER GMBH, Kirchdorf
Hans-Jörg Vollert, Vollert Anlagenbau GmbH, Weinsberg
Dipl.-Volkswirt Wolfgang Weber, WEBER Maschinentechnik GmbH, Bad Laasphe
Hermann Weckenmann, Weckenmann Anlagentechnik GmbH & Co. KG, Dormettingen
Dipl.-Ing. Sigurd Weisig, Weisig Maschinenbau GmbH, Alfeld
Egbert Wenninger, GRENZEBACH Maschinenbau GmbH, Asbach-Bäumenheim
Dr. Marcus Wirtz, JÖST GMBH + Co. KG, Dülmen
Managing Director: **Joachim Schmid**

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Erich Kollmar, Gebr. Bellmer GmbH Maschinenfabrik, Niefern-Öschelbronn
Holger Kühn, IST Metz GmbH, Nürtingen
Walter Kurz, LEONHARD KURZ Stiftung & Co. KG, Fürth

Inhalt

Bruno Müller, Müller Martini AG, Zofingen
Dr. Joachim Schönbeck, ANDRITZ AG, AT-Graz
Marcus Tralau, KAMA GmbH, Dresden
Dr. Jürgen Vutz, Windmöller & Hölscher KG, Lengerich
Managing Director: **Dr. Markus Heering**

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Hubert Baren, IPTE Germany GmbH, Heroldsberg
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Dr. Peter Fath, RCT Solutions GmbH, Konstanz
Dr. Joachim Heck, Ehrfeld Mikrotechnik BTS GmbH, Wendelsheim
Christian Knechtel, VON ARDENNE GmbH, Dresden (until June 2020)
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Volker Pape, Viscom AG, Hannover
Dr. Stefan Rinck, SINGULUS TECHNOLOGIES AG, Kahl am Main
Prof. Dr. Wolfgang Schmutz,
ACI AG-group, Zimmern ob Rottweil
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B&R Industrie-Elektronik GmbH, Bad Homburg
Jürgen Siefert, Schneider Electric GmbH, Ratingen
Managing Director: **Dr. Reinhard Heister**

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Andreas Daum, ifm electronic GmbH, Essen
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Dr. Hans-Jürgen Haas, Parker Hannifin Manufacturing Germany GmbH & Co. KG, Chemnitz
Stefan Hänchen, Herbert Hänchen GmbH & Co. KG, Ostfildern
Ingrid Hunger, Walter Hunger GmbH & Co. KG, Lohr / Hunger DFE GmbH, Würzburg
Michael Knobloch, HAWE Hydraulik SE, München
Stefan König, Danfoss Power Solutions GmbH & Co OHG, Neumünster
Dr. Ansgar Kriwet, Festo AG & Co. KG, Esslingen
Heribert Rohrbeck, Bürkert GmbH & Co. KG, Ingelfingen
Frank Seehausen, AVENTICS GmbH, Laatzen
Janfried A. Tirre, Linde Hydraulics GmbH & Co. KG, Aschaffenburg
Daniel Waller, BUCHER HYDRAULICS GmbH, Klettgau
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Jan Drömer, E&K AUTOMATION GMBH, Rosengarten / Nenndorf
Andreas Drost, MLR System GmbH, Ludwigsburg
Ken Dufford, CROWN Gabelstapler GmbH & Co. KG, Feldkirchen
Christian Erlach, Jungheinrich AG, Hamburg
Philipp Hahn-Woernle, viastore systems GmbH, Stuttgart
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Wolfgang Hillinger, DS AUTOMOTION GmbH, AT-Linz
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Ulrich Kreimeyer, FlexLink Systems GmbH, Offenbach
Wilfried Neuhaus-Galladé, J.D. Neuhaus GmbH&Co. KG, Witten
Marc Rieser, VETTER Krantechnik GmbH, Siegen
Franz Schulte, Demag Cranes & Components GmbH, Wetter
Dr. Franz-Maria Wolpers, thyssenkrupp Industrial Solutions AG, St. Ingbert-Rohrbach
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Spokesman: **Jürgen Nowicki**, Linde AG,
Linde Engineering, Pullach
Fadi A. Ghantous, Siemens Gas and Power GmbH & Co. KG – Solutions, Erlangen
Helmut Knauthe, thyssenkrupp Industrial Solutions AG, Dortmund
Helmut Maschke, Air Liquide Global E&C Solutions Germany GmbH, Frankfurt am Main
Bodo Mayer, GE Power AG, Steam Power Europe, Stuttgart
Jörg de la Motte, Bosch Rexroth AG, Lohr am Main
Michael Rzepczyk, SMS group GmbH, Düsseldorf
Dr. Hannes Storch, Outotec GmbH & Co KG, Oberursel
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Homag Group AG, Schopfloch
Gregor Baumbusch, Michael Weinig AG,
Tauberbischofsheim (from May 2019)
Dr. Stefan Brand, VOLLMER WERKE Maschinenfabrik GmbH, Biberach
Frank Diez, Ledermann GmbH & Co. KG,
Horb am Neckar
Markus Hüllmann, G. Kraft Maschinenbau GmbH, Rietberg
Jürgen Köppel, Leitz GmbH & Co. KG, Oberkochen
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Klaus-Jürgen Lange, Anthon GmbH, Flensburg
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Simon Möhringer Anlagenbau GmbH, Wiesentheid
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Managing Director: **Dr. Bernhard Dirr**

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Daniel Sälzer, Pfeiffer Vacuum GmbH, Aßlar
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Brückner Maschinenbau GmbH & Co. KG, Siegsdorf
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Lutz Busch, Kampf Schneid- und Wickeltechnik GmbH & Co. KG, Wiehl
Manfred Hackl, EREMA Group GmbH, Ansfelden
Sandra Füllsack, Motan Holding, Konstanz
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