

GERMANY 

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Cover Picture: The JadeWeserPort in Wilhelmshaven is Germany's only deep-water port and can also handle the world's largest container ships. Furthermore, the town district of the same name is an interesting location for companies.

Photo: ©JadeWeserPort, Wilhelmshaven

Maintaining a Steady Course in the World Trade Order

By Dr Holger Bingmann, President of the German Wholesale, Foreign Trade and Services Federation (BGA)



Container handling at Hamburger Hafen & Logistik AG (HHLA)'s Container Terminal Tollerort

©HHLA/Thies Rätzke

Ten years after the financial crisis we currently face a global trade policy crisis – a massive attack on the rule-based world trade order. We must avoid being drawn into this chaos, instead keeping a cool head and remaining on a steady course. In the first half of 2018 German foreign trade fared well – an outstanding achievement in view of the global risks and ongoing geopolitical uncertainty. Meanwhile, in the background the decline in international incoming orders clearly heralded a turning point. So after a positive first-half performance, we will not be able to maintain the pace of growth in foreign trade in the second six months. Against this backdrop we are cutting our growth forecast for German exports in the current year to 3.5 per cent. The undermining of the international economic order by the US is also a development we are regarding with considerable concern, with the long-term effects of the financial crisis causing additional difficulties. Emerging coun-

tries in particular, but also countries such as Italy, are highly indebted. And at the same time base rates are at record lows. However, in order to prepare for the next crisis, central banks must raise rates in the near future so that they again have scope to shape monetary policy. In this regard the Federal Reserve's interest rate decision makes good

sense as it restores its ability to form monetary policy in the event of future crises.

Export and Import Growth

First let us take a closer look at the figures to date: in the first half our total exports rose by four per cent (to EUR 662.9 billion). And our performance within the EU was es-



"We welcome the efforts currently being made by the German government alongside our European neighbours within the framework of the G20 to ensure stability and preserve the multilateral trading system. We continue to require a stable, predictable and rule-based framework for global trade."

By Dr Holger Bingmann, President of the German Wholesale, Foreign Trade and Services Federation (BGA)

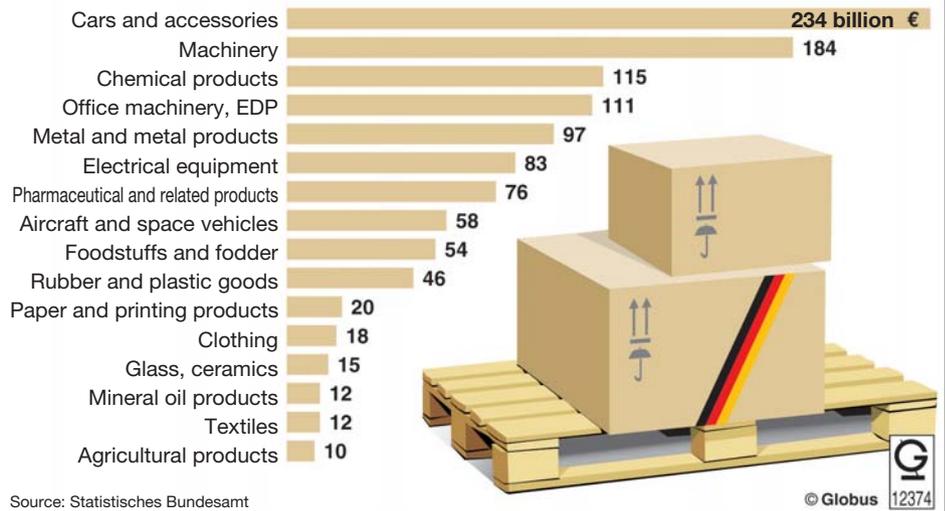
pecially noteworthy, with exports of German goods to other EU member states rising by almost five per cent (+4.8% to EUR 459.1 billion). This underlines the significant economic upturn in our European neighbours. Whilst our exports to France rose by just 1.4 per cent, exports to Italy advanced by 8.6 per cent and to Spain by 3.9 per cent. Even more noteworthy is the performance of German imports, which rose by almost five per cent in the first half (+4.8% to EUR 541.3 billion). At the same time the shadows cast by Brexit can no longer be overlooked: in the first half alone our exports to the United Kingdom fell by almost three per cent (-2.7%) to EUR 42.1 billion. The exchange rate effect and the absence of foreign investments in light of the continuing uncertainties regarding the future basic conditions for bilateral trade are the key negative drivers here. German exports were also very strong outside Europe, though export growth to the American continent was comparatively weak at just over two per cent (+2.2% to EUR 78.3 billion). Exports to the US grew by just one per cent (+0.8% to EUR 56.1 billion). Business with Brazil, on the other hand, was considerably better, with exports to the South American country rising by almost 17 per cent year-on-year (+16.7% to EUR 4.7 billion). At 4.5% (to EUR 125.3 billion) export growth to Asia was markedly stronger than the increase in exports to North America. This demand was driven in particular by China, with German exports to the People's Republic advancing by 10 per cent to EUR 53.3 billion. China is and will remain a key market and a difficult partner. However, the USA remains the most important export trade partner, followed by France. Based on trade volume overall, the People's Republic of China ranks first. Friction in international trade between our most important trading partner China and our most import export market the USA will undoubtedly have a huge impact on us.

A Tough Situation in Individual Markets

Several individual markets are also giving us cause for concern, with the currency crisis and spiralling inflation this summer drawing attention to Turkey's current account and budget deficit. With an inflation rate of 18 per cent (as of August 2018) and foreign debt of almost 70 per cent of GDP it is essential that long-term solutions are found to stabilise the Turkish economy. Although our exports to Turkey grew by 4.8 per cent in the first half, this is a performance that cannot be expected to be maintained. "United in dissent" appears to best sum up German-Russian relations at present – despite the fact that Germany and Russia are of great economic importance to one another. In the first half German goods worth EUR 12.9 billion were exported to Russia, while the value of Russian exports in the opposite direc-

Germany's Export Portfolio

In 2017 Germany delivered goods worth EUR 1279 billion to international markets. These exported goods included:



tion was even higher at EUR 17.5 billion, up 7.4 per cent year-on-year. So trade with Russia remains volatile, with exports having fallen by 26 per cent in 2015 and then by a further one per cent in 2016 before again rising by 20 per cent last year. But here once again the clouds are gathering. And it is not just that – in common with virtually everywhere else – economic forecasts have been downgraded. At the moment the USA is drawing up further sanctions against Russia whose impact, as with those imposed on Iran, is likely to be felt. Unsurprisingly, German-Iranian trade has suffered in advance of the US decision to withdraw from the nuclear deal with Iran and the associated reimposition of US sanctions. German exports to Iran have declined by almost seven per cent (-6.9% to EUR 1.3 billion). And this is probably just the start of the downward spiral. With its maximum pressure policy the USA has made it very clear that it wishes to prevent all economic relations with Iran. So in this regard we welcome the endeavours of the German government and the European Commission to enable German and European companies to continue doing business

with Iran nevertheless. However, the updated Blocking Statute means companies are faced with an impossible question of compliance with which they may even inadvertently be playing into the hands of the US, while the financing of just the payment transactions of trade with Iran continues to cause us considerable concern. The EU should do everything in its power to maintain its sovereignty in foreign policy even if this means creating its own new payment transaction instruments. Countries outside the EU must certainly not be able to dictate to European companies the countries with which they may and may not trade. Accusations that the EU would circumvent the US sanctions with such actions should not deter us. For what is at stake here is the legitimate interest in facilitating bilateral trading relations on the basis of European and international law. Saudi Arabia also remains a tough market in the region. Despite a temporary relaxation the condemnations of recent months have resulted in a 5.2 per cent decline in exports, and we regard the still very tense political relations as posing a considerable risk to economic stability. The recent rise in the oil price illustrates that conflicts could continue to hamper the global economic situation.

The Global Economic Order should not be Called into Question

It is with great concern that we have been observing for almost two years the constant attacks on and steady undermining of the world trade order. An order that has been laboriously constructed over 70 years and which has also played a pivotal role in combating global poverty. So we should keep calm and certainly not raise barriers ourselves. Over the next ten to fifteen years 90 per cent of global economic growth will take



Combined transport makes a key contribution to handling the flow of goods.

Germany's Imports

In 2017 Germany imported goods worth EUR 1034 billion. These included:



place outside the EU. Therefore we must maintain the same course in the global trade order for our wealth and social security! This applies in particular to the rules of the WTO and its ability to amicably settle trade disputes between countries. We are currently witnessing a serious attack on the WTO by the government of the US President Donald Trump. Through the calculated misuse of exemptions in the international rules, such as the additional steel and aluminium tariffs we have seen imposed by the USA, the government of Donald Trump is challenging the very foundations of the global trade order. And in addition, the Dispute Settlement System, which since its establishment in 1995 has resolved over 500 international trade disputes and prevented countless further disagreements, risks becoming unable to act. We welcome the efforts currently being made by the German government alongside our European neighbours within the framework of the G20 to ensure stability and preserve the multilateral trading system. We continue to require a stable, predictable and rule-based framework for global trade. This is vital to ensure that German export-oriented companies continue to have access to international markets. The trade system is certainly not perfect – but it is the best system that governments around the world have been able to come up with over decades of collaboration to work together more effectively on trade issues. Since 1980 the average tariffs have fallen by two thirds. The system has provided stability and predictability in global trade and also withstood the financial crisis. As a result, the world trade system has played its part in creating unparalleled growth and development around the globe. International trade is an important catalyst for progress in particular in areas

such as tackling poverty, health, education and environmental protection.

Punitive Tariffs are not the Way forward

A reform of the WTO must also address grievances arising from unwarranted subsidies and the ineffective protection of intellectual property. Much of the USA's anger with China in this regard is justified. Since joining the WTO in 2001, China has not opened up to the markets as the West expected but has instead practiced a kind of mercantilism. China's state-owned companies, with their often opaque subsidies, are a problem, as is the fact that foreign companies in China must battle daily with onerous regulations and are often required to relinquish their intellectual property in exchange for market access. Unilaterally imposed punitive tariffs are not the way to make progress. For the pursuit of such a sledgehammer policy causes more damage than it yields benefits. The advanced, international division of labour means that the dispute



Freight processing in Neustadt harbour in Bremen

will have a disruptive impact on supply chains worldwide. We need trade agreements, not trade wars. The attacks on the world trade order and the uncertain future of the WTO clearly illustrate the pressing need for Germany to negotiate further bilateral agreements. Such deals are a strategic necessity along with multilateralism. We therefore very much welcome the commitment of the European Commission and the German government to continuing to support free trade agreements and negotiations with new partners. In doing so, the EU clearly illustrates its backing for open markets and the presence of German companies in new, fast-growing regions. Despite all points of contention we must also remain in dialogue with the US, making our presence felt in the country, and cannot simply throw away all that we have built up over the decades. Instead of now erecting our own protective barriers, we should fight for a European free trade agreement with the US. We're still right at the start of the process; however, the necessary political will appears to be present on both sides. One thing is clear: such an agreement is not only urgently required in order to prevent further trade disputes with the US but would also be a growth driver for which we are likely to soon be very grateful. Much will depend on how ambitious the negotiations are.

The Dismantling of Trade Barriers must not Result in more Red Tape

New free trade agreements must take full advantage of the opportunities to remove all unnecessary trade barriers between partners. Yet at the same time the priority must again be trade in goods and services while other themes such as investment and sustainability must not be overplayed. And another important consideration: agreements must be manageable. For small and medium-sized enterprises in particular. It is these companies in particular which must currently deal with far too much bureaucracy when they move beyond the borders of the Internal Market. The loveliest tariff reductions are no use if companies are unable to understand and fulfil conditions. This applies not just to complex rules of origin but also to the manner in which origin must be proven. Maintaining a steady course – preferably with the EU family – would have also been the best course of action for our partners on the other side of the English Channel. The trade dispute with the US is a perfect illustration of the protection that the EU can afford its members. No individual EU member state would be able to deal effectively alone with the US. Together, however, we have an influence on the world economic order and can in all likelihood help to shape it. In this era we regard Brexit as a momentous and catastrophic step. Since the signs are pointing to separation, we now need the best



Germany imported agricultural products worth EUR 31 billion in 2017. Photo: Checking a delivery of mangos

possible solution in order to limit the damage for German companies. The situation is serious and the negotiations have long since passed the critical point and have now come to a standstill. The heads of state and government must now finally bring about a solution. This is now the most important task facing the entire EU and its institutions. A worst-case scenario is unavoidable. There is a genuine danger that both sides face an outcome that neither is seeking, with no agreement reached and serious consequences for Britons and Europeans alike. In the event of such a hard Brexit – i.e. one without a free trade deal – German companies

could face billions in costs. There are only a few weeks to go until 29 March 2019, the scheduled date for Britain's departure! But at the same time it must be remembered that any agreement is subject to approval by the national parliaments – including that of the UK. For many companies there will not be enough time to deal with the complex issues that arise from the process. This also applies to the British customs authorities, which must build up the necessary capabilities for smooth customs clearance. Therefore, in addition to a trade agreement a transition period is urgently required which enables the Britains to remain for at least another two years in the customs union and the Internal Market. Time is of the essence. But an agreement should not be targeted at any cost. For us wholesalers and foreign traders the priority remains the integrity of the Internal Market. No individual country can have anywhere near as much influence on the international stage as the EU as a whole. And yet there is a need to take advantage together of the existing flexibility on both sides. The EU should also not negotiate so uncompromisingly that the link between it and the UK is broken permanently – so that their and our grandchildren can discuss a future return to the European home. Even if the UK will perhaps no longer be in the European Union at the end of the process, it remains our European neighbour.

A Significant Economic Factor

The Federation of German Wholesale, Foreign Trade and Services (Bundesverband Großhandel, Außenhandel, Dienstleistungen e.V. / BGA) is the most comprehensive representative body for Germany's wholesale, foreign trade and services sector. In terms of turnover volume, wholesale and foreign trade is the second-largest sector of Germany's economy. Annual turnover is around €1,256 billion in the wholesale sector. In foreign trade the annual volume is around €1,279 billion in exports and €1,034 billion in imports. The turnover in exports and imports amounts up to two thirds of Germany's GDP. Approximately 125,000 companies with 1.9 million employees are active in Germany's wholesale and foreign trade sector – more than in the entire chemicals industry. A full 65 percent, or two thirds, are members of the BGA. They include large and famous companies like Metro, Thyssen-Krupp and MAN-Ferrosstaal. However, around 98 percent of the federation's members are medium-scale firms.

Import trading companies can be your bridge to the German market. For many foreign companies especially SMEs, it is not easy to get access to the German market. Lack of information, financial risks, and legal constraints may hinder exporters from placing their goods on the German market successfully. At this point, a German importer may help. Exporters can use the diverse and broad services of German import trading companies for marketing, selling and distributing their products on the German market, and even within the EU. German importers act as intermediaries between suppliers abroad and customers in Europe.

www.bga.de



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Improved Options Thanks to Sound Professional Expertise

Training and the continuing development of professional and social skills and proficiencies are today core aspects needed to improve competitiveness in our globalised economy. As part of its strategic programmes to promote sustainable economic growth, Germany is providing support to its partner countries to enable them to train more personnel with urgently required skills to ensure that they can remain competitive over the long term in the worldwide marketplace.

The support being offered by Germany can rely on the assistance that can be provided by German businesses as a result of their considerable expertise with regard to vocational training. The dual vocational training system employed in this country enjoys considerable prestige internationally and the demand for this form of training is extensive throughout the world. The Federal Ministry for Economic Cooperation and Development (BMZ) is currently sponsoring more than 100 vocational training projects in 63 different countries. At present, Germany is by far the largest provider of aid to such projects worldwide. Since 2010, its corresponding funding commitments with regard to partner countries have grown more than threefold. The provided support is focussed on the labour market-orientated development of vocational training systems, the preparation of quality standards and the establishment of training programmes for teaching staff, curriculum planners and school heads. The creation of vocational colleges and technology competence centres also makes an important contribution to the quality assurance of vocational training programmes over the long run.

Successfully implemented projects are ongoing that are relevant to many different business sectors. These range from the needs-based training of specialists in renewable energy and energy efficiency in four of the states of Brazil through the updating of training courses for experts in IT in Uzbekistan, the creation of a regional training centre for health logistics in Rwanda, the renovation, enlargement and furnishing of public and private agricultural colleges and the associated commercial sectors in Togo to the reorganisation of the vocational training system



In October 2016, on the 25th anniversary of the opening of its international office in Tunis, the automotive supplier Marquardt inaugurated a new training centre at a ceremony attended by Zied Laadheri, the Tunisian minister for industry and trade, the German Ambassador, Dr. Andreas Reinicke, and the Governor of Tunis, Omar Mansour. Here Marquardt instructs young trainees in a variety of specialist fields, thus providing them with sound future prospects.

employed by centres in Ethiopia and the supply of technical equipment to these.

A Wealth of Activities in Africa

It is particularly the African continent that is at the focus of the development endeavours of the German government. A survey commissioned by the Federal Ministry for Economic Cooperation and Development (BMZ) has shown that a central need is to increase productivity and generate more workplaces in Africa. When the results of the survey were publicly presented in September 2017, Dr. Gerd Müller, the Minister for Economic Cooperation and Development stressed: "It would be possible to create 20 million jobs. Both Europe and Africa must do more to achieve this goal. It is the responsibility of Africa to invest more in its people, to do more to impose democracy and the rule of law, to promote businesses and fight corruption. Europe, on the other hand, must cease to exploit Africa, employ fair trade methods, invest more and ensure improved value generation in our neighbour continent to the south."

The creation of jobs is one of the priorities of the concept for a 'Marshall Plan' for Africa initially outlined by Müller in January 2017. Of the more than 100 transformation concepts it summarises, many are now already at the implementation stage. During

the G20 Conference on Africa in Berlin in June 2017 and based on German development concepts, partnerships aimed at reform were initiated with Ghana, Côte d'Ivoire and Tunisia. In the case of Côte d'Ivoire, for example, €100 million in funding is being supplied to finance renewable energy and energy efficiency projects and as a result measures for the training of personnel in new vocational fields have also been kick-started.

In Tunisia, the partnership activities can be based on projects that have already proved successful. Knauf, a German construction material supplier, has already provided



Professional Training Solutions is known as reliable partner in terms of training and education solutions for international and national companies in Africa.

training to some 800 Tunisian nationals in skilled manual trades and more than 100 of these have already established their own businesses. During the most recent visit of Minister Gerd Müller to this North African reforming country in October of this year, the plans for cooperation were augmented. A training and job package was arranged with German businesses and organisations active in the textile, automotive and tourism sectors as a result of which some 7500 additional workplaces are to be generated in the automotive industry alone.

There are plans for similar partnerships with other Maghreb countries and with Egypt. The Land of the Pyramids had already entered into an agreement in October 2017 whereby collaboration in the fields of education and training was furthered by means of an education pact. As a result of a strategic vocational training alliance with the German company Siemens, for example, a new training centre has been constructed in which 5500 Egyptian specialists will learn skills in the areas of engineering, electrotechnology and automation techniques. To date, some 50,000 Egyptian vocational college graduates have benefited from the German involvement here. And more than 100 vocational colleges have been upgraded. As Minister Müller pointed out: "German investment is now not only securing jobs in this country but also throughout the world. Our businesses are aware of their corporate

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Within the framework of the collaborative "Training Prospects for Refugees" project, Volkswagen AG in Wolfsburg is working in tandem with partners to provide refugees with the opportunity to gain a meaningful professional qualification.

responsibilities and are making a significant contribution to the training of specialist personnel. This is something we will continue to promote and develop as part of our Marshall Plan for Africa."

Through its Fachkräfte für Afrika (or 'Specialist personnel for Africa') scheme, the Mechanical Engineering Industry Association (VDMA) is providing support to its members with interests in Africa and with the help of funding contributed by the BMZ, it is collaborating with partners in Botswana, Kenya

and Nigeria to set up vocational training centres. These centres will employ the dual vocational training system to turn out specialists in the fields of industrial engineering, electrotechnology, electronics and mechatronics. Here, African private businesses are to play a central role. The training programmes will thus be designed to meet the needs of the local economy. It is hoped that more than 1000 individuals will be able to gain the necessary qualifications over the next three years.

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YOUR GATEWAY

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Industry Responds to Skilled Worker

By Silvia Niediek (iMOVE)



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The problem is even more pronounced in individual regions. In North America, it is the second most important risk factor and in China and Asia / Pacific even occupies the top spot.

German Companies Benefit from In-House Training

In German society there is a long-standing and well-established tradition of company-based training to help overcome shortages of skilled workers. Around 20% of all companies – equivalent to 428,000 – provide training; the majority of these are small and medium-sized companies. In Germany, vocational training is not organised and financed solely by the state, but the private sector is also involved, and even covers the majority of the costs. However, 70% of the funding invested is recouped through the productive contributions of trainees during the training.

The German economy generates €7.7 billion annually for vocational education and training compared to just under €5 billion from public expenditure. The costs to companies are incurred largely from creating the conditions required for training in the workplace and from paying for the training remuneration which trainees receive. This, on average, is approximately €880 gross per month and enables a modest standard of living.

The companies provide training each year for over 500,000 new trainees and almost 70% of these are subsequently offered employment and taken on. Average net costs

The international shortage of skilled workers is hampering German exports and investment abroad. In Germany, the economy is actively engaged in responding to this shortage. It is involved in training qualified employees in their companies and is benefiting from this in numerous ways. The establishment and expansion of training structures across the world means that the group of those benefiting can be significantly expanded. To support this, German industry and international stakeholders are able to draw upon collaboration with the German education and training industry and its network platform iMOVE.

The international shortage of skilled workers is placing the German economy's commercial activities abroad at risk. One third of German companies with export interests refer to the problem of finding suitable personnel for their company as risky. These are the results of the AHK World Business Outlook Survey conducted in spring 2018 which reports on the responses of more than 5,100 German companies worldwide.

Despite the financial crises and high levels of risk, global economic growth is certainly

robust in overall terms, and German companies are looking to the future with confidence. However, the shortage of skilled workers is still a significant risk factor and, in the international analysis, comes in third position behind economic policy and demand.



Training on the maintenance of electronic devices

Shortage with In-House Training

for companies over the course of the 3-year training occupation amount to around €11,000 – however the net costs reduce from year to year while the level of training productivity continues to grow. Even in the training phase, just under one third of companies managed to achieve a positive gross margin.

Complex Benefits for Companies

The advantages enjoyed by companies providing the training are varied. Those providing training make cost savings in terms of job advertising, recruitment and the induction of trained skilled workers, and they are able to counteract poor hiring choices and staff turnover. Those companies also gain precisely the expertise they need because the training regulations provide sufficient scope for delivering hard and soft skills which are specific to the company. Short-term employee absenteeism, in the case of illness or holidays, can be covered by trainees in a cost-effective manner and without complications.

Internally-trained skilled workers develop a high level of identification with the company which has trained and supported them. Those providing training therefore not only have young people “breathing new life” into their companies, but are also ensuring the future of their company in the best way possible by training qualified successors ready to replace those skilled workers who are about to retire. Last but not least, they image of their company is enhanced: Training companies demonstrate a particular social responsibility and generally therefore also enjoy a certain level of respect.

Cooperation with German Training Providers

In order to respond internationally to the challenge of the skilled worker shortage, German companies which are active abroad are cooperating in increasing numbers with an estimated 22,000 German training providers. These providers have a precise understanding of the requirements of qualified training and continuing education under international standards and are providing their clients with tailored solutions to meet their respective requirements.

Today, the export of products and services in the area of vocational training and continuing education has become an established component of the German education and training industry. Services provided by this growth sector include curriculum planning, training of trainers, the planning and equipping of educational establishments, teaching materials and much more.



Nurse assistant training in Delhi

iMOVE: Training – Made in Germany

iMOVE in the Federal Institute for Vocational Education and Training is the central network platform for the initiation of cooperation projects in the education and training industry. As the export initiative of the Federal Ministry of Education and Research (BMBF), it supports the German economy which seeks to initiate and develop international training measures to help open up new markets.

However, iMOVE also provides access to German training providers for international stakeholders who value the successful German approach to training. Those seeking information are able to access services provided free of charge via the iMOVE website, which is available in a range of different languages. This includes access to the iMOVE provider database containing profiles and contact information of around 250 German



Seamstress training in India

training providers as well as the opportunity to post an individual request in the iMOVE B2B marketplace.

www.imove-germany.de/english



Training of electricians

Producing the Future: Opportunities

By Carl Martin Welcker, President of the Mechanical Engineering Industry Association (VDMA)

The German mechanical and plant engineering sector is in rude health. It is the backbone of industry in Germany and a vital supplier of leading-edge, premium-quality technology for many international customers.

With a labour force of 1.35 million, the mechanical and plant engineering sector is the biggest industrial employer in Germany and one of the leading branches of industry with a turnover of EUR 226 billion in 2017. It is with good reason that the mechanical engineering industry is the leading employer of engineers and highly attractive to qualified specialists. And this success hasn't been achieved by chance. The mechanical and plant engineering industry is at the heart of development, supplies and uses the very latest technologies and delivers solutions for the myriad of challenges of our age. Thanks to its innovation culture, which is admired worldwide, ideas become products.

Taking Advantage of Opportunities

The breadth of potential applications is a huge opportunity for the mechanical engineering industry. There is scarcely an area of our living environment that is not shaped by technology from the mechanical and plant engineering sector. In addition, collaboration and the capacity for integration are deeply embedded in the industry's DNA. Accordingly, the combination of research, science and industrial practice, within the framework of collective industrial research, for example, has resulted in unique innovation networks. The outcomes are premium-quality products and satisfied



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Thyssenkrupp is among the world's leading suppliers of manufacturing facilities and production equipment for the automotive industry.

the mechanical engineering industry is well placed to deliver. It sits at the data source for smart production, because machines and plants are generating the key information for Industry 4.0. And technology is one side of digitisation. The conception of new business models and the implementation of Work 4.0 are further key aspects to be shaped. For the transformation of the world of work in particular is relentless. Yet the individual remains centre stage. In the future they will continue to develop, control and steer machines. Moreover, without qualified employees it will not be possible to success-

And the VDMA stands ready to play its full part, working in tandem with policy makers and with schools and universities. Here it is worth mentioning the many successful projects of the Nachwuchsstiftung Maschinenbau (Youth Education and Development Foundation). The Foundation



“Digitisation represents a clear opportunity for the mechanical and plant engineering industry. Because it requires smart, individual, efficient, swift and networked solutions. And the mechanical engineering industry is well placed to deliver.”

Carl Martin Welcker,
President of the Mechanical Engineering Industry Association (VDMA)

customers, with Germany as a location benefiting. Keyword opportunities: digitisation represents a clear opportunity for the mechanical and plant engineering industry. Because it requires smart, individual, efficient, swift and networked solutions. And

fully sustain Germany's technological leadership of the mechanical and plant engineering industry and its leading position in international markets. Education and qualifications are bound to play a pivotal role and it is now time to set the right course.

German Mechanical Engineering-Figures 2017

Turnover	bn EUR	226.2
Turnover per employee ¹	1,000 EUR	219.2
Production	bn EUR	214.0 e*
Exports	bn EUR	168.1
to EURO-countries	bn EUR	47.8
Imports	bn EUR	69.4
Domestic sales ²	bn EUR	45.9 e*
Domestic market supply ³	bn EUR	115.3 e*
Export share ⁴	percent	78.6 e*
Import share ⁵	percent	60.2 e*
R & D expenditure	bn EUR	5.8

1) Calculated with average number of employees per year
2) Production minus exports
3) Production minus exports plus imports
4) Exports in percent of production
5) Imports in percent of domestic market supply

e*) estimated

Sources: ifo-institut, Statistisches Bundesamt, Stifterverband der deutschen Wissenschaft, VDMA

The VDMA represents more than 3,200 mostly medium-sized companies in the mechanical and plant engineering sector. With over 1.35 million employees and sales of around EUR 226 billion (2017), the sector is the largest industrial employer in Germany and one of the leading German industrial sectors.

and Challenges

accompanies and supports vocational training across the mechanical engineering industry and focuses on the development and implementation of practical and sustainable projects with general and vocational schools and companies.

Shaping Changes

At the same time there are constant challenges to the strength of the mechanical and plant engineering industry outlined earlier. For world events are shaped by dynamic and constant changes that are more abundant and complex than ever before. And there are a wide range of themes that relate to mechanical engineering: for example, the industry requires the right framework conditions to successfully progress, in particular with regard to federal policy and in the context of ever tougher international competition.

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For the world's largest high-voltage direct-current (HVDC) transmission line in China Siemens worked in tandem with Chinese partner companies to develop HVDC transformers which are among the most powerful in the world with a capacity of 587 megavolt-ampères.

Also vital for Industry 4.0 is a seamless EU internal market for goods and services. Only in this way can Europe position itself as an attractive global market, for the EU and the internal market are the bedrock for the success of European industry. Against this backdrop, nationalism and isolationism represent a growing danger to industry and ultimately pose a threat to jobs and the level of prosperity for all.

In this regard, the VDMA requires EU policy makers to adopt a practical approach when drawing up legal requirements and guidelines. Red tape must be proportionate and must not hinder companies or conflict with their business reality.

dispensable role played by free trade in our lives and the extent to which our economic power and therefore our wellbeing depend on it. Without free trade we would not be able to export the products manufactured in this country ? and millions of jobs would be lost. Furthermore, without unrestricted commerce it would not be possible to raise living standards in many countries around the globe.

In short, the future both offers opportunities and poses challenges – and the mechanical engineering and plant industry is well placed to prosper.

www.vdma.org

©SMS group



The revamped SMS Concast continuous casting machine in full operation at Hyundai Pohang, South Korea.

In the light of digitisation and cross-company data exchange, issues pertaining to data and legal compliance must be clarified. In addition, it is necessary to extend the necessary infrastructure for digital networking and to factor in rural areas. It is here that many of the hidden champions are found which produce hi-tech, export worldwide and of which we are justifiably proud.

Support Free Trade

Another key theme for the mechanical and plant engineering industry is free trade. With an export ratio of around 78%, its importance for the sector is clear. Against this backdrop, the VDMA cautions against protectionism and a spiral of punitive tariffs, for in such a scenario all parties would ultimately suffer.

To raise public awareness of the importance of unrestricted commerce, the VDMA has launched the "Thank You, Free Trade" campaign. This initiative illustrates the in-

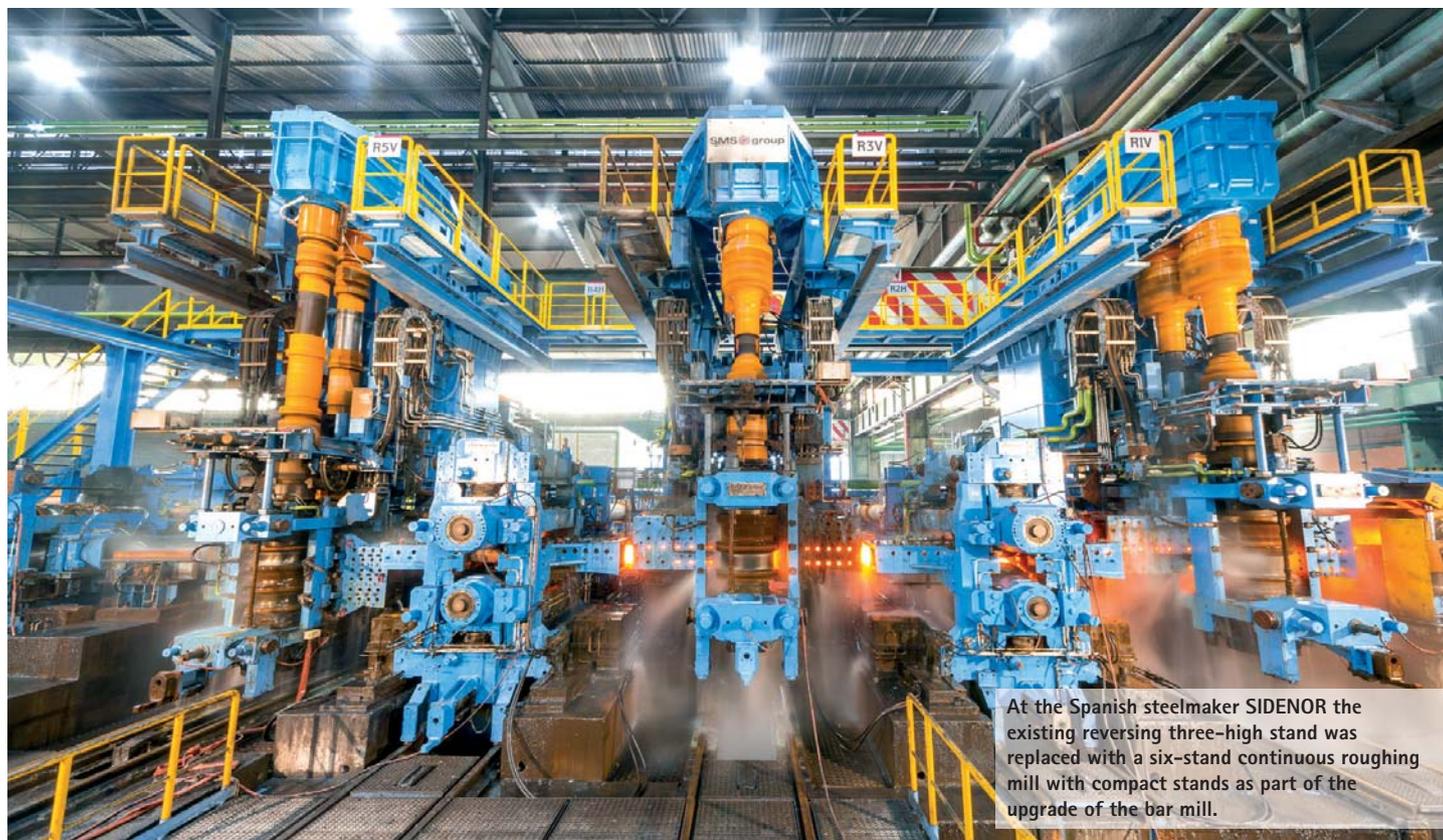
German Machine Exports by Region 2017

	bn EUR
Europe	95.2
EU-28	77.9
EURO-19	47.8
Asia	39.7
North America	19.5
Latin America	7.2
Africa	4.4
Australia/Oceania	2.1
Total	168.1

Sources: Statistisches Bundesamt, VDMA

Large Industrial Plant Manufacturing

By Klaus Gottwald, VDMA Large Industrial Plant Manufacturers' Group



At the Spanish steelmaker SIDENOR the existing reversing three-high stand was replaced with a six-stand continuous roughing mill with compact stands as part of the upgrade of the bar mill.

Although the members of the VDMA Large Industrial Plant Manufacturers' Group (AGAB) reported an overall decline in orders in 2017, a breakdown reveals significant increases in key segments of large industrial plant manufacturing. Based on an adaptation of the product and service portfolio to the changed market conditions, the development of new business models and the opening-up of entirely new business fields, companies in the sector are looking at the current financial year with justified optimism. As well as individual major projects, there is a particular focus on modernisations and service orders.

A Decline in New Orders in a Tough Market Environment

The members of the VDMA Large Industrial Plant Manufacturers' Group (AGAB) booked orders valued at EUR 17.8 billion in 2017, a year-on-year decline of 6% (2016: EUR 18.9 billion). In light of this decline it seems inappropriate to speak of a change in trend. However, there are clear signs that the general downward trend in recent years is not continuing. The current weakness of orders is exclusively attributable to the politically motivated decline in the market for thermal power stations and a dearth of mega contracts. In key subsectors such as chemical plant manufacturing, metallurgical plant and rolling mill manufacturing and paper plant manufacturing, however, significant increases were booked.

In the year under review domestic orders rose by 3% to EUR 3.8 billion (2016: EUR 3.7 billion). This stabilisation stemmed pri-

marily from growing orders books in metallurgical plant manufacturing and electrical engineering as well as the ever more significant business in modernisations, services and spare parts. Export demand fell by 8% in 2017 to EUR 14 billion (2016: EUR 15.2

billion). The falls in Africa and the Middle East were particularly sharp. By contrast, large industrial plant manufacturing in the Asia-Pacific region posted growth of 60%. This upswing is largely due to strong demand from China in particular and individual major orders from south-east Asia. Members of the AGAB also reported strong orders from the USA, Russia, Great Britain and India.

Strong Competition in Large Industrial Plant Manufacturing

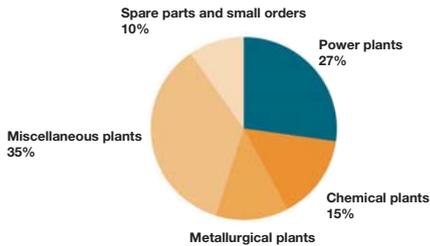
There has been a marked increase in pressure in the large industrial plant manufacturing sector in recent years which is set to continue in the medium term. A recent VDMA survey reveals that China is considered to be the strongest international rival of Germany by some distance. 62% of the group members polled regard Chinese plant manufacturers as direct competitors. Next

	2016	2017	Change 2017/2016
Order intake (total)	18.9	17.8	-6 %
Domestic orders	3.7	3.8	3 %
Foreign orders	15.2	14.0	-8 %
thereof			
Industrialized states	4.1	4.5	8 %
Asia-Pacific-region	2.2	3.5	60 %
Easter Europe and CIS	1.8	1.8	1 %
Near and Middle East	1.8	1.4	-22%
Rest of the world	5.4	2.9	-46%
Sales	22.8	21.2	-7%
Export share (in %)	80.7	78.9	

Source: VDMA Large Industrial Plant Manufacturers' Group

Drives Change

Incoming orders by segments 2017



Source: VDMA Large Industrial Plant Manufacturers Group

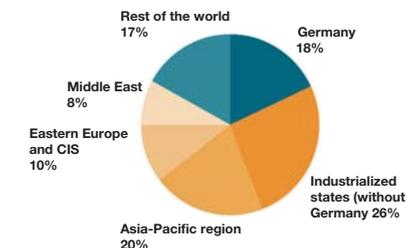
are South Korea and India, lagging some distance behind. In addition, companies from Europe, the USA and Japan play an active role in the market, in particular when it comes to technologically sophisticated and complex projects.

At the same time, demand structures have fundamentally changed in some sub-sectors of large industrial plant manufacturing. Examples include the paper industry, where classic large plants for the manufacture of graphic papers are becoming obsolete in the digital era, and the energy sector, which is being affected by growing decentralisation and networking. Here manufacturers of large gas and steam turbines are struggling with massive surplus capacities while suppliers of smaller and flexible solutions are enjoying success. Survival in this competitive and volatile environment requires adaptability and flexibility as well as comprehensive technical, planning and legal know-how.

New Business Areas and Models are Coming to the Fore

The VDMA's large industrial plant manufacturers are reacting to the accelerating pace of change in various ways. They are adapting their product and service portfolios to the new market situation, developing new business models or tapping into entirely new business fields. In this regard the service business frequently plays a key role. In the power station manufacturing sector, for in-

Incoming orders by regions 2017



Source: VDMA Large Industrial Plant Manufacturers Group

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Thanks to cost-efficient and environment-friendly technology, the TwinDrum pulper system offers excellent ink removal and gentle breaking down of fibres in the stock preparation process of the paper production.

stance, the vast majority of contracts for plants are now awarded with a long-term service contract. It is by offering such service packages that the large industrial plant manufacturing sector has succeeded in stabilising its sales. In addition, it is easier for

companies to gain insights into their customers' specific needs and gain impetus for research projects. In 2017, services accounted for 16% of the total sales of the VDMA's large industrial plant manufacturers. And in light of the advanced age of many industrial

©thyssenkrupp Industrial Solutions AG



With state-of-the-art production processes cement plants conserve resources and reduce their environmental impact, guaranteeing their operators optimum productivity and cost-effectiveness.



©SMS group

The new state-of-the-art heat-treatment line supplied by SMS group to TimkenSteel has the capacity to produce 50,000 tonnes of bars and tubes for the automotive, industrial and oil and gas industries.

large-scale project business need to be tailored to the new framework conditions. Flexibility and speed are the new trump cards.

Growing Confidence in the Large Industrial Plant Manufacturing Sector

Despite the overall decline in orders, a significant recovery is underway in some subsectors of large industrial plant manufacturing. In segments such as chemical plant manufacturing, metallurgical plant and rolling mill manufacturing and paper plant manufacturing, significant increases were booked in 2017 and the prospects are also good for 2018. It is clear that the intensive efforts of the large industrial plant manufacturing sector to tap into new business fields in services, plant operation and digitisation are increasingly paying dividends. Additional drivers are attractive raw material prices and a dynamic global economy.

The industry is confident that this positive trend will also continue beyond 2018. The economic outlook remains favourable. In addition, the use of Industry 4.0 technologies is set to improve efficiency in project execution, while digital products and services will boost sales. Even if most of the contracts are small, the cumulative potential is nonetheless considerable. According to a current VDMA study, the industry expects digitisation to have a positive impact on revenues and estimates that margins in the large industrial plant manufacturing sector could increase by up to 10% over the next three years.

So even if the various political and economic risks must not be disregarded, there is reason to be optimistic in the medium term. In addition to individual major projects, customers are mainly focused on modernisations and service contracts. The VDMA's large industrial plant manufacturers possess the necessary expertise to undertake most of these different project types and are constantly improving these capabilities.

www.vdma.org/large-industrial-plant

plants this figure is set to rise to 20% in the near future.

A key role is being played by digitisation. Accordingly, large industrial plant manufacturers are now offering various services within the framework of predictive maintenance or establishing digital service platforms. In addition, the processing and analysis of huge amounts of digital data is yielding further business opportunities for large industrial plant manufacturers. This is also likely to have an impact on use models. Contract types such as "Performance Based Contracting" and transparent pricing models such as "Pay per Use", whereby customers only pay for services requested, will play a greater future role in the large industrial plant manufacturing sector.

The introduction of digital processes and business models in large industrial plant manufacturing is an evolutionary process which cannot be carried out in a single step. What is required, rather, is a bundle of measures ranging from the adaptation of companies' processes and structures via the development of networks and digital products to the introduction of new communications solutions between customers and plant manufacturers. There are no panaceas. Companies must come up with individual solutions that take into account the specific business environment and the respective customer requirements.

Innovative Methodology Makes the Difference

To stay ahead of the game the members of the VDMA Large Industrial Plant Manufacturers' Group strive to constantly improve their

methodological knowledge, in the areas of risk and contract management, for example, and also to offer their customers tailored financing, without which many projects today cannot be carried out. In addition, they are increasingly employing new, agile project and process management methods. These methods represent an alternative to traditional project management approaches above all for development and digitisation projects which do not have precise goals and with some open product functions. In addition, segments of the industry are turning to so-called integration flow management and bionic approaches. The use of these methods can streamline project processes, for instance by remodelling work packages and arranging them appropriately. Positive experiences from sectors such as logistics and medical technology illustrate the potential gains. In these sectors lead times have been cut by up to 10%, achieving savings in the double-digit million euro range.

In addition to the traditional mega projects, small- and medium-sized projects are again coming to the fore in some segments of the large industrial plant manufacturing sector. This development is being driven by changing customer requirements. Modular plants equipped with digital interfaces and capable of flexibly manufacturing small batch sizes are in demand in the steel industry, the wood processing industry and the energy sector. The large industrial plant manufacturing sector must adapt to these new market requirements. This means, in particular, that management processes designed for

Further information is contained in the VDMA Large Industrial Plant Manufacturers' Group's status report entitled "Into the future, with innovation and the capacity to adapt!", featuring detailed analysis of the business situation and the prospects in individual segments of the large industrial plant manufacturing sector. This report is also available in English.

The Group is preparing a benchmarking study on digital business models in the international large industrial plant manufacturing sector in conjunction with the consulting firm PwC. The results of this study will be published in 2019.

To request a copy please email ina.dittrich@vdma.org.

An Innovative Sector Spearheading Digitisation

The electrical engineering and electronics industry is spearheading digitisation, which is set to shape the future of the economy and society. The current focus is on artificial intelligence, the fifth generation of cellular mobile communications, blockchain technology, brain-computer interfaces, gesture control and eye tracking. The day will come when all of these technologies are in everyday use, a time that is likely to arrive sooner rather than later given the rapid pace of technological progress. And the electrical engineering and electronics industry is playing an enabling role.

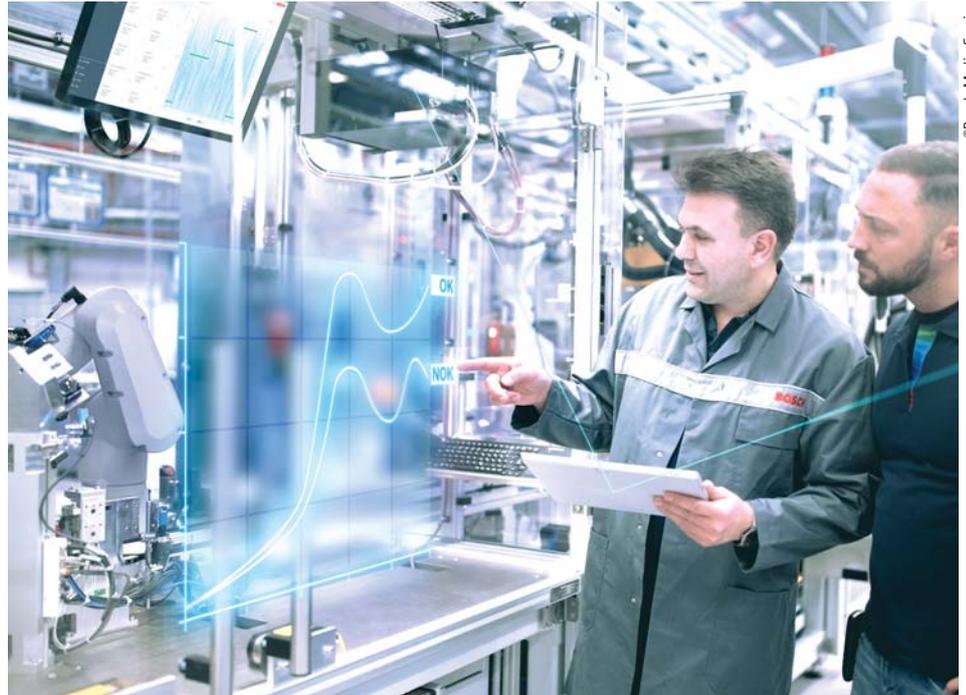
ZVEI: Manufacturers' Association of Germany's Most Innovative Industry

The ZVEI - German Electrical and Electronic Manufacturers' Association promotes the industry's joint economic, technological and environmental policy interests on a national, European and global level. Founded in 1918, the Association provides a voice for the sector to policy-makers and society. Headquartered in Frankfurt am Main, it has offices in Berlin, Brussels and Beijing. The ZVEI represents more than 1,600 companies, mostly Small and Medium-sized Enterprises.

The sector has round about 881,000 employees in Germany plus 736,000 employees all over the world. In 2017 the turnover was approximately Euro 191 billion.

The electrical and electronics industry is the most innovative industry sector in Germany. One third of the industry's sales are based on new products. Every third innovation in Germany's manufacturing sector stems on solutions of the electrical and electronics industry. Every year, the industry spends around Euro 17.2 billion on research and development, which corresponds to more than 20 percent of all industrial R+D spending.

The electrical industry covers a very broad and dynamic product portfolio, everyone comes in contact with daily. It is the leading sector of digitisation and pacesetter of technical progress. As a driver of innovation, the electrical industry is actively shaping digital change in the five leading markets of industry 4.0, energy, mobility, health and buildings as well as in the fields of cybersecurity, society & environment and education & research.
www.zvei.org



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Under the slogan "Factory of the future. Now. Next. Beyond" Bosch presented solutions for the connected factory at Hannover Messe 2018.

The sector is experiencing its strongest growth since the financial crisis in 2010 and 2011, with the turnover of EUR 191 billion in 2017 beating the record set in 2007 by EUR 8 billion. Exports were at a record level for the fourth consecutive year.

And at the same time all specialist areas performed well, with automation – the largest specialised segment – posting an approximately eight per cent increase in turnover. Sales of electronic components advanced by 7.6 per cent. The entire consumer goods segment posted 4.4 per cent growth, with energy technology and medical technology reporting respective increases of 7.4 per cent and 1.7 per cent.

The aggregate fixed asset investment of electrical engineering and electronics companies in Germany in 2017 amounted to EUR 6.6 billion, a ten per cent year-on-year increase. Spending on research and development rose by six per cent to EUR 17.2 billion, which means that the sector again accounted for one fifth of all private R&D expenditure.

The ZVEI is driving on digitisation in all sub-sectors. This entails particular challenges for microelectronics, for without effective microelectronics digitisation is not possible. In view of the fiercer competition from

Asian suppliers in particular, the German electrical engineering and electronics industry champions a new German-European industrialisation strategy.

The sector is focused on the essential cross-cutting issue of cyber security. All the leading markets defined by the ZVEI – from Industry 4.0 through energy and buildings to mobility and health – have established cyber security initiatives. To raise awareness of this issue, the ZVEI has worked with the BSI (Federal Office for Information Security) to draw up a security situation picture for the German electrical industry. The survey has highlighted the importance of cyber security: in the past two years, 60 per cent of the companies surveyed have been affected by trojans and ransomware. The ZVEI also considers it noteworthy that in both the office sector and production, software vulnerabilities are a common cause of incidents.

The Alliance for Cyber Security, headed up by the ZVEI, is dedicated to the task of improving cyber security. With over 2,100 members, it is the largest information and exchange network in Germany and strives to ensure that cyber security – as well as environmental protection, compliance and CSR – is always included in corporate policy guidelines. In addition to the protection of



©Weidmüller

The electrical technology company Weidmüller has teamed up with other companies in the Robotation Academy in the Chinese city of Foshan to develop innovative connection solutions for supplying robots with power, data and signals.

office infrastructure and information technology, the ZVEI and the Alliance for Cyber Security are also focused on the protection of production infrastructure and industry-specific information technologies (industrial security).

The Burgeoning Importance of Industrial Security

With the advent of the Internet of Things and the growing level of networking and automation in the industry, industrial security is becoming a key consideration of manufacturing industry. This encompasses the safeguarding of industrial products and their development, production and operation. For the security and integrity of the environment from which a product originates is equally important for the security of a product. Industrial security takes particular account of the "mission-critical" effect of all

components. In industry, a computer malfunction generally results in a production facility coming to a standstill – with very high costs.

Effective protective measures for companies and products are essential for the implementation of data-based business models and new collaborations and for ensuring reliability in an era of global value-creation relationships.

For Joint European Action

Greater awareness of cyber security not only protects private users and companies, it is also a locational factor. In light of the growing international competition between the USA, China and Europe/Germany as a result of digitisation, it is important that Europe aims to create a global level playing field. The purpose of the "European Cybersecurity Package" published by the EU Com-

mission in September 2017 is to ensure that a harmonised cyber security certification framework is developed.

The ZVEI explicitly supports the goal of treating cyber security in a harmonised manner and as a priority. In the Association's opinion the firmly established declaration of conformity by producers would represent a suitable cost-efficient and flexible approach.

A common European approach increases the demands on cyber security and fosters innovation and the development of user-friendly technology. A new cyber security framework should serve as a level playing field for all. This strengthens the competitiveness of Europe and can help European companies to become the global leading provider of security – and of industrial security in particular.

Support for "Artificial Intelligence"

The ZVEI champions a common European strategy for artificial intelligence. AI is a key technology of digitisation which both creates options for new data-centric business models and increases the productivity of companies, for example through the predictive maintenance of machines and plant and improved quality assurance. In addition to the AI Master Plan agreed by the German government this July, the ZVEI has drawn up a ten-point plan the recommendations of which include strengthening research and development aimed at market-ready implementation and supporting small and medium-sized enterprises in using AI applications.

At the start of 2018 the ZVEI also founded the 5G Alliance for Connected Industries and Automation (5G-ACIA), which includes representatives of the traditional automation and manufacturing industry and leading organisations from the ICT sector. Among the members are international technology suppliers from the electrical engineering and el-



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Innovative software solutions provide the necessary connectivity for Industry 4.0. Bosch's new Nexeed software portfolio pools software and services for production and logistics. Using sensors the product independently stores its position and condition via the mobile radio network in the cloud. This means every product and every load carrier can be retraced by logisticians.



©ZVEI – Barbara Geising

Tomorrow's smart home will be even more intelligent, dynamic and individual as a result of comprehensive networking and the introduction of other artificial intelligence technologies.



Smart traffic engineering solutions help to ensure more efficient traffic management, reduce accidents and cut emissions.



Siemens is working with the multi-technical service provider SPIE to roll out EV charging infrastructure.

electronics and the telecoms industries and users from the mechanical engineering and chemical industries. The academic side has been bolstered by the Korea Electronics Technology Institute (KETI) and the Technologie-Zentrum Informatik und Informationstechnik (TZI – technology centre for information technology) at the University of Bremen.

The new 5G mobile communications standard is of great significance to industry. The paramount objective of the 5G Alliance for Connected Industries and Automation (5G-ACIA) is to ensure the best possible applicability of 5G technology and 5G networks for connected industries, in particular the manufacturing and process industries. 5G-ACIA will ensure that the interests and particular aspects of the industrial domain are adequately considered in 5G standardisation and regulation.

Digital Solutions Enable Efficient Climate Protection

The modern and efficient technologies of companies in the German electrical engineering and electronics sector offer advances in the area of climate protection. Equipment and services and digitisation are playing a key role in dealing with current global challenges.

With the digitisation of the energy transition in Germany smart networks will play an increasingly pivotal role in the energy system, new business models will evolve and processes will be optimised with the help of digital solutions. The digitisation of metrology, for example, will improve the efficiency of energy use and help synchronise the growing proportion of decentralised and fluctuating energy production.

In the buildings sector the smart home of tomorrow will be even more intelligent as a result of comprehensive networking, self-learning functions and the introduction of other artificial intelligence (AI) technologies, adapting more dynamically to user needs and significantly improving energy efficiency. There is particular scope for efficiency gains from the self-learning and more dynamic

control of the interplay between smart homes and the smart grid.

Mobility as a Challenge for Society

Safe, efficient and low-emission mobility can also only be achieved through the use of electrical and electronic solutions. The systems and digital solutions of the German electrical engineering and electronics industry are spearheading the further development and modernisation of individual means of transport and of the transport system as a whole. Opportunities for climate protection, for example, lie in systematic electrification through the development of a public charging infrastructure for alternative vehicles such as the overhead power line hybrid lorry. Through the networking of vehicles future systems will exchange information bilaterally with other vehicles, with traffic lights and with traffic control systems (Car2X). This has the potential to improve safety, increase efficiency and enhance environmental sustainability.

In addition, the healthcare sector is also set to change radically over the coming years.

Through digitisation and networking medical technology is making a key contribution to the emergence of new treatment procedures and processes. E-health applications such as telemonitoring and teleconsultations are opening up new avenues in healthcare provision for doctors and patients. Furthermore, digital technologies can make an important contribution in the event of an emergency, because telemedicine serves as a kind of early warning system. Even in the case of chronic illnesses acute treatments are increasingly being replaced by long-term care processes in which the patient is actively involved. The data from practice can be used to further optimise provision, which can also be better adapted to the needs of the individual patient. So digitisation ensures that healthcare is not only faster and more efficient but also more closely tailored to the needs of the individual patient. Treatments will be more effective for the individual because they will be selected more precisely. Preventative measures will gain in importance. Patients with chronic illnesses will be treated in their own homes using telecare solutions.



LG Electronics (LG) is currently equipping a luxury apartment complex in a suburb of Seoul with LG smart home appliances and technologies.

German Machine Tool Industry Is

By Stefan Schwaneck, German Machine Tool Builders' Association (VDW)



©Deutsche Messe AG

"Connecting systems for intelligent production" – the slogan for EMO Hannover 2017's claim fully reflected the focus on a wide variety of connectivity solutions, data analysis applications and innovative services.

The German machine tool industry sets the pace for lasting economic growth: Record-breaking order bookings in the first half of 2018 not only exceeded the preceding year's equivalent period by twelve per cent, but also showed a long-desired shift towards a stronger domestic demand. After EMO Hannover 2017, the world's premier metalworking trade fair, domestic orders rose by more than 34 per cent. The Euro nations likewise showed a just-under-double-figure increase. This upturn in demand stands on a broad foundation in terms of both technologies and markets, showing significant capital investment in modernisation and capacity upsizing.

Due to the boom in almost all user industries worldwide the production output passed the 16-billion-euro mark in 2017 for the first time in history. With 73,700 staff in May 2018 (the highest figure since the early 1990s), utilised capabilities of more than 93 per cent, and a continued sizeable increase in orders, the VDW (German machine tool builders' association) forecasted a plus of eight per cent for the production output in 2018. An increase in turnover by 13 per cent in the first half of 2018 corroborated this projection.

In general, the German machine tool industry benefits from the large volume and

automotive-driven global project business. However, the industry is well positioned in other manufacturing technology sectors such as aerospace, machine and system construction, electrical engineering, precision mechanics/optics, and medical technology, too. For this reason, VDW is confident that the global economy will continue to offer a good business environment.

This also relates to the fact that German machine tools are well-known for quality, flexibility, productivity, and sustainability around the globe. The export ratio of 70 per cent is an impressive indication of their value particularly for customers competing in

international markets. The fact that innovation is especially important to the machine tool industry is due to the way the industry sees itself. Most German machine tool builders don't rely on economy of scale effects but are used to tailor solutions to specific customer needs. With a strong focus on high efficiency and an economical use of resources, their individual products lead to cost savings and increasing quality in production.

International Connectivity Is the Key: a Common Language for Machine Tools

In recent years, digitization and networking have become an integral part of mechanical engineering. Customers increasingly demand that machines be easily and reliably integrated into their respective IT ecosystems. Connectivity is the key to all added value and business models of the IoT era and requires open, independent interfaces. Especially small and medium-sized enterprises need a way to easily participate in new developments such as platform economics, as they're required to focus on their

Reaching New Heights



core know-how in day-to-day business instead of spending their resources on programming customized software solutions.

This is why the industry initiative Connectivity for Industry 4.0, which just recently introduced umati (universal machine tool interface), attracts serious attention. Created in a joint effort by VDW and 17 well-known machine tool builders, application partners, control technology experts, and academic institutions in the field, umati enables machine tools and peripherals to easily, secure, and seamlessly connect to customer-specific IT ecosystems. 21 use cases and more than 100 parameters serve as the basis for developing the common interface. First demo applications were displayed at AMB Stuttgart, a major national trade fair in Germany.

umati: International Collaboration Towards a New Global Standard

To establish umati as a universal, globally accepted connectivity standard, close coordination with international partners will be necessary. This has been the reason why the initiative – even though it originated as a purely German project – committed itself to international cooperation right from the start.

Members of the working group regularly reported on the project's progress at the meetings of the European machine tool association Cecimo. Talks are underway with VDW's American sister association AMT (which has already created valuable ground-

work with its open MTConnect interface) and also contacts to Japan, China, and South Korea were followed with great excitement. Ultimately, the feedback of customers' needs from all over the world, which will be gathered in a joint working group with the OPC Foundation starting at the end of 2018, is expected to help achieving the goal of a universal, globally accepted connectivity standard.

It is the stated goal of VDW and the companies involved to present a complete implementation of the specification at EMO Hannover 2019, hoping that even the first products running umati can be offered at the sector's most important event.

EMO Hannover 2019: Hotspot for the Machine Tool Industry

But also apart from umati, EMO Hannover 2019 (16th to 21st September) will once again demonstrate how strongly the machine tool industry has committed itself to digitization. As largest innovation platform in the industry, EMO Hannover 2019 will bridge the gap between classic metalworking and machine networking. Alongside the latest developments in the full range of metalworking machining processes from additive manufacturing through to metal cutting, the trade fair will showcase innovative solutions, industrial applications and future technologies in the field of metalworking.

2,200 exhibitors from 44 countries and visitors from 160 countries make EMO the most international trade show of its kind.

With more than 181,000 square meters (approx. 1.96 million sq.ft.) of net display space, the show attracts visitors with a high level of decision-making authority and technical expertise. 73 percent of the visitors in 2017 were actively involved in their companies' decision-making processes and placed orders worth over 8 billion euros at the show.

After positive experiences in 2017, young tech enterprises will once again have the opportunity to present themselves to an international audience at EMO Hannover 2019. Start-ups that have been active in the market for less than five years and have less than 50 employees to promote their groundbreaking ideas, can get into contact with customers and other industry experts and gain important input for their future business activities.

The Future of Production Processes is Digitization

This way, EMO Hannover 2019 will not only reflect the growing importance of digitization in its claim *Smart technologies driving tomorrow's production!*, but also continue to systematically develop its concept as the world's premier trade fair in the sector. The special exhibition *IoT in Production* will present a full overview of the central aspects of digitization, among others industrial security, data analytics, process monitoring, predictive maintenance, artificial intelligence, and big data management. Besides individual exhibitors, initiatives from Spain, France, Switzerland, Japan, China, and the USA will supplement the area with additional expertise.

Also highlighting the theme in a new area for individual control technology, software and automation technology exhibitors, EMO Hannover 2019 will cover the entire value chain of the future from individual machines up to cloud-based systems like no other event.

Last but not least, the trade show will offer a wealth of special events, forums, and conferences staged by its organiser VDW, its business partners and numerous exhibitors. The overall programme – in 2017 the online calendar featured over 600 additional events from 3D printing to e-mobility to cost-effective wastewater management – makes EMO Hannover the most important networking and knowledge transfer get-together for production experts from all over the world. www.vdw.de



At the "Production for Tomorrow" symposium at EMO Hannover 2017 researchers from the German Academic Society for Production Engineering (WPG) presented innovations in conventional metalworking technologies that have the potential to safeguard the good reputation of German machine tools in the coming years. (Photo: sheet metal processing centre)

Strong Innovation to Achieve the Mobility,

By Bernhard Mattes, President of the German Association of the Automotive Industry (VDA)



eActros all-electric, heavy-duty trucks by Mercedes-Benz Trucks are currently being trialled by the Mannheim-based firm TBS Transportbeton.

The growth of the online mail order trade, increasing urbanisation and a burgeoning demand for flexibility from customers – all these are challenges to which the German automotive industry must rise to shape the mobility, transport and logistics of tomorrow. Manufacturers and suppliers are drawing on all their powers of innovation to develop new solutions to address these challenges.

Alternative drive technologies are a key future field – and this is an area in which German manufacturers and suppliers are set to invest a total of EUR 40 billion over the next three years, with a particular focus on electric mobility. Furthermore, around a third of all global patents in the areas of electric mobility (34 per cent) and hybrid drives (32 per cent) are from Germany. German manufacturers are also forging ahead with the “Ionity” joint venture in the field of charging infrastructure. With regard to alternative drivetrains, the

key idea is the open-technology diversification strategy which the German automotive industry has been pursuing for many years. In addition to the further optimisation of the modern and efficient combustion engine and the development of alternative drivetrains, with a particular focus on electric mobility, the strategy encompasses CO₂-neutral e-fuels, hydrogen and the natural gas drive. For it is only with the widest possible range of drive types and fuels that it will be possible

to meet the European Commission’s ambitious CO₂ target values.

The Latest IAA Commercial Vehicles Show Revealed a Quantum Leap in Electric Mobility

The 67th edition of the IAA Commercial Vehicles showed that the future is now ready to go into series production. In Hannover exhibitors showcased a host of e-models, in particular e-vans, which are either going into series production or are already available



“The German automotive industry is committed to deepening cooperation between manufacturers, suppliers and start-ups. In our view such partnerships have great potential to successfully shape the mobility of tomorrow in many ways.”

Bernhard Mattes, President of the German Association of the Automotive Industry (VDA)

Transport and Logistics of Tomorrow

for purchase. Electric city buses and medium-duty delivery trucks complete the offering. This meant visitors to the IAA were able to experience a quantum leap in electric mobility. Concept studies presented at the 66th IAA Commercial Vehicles in 2016 have since become series production models.

Vans with electric battery drives offer significant advantages over vans with conventional drives: they drive emission-free locally, are quiet and their batteries can be swiftly recharged. Furthermore, they have a range, depending on manufacturer and brand, of between 120 and 200 kilometres. The load volume of these e-vans ranges from 6 to 20 cubic metres and their load capacity from 900 to 1,750 kilogrammes. Smaller e-vans with a load volume of 4 cubic metres and a load capacity of 700 kilogrammes are also available.

This means that CEP (Courier, Express and Package) service companies, tradespeople and suppliers in towns and cities can perform their daily tasks as required. Delivery traffic for which the last mile is key therefore has a product range which also satisfies modern logistics requirements. For the rapid expansion in online trade is being accompanied by similar growth in movement of goods, resulting in increased demand for vans in urban areas. Local zero-emission e-vans can also help to further improve air quality in towns and cities.

Delivery Companies with Innovative Solutions

Inextricably linked to smart solutions for the mobility, transport and logistics of tomorrow are the development partnerships of supplier companies. Suppliers, in fact, account for 70% of the value creation of a vehicle. In the areas of digitisation, networking, automated driving and safety supplier companies are already taking a forward looking approach and thus making a key contribution to the innovative strength of the automotive sector.

For example, in the immediate and near future sensors and cameras will enable commercial vehicles to see and hear. High-resolution monitors and cameras will replace exterior mirrors and eliminate all blind spots. This improves safety in urban areas in particular, for example when turning. Furthermore, the absence of large exterior mirror housings enhances vehicle aerodynamics and thus reduces fuel consumption. Suppliers are also coming up with exciting acoustic solutions. For example, microphones can pick up external sounds and send them to computers. Artificial intelligence

helps to evaluate the sounds around the vehicle and distinguishes between horns and general road noise, for example.

In the area of networking, the driver's smartphone creates a host of new possibilities. From keys and driving authorisation all the way to health checks during the journey, suppliers are using mobile communication to connect the vehicle, driver and control centre. Through these innovations mobile services organise the entire logistics chain, from order to delivery, and also provide information online about the condition of the vehicle and the driver's concentration.

And manufacturers and suppliers are also forging ahead in automation. One example of this is platooning: this involves connecting several commercial vehicles electronically so that they can communicate in real time. If the vehicles are arranged in a convoy, the lead vehicle is able to communicate its driving behaviour to the other vehicles. By driving in a platoon savings of up to 10 per cent in fuel consumption and CO₂ emissions can be achieved.

In addition to tie-ups with the established players in the automotive sector, the German automotive industry is increasingly establishing partnerships with start-ups. At the New Mobility World (NMW) Forum at the IAA, for example, innovative young companies had the opportunity to showcase their fascinating solutions which will make transport, logistics and mobility safer, more efficient and more comfortable. The German automotive industry is committed to deepening cooperation between manufacturers, suppliers and start-ups. In our view such part-



The new e-Crafter1/2 marks the start of an electric mobility offensive by Volkswagen Commercial Vehicles.

nerships have great potential to successfully shape the mobility of tomorrow in many ways.

Industry and Politics Must Work together to Create the Conditions

to ensure that the innovations in the fields of alternative drivetrains, digitisation, networking and automation can have the desired impact. This includes the further expansion of the public charging infrastructure for electric mobility, natural gas and fuel cells. In addition, a strategic agenda must be drawn up for the regulation and technological and market development of CO₂-neutral e-fuels. With regard to digitisation and networking we require a comprehensive extension of digital infrastructure, in particular of the new 5G mobile radio standard. All of which serves to underline that tomorrow's sustainable and digital mobility can only be achieved in Germany and Europe if industry and politics work in close partnership. www.vda.de



MAN Truck & Bus showcased its Lion's City vehicle at the latest IAA Commercial Vehicles show in Hannover, providing a glimpse of fully-electric urban passenger transport.

Innovation and Inspiration – the Future

By Dr Ben Möbius, Chief Executive Officer of the German Railway Industry Association in Germany



What does the future of the railway industry look like? The railway industry's mission in Germany is clear: to make mobility even more climate-friendly, customer-friendly, safe and efficient. Zero emissions, zero accidents, 100 per cent travel experience and efficiency. Today, the transport sector faces huge challenges such as global warming and nitrous oxide and fine particle pollution. Megacities in particular need smart concepts in order to avoid a transport collapse. Grotesque huge traffic jams at peak times, harmful air and endless searches for parking spaces are burdens that people face. But there is another way. Rail 4.0 and "Made in Germany" alternative drives are leading the way. Three megatrends are spurring the sector on.

Digitisation and Automation

State-of-the-art technologies such as automated operation systems enable underground trains to run much more frequently. Da-

Automation is on the way to becoming reality. Points and signals, for example, have long been automated by means of intelligent signal boxes. Automated systems,



"Globalisation is a win-win strategy. Because all players benefit from cooperation. Sustainable cooperation is based on trust and appreciation. For innovation and excellence."

Volker Schenk, President of the German Railway Industry Association (VDB)

ta-based light systems guide travellers to carriages with free seats, while digital monitoring improves safety in trains and at stations. Virtually developed design makes trains that are emblematic of their cities. All of the above improve life quality in urban areas around the world - with "made in Germany" products.

often from the production lines of the German railway industry, are in operation around the world on underground systems in particular. As of July 2016, there are 55 fully automated underground lines in 37 cities around the world, operating 803 km in total. This represents growth of more than 14% since 2014. Around a billion passengers in

15 European cities are now using such railways annually. By 2025 it is projected that 2,300 km of automated underground lines will be in operation. Automated operation enables track use to increase by up to 40% thanks to greater train frequency. Smart mobility instead of gridlock in megacities. And what's more: optimised start-up and braking improves energy efficiency by 30%. This means rail transport is becoming more cost-effective - and most importantly more climate-friendly.

Clean Mobility

In its latest report, the IPCC states that human activities are responsible for around 1.0 °C of global warming. It identifies transport as one of the causes. Hitherto the transport sector has fallen far short of meeting the Paris climate goals. Which means that the transport sector must drastically reduce its GHG emissions in order to stem climate change. Accordingly, mobility must make a far greater contribution to protecting the climate. And the railway sector will play the pivotal role.

Rail is already the lowest-emission mode of transport. Nevertheless, further progress must be made. Digitisation and alternative drives are creating the "clean mobility" of the future.

Railway 4.0 protects the climate globally - and is emission-free locally. In Germany, for example, over 95 percent of CO₂ emissions in the transport sector are caused by road traffic. Rail transport, in contrast, is responsible for only around 0.8%. Railway 4.0 is the answer globally. Buzz term electric mobility. In Germany 90% of rail transport is powered by electricity, with almost half generated from a renewable source. And now emission-free electric mobility can also be provided without a catenary. Thanks to groundbreaking "Made in Germany" battery hydrogen and hybrid technologies which were recently showcased at InnoTrans 2018 in Berlin. Railway logistics eases the burden on the environment and motorways. This means fewer lorries, fewer traffic jams and less damage done to roads. The results are more growth and improved life quality. The innovations of the railway industry in Germany bring us closer to attaining our goal of zero emissions: worldwide.

Globalisation

International competition is a success story for the railway industry, because global partnerships inspire. It is only in this way that the best solutions emerge. With an

of Mobility "Made in Germany"

Excellence through trust – The export philosophy of the railway industry in Germany is based on four pillars of fair partnership:

1) Cost effectiveness: a reasonable purchase price and predictable life cycle costs (LCC), which can be reliably optimised over 10, 20 and 30 years for trains, infrastructure and components. True-cost pricing rather than snapshots. Quality with a unique cost-benefit ratio for a highly-efficient rail system throughout the year that attracts significantly more customers.

2) Energy-efficiency: climate-friendly and cost-effective mobility courtesy of excellent drive technologies, digital optimised drive profiles, highly-innovative materials, energy-saving components.

3) Smart maintenance: predictive processes, open standards, reliable spare parts supply over the life cycle for maximum availability and efficient operation without lock-in effects.

4) Co-operation: long-term, fair collaboration, joint development of transport concepts, dual training of employees on site, project experience, reliability, transparency over the black box. In this way threshold countries, for example, can build their own skills and drive their economic development with German know-how.

export ratio of 50% the German railway industry is a world market leader.

In conjunction with our partners around the globe we are achieving the best ever mobility. The spectrum extends from established technologies to highly-innovative, extremely efficient solutions for markets worldwide. As one of the world's largest

©Siemens Mobility/Pressebild



Testing of the first autonomous tram in Potsdam

railway industry markets, China in particular offers excellent opportunities for complementary collaboration. Successful together - in 2018 the VDB opened the VDB foreign representative office in China. The two VDB offices in Chengdu and Tianjin are beacons for German-Chinese partnership. The potential is vast and spans metro systems for cities, the expansion of the high-speed network from 20,000 kilometres today to around 30,000 Kilometer by 2020 and investment EUR 480 billion in network expansion.

India, with the world's fifth-longest railway network, is another very exciting market. In the current budget the Indian railway sector is prioritised as a growth driver and investment of around USD 140 billion over five years is planned. India is creating new connections with high-speed projects. In many Indian metropolises local public transport is being upgraded with pioneering railway projects to improve life quality. More than 10 metro systems are under construction or being opened. And South America has great potential too. The Tren Bioceánico

project is a spectacular undertaking: the construction of an approximately 3,700-kilometre rail network from the coast of Brazil via the central Bolivian cities of Santa Cruz and La Paz to the port city of Ilo in southern Peru. As well as Brazil, Bolivia and Peru, Argentina, Paraguay and Uruguay also have an interest in the execution of the project. The project is worth around USD 10 billion.

What Adam Smith as the founding father of the national economy knew has been experienced by the world for many decades: success through global collaboration. The railway industry in Germany, as a global pioneer and with its export-oriented high-tech sectors, is synonymous with this collaboration. High-speed trains, regional trains, metros, trams, digital light and safety technology, intelligent service, tracks, sensors, automated goods trains – around the world the very best mobility solutions on railways are often "Made in Germany". The future is on rails. Protectin the climate, improving customer quality - every day we make people's lives a little bit better.

www.bahnindustrie.info

©Bombardier Transportation



Talent 3 trains run on power from their in-built batteries.

©René Frampe



Coradia iLint, the world's 1st hydrogen-powered train

Leading the Way with High-Tech Products

The global shipbuilding industry rebounded in 2017 after experiencing extremely weak demand a year earlier, posting a doubling of orders (in CGT). Nevertheless, global production capacity continues to surpass order volume by 75 per cent. Against a backdrop of extremely tough global competition, the German and European shipbuilding sector put in a very strong performance last year. With annual turnover of around EUR 50 billion and almost 400,000 employees, the maritime sector is one of the most important in Germany's economy.

Due to the healthy demand in special markets coupled with the striking weakness in volume markets, Europe's market share has climbed in value terms from under 10% to over 50%. In 2017 its market share was 35%. While orders in Germany as expected came nowhere near matching the record level achieved in 2016, the output of the country's shipyards, nevertheless, remained strong thanks to their full order books. Underpinning this performance is the specialisation of the European shipbuilding industry, and of the German sector in particular, and the successful focus on high-tech niche markets. The President of the German Shipbuilding and Ocean Industries Association, Harald Fassmer, stated: "Today, unique major projects of the very highest standard are being delivered one after the other in a timely fashion. Our shipyards are achieving this outstanding performance in close partnership with hundreds of highly-specialised companies. Our first-class system expertise is one of the key features that make Ger-



©MEYER-WERFT, Papenburg

In April this year the Papenburg-based shipbuilder MEYER WERFT delivered the cruise ship Norwegian Bliss to the Norwegian Cruise Line shipping company. This vessel will operate in Alaska and the Caribbean.

many such a strong player and our industry so vital for the economy." However, the extensive withdrawal from cargo shipbuilding means painful adjustments have had to be made, resulting in job losses in Germany's shipyards. As a result the number of ships built in Germany has fallen sharply, with the result that the sector no longer meets the needs of the diverse domestic supply industry. However, value creation chains are far more complex nowadays with the result that the sector has been able to improve sales and employment levels overall.

In order to protect itself against global risks and threats such as growing protection-

nism, technology theft and predatory pricing in the ferry sector at present, the German maritime industry is focusing on pooling resources and doing everything possible to improve its competitiveness.

Maritime Agenda 2025 – the Way ahead for the Sector

In its Maritime Agenda 2025 document published in January 2017, the German government sets out a long-term blueprint for a stronger German maritime industry. This includes a wide-ranging focus on innovation. The Agenda identifies nine fields of action for improving the innovation expertise of a sector dominated by SMEs in view of new challenges in areas such as climate and environmental protection and resulting from the advance of digitalisation and automation. The aims include the consolidation and expansion of technological leadership, the opening up of future markets, driving the energy transition within the maritime industry and leveraging the benefits of Industry 4.0. The German shipbuilding and ocean industries sector believes that the Maritime Agenda 2025 document shows the way forward for the German maritime industry, which must now take decisive action.

"Germany is more than ever the country of maritime innovations – with high-tech shipbuilding and ocean technology products we will defend our leadership amid fierce competition and satisfy our discerning customers. The ongoing improvement of production methods will ensure a competitive



©Fr. Fassmer GmbH & Co. KG/S. Sauer

The SK38 sea rescue cruiser built by the Fassmer Werft company in Berne/Unterweser has been christened the Berthold Beitz.

cost structure”, the Association states in a position paper.

The German marine shipbuilding industry delivers innovative and competitive solutions for German and international customers which attach particular importance to premium quality and systems expertise. As systems specialists shipbuilding companies integrate the products and services of the SME-dominated domestic supplier industry.

The Supplier Industry also Faces Growing Challenges

The companies of the shipbuilding and offshore supplier industry, with their 63,500 highly-qualified employees and an export ratio of 74 per cent, also expect to post a slight increase in orders this year after successfully filling their order books in 2017. In view of changing markets and competition situations, suppliers must also make intelligent use of the growing digital opportunities in the interaction of operators, shipyards and their own companies. For the shipping industry, too, the entire logistics chain must be properly networked so that new ideas and business models can be implemented. This requires the interfaces to be standardised. Here, the shipping operators and the suppliers cooperate, but it is also a matter of smooth and efficient operation throughout the entire service life of the ship. “Today, we supply important information to the entire logistics chain from the data provided by a wide range of on-board sensors and now also earn money by doing so. The digital opportunities help us to develop systems that will make climate-neutral maritime transport possible”, explains Martin Johannsmann, chairman of the VDMA Marine Equipment and Systems Working Group.

Climate neutrality at sea is a crucial issue for shipbuilding suppliers. Many of the technologies for an effective reduction in CO₂ and a further reduction in emissions are already available today, and the industry is constantly developing the technical possibi-

©Fr. Lürssen Werft GmbH & Co. KG/K. Jordan



The 74-metre luxury yacht "Aurora" built in 2017 by the Bremen-based shipbuilder Lürssen Werft has six decks and can accommodate 16 guests.

lities further. “Consumption-optimised conventional engines are being supplemented by multi-fuel drives, while hybrid systems are being refined in order to offer operators an individual cost-effective and ecological solution”, says Lex Nijsen, a board member of the VDMA Marine Equipment and Systems working group in Hamburg. Electric drive systems are not always the optimal solution. “What functions well with ferries doesn’t work for overseas container transport. We’re thus supporting the further establishment of LNG (Liquid Natural Gas) in shipping with the project for the production and use of synthetically produced fuels with the aid of Power-to-X procedures, which will make it possible to give up fossil fuels in the long term.”

But political support is also required. Dr. Frank Starke, Managing Director of Caterpillar Motoren and board member of VDMA Engines and Systems, emphasises: “Against the backdrop of an approach that is open to technology, the harmonisation of emission limits in shipping must be driven forward and their enforcement and observance consistently monitored. Only reliable internatio-

nal framework conditions create an investment-friendly climate to bring about a successful maritime energy transition.”

Digital Service Offers are Increasingly Important

Maritime business areas are undergoing change. Increasing shares of sales are being generated with new services that go well beyond pure maintenance and repair. The provision of service offers high earnings potential as well as representing a distinguishing competitive feature and will, therefore, play a key role in companies’ future success. The digitalisation of service at maritime equipment suppliers is leading to great

©MV Werften Wismar GmbH



The MV Werften shipbuilder in Wismar is setting new standards in the construction of Rhine Class river cruise ships that call to mind the elegance of yachts in their design. Its 6-star ships are especially designed for use on rivers in Europe.

©Pella Sietas GmbH/Hans-Uwe Schnoor



The latest harbour ferries built by the Hamburg-based shipbuilder Pella Sietas boast a hybrid propulsion system and further technological innovations that reduce their environmental impact.

changes and opportunities for the sector. The comprehensive availability of the latest data from ship operation, the ever more efficient communication solutions and the transfer of innovative procedures for analysing large data volumes are prompting companies to implement new business models, which will involve increasing value added with data-based services.
www.vsm.de

From Rubbish to Resource: Closing

Contamination of the environment with plastics and how plastics waste is dealt with have long been hot topics of discussion among the general public. And the debate has been further fuelled by an abundance of media reports on marine litter and the perceived poor recyclability of plastics packaging in particular. In addition, there are proposals from the European Commission that are a move in the right direction overall, but which certainly have the potential to give rise to conflict. While there are calls to ban certain plastics products and a fixation on plastics recycling, there is a failure to take into account the key role that plastics products have to play in saving energy, preserving resources and protecting the climate. In terms of resource efficiency and their CO₂ footprint they often outperform other materials, as life cycle assessments illustrate.

A wide-spread renunciation of plastics bags, criticism of single-use solutions and demands for a plastics tax: plastics has become the biggest scapegoat. Yet the material is often only representative for criticism of an observed throwaway mentality and consumption which is perceived as excessive. In fact, surveys consistently show that a large majority of Germans continue to take a positive view of plastics, plastics products and the plastics industry. Nevertheless, the potential avoidance of plastics (packaging) in everyday life is in vogue in certain sections of the population, with criticism of the societal phenomenon of littering resulting in a fundamental criticism of the material. And plastics is reproached for the very characteristic that is in fact its greatest advantage: its long lifespan. And these discussions have also now encompassed the Chinese decision to ban imports of plastics waste. For China the aim was to satisfy the country's hunger for raw materials, while here in Germany exporting was portrayed as a way of getting rid of waste on the cheap. But this was and remains wrong as the waste was primarily commercial production waste, which in this way was returned to the production cycle, and not the content of the country's yellow recycling bags.

In this challenging situation, with photos of rubbish in the sea, cans, bags and bottles by roadsides and reports of microplastics in water bodies, the EU has resolved to take ac-



©ALBA Group (above left), BASF SE (3)

Plastic products – which are vital in many areas of modern life – appear to be both the blessing and curse of the modern age, and new and effective strategies are required to deal with them.

tion. In order to protect the environment and at the same time go so far as to lay the foundation for a new plastics industry, the Commission drew up a new plastics strategy this year. This strategy proposes measures for reducing the environmental pollution caused by plastics waste and for improving materials. The aim is for all plastics packaging in the EU to be recyclable or reusable, the consumption of single-use plastics reduced and the intentional use of microplastics restricted by 2030.

Sustainable Packaging

The overall objectives of the EU plastics strategy, the preservation of natural resources and the avoidance of greenhouse gas emissions are naturally also key concerns of the plastics industry. The sector recently took a stance in a joint position paper in which the associations of the plastics value creation chain in Germany – plastics producers, processors and machinery manufacturers – pledge to assume corporate responsibility for resource efficiency and environmental protection and welcome the European Commission's proposal to promote greater dialogue between key players such as producers, local authorities and recyclers. At the same time the sector regards the banning of plastics as a move in the wrong direction as this does not achieve a better understanding of sustainable consumption and environmentally-aware behaviour and could

result in a greater reliance on other, potentially more environmentally-detrimental materials.

The prime example is plastics packaging which delivers significant added value in terms of functionality, safety and hygiene.

Plastics Production in Germany

Within Europe, Germany remains the most significant location for plastics production. About a third of European plastic production comes from here. Worldwide too, Germany is one of the most important producer countries for plastic, with a share in global production of about six percent. At the same time, Germany is also the largest plastics market in Europe, accounting for around a quarter of European demand. This also applies to 2017. Production grew by 3.8 percent compared with 2016. It stood at 19.9 million tonnes in 2016.

The most important customer for plastics in Germany is the packaging industry, accounting for about a third of demand. It is followed by the construction sector with 24 percent, the automotive sector with 11 percent and the electrical/electronics industry with about six percent. When it comes to export and import, the EU member states are of outstanding importance. They account for over 70 percent of exports and almost 85 percent of imports.

Material Life Cycles for Plastics

The so-called Denkstatt study carried out a few years ago investigated what would happen if there were no plastics packaging. The premise of this study was that foil packaging, plastics cups, foams, etc. will be replaced with viable alternatives made from other materials. The study concluded that life-cycle energy demand in Europe would increase annually by a factor of 2.2 and greenhouse emissions by a factor of 2.7. This is equivalent to the emissions of an additional 21 million cars on Europe's roads or the total CO₂ emissions of Denmark. Such a scenario is clearly in no-one's interest.

The Global Issue of Marine Litter

According to research, around 80 per cent of marine litter reaches water from the land, with eight countries responsible for almost two thirds of the waste in the world's oceans. One of the reasons for this is that billions of people around the globe have no access to controlled waste disposal including in many Asian countries which in turn are responsible for a large proportion of the plastic waste in the oceans. Therefore, concerted global efforts involving plastic manufacturers are required to improve waste management. In March 2011, sector organisations from around the globe set the ball rolling with the publication of The Declaration of the Global Plastics Associations for Solutions on Marine Litter. This pledge has already been signed by 75 organisations from 40 countries and around 350 projects have been launched including effective waste management for efficient recycling initiatives



New solutions are offered by high-quality biodegradable bioplastics based on renewable raw materials.

and local training activities to raise awareness. In Germany, for example, the training activities of plastics manufacturers include the "Together for better protection of our waters" initiative in conjunction with the German Canoe, Rowing, Diving and Sailing federations and the "K" trade fair organiser



Recycling instead of landfilling – the plastics industry supports solutions for greater sustainability throughout the entire value chain.

Messe Düsseldorf to raise awareness of the need to handle resources responsibly. There are also numerous voluntary sustainability initiatives in the sector including the nationwide ERDE recovery system for crop plastics and Rewindo, the leading German PVC profile manufacturers' window recycling initiative. Since 2013, the world's leading plastics-producing companies and their organisations in the World Plastics Council have also been involved in activities to strengthen the circular economy and tackle the issue of marine litter. PlasticsEurope was also involved in drawing up the 2017 action plans by the G7 and G20 states to tackle marine litter, drawing on its experience and findings.

In Germany, 99 per cent of all post-consumer plastics waste is now recycled – around 45 per cent is mechanically recycled while 53 per cent is used for energy recovery. In addition, a current picture of PVC production, processing, waste and recycling flows in Germany shows that recyclates are increasingly becoming an alternative and therefore a key raw material for new plastics products. Now the overriding aim must be to help those countries with a great deal of progress to make up in terms of plastics recycling to build sustainable waste management structures. From a circular economy perspective it is also important to end the landfilling of plastics waste throughout Europe. In Europe there has been a long-established shift towards increased recycling – in 2017 almost 70 per cent of post-consumer plastics waste was recovered through

recycling and energy recovery processes, a marked improvement compared with previous years – though almost a third is continuing to end up in landfill. But with the EU pushing hard for higher recycling rates and more eco-friendly product design, recycling and energy recovery must not rashly be made rival processes. There is also a need to press ahead with raw material processes. In the final analysis, the combination of all recovery methods is currently the most efficient approach. With this in mind, the plastics industry is currently working in close partnership with authorities and institutions, encouraging the transfer of know-how at national, European and global level and supporting solutions for increased sustainability throughout the entire value creation chain. For plastics is rather part of the solution than part of the problem.

PlasticsEurope
Association of Plastics Manufacturers

PlasticsEurope Deutschland e.V. is the trade association of the plastics manufacturing industry in Germany and part of the pan-European PlasticsEurope association, which is based in Brussels. The association's headquarters for Central Europe, one of its five territorial regions, is located in Frankfurt am Main in Germany. In addition to Germany this region includes Austria, Czech Republic, Hungary, Poland, the Slovak Republic, Slovenia and Switzerland.

www.plasticseurope.org



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The German Food Industry

A Valued International Trading Partner

With a 595,000-strong workforce employed by a total of 6,044 businesses and revenue of EUR 179 billion in 2017, the food and beverage industry is the fourth largest in Germany and a leading player in Europe. Germany's food and beverage industry is renowned for the high quality and safety of its products, competitive prices and incomparable diversity, with its approximately 82 million customers in the country able to choose from over 170,000 products every day.

These characteristics mean demand for "made in Germany" food products is stronger than ever before in international markets, too. In the EU, good taste, provenance and price are seen as the chief strengths of German food, while in non-EU countries the German food industry has built its reputation above all on provenance. The sector is also appreciated overseas for its reliability and customer focus.

The Food Industry – Centre of the Food Chain

As the country's fourth largest sector the food industry provides employment, stability and wealth in Germany. The sector which consists of 90 per cent SME's is an especially important employer in rural areas. At the

same time, it serves as a link between the countryside and urban conurbations. The industry processes around 80 per cent of Germany's agricultural products, thereby ensuring comprehensive security of supply. The incredible range of food products offered also enables the country's urban residents to enjoy an unlimited number of personal lifestyles.

The food and drink industry is closely interlinked with its partners in agriculture, trade, commerce and catering. The entire food sector in Germany offers a diverse range of employment opportunities to more than five million employees and almost 230,000 trainees. In 2016 the approximately 696,000 businesses in the German food sector generated revenue of EUR 167 billion

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Every two years at ANUGA, the world's largest trade fair for the food sector staged in Cologne, the German food industry showcases the consistently high quality, safety and diversity of its products (photo top and bottom).



One of the chief developments in consumer behaviour over the last decade is the growing focus on freshness.

and accounted for around six per cent of total economic value-added in Germany.

The German Food Market, Leading the Way Globally

The German food market is not just the largest in Europe but also one of the most sophisticated in the entire world. In addition to dealing with strong competitive pressure, stringent legal requirements and the very highest safety standards, the businesses in the sector must also cope with the growing expectations of German consumers with regard to food products. For most food is expected to do far more than simply fill their stomachs: products must taste good, be affordable and be available in the widest possible range – but above all they must also reflect individual eating habits and lifestyles. Today more and more people are defining themselves by what and how they eat. This means products must not only be adapted to a specific understanding of values but also to specific nutritional behaviours (paleo, ketogenic, low-carb, etc.). The demand for organic products also remains strong at present. Expenditure on these products continues to grow and today they are no longer niche since 98 per cent of households purchase at least one product per year. Nevertheless, other trends are even more pronounced: for example, the last decade has seen a marked increase in freshness orientation. Protein, soy, vegetarian and "free-from" products are also faring well at the moment.

Germans are increasingly employed, mobile, flexible, international, interconnected and pressed for time. Whilst home cooking is becoming increasingly popular among consumers who are especially conscious of what they eat and sustainability-oriented, most people simply lack the time, the expertise or the desire to prepare their own meals. As a result, expenditure outside of the home ac-



Fair trade products are also firmly established in the portfolio of German food retailers.

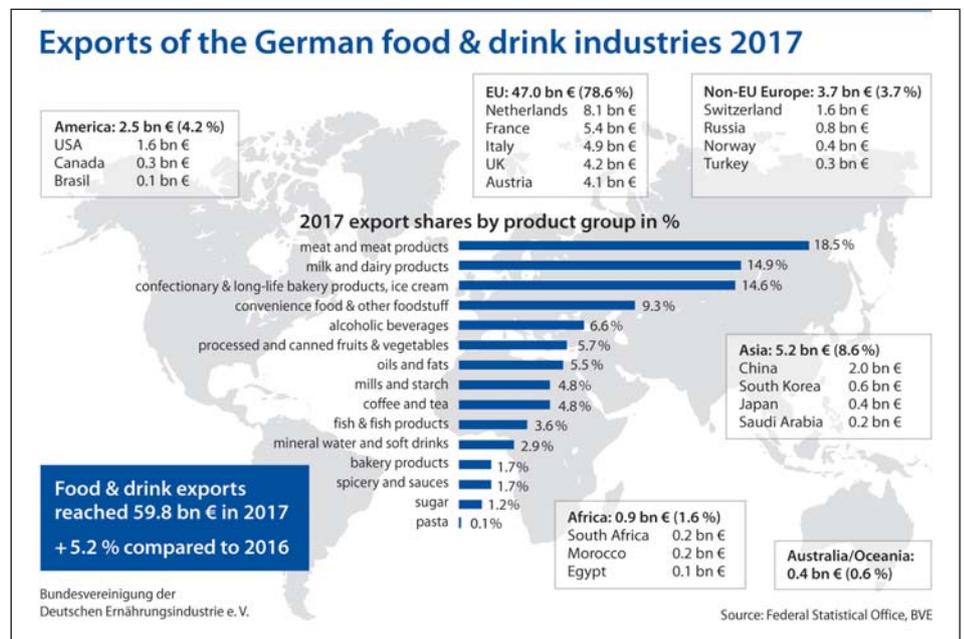
counts for a quarter of consumer spending on food today. In recent years, there has also been a rise in demand for convenience products.

Product Innovations are Constantly Creating New Market Segments

For food producers, these societal developments offer both challenges and opportunities: On the one hand the task of remaining competitive in the marketplace by meeting the needs of consumers is becoming ever more complex. On the other, the changes in eating and consumption behaviour offer companies great scope for value creation. This has resulted in new products being brought to market at ever shorter intervals. The range of German food products increases by at least 40,000 every year and new market segments are constantly emerging: functional food, vegetarian, vegan, gluten-

free, lactose-free and light and convenience products and also products with unique characteristics such as regional, seasonal, sustainable, fair trade and organic are widely available today. This product portfolio is becoming ever more specialised and complex. In this way, the food industry is able to offer all-round products tailored to the needs of every individual which are available at all times and in every price segment.

For although quality is coming to the fore as a purchase criterion, German consumers in general remain very price conscious. Only 25 per cent of consumers are prepared to spend even 16 per cent more for better quality. A one-person household spends an average of EUR 159 per month on food, while a four-person household spends EUR 500. This represents 10.5 per cent of their disposable income. The food price level is slightly above the EU average.





© Messe Berlin GmbH/Volker Otto

The meat and meat-processing industry is one of the strongest segments of the German food industry in terms of exports.

Consumers Seek More Information

The increasing expectations of food products and their manufacturers are also reflected in a greater need for information among consumers. The interest in the provenance of food and how it is produced is burgeoning. And consumers get this information not just from packaging and product tests but increasingly from the producers themselves. A survey by the Federation of German Food and Drink Industries (BVE) and the AFC Consulting Group AG shows that 90 per cent of companies have noted an increase in enquiries from consumers. Furthermore, a large majority of the firms consulted (88 per cent) are finding that they are spending significantly more time dealing with these queries. Per day 51 per cent of the companies received between one and ten enquiries, while 14 per cent received more than 50. Almost 40 per cent of food producers respond to customer enquiries within 24 hours while 56 per cent do so within three days. Most queries concern differences in quality, labelling and packaging. In the future companies are also anticipating more queries regarding "sustainability".

The change in consumer behaviour, but also growing production costs, greater competitive pressure, the strong concentration in the food retail market and increasing internationalisation, have ramped up the pressure on German food producers, prompting them to concentrate on value creation. Through the scientific use of machinery and state-of-the-art technologies they have succeeded in steadily increasing food safety and quality, extending the range of products available and improving their own capacity for innovation. With the help of technology and optimised production processes they have also achieved widespread security of supply and competitive prices in Germany. Targeted processing techniques, internal and external quality management, systematic controls, the use of specialist staff and the stringent regulation of products and production have

also helped the German food industry to become established as an international market leader. Over the last 20 years the efficiency and output of the sector have risen by over a third.

Exports are Driving Growth

Owing to the tough domestic business environment - with rising production costs, fierce competition and a strong concentration in the food retail market - the companies in the German food sector have put exports at the heart of their sales strategies. For while increases in domestic turnover are determined only by prices, the international marketplace offers food producers huge scope for growth. In the long term, exports will ensure the survival of the mostly small and medium-sized enterprises in the sector, delivering wealth and employment. Today the sector earns one in three euros overseas. In 2017 the value of the German food industry's exports totalled a new record of EUR 60.1 billion, a year-on-year increase of 6.3 per cent. The strongest export sectors of the German food industry are meat and meat

processing, dairy and confectionery. The export ratio of these three sectors is almost 50 per cent. In addition, German exports of convenience food and alcoholic drinks are also increasing.

Challenges in the Global Arena

Most German food exports (78 per cent) are still destined for other EU countries due to the advantages of the internal market, shorter transportation routes and the similarity of consumer tastes. However, the increasing level of competition and market saturation are hindering further growth.

This means that manufacturers are becoming increasingly dependent on markets outside the EU - for example in Asia and in America - where consumer purchasing power is growing. Many companies have already recognised this potential, with the robust export figures in 2017 largely the result of stronger exports to the Asian market in particular. In 2017 the value of German food exports to non-EU countries totalled EUR 12.8 billion.

However, further growth was hindered by factors including insufficient market access, increased competition, higher trade barriers, bureaucracy, economical and political crises, inadequate legal security and uncertainties with regard to exchange rates and trading partners. Small and medium sized enterprises in particular often lack the time and resources to develop exports out-side the EU, which can be a costly process.

In order to continue to compete successfully in the global arena and grow its market share, the industry requires specific export assistance in the form of expert and financial support as well as reliable and stable trading rules. With this in mind, the food industry is actively engaged in discussions with policy makers and is firmly committed to a more liberalised trade policy.

www.bve-online.de

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The highest quality control standards are employed in food production.

German Furniture Industry Grows Slightly

By Jan Kurth, Secretary of the Association of the German Furniture Industry

©VDM/Ballerina



The topic of smart home is above all currently being implemented in the modern kitchen, when for example the oven can be controlled from the car via an app.

Following a decline in sales in the second half of 2017, the economic situation of the manufacturers improved slightly in the first half of 2018, but on balance furniture sales stagnated, especially on the domestic market. The slight growth was solely due to business abroad, because sales beyond the borders rose in the first six months by 2.7 percent compared to the same period in the previous year. In contrast, domestic sales stagnated with a minimum increase of 0.3 percent. The export business profited from rejuvenated demand in the most important European sales markets and increasingly benefited from the positive economic development in the large growth regions outside of the EU. Almost one third of German furniture exports is now to non-EU countries.

According to official statistics, the individual segments of the German furniture industry did not develop uniformly from January to June 2018. The kitchen manufacturers recorded an increase in sales by 4 percent to around € 2.5 billion. With sales of around € 1.1 billion, the office furniture industry had a significantly positive result (+7.9%). The manufacturers of shop and other non-household furniture also achieved around 7.2 percent above the previous year's value, generating sales of around € 920 million. The manufacturers of upholstered furniture registered a noticeable decline; their sales from January to June 2018 reduced by 5.3 percent to around € 480 million. The sales development in home furniture, other furniture and furniture parts was also more negative than the industry average, with a 1.6 percent decrease to € 3.7 billion. The industry's smallest segment – the mattress industry – recorded the most significant

fall in sales of 12.8 percent to around € 400 million. However, these must be qualified with reference to the above-average

than 50 employees (-2.2%), and this figure is thus slightly (+0.7%) above the previous year's level. Despite the difficult market environment, around 600 new jobs were created in the industry within one year.

Almost one in three Pieces of Furniture is Exported

In the first half of 2018, compared to the same period in the previous year, German furniture exports increased by 2.2 percent to € 5.5 billion. Sales in EU countries were only slightly above the previous year's level with a plus of 1.2 percent and thus significantly weaker than total exports. Exports to the most important export market of the



“German manufacturers, like international manufacturers, have their fingers on the pulse of the time and provide an increasing number of options in their furniture and furnishings offer.”

Jan Kurth, Secretary of the Association of the German Furniture Industry

sales growth in this segment in recent years. Here a glance at the industry's employment data: 84,300 men and women currently work in the 482 companies with more

German furniture industry, France, were increased by 3.5 percent, and the Dutch (+6.2%), Polish (+10%) and Spanish market (+6.1%) also developed positively from the



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Solid wood is often combined with painted surfaces or glass surfaces and always looks elegant and cozy.

German furniture industry's point of view. However, furniture exports to important sales markets such as Austria (-1.3%) and Switzerland (-3.8%) were in decline.

The most important growth markets for German furniture currently lie outside the EU. The performance of German furniture manufacturers in the large growth markets USA (+9.5%), China (+25.9%) and Russia (+14%) is particularly worth highlighting. Due to the respective market size and strong demand for high-quality furniture, these results are certainly also capable of being developed further. Other non-European markets such as Canada, Mexico, Japan, South Korea and Singapore are also currently developing positively; however, exports to these countries are still on a relatively low level. Overall, the non-EU countries should become an important driver for growth in the German furniture industry in the coming years.

The industry's export rate – this is the goods delivered directly abroad by domestic furniture manufacturers as a proportion of the industry's total sales – climbed in the first half of 2018 to 32.6 percent and thus

reached a new maximum value. In the first half of 2017 the corresponding value was still 32.1 percent. Since the turn of the millennium, the export rate in the furniture industry has thus doubled. The success of German furniture manufacturers abroad is thanks to the quality, the delivery reliability, the design and the individuality of our products. German manufacturers often control the workflows and logistics better than their international competitors. These are important purchasing arguments for consumers – whether in Shanghai, St. Petersburg or San Francisco.

The import competition remains high: having already increased by 0.8 % to € 12.7 billion in the full year 2017, German furniture imports rose by a further 0.6 % to € 6.6 billion in the first half of 2018. However, the export deficit reduced in the same period by 8.1 % to around € 1.2 billion due to significantly increased exports. Overall, East European furniture imports into Germany are increasingly winning against Asian competitors. Poland gained 7.4 percent and, as in the previous year, remained the furniture country of origin with the greatest volume

by far. More than one in four pieces of furniture imported into Germany (26.3%) now comes from our eastern neighbour. With a slight increase of 0.7 percent, the Czech Republic remained the third most important import country. In total, imports from EU countries increased significantly by 1.8 percent. In comparison, imports from Asia fell by an above-average amount (-5.9%), especially imports from Vietnam (-12.3%), Taiwan (-13.9%) and Indonesia (-9.8%). Imports from the second most important import country, China, were also clearly in decline with a minus of 5.2 percent. The structure of German furniture imports is highly concentrated: The three most important supply countries, Poland, China and the Czech Republic, currently account for around 56 percent of all German furniture imports.

Current Furniture and Furnishing Trends

The visibility of megatrends continues to increase in home furniture. Whether globalisation, urbanisation, digitalisation, individualisation or neo-ecology: German manufacturers, like international manufacturers, have their fingers on the pulse of the time and provide an increasing number of options in their furniture and furnishings offer. Customer needs can no longer be identified solely from socio-demographic characteristics and target groups. People's lifestyles are now too different for that. The directions of this "increase in options" is stimulated by the megatrends. Megatrends are therefore initiators and at the same time indicate directions.

The individualisation megatrend has become even stronger in the furniture sector on at least two levels: Type plans abound in diversity and the internet is set for the initial overview of offers. Here many portals offer individual advice or enable individual furnishing of a person's home by means of "virtual reality".

The digitalisation megatrend also has two significant consequences for home living: The topic of the "Smart Home" is becoming increasingly important for the products themselves. Application functions are offered for many household appliances, windows and doors, for white goods, heating control, etc., which primarily increase comfort and convenience in everyday life. The second dimension has far-reaching effects on our mind: Anyone who is honest, admits to their media exertions. Most people have their smartphone in their hand within one minute of waking up. With these, or with the television or radio, sensory overload and continuous distraction begin directly and multiple cravings are awakened. We lose ourselves in the sheer volume of options available (weather, stock exchange, breaking news, emails, recipes, music...). If the "occuput" or back of the head is then also awakened and with it terms such as digital trans-



©DWM/cor

The color blue comes on upholstered furniture back into the modern apartments.

formation, chatbots, bitcoins, blockchains, dash bottoms ... a grip on reality is suddenly desired. Tried and tested returns. Records, old-timers and filter coffee are booming and in the home they are models from supposed "good old days". Vintage look, retro, boho style, mid-century design. In our fast-paced times it is not surprising that many people in the industrial nations love such furniture. People want real things, or perceived real things in the virtual reality.

Against the background of globalisation, the home becomes the central place for identity. Through personal home furnishings, people know where they really belong. Identity is self-design, not only of a person's own personality but also of their own, private environment. Living is everyday identity formation. Many people find the world too much and consider their own home to be an identity-forming protection zone. A person's own home is looked after, designed and loved. Safety technology and creativity are spreading and the own home is becoming a unique enclave of carefreeness. Along the lines of: "The world is too much for me, I'm all that I need", home is protection, a safe haven and idyllic world.

The trend is for the population of our world to be drawn from the land and into the cities. For the first time in history, more than half the world's population now lives in cities. Metropolises have two long-since known challenges to deal with: Continuous creation of more living space and organisation of the growing traffic volume. In the home, the **urbanisation** megatrend is consolidated in many respects. The planning permission figures show that fewer detached houses and more multi-dwelling buildings are being built instead. Discussions about rent levels in large towns and cities are a recurring theme and many people have to live in a smaller space than they want. More single households are additionally heating up the already strained housing market. The construction sector will change. Away from the detached house in the country towards green multi-storey buildings in the city. Apartments in mega-cities will become smaller. Smaller and multifunctional furniture is already being offered accordingly.

Neo-ecology forms a bouquet full of blossoms. Together with the topic of health, this megatrend also proves to penetrate many areas of our lives. In our food, in the clothing sector, in packagings or travel; wherever you look, attention is being paid to naturalness, authenticity and sustainability. Today, no-one can afford to ignore the topic. In the clothing sector, the worldwide sustainability efforts are already immense. In addition to the pressure of the NGOs, the media, governments and the increasingly sensitive consumers, the "costs aspect" of the manufacturers is also driving the topic of sustainability. Internationally operating

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Authentic materials like wood and stone are growing in popularity. Latest trend in the dining room area is the bench at the dining table.

suppliers of furniture have long since busied themselves with the efficient use of resources, the avoidance of energy, water and waste. This improves the profit margin and ecobalance at the same time. In 2025, eco will become the standard for furniture. Natural furniture is coming.

Forms, Fabrics, Colours, Materials

Overall, more organic forms will be placed on the market in the coming season, especially in the seating segment. Organic design is based on organic nature. Dynamic roundness and vigorous curves emerge as conspicuous features. Organic design is soft and therefore differs from geometric and functional forms.

A wide range of natural fibres can be identified in the cover fabrics offered for upholstered furniture. Cord and velvet play an outstanding role. The blue colour spectrum from European blue (Pantone reflex blue) to light blue, turquoise to petrol, remains popular. Blue stands for harmony, gives a serious impression and has a pleasant, calming effect. A new colour is olive green. It stands for naturalness, spring, hope, health, youth, nature and vegetation. But

olive is not bright, instead, with its grey fraction, it tends to be muted and inconspicuous.

Linoleum is coming back. The material mainly made from linseed oil, cork dust and jute fabric and invented back in 1860 was originally intended to be used as a resilient flooring and is still used for this purpose today. The furniture industry shows the robust and ecological material as a tabletop, sideboard front or as decorative inlays in a secretaire. Linoleum is a robust, ecological and healthy building material.

Solid wood will expand its position again. The designs of tables, cabinets and sideboards are discreet and elegant and far from the rusticity of times past. Oak remains a best seller, but walnut and cherry are also holding their position. Wood in furniture fronts is also often combined with other natural materials such as glass and metal.

In general, furniture in all price ranges will become more high-quality visually. Furniture that somehow appears "cheap" will no longer achieve a good market performance in the future.

www.germanfurniture.de

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In our fast-moving world, garden or balcony offer pure relaxation. That's why outdoor space is becoming increasingly popular for customers.



©Deutsche Messe/Hainer Jensen

Visitor interest at CeMAT 2018 in Hannover was piqued by innovative solutions in the field of Integrated Automation, Motion & Drives (IAMD).

The German Exhibition Industry

German Trade Fairs are Growing with Digital Support

By Dr Peter Neven, CEO of the Association of the German Trade Fair Industry (AUMA)

In 2017 international and national trade fairs in Germany achieved the largest growth in key figures for five years. At last year's 157 events year-on-year increases of more than 3 per cent in exhibitors and stand space were reported. Only the number of visitors remained constant due to the smaller number of visitors to motor shows.

Capital goods trade fairs in particular reported significant growth in visitors and stand space. However, consumer goods fairs, public exhibitions and service shows also contributed to the success enjoyed in 2017. Contributory factors include the consistent robustness of German economic condition and also the ongoing improvement in the event and infrastructure quality of trade fairs and venues. In addition, trade fairs

continue to occupy a key position in marketing. German exhibitors spend almost half of their B2B budget on trade fair participations. It is a similar story for visitors, with around 80% of decision-makers from industry, business and administration visiting trade fairs at least occasionally.

German trade fairs enjoy above-average approval among international participants. The number of foreign exhibitors advanced by over 6% while international visitor numbers were up more than 4%. Announcements of protectionist measures such as tariff increases have hitherto had no negative im-

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“One of the main reasons for the stable role of trade fairs is that participation and visiting are becoming more efficient and economical as a result of the use of digital media.”

Dr Peter Neven, CEO of the Association of the German Trade Fair Industry (AUMA)



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pacts on trade fairs in Germany. The fundamental rule, however, is that trade barriers cause uncertainty on the markets and therefore also at trade fairs. So barriers need to be eased rather than put up. This is a position that AUMA will strongly advocate. In 2017 there was an above-average increase in exhibitor participations from South and East Asia in particular - of more than 11%. The number of international visitors is an increasingly striking quality attribute of German trade fairs. The last ten years alone have seen growth of around a third. And the first half of 2018 demonstrated once again that exhibitors and visitors from around the globe continue to have great trust in the efficiency of trade fair participations in Germany. The number of exhibitors from abroad again increased by over 3%, with the number of international buyers growing by a similar percentage. As in 2017, the number of domestic participations held steady. So, exhibiting companies continue to regard their business opportunities with a cool head despite a number of risks in foreign trade.

Trade Fairs and Digitisation go Hand in Hand

Naturally, the trade fair industry is being shaped by advancing digitisation too. But isn't digitalisation weakening trade fairs if almost everything is available and presentable online? At the moment, at least, this isn't the case. For although digital media are constantly available,



Around 180,000 visitors from 127 countries visited photokina 2018 recently. As of 2019, the world's leading fair for photography, video and imaging will take place in May every year in Cologne.



© Messe Düsseldorf/Cellmann

The 20th edition of the international trade fair for metalworking technologies (METAV 2018) in February 2018 in Düsseldorf confirmed the sector's sound economic situation and the investment mood of the consumer industries.

this doesn't automatically mean that they are being more widely used to make complex decisions. And if online traders are

opening their own bricks-and-mortar shops even for less complex products in order to have contact with their customers, this also

bodes well for the future of trade fairs.

But one of the main reasons for the stable role of trade fairs is that participation and visiting are becoming more efficient and economical as a result of the use of digital media. Exhibitors have long been able to take advantage of online ordering systems for their stand bookings and associated supplementary services. Meanwhile, organisers use a wide variety of digital tools for the marketing of their trade fairs. This begins with online newsletters way in advance of a trade fair to inform exhibitors about changes to the upcoming event and the situation of the industry. In addition, there are blogs which often focus on the industry rather than the individual trade fair and which generate interest among exhibitors and visitors. Immediately ahead of a trade fair, potential visitors are sometimes targeted intensively via social media. This is an approach more often taken with public fairs but also with specialist events. For individual exhibitions with a primarily young target group digital media are now the most important tool for visitor marketing.

In addition, visitors benefit considerably

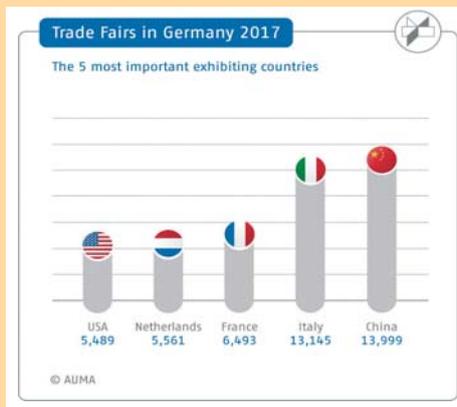
Nearly all Continents Contributed to Strong Exhibitor Growth

In 2017, almost all regions in the world contributed to the growth in the number of exhibitors presenting their products at trade fairs in Germany. The only exception was North America. The levels of participation from South, East and Central Asia increased by significantly more than the average – by 11.2% compared to each of the previous events. These are results of calculations by AUMA – Association of the German Trade Fair Industry.

In total, 107.830 foreign exhibitors were counted at 157 international events in Germany. The levels of foreign participation grew by 6.3% overall. The main driver of growth was again China with an increase of 16% (13.999 exhibitors in total). This meant that for the first time in an odd-numbered year China was ranked first among the exhibitor countries, with Italy (13.145) previously having been ranked first in each of these years. France ranked third with 6.493 exhibitors.

Other countries among the 20 most important exhibitor countries also recorded significant increases, such as Japan (23%), Czech Republic and Portugal (15% each) and Poland (12%). Only the USA registered 5% fewer participations mainly due to their role as partner country of Hannover Messe one year ago. Other countries with relatively high numbers of exhibitors also recorded a strong growth in exhibitors, such as Croatia (25%), Greece (20%) and Russia (17%). Following marked declines in the levels of Russian participation in recent years due to economic sanctions, there were once again increases at some technology-themed trade fairs.

Among the continents or economic regions,



alongside South, East and Central Asia, Australia/Oceania saw the biggest increase of 12%. They were followed by the European countries outside the EU (+7%) and the EU with around +6%. The growth rates of Africa, Latin America and the Middle East hit the level of just 1-2%. An individual development worthy of note was that Argentina overtook Brazil as the most important exhibitor country from Latin America for the first time, thanks to strong export marketing for food and wine.

30% More Foreign Visitors than 10 Years Ago

Around 85,000 visitors from the People's Republic of China visited international trade fairs in Germany in 2017 to acquire information and pave the way for business relations. That figure is twice as high as ten years ago. The number of visitors from all countries outside Europe rose by 30% in the same period of time.

Chinese interest in German trade fairs has in-

creased considerably more on the purchasing side than on the exhibiting side, with the latter showing a rise of "only" around 50%. According to AUMA CEO Dr Peter Neven, "German trade fairs and their offers from all over the world are clearly a very good match for buyers of investment and consumer goods for the Chinese market."

In addition to guests from China, Germany's international trade fairs and numerous associated sector-specific conferences attract many visitors from other countries on different continents. Around 650,000 people from countries outside Europe attended trade fairs in Germany in 2017, more than ever before in an uneven year in which fewer major investment goods fairs are held for scheduling reasons.

Of the total of 9.7 million visitors in 2017, 2.9 million came from abroad, including approximately 1.8 million from the EU and a good 460,000 from other countries in Europe. Of the visitors from outside Europe, nearly half or around 300,000 came from South, East and Central Asia. Around 95,000 came from the Middle East, followed by about 90,000 from North America. Latin America followed with 75,000 and Africa with around 65,000 visitors. Australia and Oceania managed to send nearly 25,000 visitors.

The largest countries of origin for visitors from the respective regions were China (85,000) from East Asia, Israel (32,000) from the Middle East, the USA (70,000) from North America, Brazil (23,000) from Latin America, and Egypt and South Africa (both around 12,000) from Africa.



At the Hannover Messe 2018 the Industry 4.0 theme included the presentation of new contactless forms of collaboration between man and machine in the "Factory of the Future".

from the wide-ranging digitisation of trade fair processes. First is often the advance electronic registration of trade visitors, which is naturally a process easier to complete from the comfort of the visitor's desk at home than in the foyer of an exhibition site. And in addition to an entry ticket registered by an electronic entry system, all ticketing processes are also becoming significantly more efficient for the organiser.

Visitors also benefit from electronic exhibitor lists on websites, which are constantly updated and for this reason alone are significantly more useful than the print catalogue. Such exhibitor lists today are also contained on trade fair-specific apps for many exhibitions which also offer comprehensive information on preparation for a trade fair visit including arrival information, hall plans and presentation programmes.

Trade Fair Participations are Becoming more Efficient but are not Replaceable

A key development is that it has been made easier to establish contact between visitors and exhibitors. Noteworthy in this regard are matchmaking tools which can be used to arrange appointments, in particular with exhibitors where the visitor has no personal contact. The trade fair visitor always has limited time. So it is all the more important that waiting times for an appointment at a trade fair are kept to the minimum.



METAV in Düsseldorf encompasses the full spectrum of production technology including new fields such as moulding, medical, additive manufacturing and quality.

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www.tubotech-online.com

wire South America

International Wire and Cable Fair

São Paulo, 1 – 3 October 2019

www.wire-south-america.com

› **RUSSIA**

ZDRAVOOCHRANENIJE

29th International Trade Fair for Health Care, Medical Engineering Healthy Lifestyle 2019

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www.zdravo-expo.ru

Interplastica

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www.interplastica.de

upakovka

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Moscow, 29 January – 1 February 2019

www.upakovka-tradefair.com

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CHIC

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The Munich-based 'bauma' is the world's leading trade fair for construction machinery and mining machines. With over 3,400 exhibitors from 58 countries and some 584,000 visitors from 219 countries, the 2016 edition again achieved record figures.



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The 67th edition of the IAA Commercial Vehicles show including the New Mobility World programme this September in Hannover managed to surpass the already high expectations of the industry with 435 world premieres.

Another development worth mentioning is lead tracking. Thanks to digitisation exhibitors are able to scan a visitor's details directly from their badge and import them into their address database. At the moment, however, this service is not offered at all trade fairs and is only used by some exhibitors. But the practice of copying out business cards is likely to be gradually coming to an end.

Trade fairs have also made significant progress in achieving market transparency in certain sectors. Naturally, it's relatively easy to get an overview of potential suppliers online. However, this certainly doesn't mean that it is easy to assess the quality of these firms and their products. A trade fair visit involves contact with real people and real products and in most cases is likely to make it significantly easier to reach a decision. In summary: The digital transformation in the trade fair industry is in full swing, with significant improvements to the efficiency of trade fair participation and trade fair visits. But the real trade fair with real people and products remains central and is now highly efficient.

www.auma.de

German Exhibition Venues Invest in Modernisation

By 2022, German exhibition venues plan to invest around 900 million euros in modernising exhibition halls and enhancing service quality, but also in building new facilities. They want to increase their hall space by approximately 55,000 m². Some 35,000 m² of this new space will already be available this year. These are results from a survey by AUMA – the Association of the German Trade Fair Industry – of 25 exhibition venues of national and international significance.

At the beginning of this year, Germany's exhibition venues had a total capacity of 2,835,922 m² hall space, or 1.4% more than the year before (2,795,509 m²). In 2017, they invested a good 330 million euros in their exhibition and conference capacities, especially in expanding and modernising halls, redesigning and reshaping entryways, and modernising the thermal, fire protection and event tech systems.

Venues of regional significance had a total capacity of 381,815 m² according to a

2017 AUMA survey, which means that Germany currently has 3.21 million m² of hall space available for exhibitions.

Exhibition Revenues Worldwide: Five of Top 10 Companies are from Germany

German exhibition companies are well represented among the leading businesses of the industry worldwide. Based on 2017 revenues, five companies from Germany rank among the top 10. This is a result of a study completed in August 2018 by the Association of the German Trade Fair Industry (AUMA). It includes exhibition organisers, exhibition hall operators, and companies that work in both sectors.

Behind the British organisers Reed Exhibitions (1,264.0 million euros) and UBM (979.0 million euros), Messe Frankfurt ranked third with sales of 669.1 million euros.

Four additional German businesses ranked 7th to 10th: Messe Düsseldorf with 367.0 million euros, Koelnmesse with 357.9 million, Deutsche Messe Hanover with 356.4 million and Messe München with 332.6 million euros.

Total revenues of German companies reached 3.7 billion euros in 2017. Because of more events in 2018 and good economic conditions, AUMA anticipates sales this year of approximately 3.8 to 3.9 billion euros.

©Heiko Stahl/Nürnberg Messe



Following the completion of its new Hall 3C at a cost of EUR 70 million, the Exhibition Centre Nuremberg can now offer exhibitors an additional 10,000 m² of space.

Koelnmesse – Trade Fairs Reconsidered

Koelnmesse is the number 1 trade fair location for more than 25 industries. Each year, Koelnmesse organises and manages around 80 trade fairs, exhibitions, guest events and special events in Cologne and around the world. Around 3 million visitors from 221 states and more than 53,500 exhibiting companies from 122 countries regularly take part in its events. With record sales of EUR 357.9 million and profit in the double-digit millions, 2017 was another successful year for Koelnmesse. Conditions are ideal for the planned measures in the Koelnmesse 3.0 investment programme. In order to continue offering exhibitors and visitors a modern, flexible and attractive trade fair venue, Koelnmesse is investing in its infrastructure and digitisation. Koelnmesse's events are the shortest route to the global market for sector leaders and SMEs alike and offer an important opportunity to be part of the globalisation of markets and the internationalisation of business. Koelnmesse is one of the most international trade fair locations in the world: on average 70 per cent of ex-

hibitors and over 20 per cent of visitors are from overseas. As well as having 12 subsidiaries outside Germany, Koelnmesse has a worldwide network of representative offices

in more than 100 countries. It will be able to showcase its international expertise and professionalism at EXPO Dubai 2020/21, for which it is organising the German Pavilion.

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Incoming Tourism Continues to Grow



A popular tourist destination: Rothenburg ob der Tauber

Travel Destination Germany remains as popular as ever. In the first half of 2018 the boom in overnight stays by international visitors continued. This is also a key factor for the German economy. According to the German Institute for Economic Research (DIW) in Berlin, tourism accounts for 3.9 per cent of gross value added in Germany – more than mechanical engineering and the retail trade. At around EUR 37 billion, overnight stays by international visitors generate almost 30 per cent of tourist consumer expenditure in Germany.

The figures released by the Federal Statistical Office for the first half of 2018 show that the number of international overnight stays in accommodation establishments with at least ten beds totalled 38.6 million from January to June, a 4.5 per cent year-on-year increase. Over 60 per cent of the 1.7 million additional overnight stays by international visitors in the first half of 2018 were from European countries, the largest volume market for German incoming tourism with almost three quarters of all overnight stays. The highest growth rates in visits were achieved by guests from Poland (+13.3%), the Czech Republic (+11.9%) and Romania (+11.5%). There were also above average increases in overnight stays for visitors from Russia (+5.9%) and Great Britain (+5.7%). The largest source market, however, remains the Netherlands, which posted a 1.8 increase in overnight stays.

There was also a marked 5.1 per cent increase in overnight stays by foreign visitors to a total

of 9.5 million stays. The USA consolidated its position as the most important source market with growth of five per cent. The Asia/Australia/South Africa region contributed more than 5.3 million overnight stays to German incoming tourism in the first half of 2018. Overnight stays by Chinese visitors increased by an impressive 5.1% to 1.3 million, cementing the country's position among the top ten source markets for Travel Destination Germany.

Tourism Profits from the Brand Image of Germany

The first-half figures for 2018 confirm the consistent year-on-year growth in incoming tourism to Germany for the last eight years. In 2017 overnight stays by international visitors grew by 3.6 per cent year-on-year to 83.9 million. Petra Hedorfer, CEO of the German National Tourist Board (GNTB), attributed this impressive performance to "positive underlying economic data, political stability in key source markets



Europa Park Rust, Germany's largest theme park, remains exceptionally popular with visitors.

and the exceptional positioning of Travel Destination Germany as a brand internationally". "We have further cemented our leadership position as a business destination, as a trade fair location and as a conference destination. And Travel Destination Germany is also booming as a holiday destination in the international market. With its exceptional brand positioning Germany appeals to international guests as a genuine alternative to other established holiday countries under the motto 'Germany Simply Inspiring', says Petra Hedorfer.

Germany's most popular destinations

1. *Miniatur-Wunderland model railway exhibition, Hamburg*
2. *Europa-Park Rust*
3. *Neuschwanstein Castle*
4. *Lake Constance*
5. *Rothenburg ob der Tauber*
6. *Dresden*
7. *Heidelberg Castle*
8. *Phantasialand Brühl*
9. *Hellabrunn Zoo Munich*
10. *Mosel Valley Wine Region*

The 2017 global nation branding survey by the prestigious Anholt-GFK Roper Nation Brands Index (NBI) ranked Germany's brand image first among 50 comparable nations. Next in the ranking were France, Great Britain, Canada, Japan and the USA. The NBI ranking is based on the six key criteria of Exports, Governance, Culture, People, Tourism and Immigration & Investment. Germany received a slightly better score compared with 2016 in all six of these categories. It also performed better in all sub-categories of the Tourism and Culture segments such as excellence in sport, cultural heritage and an interesting contemporary cultural scene.

The Bauhaus Anniversary and German Summer Cities are Top Themes in 2019

The 100th anniversary of the foundation of the legendary Bauhaus movement in Weimar is one of the outstanding cultural events in Travel Destination Germany in 2019. The German National Tourist Board is publicising some of the highlights of this anniversary with a themed global campaign. "The roots, legacy and international impact of the Bauhaus movement can be experienced in Weimar, Dessau, Berlin and countless other locations. This means the celebrations will be a key element of the cultural tourism offering of Travel Destination Germany", says the CEO of the GNTB.

One of the highlights not just in Thuringia but in Germany as a whole will be the opening of the Bauhaus Museum Weimar on 6 April 2019. With contemporary architecture and a multimedia exhibition, the Weimar Bauhaus



©Miniatur Wunderland Hamburg

Miniatur Wunderland in Hamburg, the largest model railway in the world, became Germany's most popular attraction in 2018.

museum will provide a new stage for the treasures of the world's oldest Bauhaus collection. Other highlights of an annual programme with over 50 exhibitions, festivals and events include the reopening of the Neues Museum Weimar with the exhibition "Van de Velde, Nietzsche and Modernism around 1900" and the opening of the "Am Horn" model home in Weimar. In addition, the specially-created "Grand Tour of Thuringia" will guide visitors through the history of the Bauhaus and Modernism in Thuringia. Saxony-Anhalt also has several highlights in store to mark the 100th anniversary of the Bauhaus movement. These include the scheduled opening in autumn 2019 of the Bauhaus Museum Dessau, where the nationally and internationally unique collection of the Bauhaus Dessau Foundation will be showcased in all its breadth and glory for the first time.

In addition to the "100 Years of Bauhaus" campaign, in 2019 Germany will also be presenting an extensive palette of interesting offerings across five core themes under the slogan

"German Summer Cities". As well as the Urban City cluster, highlighting big-city culture, shopping and roof-top bars, there will also be a Romantic cluster focusing on small history-steeped towns, palaces and parks, wine regions and traditional gastronomy. In the Holiday on the Water cluster Germany also scores highly with a host of attractive offerings for a summer break. The spectrum ranges from coastal experiences via island life, bathing lakes, river rafting, excursion steamers, bathing boats and beach clubs to houseboat holidays on rivers and lakes. The Art & Culture cluster also provides an attractive reason for travel to Germany, highlighting museums and exhibitions, industrial heritage, music and shows and open-air events. In addition, a plethora of sightseeing destinations are a perennial reason for travel to Germany. From Hamburg's Elbphilharmonie in the north to the Zeche Zollverein in the Ruhr Region, the Brandenburg Gate, Neuschwanstein Castle and Hohenzollern Castle - Germany boasts a cornucopia of remarkable landmarks.

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The island of Mainau - a jewel in the crown of the popular tourist region of Lake Constance

GERMAN EMBASSIES

AFRICA

Algeria

165, chemin Sfindja (ex Laperlier), Algier

Angola

Rua de Benguela 17, Luanda

Benin

1438, Avenue Jean Paul II, Cotonou

Botswana

Queens Road 1079–1084, Gaborone

Burkina Faso

14 Rue Kafando Romuald, La Rotonde, Ouagadougou

Burundi

22, Avenue du 18. Septembre, Bujumbura

Cameroon

Novelle Route Bastos, Bastos-Usine, Jaunde

Central Africa

See Embassy Jaunde (Cameroon)

Chad

Avenue Félix Eboué, N'Djamena

Congo

s/c ICO WOOD, Avenue Denis Loemba, Pointe-Noire

Congo (Democratic Republic)

82, Avenue Roi-Baudouin, Kinshasa-Gombe

Egypt

2, Sh. Berlin, Zamalek, Cairo 11211, Cairo

Eritrea

Warsay Street, Saba Development Building, Asmara

Ethiopia

Yeka Kifle Ketema, Woreda 03, Addis Abeba

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Boulevard de l'Indépendance, Immeuble les Frangipaniérs, Libreville

Gambia

See Embassy Dakar (Senegal)

Ghana

No. 6, Kenneth Kaunda Road, North Ridge, Accra

Guinea

B.P. 540, Conakry

Kenya

Ludwig Krapf House, Riverside Drive 113, Nairobi

Lesotho

See Embassy Pretoria (South Africa)

Liberia

Tubman Boulevard, Monrovia

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See Embassy Tunis/Tunisia

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101, Rue de Pasteur Rabeony Hans (Ambodirotra), Antananarivo 101

Malawi

Convention Drive (Capital City), Lilongwe

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Badalabougou Est, Rue 14, Porte 334, Bamako

Morocco

7, Zankat Madnine, Rabat

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Boile Postale 372, Nouakchott

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See Embassy Antananariva (Madagascar)

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Sanlam Centre, 6th Floor, Independence Ave., Windhoek

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Avenue du General de Gaulle, Niamey

Nigeria

15, Walter Carrington Crescent, Victoria Island, Lagos

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KN 27 St No 5, Kiyovu, Kigali

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5219 Haile Selassie Avenue, Lusaka

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Umoja House, Mirambo Street/Garden Av., 2nd Floor, Daressalam

Togo

Boulevard de la République, Lomé

Tunisia

Impasse du Lac Windermere, Les Berges du Lac, Tunis

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30, Ceres Road, Avondale, Harare

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www.germany.org.au
Level 5, Int. Chamber House, 121 Exhibition Street, Melbourne, VIC 3000, www.germany.org.au

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Deutsche Handelskammer in Österreich Schwarzenbergplatz, 5/Top 3/1, 1030 Wien, www.dhk.at

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Canadian German Chamber of Industry and Commerce Inc. 480 University Ave., Suite 1500, Toronto, ON M5G, 1 V2 www.germanchamber.ca

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Cámara Chileno-Alemana, P.O. Box Casilla 19, Correo 35, Santiago de Chile www.chamchal.cl

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Njemacko-hrvatska industrijska i trgovinska Komora, Strojarska cesta 22/11, 10000 Zagreb, Kroatien <http://kroatien.ahk.de>

Czech Republic

Česko-německá obchodní a průmyslová komora, Václavské náměstí 40, 11000 Praha 1 <http://tschechien.ahk.de>

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Det Tysk-Danske Handelskammer, Kongens Nytorv 26, 3. Stock, DK-1050 Kopenhagen K www.handelskammer.dk

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Cámara de Industrias y Comercio Ecuatoriano-Alemana, Casilla 17-16-083, Quito www.ahkecuador.org.ec

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German-Arab Chamber of Industry and Commerce 21, Soliman Abaza St, off Jameat El Dowal El Arabia St. Mohandessin-Giza, Cairo, Egypt. www.ahk-mena.com

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Deutsch-Baltische Handelskammer in Estland, Lettland, Litauen, Suurtüki 4b, 10133 Tallinn www.ahk-balt.org

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Deutsch-Finnische Handelskammer, Postfach 83, 00101 Helsinki www.dfhk.fi

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La Chambre Franco-Allemande de Commerce et d'Industrie, 18, Rue Balard, F-75015 Paris <http://frankreich.ahk.de>

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German Chamber of Commerce, Hong Kong, 3601 Tower One, Lippo Centre, 89 Queensway <http://hongkong.ahk.de>

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Deutsch-Ungarische Industrie- und Handelskammer
Lövöház u. 30, 1024 Budapest
www.duihk.hu + www.ungarn.ahk.de

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Repräsentanz der Deutschen Wirtschaft in Island,
Borgartun 35, 5th floor, 105 Reykjavik
http://island.ahk.is

India

Indo-German Chamber of Commerce
Maker Tower E, 1st Floor, Cuffe Parade, Mumbai 400 005
www.indo-german.com

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http://indonesien.ahk.de

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German-Iranian Chamber of Industry and Commerce
P.O.Box 15875-6118, Teheran
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German-Irish Chamber of Industry and
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www.german-irish.ie

Israel

Israeli-German Chamber Of Industry and Commerce,
P.O.Box 50150, IL-6150101 Tel Aviv
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Camera di Commercio Italo-Germanica,
Via Gustavo Fara 26, 20124 Milano
www.ahk-italien.it

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Deutsche Industrie- und Handelskammer, Sanbancho
KS Building, 5F, 2-4 Sanbancho, Chiyoda-ku,
Tokyo 102-0075
http://japan.ahk.de

Kazakhstan

Delegation der Deutschen Wirtschaft für Zentralasien,
Businesszentrum Koktem Square/Bostandyski rajon/
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Korean-German Chamber of Commerce and Industry,
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Litauen, Strelnieku iela 1-4, LV-1010 Riga
www.ahk-balt.org

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Deutsch-Baltische Handelskammer in Estland, Lettland,
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50250 Kuala Lumpur
http://malaysia.ahk.de

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Cámara Mexicano-Alemana de Comercio e Industria, A.C.
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Cámara de Comercio e Industria, Peruano-Alemana,
Casilla 27-0069, Lima 27 – San Isidro
www.camara-alemana.org.pe

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European Chamber of Commerce of the Philippines,
8/F Döhle Haus Manila, 30-38 Sen. Gil Puyat Avenue,
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Polsko-Niemiecka Izba Przemyslowo-Handlowa,
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Deutsch-Slowakische Industrie- und Handelskammer
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Deutsch-Slowenische Industrie- und Handelskammer,
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10252 Stockholm
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www.gaccmidwest.org, www.ahk-usa.com

German American Chamber of Commerce of the Southern
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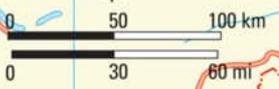
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Hainich

Westerwald

- World Heritage Site
- Airport
- Mountain Peak (in meters)
- State Boundary
- International Boundary
- Motorway
- Trunk Road
- Railway

- MÜNCHEN** Regional capital
- Fürth** Towns/cities with a population of more than 100 000
- Köln** Part of the "Magic Cities" association
- Augsburg** Part of the "Historic Highlights" association
- Murnau** Towns with ICE or EC/IC rail connection, population < 100 000
- NP** National Park





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