

ANNUAL REPORT 2017

CONNECTING
IDEAS

CREATING
SOLUTIONS



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OF CUSTOMERS
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“OUR GOAL IS TO BE OUR CUSTOMERS’ FIRST CHOICE FOR INNOVATIVE, TECHNOLOGICALLY LEADING-EDGE, AND DIGITAL SOLUTIONS.”

Dear Ladies and Gentlemen,
Dear Business Partners,

Industry 4.0, digitization, and the Internet of Things are entering our daily lives and initiating changes in ways that are intense and highly dynamic. These much-discussed developments can be seen everywhere and are increasing every day.

At Körber, we feel that we have a strong responsibility to participate in these dynamic developments and discussions and play a leading role in shaping them. It’s all part of our long-term perspective and our commitment to always offer our customers outstanding, innovative, future-oriented products, services, and solutions. We want to actively contribute to the success and satisfaction of our customers – also with a view to easing the transition to the fourth industrial revolution.

That’s why our motto for the year 2017 was **“Connecting ideas – creating solutions.”**

Last year, we focused especially on bringing together, connecting, and cooperatively expanding the know-how and ideas of our employees, customers, and business partners regarding the new digital technologies and their potential applications. In pursuit of this goal, we chose a variety of formats and locations throughout the world. For example, we collaborated intensely with our employees and customers in international “sprints.” And through each one of these sprints, we quickly and collaboratively defined and successfully implemented concrete ideas and the corresponding pilot projects.

Through our new Business Area Körber Digital, which was founded in Berlin in 2017, we have created the opportunities and preconditions for talking to our customers, employees, and business partners in a very competent, focused, and creative environment about the combination of existing and new technologies, and also for working on entirely new digitally based products and business models. The aim of these discussions is always to create new, useful, and successful solutions. That’s because our goal is to become our customers’ first choice for innovative, technologically leading-edge, and digital solutions.

In this report you’ll find many ideas that we have already implemented this year, both with and for our customers, in new and future-oriented products and solutions. One of these solutions is called plug & produce, which reduces the time and costs involved in integrating a new machine into a production network by 75 percent. Another solution is a new product line that reduces the number of unplanned downtimes and optimizes maintenance processes. This results in a significant increase of productivity for our customers. Furthermore, we are using technology created by a startup from southern Germany to design the restructuring of production halls faster, more efficiently, and thus more cost-effectively.

Our systematic focus on customers, technology, and innovation is validated by our positive economic development. In the past fiscal year, we



received incoming orders totaling €2,901 million – a 23 percent increase compared to the prior year. Our Group sales amounted to €2,609 million – an increase of 18 percent. Our consolidated earnings (EBITA) also developed positively, reaching €239 million.

In the past fiscal year, we were also able to further expand our position in the market and in terms of technology. In addition to the regional aspect of our ongoing internationalization, we also focused on all the areas of technology that are relevant to us – machines and plants, software, and digital solutions. In the Business Area Logistics Systems, our acquisitions of the software specialists DMLogic and HighJump have enabled us to expand our position in the US market and move into a leading position in the area of worldwide supply-chain solutions. In the Business Area Tissue, we continued to supplement and strengthen our product portfolio through the acquisition of MTC. Our acquisition of Systec & Services in the Business Area Pharma Systems has helped to enhance our expertise in the area of track & trace systems. And through our equity investments in BigRep and the investment fund High-Tech Gründerfonds, we are strengthening our digital partnerships and networks.

We would like to give a special thanks to our employees and managers, who in 2017 once again contributed to the success of our customers and our companies through their great commitment,

strong sense of responsibility, and innovative spirit. They are very actively shaping the digital advancement of our Group and our expertise.

I would like to sincerely thank our customers, both personally and on behalf of the entire Group Executive Board and all of our employees, for the trust you have placed in us and for our very successful cooperation. We appreciate your openness and your willingness to strike out in new directions and to develop new solutions in cooperation with us.

We look forward to continuing this successful progress with you in the future, shaping it together, and thus making a significant contribution to your business success.

Hamburg, April 2018

Stephan Seifert
Chairman of the Group Executive Board
of Körber AG

THE GROUP EXECUTIVE BOARD OF KÖRBER AG

SUCCESSFULLY ENTERING A DIGITAL FUTURE TOGETHER:
THE MEMBERS OF THE GROUP EXECUTIVE BOARD OF KÖRBER AG

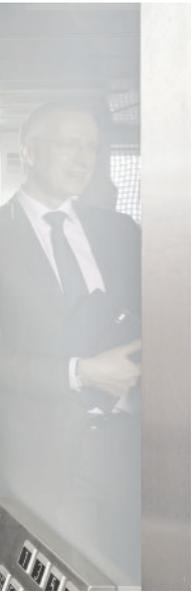


STEPHAN SEIFERT
CHAIRMAN OF THE GROUP EXECUTIVE
BOARD OF KÖRBER AG





CHRISTOPHER SOMM
MEMBER OF THE GROUP EXECUTIVE
BOARD OF KÖRBER AG



STEFAN KIRSCHKE
MEMBER OF THE GROUP EXECUTIVE
BOARD OF KÖRBER AG



STEP BY STEP INTO THE FUTURE

BY MEANS OF ACQUISITIONS, EQUITY INVESTMENTS
AND A NEWLY ESTABLISHED BUSINESS AREA, KÖRBER
IS WELL ON ITS WAY TO BECOMING A DIGITALLY
LEADING TECHNOLOGY GROUP

JUNE 1, 2017

EQUITY INVESTMENT IN HTGF III: A DIRECT LINK TO STARTUPS

The fund “High-Tech Gründerfonds (HTGF)” — a venture capital investment company — has been very successful to date. Whereas only six companies were involved in the first edition of the public-private partnership, the number rose to 18 in the second HTGF edition. The High-Tech Gründerfonds III was launched on June 1, 2017. When it kicked off, 26 companies made targeted investments in up to 40 startups from the tech sector. These startups are working on promising business models that are still at an early stage of development. The fund also encompasses public investors such as the German Economics Ministry and the KfW bank. In order to engage in an in-depth dialogue with young companies and stay in close touch with future-oriented technologies, the Körber Group is also involved in the HTGF III. Having a direct link to up-and-coming startups provides important input for the core business of all Group companies, e.g. in areas such as mechanical engineering, sensors, robotics, logistics, and software solutions. In addition, the extensive sharing of information supports Körber’s strategic development into a digitally leading technology Group. In this investment, Körber always focuses on innovations that result from digitization and Industry 4.0, and that effectively augment or expand the Group’s portfolio.



JUNE 14, 2017

ACQUISITION OF MTC S.R.L.: A TUSCAN TISSUE SPECIALIST

Tuscany is a popular travel destination for tourists from all over the world. However, what most of them do not know is that the heart of Italy's tissue industry is located in the northern part of the region. In order to further boost the sector's image and make it better known, Italy's main tissue specialists have been jointly organizing a trade show since 2013 — the "It's Tissue." The event will be taking place for the third time in June 2018. Körber will attend the fair with two exhibitors: Fabio Perini and MTC S.R.L. The latter company is based in Porcari and has been part of the Körber Group since its acquisition on June 14, 2017. MTC S.R.L. develops, produces, and sells interfolders and multifolders for cosmetic wipes and paper towels. It is considered the global technology leader for such machines as well as those for the processing of napkins. MTC machines fold and package hygienic paper products. The company has introduced numerous innovations, including a folding system that uses only a single paper feed on its vacuum interfolders. MTC's innovative prowess and its broad range of products make it a perfect addition to the Business Area Tissue.

JUNE 30, 2017

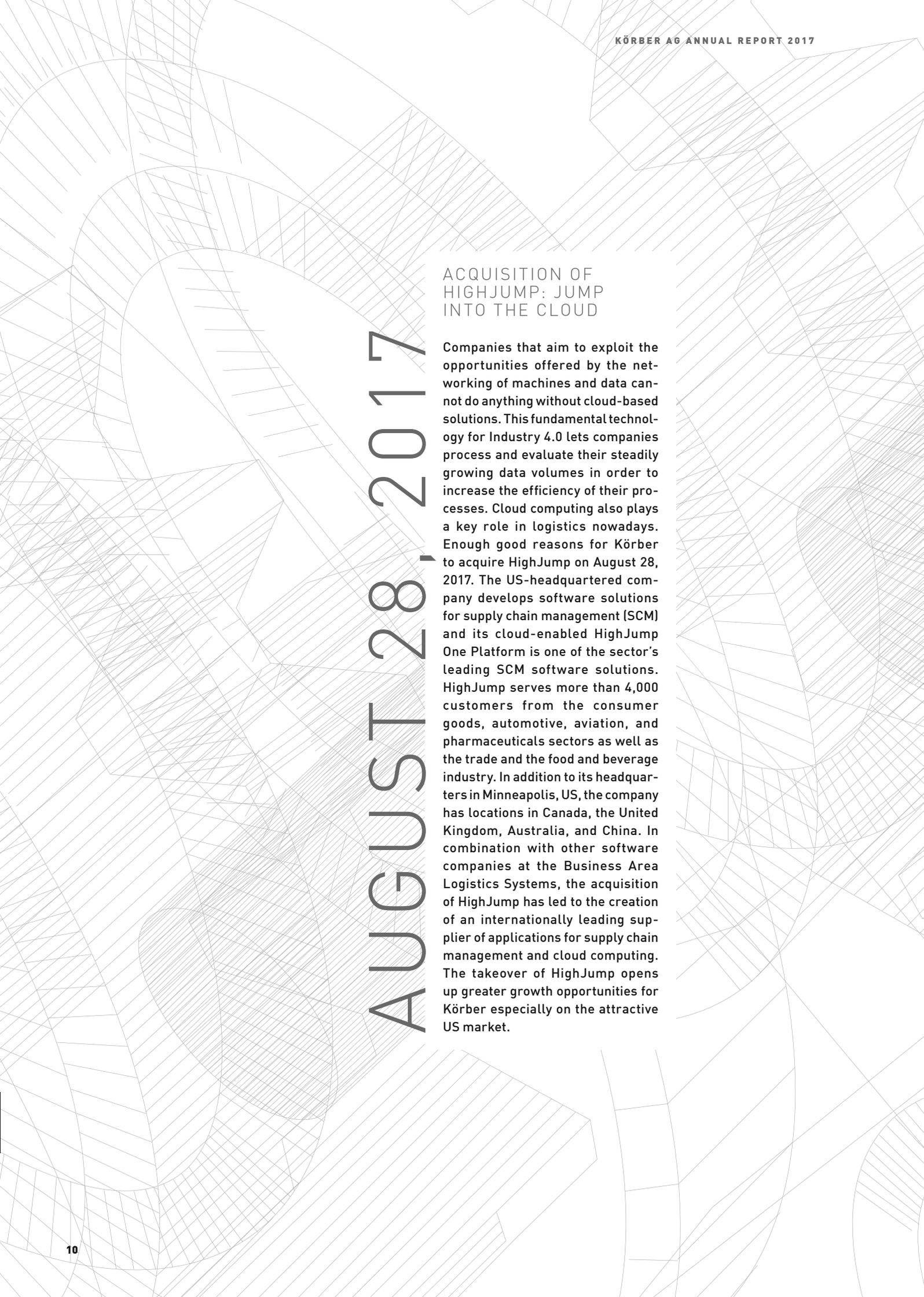
ACQUISITION OF DMLOGIC: INTERNATIONALIZATION STRATEGY

In June 2014, the US software specialist DMLogic LLC expanded its successful warehouse management activities to Europe by establishing a site in Eindhoven, Netherlands. Three years later, the company became firmly anchored in the European continent — as part of the Körber Group. Through the acquisition of a majority interest in DMLogic on June 30, 2017, the Group has continued to pursue its internationalization and growth strategy for its Business Area Logistics Systems. DMLogic, which is headquartered in Pittsburgh, has an outstanding reputation in its home market. The Business Area can exploit this in order to substantially expand its activities in the United States. DMLogic also has a site in Sydney, enabling the Business Area Logistics Systems to focus more strongly on the Australian market as well. DMLogic is a specialist supplier of logistics software products, primarily for customers from the pharmaceutical and automotive industries as well as from the trade. The company's software solutions help to make customers' warehouse management systems more efficient and productive. DMLogic covers the entire range of services — from design and implementation to support.

AUGUST 4, 2017

EQUITY INVESTMENT IN BIGREP: PRINTING ONE'S WAY INTO THE FUTURE

BigRep's motto is "think big." The Berlin-based startup manufactures the world's biggest series-produced 3D printer and also offers other additive manufacturing systems. The company's 3D printers are used for conventional industrial applications such as the production of spare parts and robot components. However, their size even lets them print furniture and designer items in one piece. One of the startup's 3D printers even manufactured a fully functional, true-to-sound violin. Since its establishment in 2014, BigRep's innovative spirit has enabled it to develop into a highly competitive company with more than 70 employees and sites in Asia and the US. The company's heart is located in Berlin's Kreuzberg district, where an interdisciplinary team of experts from 14 different countries is continuously reinventing the future of 3D printing. Körber's strategic equity investment in BigRep enables the Group to more intensely investigate the possibilities of additive manufacturing and increase its know-how in this field. Thus underscores the technology's great potential for the Group's long-term growth.

The background of the page is a complex, abstract pattern of overlapping circles and lines, creating a sense of depth and movement. The lines are thin and grey, while the circles are slightly more prominent, some with a fine grid pattern inside. The overall effect is a modern, technical aesthetic.

AUGUST 28, 2017

ACQUISITION OF HIGHJUMP: JUMP INTO THE CLOUD

Companies that aim to exploit the opportunities offered by the networking of machines and data cannot do anything without cloud-based solutions. This fundamental technology for Industry 4.0 lets companies process and evaluate their steadily growing data volumes in order to increase the efficiency of their processes. Cloud computing also plays a key role in logistics nowadays. Enough good reasons for Körber to acquire HighJump on August 28, 2017. The US-headquartered company develops software solutions for supply chain management (SCM) and its cloud-enabled HighJump One Platform is one of the sector's leading SCM software solutions. HighJump serves more than 4,000 customers from the consumer goods, automotive, aviation, and pharmaceuticals sectors as well as the trade and the food and beverage industry. In addition to its headquarters in Minneapolis, US, the company has locations in Canada, the United Kingdom, Australia, and China. In combination with other software companies at the Business Area Logistics Systems, the acquisition of HighJump has led to the creation of an internationally leading supplier of applications for supply chain management and cloud computing. The takeover of HighJump opens up greater growth opportunities for Körber especially on the attractive US market.

NOVEMBER 1, 2017

ACQUISITION OF
SYSTEC & SERVICES:
COMBATING
PRODUCT PIRACY

In order to effectively combat product piracy in the pharmaceuticals sector, the European Commission passed the Delegated Regulation (EU) 2016/161. The regulation forces the pharmaceuticals packaging industry to take action and introduce serialization with track & trace capabilities for almost all prescription drugs by February 2019. Only companies that do so will be able to continue supplying products. Systec & Services GmbH, which has been part of Körber's Business Area Pharma Systems since November 1, 2017, helps suppliers meet the regulation's requirements. The company has decades of experience in the development and introduction of track & trace solutions for medical products and is an expert and active partner in all stages of its customers' projects. In addition, Systec & Services advises customers from the pharmaceutical and biotech industries in the selection and implementation of software solutions for manufacturing execution systems (MES). The company is headquartered in Karlsruhe and has a branch in Pratteln near Basel, Switzerland.

DECEMBER 28, 2017

ESTABLISHMENT
OF KÖRBER DIGITAL:
FOCUSING ON
DIGITIZATION

The heart of Berlin is home to the headquarters of a new Business Area that is forging ahead with Körber's digital advancement: Körber Digital. Starting in December 2017, the Business Area's digital experts have been working enthusiastically and with great innovative spirit to fully exploit the diverse possibilities of digital networks and data analyses for the Group and its customers. Serving as a central point of contact for digital innovations and new digital business models, the Business Area combines the dynamic entrepreneurial spirit of a startup with the Group's long-term growth targets. Körber Digital has an ambitious goal: to spearhead the industry's digital revolution. Stefano Di Santo, CEO of Körber Digital, explains how he intends to achieve this goal in the interview starting on page 20.

CONNECTING IDEAS, CREATING SOLUTIONS

KÖRBER IS STRONGLY FOCUSED ON FORGING AHEAD WITH ITS DIGITAL ADVANCEMENT. AS PART OF THIS EFFORT, THE GROUP IS NOT ONLY NETWORKING WITH PROMISING STARTUPS BUT ALSO USING NEW APPROACHES IN ITS INTERNAL INNOVATION PROCESS. THE GOAL IS TO TRANSFORM NEW TECHNOLOGIES INTO FUTURE-ORIENTED PRODUCTS, SERVICES, AND SOLUTIONS EVEN FASTER

In the age of digitization and Industry 4.0, speed is a crucial success factor. New technologies, products, and solutions are emerging at ever shorter intervals. They are changing the daily lives of their users, in the consumer market as well as in the industrial environment. For industrial companies, this rapid transformation is both a risk and an opportunity. The opportunity: Com-

panies that adapt to the fast pace of innovation and transform new technologies and data processing methods into smart and sustainable solutions quickly and efficiently can safeguard their business success over the long term. The risk: Companies that are too slow will end up playing only a subordinate role in the medium or long term – or completely disappearing from the market.

In this dynamic environment, it is crucial to boldly embrace changes and be open to new methods. Körber realized this early on and developed a strategy for making digitization another one of its core areas of expertise throughout the Group and adapting it to the specific needs of its customers. Through its digital strategy, the Group is creating the pre-conditions so that it can continue to

actively participate in shaping the digital transformation. This means innovatively refining established technologies and offers; increasingly offering innovative digital products, services, and solutions; and initiating and promoting completely new business models. The focus is always on providing concrete added value for customers.

ECOSYSTEMS AS INNOVATION DRIVERS

To make the successful implementation of this digital strategy possible, the Group is also using completely new ways of generating ideas and developing products in its innovation process. One approach that is becoming increasingly important for Körber is that of “digital ecosystems.” These are global networks in which partners from diverse areas combine their specific know-how and cooperatively develop innovations. Ecosystems are deliberately kept open. Membership is open to customers, suppliers, individual developers, universities, research institutes, and even competitors. The usefulness of this approach is obvious: Combining different areas of expertise shortens innovation cycles, and customers directly benefit from that – with regard to all offers.

The ecosystems that Körber concentrates on are mainly digital innovations with a focus on industry. Cooperative projects with startups are especially promising. These projects range from open exchange to equity investments. Both approaches put Körber in touch with a wide range of young companies that give the Group access to promising new technologies and thus to attrac-

tive global growth markets. These young companies also provide Körber with fresh new ideas and creative conceptual approaches that make the Group’s and the Business Areas’ own idea generation processes faster and more effective – in other words, more agile.

SPRINTING TOWARD NEW IDEAS

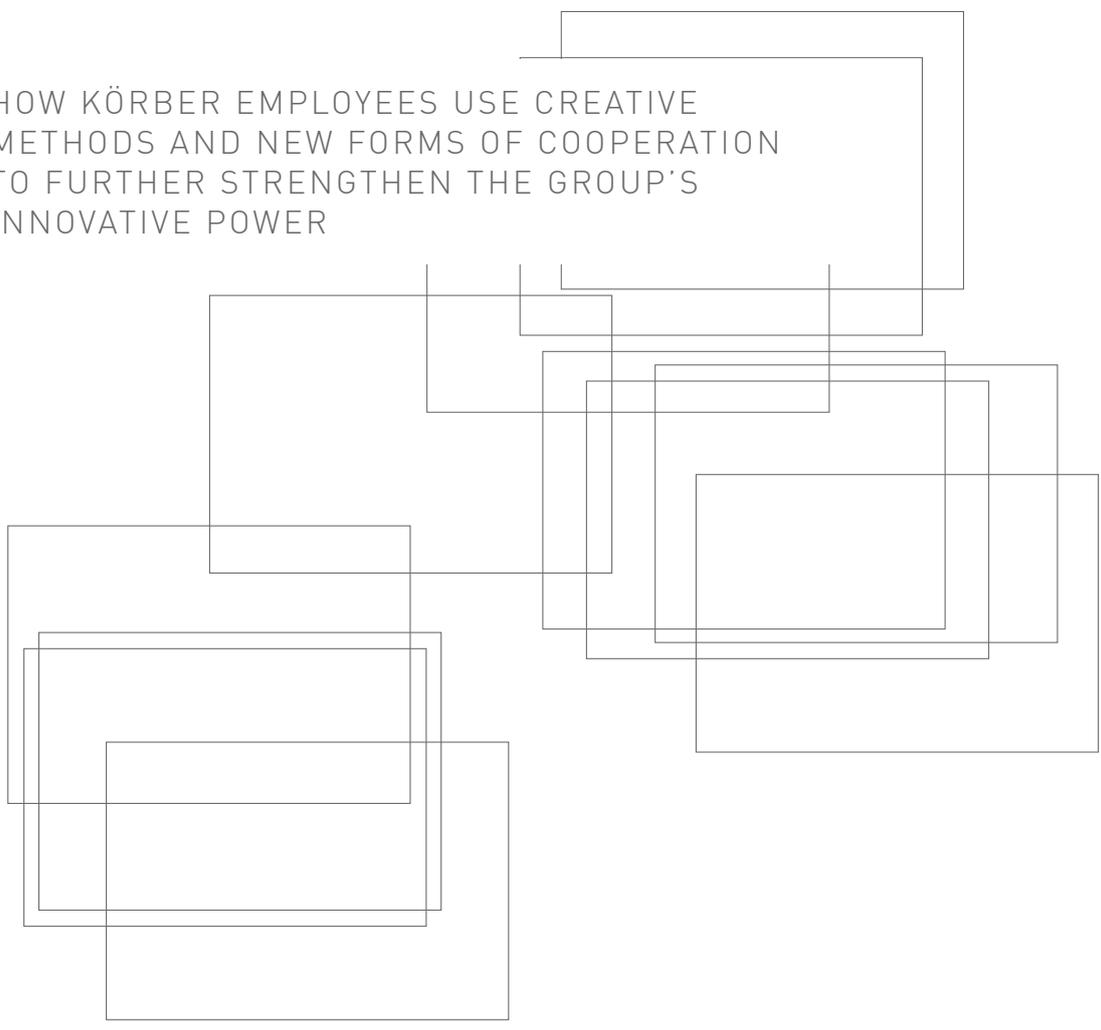
Today it’s already possible to see how successfully Körber has integrated new methods into its daily work. Last year the Group introduced “sprints” with the focus areas Smart Factory, Customer Focus, and Data, Analytics, Software & Platforms. In the sprint workshop series, each of which lasted several weeks, teams of experts from all Business Areas and from Körber AG developed new ideas for digital products, services, and solutions. These sprints generated numerous initiatives that are already driving the implementation of very concrete solutions.

Körber’s strategically focused digital advancement is very target-oriented. That applies to the latest approaches to innovation management, innovative methods for recruiting employees, and intensifying cooperation between Körber experts within existing internal networks such as the Network Center Technology. In all of these fields, Körber always creates the best possible conditions for taking full advantage of the new technological opportunities offered by digitization and Industry 4.0. This approach is already paying off for the Group’s customers, employees, and job applicants. Six employees explain exactly how on the following pages.



STEPPING UP THE PACE

HOW KÖRBER EMPLOYEES USE CREATIVE
METHODS AND NEW FORMS OF COOPERATION
TO FURTHER STRENGTHEN THE GROUP'S
INNOVATIVE POWER



**“CUSTOMER FOCUS”
AT KÖRBER DIGITAL**

Focus on the customer — more than just a slogan!

A clear orientation towards customers has always been a key factor of Körber’s success. That’s no surprise, because it’s one of the Group’s Corporate Values. Customer relations management is one of the fields in which digitization is opening up new and more extensive opportunities. In order to quickly take advantage of these opportunities as effectively as possible, 12 employees from throughout the Group met in a sprint format in the summer of 2017 to analyze the “customer journey.” “This concept refers to the cycles that customers go through before and after buying a product,” explains Simon Winter, Program Manager Customer Focus at Körber Digital. “In the course of such ‘journeys,’ customers come into contact with Körber at various points. One of the sprint team’s main goals was to improve the digital interaction at these points.” The team’s cooperative effort resulted in more than 20 concrete projects and initiatives involving innovative solutions

**SIMON WINTER COMES FROM THE
BUSINESS AREA TOBACCO AND
IS NOW “CUSTOMER FOCUS” PROGRAM
MANAGER AT KÖRBER DIGITAL**



**“I’M VERY HAPPY
TO BE ABLE TO
ACTIVELY SHAPE
THE FUTURE
TOGETHER WITH
MY COLLEAGUES
AND CUSTOMERS.”**

for digital marketing and sales. Some of these results, namely short-term initiatives that are especially promising, either have already been or will soon be integrated into daily business

operations. They include intensified and, even more importantly, precisely customized digital marketing; expansion of the customer portals; more extensive use of virtual and augmented reality as marketing tools; and the development of new software solutions for customer relationship management (CRM). “These initiatives are being implemented under the leadership of the Business Areas that have the greatest potential in the respective areas. The focus is always on measures that directly benefit all the other Business Areas as well as our customers,” Winter says. “Our customers are permanently in the loop. In other words, we have the ideal conditions for demonstrating our customer orientation to them on a daily basis.”

“THE COOPERATION WITHIN THE NCT BOOSTS OUR EXPERTS’ CREATIVITY AND THUS THE PACE OF OUR INNOVATION CYCLES.”

**PANO PAPAMANOGLOU,
CTO OF THE BUSINESS AREA
LOGISTICS SYSTEMS AND
MEMBER OF THE NETWORK
CENTER TECHNOLOGY (NCT)**

NETWORK CENTER TECHNOLOGY

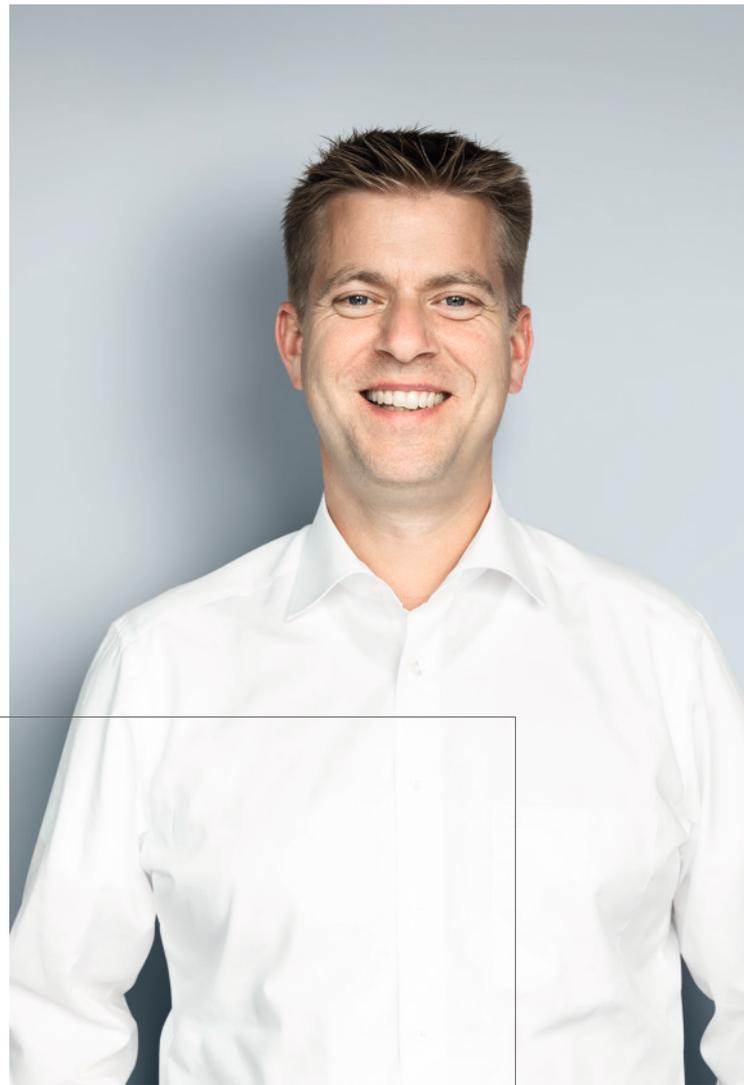
Harnessing knowledge

“Innovations arise when the right people come together at the right time and are open to other viewpoints,” says Pano Papamanoglou, CTO of the Business Area Logistics Systems. According to Papamanoglou, a great example of a successful, network-oriented partnership is the Network Center Technology (NCT), for which he is responsible at the Business Area Logistics Systems. The NCT is a group-wide network of experts that was founded at Körber in 2009. Papamanoglou is always involved whenever specialists from the Group get together. “One of Körber’s biggest strengths is its wide variety of know-how and experience,” says Papamanoglou. “We exploit this diversity at the NCT by cooperatively turning it into innovative products or processes.” The international Körber network has more than 200 members and is divided into ten Clusters, ranging from Automation to Product Design, Software, and Additive Manufacturing. The experts from the work groups meet several times a year in order to directly discuss current topics from their respective fields and to initiate or promote joint development projects. These meetings

are moderated by colleagues from the Business Areas and coordinated by colleagues from the Corporate Center Strategic Technology Management at Körber AG. The NCT also includes in these meetings specifically chosen external experts from universities, tech companies, startups, and other organizations. According to Papamanoglou, “These discussions broaden the NCT members’ horizons. There’s always a very special atmosphere that is creative, dynamic, and goal-oriented.”



**“OUR TEAM MEETS
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NESS. THIS IS ONE
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HAS DEFINITELY
PAID OFF.”**



**JENS DELVENTHAL, PROGRAM LEAD
“SMART FACTORY” AT KÖRBER DIGITAL**

“SMART FACTORY” AT KÖRBER DIGITAL

Turning ideas into products

One of the most ambitious ideas related to digitization and Industry 4.0 is the Smart Factory. This is an intelligent production environment that organizes itself — ideally without any human intervention. The 13 experts from Körber who worked together on the Smart Factory sprint wanted to turn this vision into a reality step by step. “The concept of a smart factory in itself broadens our horizons and gives us great ideas on how we can further optimize our value chain

and those of our customers — for example, with regards to machine utilization and throughput times,” says Program Lead Jens Delventhal. The participants of the sprint spent eight weeks investigating the possibilities of process automation, robotics, and human-machine collaboration in order to find new digital solutions for the Smart Factory. They also drew inspiration from outside the company — for example, during a visit to the Digital Capability Center, a train-

ing factory in Aachen that focuses on Industry 4.0. The sprint team suggested around 40 projects. After approval by the Group Executive Board, three of them are so far advanced now that they are undergoing testing. “The crucial thing is that the ideas must be suitable for actual use,” says Delventhal. “After all, we want the sprints to produce concrete solutions rather than unrealistic projects.”

“PURCHASING OPENS DOORS TO NEW IDEAS...”

**MICHAEL STIETZ,
HEAD OF PURCHASING —
PMTC, KÖRBER AG**

PURCHASING & TECHNOLOGY

Using connections and exploiting potential

Körber works together with a large number of suppliers worldwide, each of which harbors great innovation potential. In order to exploit this potential, the Group is strengthening a team that was previously often regarded as basically an in-house service provider: Purchasing. “Digitization is a key driving force of this change,” says Michael Stietz, Head of Purchasing — PMTC at Körber. “That’s because increasing automation is boosting the efficiency of our processes, and that in turn enables us to focus more on the strategic elements of our work.” That includes the search for new ideas from among our suppliers. “This innovation scouting is a powerful tool for accessing interesting solutions and initiating development partnerships with suppliers,” says Stietz. The Purchasing team helps to open doors in this respect. If a supplier is interested in forming such a partnership, the task is handed over to experts from Research & Development. “Without the help of the Purchasing colleagues, we often wouldn’t know which new ideas individual suppliers are working on at any given moment,” says Achim Aberle, Head of Technology & Development at Aberle, a company in the Business Area Logistics Systems. “Our colleagues’ contacts make it more likely that we can beat the competition in accessing new solutions from our suppliers.” However, such contacts don’t give Körber carte blanche. A lot of patience is needed in order to create development partnerships, and they are often the result of a shared innovative spirit. “However, nobody immediately lays all of their cards on the table. You have to build trust and organize partnerships in such a way that they genuinely benefit both sides,” says Aberle.



“... THAT FURTHER STRENGTHEN OUR INNOVATIVE CAPABILITIES.”

**ACHIM ABERLE, HEAD OF TECHNOLOGY &
DEVELOPMENT, ABERLE GMBH**

**“FOR ME IT’S
HIGHLY
MOTIVATING
TO GET PEOPLE
INTERESTED
IN KÖRBER.”**

**DAGMAR DÖHRING, HEAD OF
RECRUITMENT, KÖRBER AG**

HUMAN RESOURCES

Only the best

Companies all over the world are competing for the best skilled employees and managers. And Körber is no exception. “In view of the ‘war for talent’ and the shift toward an employee-oriented market, the challenges to recruiting have increased considerably,” says Dagmar Döhring, Human Resources Manager and Head of Recruitment at Körber. “We are now using completely new approaches in order to get top-level candidates interested in our company,” she adds. “We are using state-of-the-art, cloud-based IT solutions to ensure a rapid digitized job application process. We’re also using innovative methods at our Recruiting Center to compete for suitable candidates. We focus on the creation of a talent pool, the management of applicants, and above all on active sourcing — which means, identifying potential skilled employees and addressing them directly via social networks and sector portals.” Speed is an important key to success

in the search for personnel — foremost when it comes to IT specialists, who are especially in demand in today’s market. “We are using new approaches to attract well-qualified and talented candidates,” says Döhring. “Building up the new Business Area Körber Digital, we regularly invite candidates to our Job Applicant Days. With this format, Körber is staying abreast of the times. It involves short decision-making paths, fast processes, and optimal candidate management, and as a result the hiring decision is made on the same day. When we accept a candidate, we immediately offer him or her a job contract. Our work at Human Resources is becoming more agile, digitized, and international. For me it’s highly motivating to get people interested in Körber in such dynamic surroundings and to support them on their career paths within the Group.”





“WE WANT TO
CREATE DIGITAL
VALUES.”

STEFANO DI SANTO, CEO OF THE NEW BUSINESS AREA KÖRBER DIGITAL, HAS NO QUALMS ABOUT POSSIBLE SHAKEUPS OF INDUSTRY DUE TO DISRUPTIVE INNOVATIONS. IN AN INTERVIEW, HE EXPLAINS WHY THE REVOLUTION CAUSED BY THE INTERNET OF THINGS WON'T SPARE THE B2B SECTOR AND WHY KÖRBER DIGITAL IS COOPERATING WITH THE GROUP'S OTHER BUSINESS AREAS TO DEVELOP NEW OFFERS FOR CUSTOMERS

Mr. Di Santo, is the mindset at Körber Digital different from that of the Group's other Business Areas? And if so, how is it different?

Our mindset is indeed different. At Körber Digital we don't look at software, a machine or a plant in isolation. Instead, we always think in terms of holistic solutions. This approach is becoming increasingly important – because of, not in spite of, the fact that we are part of a Group whose Business Areas very successfully build machines and plants and develop and sell software products.

Let me briefly explain why this is so. Today, when we talk about the Internet of Things (IoT), in which machines or facilities and products are connected with one another and with people, we can proudly say that Körber is doing very well on the “T” side – for example, in terms of machines and hardware, including the software that goes with it. On the “I” side – the Internet and the potential it offers through networking and data analysis – we want to, and must, make further improvements as rapidly as possible.

As we learn how to pay even closer attention to the overarching demands of our customers and our markets, we will automatically turn our gaze toward completely new problems. And on this basis, with this expanded mindset, we're using our internal network and new cooperation projects with our partners to enable our customers to use all of our colleagues' innovative ideas even more effectively. After all, one

of our main goals is to work together with our colleagues from across the Group and with our customers to develop new digital products, services, and business models, refine them successfully to the point of market readiness, and thus make a significant contribution to our customers' business success.

Today we're reading a great deal about “digital disruption” – the intense, and sometimes sudden and massive, transformation of entire business models and sectors through digitization. What does this mean for a technology group that has its roots in mechanical engineering and plant construction?

Körber is already a technology Group through and through – and its strengths include mechanical engineering and plant construction. But software has been essential to the operation of both of these sectors for a long time now. That's why we have been systematically enhancing our software expertise in all of our Business Areas for a number of years. In other words, thanks to our cutting-edge technical expertise, we can play a leading role in all the industries represented by our customers today. To make sure things stay that way and, ideally, to discover completely new areas where we can apply our comprehensive know-how and broad experience, we are now systematically taking the next big step. I'm convinced that our

Connected:
Körber Digital is
counting on
an intensive
exchange.



“WE ENABLE OUR
CUSTOMERS TO
USE INNOVATIVE
IDEAS EVEN MORE
EFFECTIVELY.”

STEFANO DI SANTO

customers will be enthusiastic about our ongoing digital advancement.

What exactly does this process entail?

Today more than ever before, “digital disruption” requires that a company completely adapts its approach to its customers. This includes seriously questioning one’s own ideas again and again: Is this something our customers need today or will need in the future? That’s how a company stays

abreast of changing times. If we look back at the past, we can see that the typical attitude throughout our entire industry was “Digitization and the Internet are revolutionizing the business with end users, for example at Netflix and Amazon. However, at B2B companies in the industrial context we won’t be affected by this development to the same extent.”

That’s no longer valid, because digital solutions are rapidly becoming more important in B2B markets

as well. The key word here is “Industry 4.0.” We want to offer our customers the option of having new experiences with us and radically questioning previous approaches in areas ranging from Material Purchasing to Production, Logistics, and Marketing. The focus here is on how to handle data – because, as the media keep reminding us, data is the currency of the future. And we want to use data profitably, with and for our customers.

You are currently setting up Körber Digital together with an international team in Berlin, one of Germany's digital hotspots. What personal qualities and skills are you looking for in the people you want to have on this team?

We are intensely addressing the "Internet generation" and all digital thinkers – including those who are already working at our Group's companies. On the one hand, we're looking for coworkers who have grown up with the Internet and feel at home in it – the people who are often referred to as "digital natives." On the other, we're also looking for people who want to contribute their comprehensive long-term experience in industry to our new approaches to solutions – people who enjoy working in a completely new and different way in order to predict and fulfill customer needs.

Actually, there is only one golden rule: Everyone who feels that our approach is the right one for them is welcome to work together with us. That way we can cooperatively figure out where we can most profitably use which talented newcomer and which personal skills. We believe that discussing things and struggling to find the best ideas and approaches is the salt in the soup – and that's why it's entirely appropriate to conduct both of these activities very intensely. I appreciate very open discussions, because all of us want to find the best possible solution. And as an Italian, I know and love this kind of discussion, which can get very emotional! After all, what we're planning is something

new. It's a passionate pursuit for all of us, and we're very ambitious. Together we grow!

Because of my professional experience as the CEO of a plant construction company, I think it's very important to make sure our experienced experts can create value for our customers by cooperating with everyone who brings in new horizons of experience or has had a different kind of training. To sum up, we want to have the best from every area. We want to take advantage of our broad and deep knowledge of technologies and industries, as well as the almost unlimited potential of digitization and Industry 4.0 – for the benefit of our customers and our business operations. This is a strong motivation for our move into the digital future!

FACTS & FIGURES ABOUT KÖRBER DIGITAL

Founded: December 2017

Headquarters: Berlin

CEO: Stefano Di Santo

WHAT?

1. Drive the digital advancement
2. Enable innovation and empower people
3. Build new digital businesses for and with customers

HOW?

1. Radical Attitude: Körber Digital is shaping the future of a digital world
2. Revolutionary Performance: Not only solving existing problems but also mastering the challenges of tomorrow
3. Rapid Style: In a disruptive world, speed is the key to success



Today, a passion for new technologies is more important than ever.

FASTER MORE EFFICIENT MORE PRODUCTIVE

FROM COLLABORATIVE ROBOTS TO DATA-BASED MONITORING SYSTEMS AND AN INNOVATIVE INTERFACE FOR CONNECTED PRODUCTION: HOW THE BUSINESS AREAS OF THE KÖRBER GROUP ARE SHAPING THE DIGITAL FUTURE AND THUS DELIVERING CLEAR ADDED VALUE TO THEIR CUSTOMERS

AUTOMATION

A COBOT IS SIGNIFICANTLY EXPANDING CAPACITY IN THE PRODUCTION AREA OF LTI MOTION

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PAPERLESS ASSEMBLY SAVES RESOURCES AND GENERATES VITAL MOMENTUM FOR GREATER EFFICIENCY

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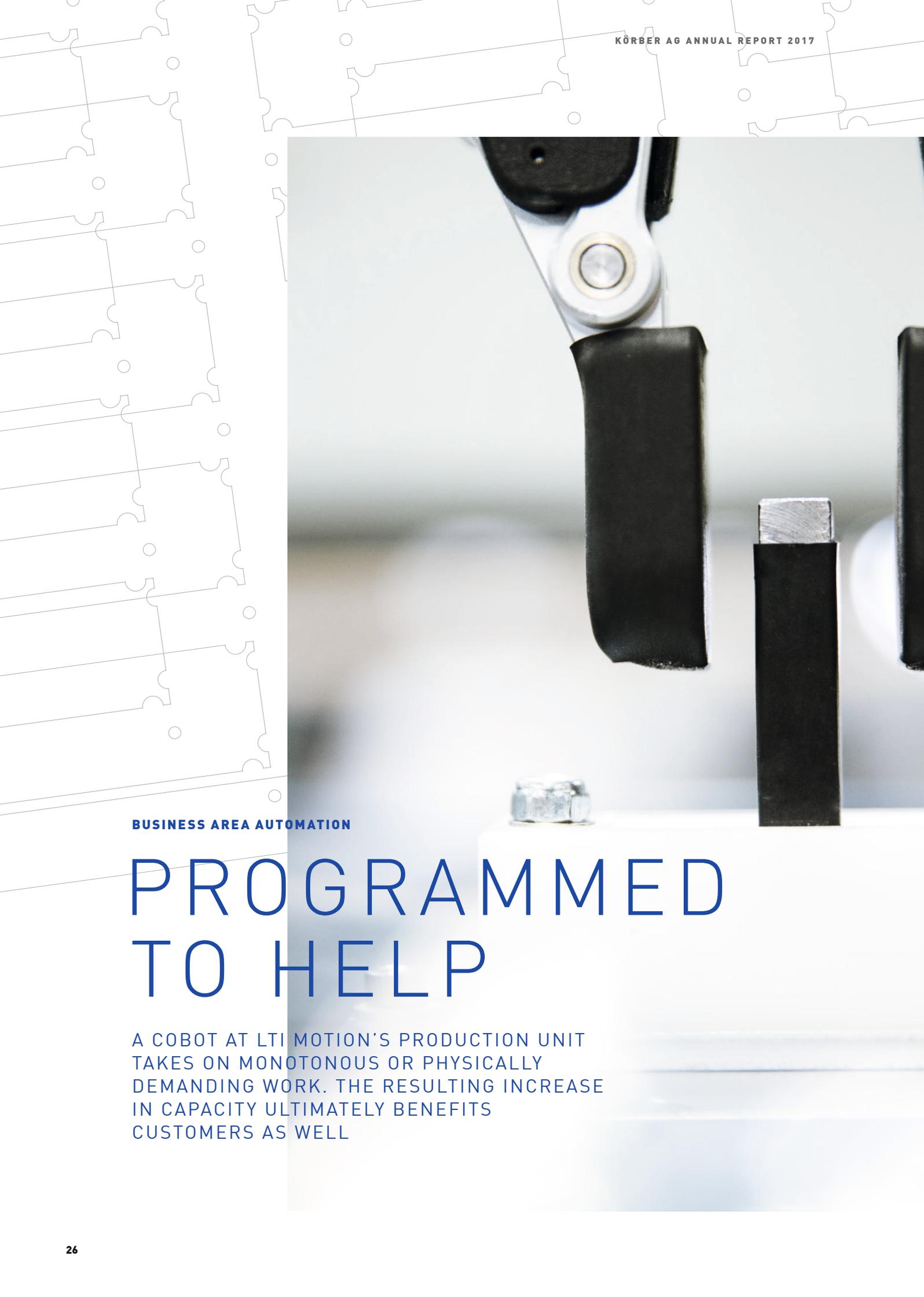
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THE "DIGITAL SOLUTIONS" INITIATIVE IS INCREASING MACHINE AVAILABILITY AND OPTIMIZING MAINTENANCE OPERATIONS

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BUSINESS AREA AUTOMATION

PROGRAMMED TO HELP

A COBOT AT LTI MOTION'S PRODUCTION UNIT TAKES ON MONOTONOUS OR PHYSICALLY DEMANDING WORK. THE RESULTING INCREASE IN CAPACITY ULTIMATELY BENEFITS CUSTOMERS AS WELL



All under control:
the cobot at the
dispensing machine
at LTI Motion.



The cobot tirelessly performs its job at LTI Motion, where it works in production on a dispensing machine that automatically seals device housings with a silicone mass. The cobot's task is to place the housing onto the machine. Once a housing is completely sealed, the cobot takes it out of the machine and immediately replaces it with another. In such "pick-and-place" activities, the cobot continuously exchanges data with the machine so that it can perform its task precisely and always with perfect timing. However, the cobot takes extra precautions when a human employee comes near. If a person approaches within a pre-defined distance, the

“THE JOINT PROJECT OPENS UP MANY NEW OPTIONS.”

EUGEN RAISCH, RESPONSIBLE FOR LEAN MANAGEMENT AT THE BUSINESS AREA AUTOMATION



No danger: The automation solution conforms to the highest safety standards.

cobot automatically switches itself off as a precautionary measure and stops working.

COOPERATION BETWEEN MAN AND MACHINE

“The cobot is equipped with special scanners that ensure a high level of safety,” explains Eugen Raisch, who is responsible for Lean Management at the Business Area Körber Automation. This is one of the main reasons why the collaborative robot is very popular at the LTI Motion team. The cobot has been used at this specialist automation company since January 2018. It is programmed in such a way that it can work together closely with human coworkers, from whom it can take over monotonous or physically strenuous tasks. The multi-motion



Simple control:
Employees can also manually order the cobot to move at any time.

INFORMATION SHARING

The idea of using a cobot first arose during the Smart Factory sprint, which Körber held for the first time last year (see page 17). The project team at Körber Automation found the dispensing machine's use case and solution in record time. It took less than three months to go from the definition of the use location and specific tasks to the programming work and the provision of the material. "We used agile methods, which greatly helped us implement the project in such a comparatively short amount of time," says Raisch. In addition to Körber Automation, collaborative robots are also being used in pilot projects at the Business Areas Logistics Systems, Tobacco, and Machine Tools. The results are being collected and evaluated in a joint analysis pool so that new applications can be made available to all the other participants as quickly as possible. Moreover, the project teams are in regular contact with one another in order to share experiences, work together on optimizing the use of cobots, and develop additional possible applications. In these tasks, Körber Digital (see page 20) supports the team. Raisch says, "The joint project opens up many new options — not only for the use of cobots, but also for many different automation solutions in production and logistics."

robotic arm has performed very well in combination with the dispensing machine. While the cobot reliably feeds the machine with housings, the employees who previously carried out the monotonous "pick-and-place" task can now devote themselves to more demanding jobs. This generates added value for customers as well. Another advantage of the collaborative robot is that it can work night shifts without any human assistance. This increases production capacity further and can ensure the faster delivery of the devices during bottleneck situations or when order volumes are very high. In addition, the housings boast consistently high quality thanks to the precision with which the cobot carries out its work. This is another big benefit for customers.

BUSINESS AREA LOGISTICS SYSTEMS

MEASURING PRODUCTION

THE BUSINESS AREA LOGISTICS SYSTEMS IS USING TECHNOLOGY CREATED BY A STARTUP FROM SOUTHERN GERMANY TO DESIGN THE RESTRUCTURING OF PRODUCTION HALLS FASTER, MORE EFFICIENTLY, AND THUS MORE COST-EFFECTIVELY

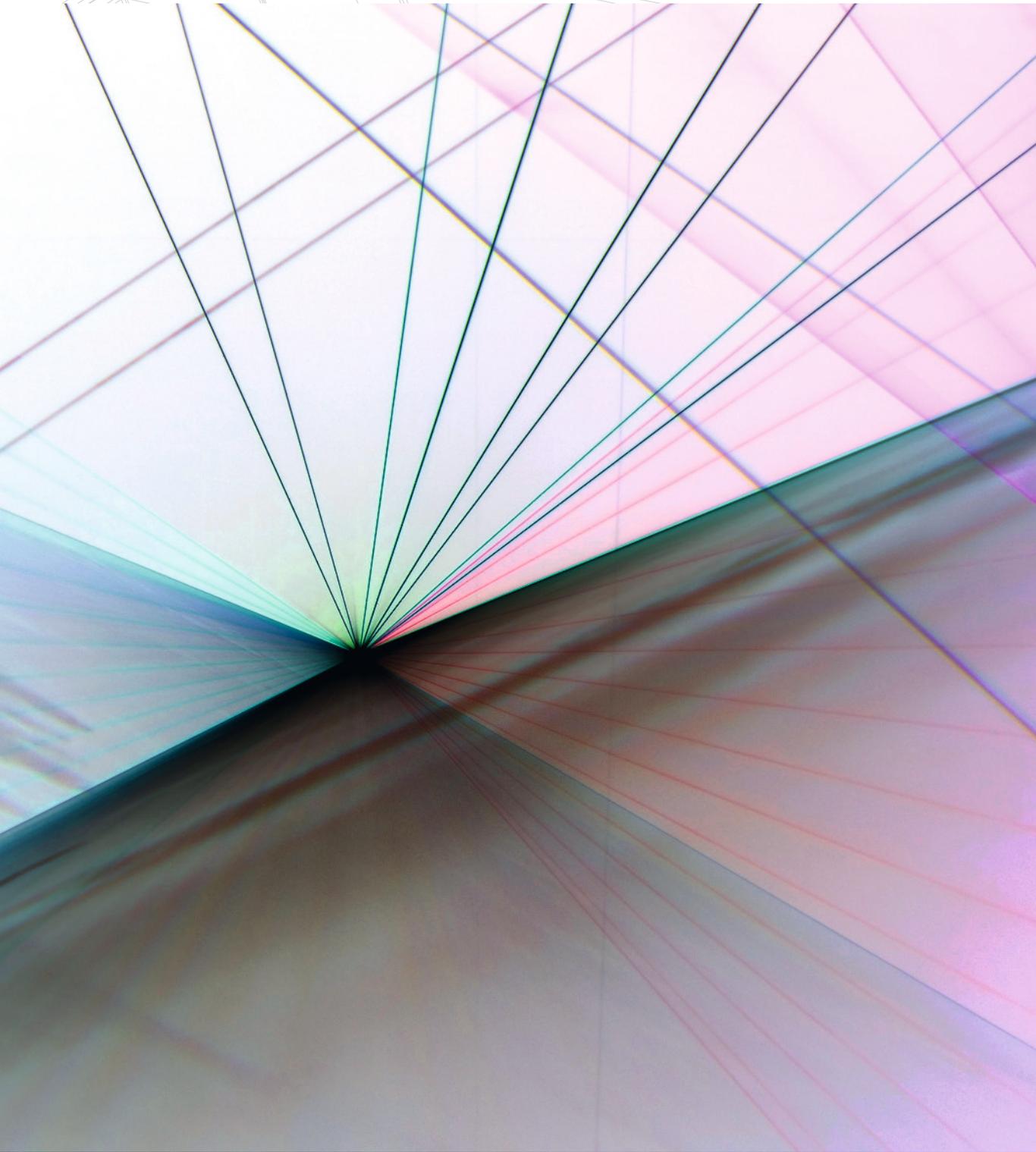
It all began with an unusual museum tour last year, when a team of experts from a variety of Körber Business Areas visited a startup in southern Germany as part of a group-wide Smart Factory sprint workshop (see page 17). In order to present its indoor navigation system, the startup invited the guests to take part in a virtual tour. The experts from Körber looked at a screen that enabled them to walk through a 3D image of a museum's rooms and call up additional information about the exhibited paintings. The guests were impressed, especially Roland Fuchs, CEO of the Körber manufacturing logistics specialist Langhammer. "The technology works more or less like Google Street View, except that users are inside a building and not out on the street," he explains. "It's quite fascinating and it made us think that an altered version of the

system might be ideally suited for our industrial applications."

PHOTOREALISTIC 3D MAPS

Following the visit, the Business Area Logistics Systems contacted

the startup and the two partners launched a pilot solution a few months later. In this solution for what is called 3D engineering, a high-tech trolley equipped with cameras and laser scanners takes precise measurements of the



Exact measurement:
Lasers are used to determine the precise size of a production hall.

customer's production hall or warehouse. A special software then turns the recordings into a photorealistic 3D image of the hall that is precise up to a centimeter. The image includes all of the technical equipment as well as all other architec-

tural and technical details. "We can use an Internet browser to call up this image on a computer. With its help, we can, for example, plan the extensive conversion of the entire hall or the precise installation of a new machine at a specific location,"

says Thorben Herbert, Program Manager Smart Factory at the Business Area Logistics Systems.

The solution offers customers numerous benefits, because 3D engineering enables building conversion projects, for example, to be planned and implemented much faster than before. It also allows customers to put their machines and facilities into operation faster and thus significantly shorten downtimes. And because the experts have to travel less, they have more valuable time for the development of customer-specific offers. That's because this innovative digital solution enables the companies of the Business Area to carry out the planning at their own facilities and use previously created 3D maps for other projects for the same customer. "3D engineering is also much more precise than planning on the basis of handmade hall plans. It enables better advance detection and avoidance of collisions with existing machines or the building when a machine is installed," says Fuchs. The application is now also being

used when Körber contacts potential new customers. "We can, for example, display our solutions directly in their future production environments. That's an extremely valuable feature."

FREE SERVICE

Among other things, 3D engineering is now being successfully used at customers from the tissue industry. In fact, the solution pays off twice for customers, because the data can also be supplied to customers for their own needs. "The system is used from a certain order volume or where certain complexity criteria apply," says Fuchs. The Business Area is working on further enhancing its 3D engineering system – also in cooperation with other Business Areas within the Group. The solution will soon combine many additional applications that create value, ranging from the incorporation of training videos to the provision of service functions such as the online ordering of spare parts. In this way, it will enthuse even more customers about this digital technology.



“Pick-by-robot”:
The TORUs from
Magazino at work in a
high-bay warehouse.

HIGH-PRECISION ORDER PICKING

Körber has recently begun to work closely together with another startup that is based in southern Germany. Since February 2018 the Group has been an investor in the company Magazino, which is located in Munich. Through this investment, Körber ensures that its Business Area Logistics Systems has access to a promising future-oriented technology. Magazino’s product range also covers a logistics segment that is considered one of the most exciting of the entire sector: The use of perception-controlled robots for order picking. Magazino is represented in this market by a product called TORU. This order-picking robot for intralogistics is equipped with 3D cameras and sensors that enable it to drive digitally controlled through the

warehouses of online vendors, for example, and pick the ordered items from the shelves. Once TORU has grabbed the item, which might be a paperback book or a shoebox, it puts the item into its integrated compartment and takes it along the shortest route to the shipping station, where the robot automatically deposits the item. This combination of unrestricted navigation and autonomous handling makes TORU unique on the pick-by-robot market. Moreover, TORU provides logistics firms and mail-order companies a great opportunity to operate more flexibly and efficiently during peak loads and at other times. Companies will especially benefit if they use several TORUs simultaneously in their warehouses.

BUSINESS AREA PHARMA SYSTEMS

ON THE PATH TO PHARMA 4.0

THE BUSINESS AREA PHARMA SYSTEMS IS IMPLEMENTING MEASURES THAT SUBSTANTIALLY REDUCE CHANGEOVER TIMES AND ENABLE NEW MACHINES TO BE EASILY INTEGRATED INTO PRODUCTION NETWORKS. IN THIS WAY, IT IS INCREASING ITS CUSTOMERS' EFFICIENCY WHILE OPENING THE DOOR FOR THEM TO NETWORKED PRODUCTION

In line with the Pharma 4.0 concept, the Business Area Pharma Systems is pursuing a number of pioneering projects at differing levels in order to enable pharmaceutical companies to exploit the diverse opportunities offered by digitization and Industry 4.0. The focus is currently on two topics in particular: innovative user guidance for shortening retooling times and networking industrial production systems. "The demands that are being put on today's packaging systems are steadily rising, especially with regard to process reliability, efficiency, and the increasing fragmentation of the product segments," says Jürg Messmer, Head of Engineering, Automation & Digitization at Dividella. "The smart use of digital technologies is the key to fulfilling these requirements."





Vision: The Hololens display provides a step-by-step guide through the retooling process.

FAST AND FLAWLESS RETOOLING

An example: Dividella, which specializes in innovative packaging systems, uses augmented reality (AR) in the form of the Hololens head-mounted display for the retooling of its NeoTOP TopLoad cartoner. This mixed reality solution from Microsoft is part of a high-resolution display and integrated computer that customer employees wear on their heads. The system can exchange data with the packaging machine. This data serves as the basis for texts or 3D images that are projected onto the Hololens in order to guide the customer's employee step by step through the retooling process as soon as the worker stands in front of the machine in question. It thus almost completely eliminates the possibility of retooling errors. The employee always sees the required information in his or her field of vision at precisely the place where the associated retooling step has to be performed on the machine. "The extensive assistance enables even less experienced personnel to efficiently conduct retooling tasks without

making any mistakes. This greatly increases the reliability of the customer's processes," says Messmer. Moreover, the solution from Dividella significantly reduces retooling times, which can greatly boost the customers' productivity because of the trend toward ever-smaller production lots. The system also automatically handles the legally prescribed documentation process. "This further increases productivity because the customer's employees no longer have to write down every individual step on paper," explains Messmer.

HEADING INTO THE FUTURE WITH PLUG & PRODUCE

The sister company Werum IT Solutions supplies an important feature for the successful use of the Hololens: the overarching PAS-X manufacturing execution system (MES). This production management software also plays an important role in another project that is related to Pharma 4.0. In this project, Werum is creating the preconditions for a completely networked industrial



“OUR SOLUTION ENSURES THAT THE SOFTWARE AND THE MACHINES SPEAK THE SAME LANGUAGE.”

production system. It includes an interface that enables new machines to be quickly integrated into the production environment of pharmaceutical companies and thus puts the plug & produce principle into practice. “The integration of machines into an existing network used to be an unproductive task that took a lot of time,” says Klaus Sauermann, Senior Head of Business Development at Werum. “Our plug & produce solution will greatly simplify this process in the future.”

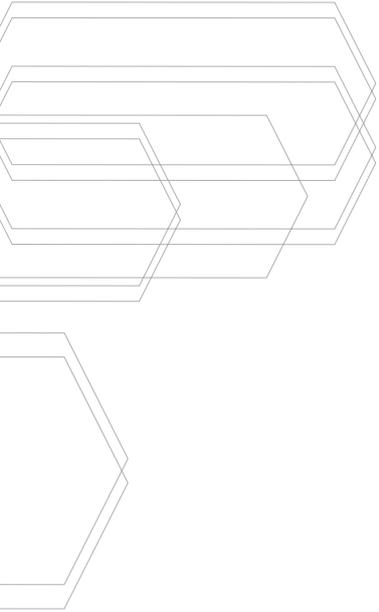
The interface makes structured data exchanges possible between PAS-X and the machines in the customers’ production halls. The solution works similar to a USB port through which a printer, for example, can be connected to a computer without requiring the installation of a separate driver. “Our solution ensures that the software and the machines speak the same language,” says Sauermann. In practice, it works like this: After the new machine announces itself to the network, PAS-X recognizes it as a relevant unit and incorporates it into the production process. PAS-X then transfers the needed data for performing a task – for example, the number of units that need to be produced or the respective product’s batch number. In addition, the software acquires all of the process and documentation-related information concerning the production process from the machine. The solution benefits drug manufacturers in a variety of ways. For example, it reduces the costs of configuring the production network and training the employees as well as the likelihood that mistakes will occur during setup. Project run times are shortened as well.

KLAUS SAUERMAN, SENIOR HEAD OF BUSINESS DEVELOPMENT AT WERUM

“All in all, it reduces the effort of integrating a new machine into a production network by up to 75 percent,” says Sauermann.

CREATE AN INDUSTRIAL STANDARD

The plug & produce system from Werum is an open solution that is not tied to a specific supplier. Werum is therefore working together with partners, other suppliers, pharmaceutical companies, and organiza-



tions such as the International Society for Pharmaceutical Engineering (ISPE) in order to establish the message-based interface as an industry standard over the medium term. “The pharmaceutical industry is striving very hard to standardize measures because plug & produce is becoming an increasingly important topic within the context of Industry 4.0. Our associated interface is the perfect solution for this,” says Sauer mann.

Thanks to the close cooperation between the Business Area’s machine production and software com-

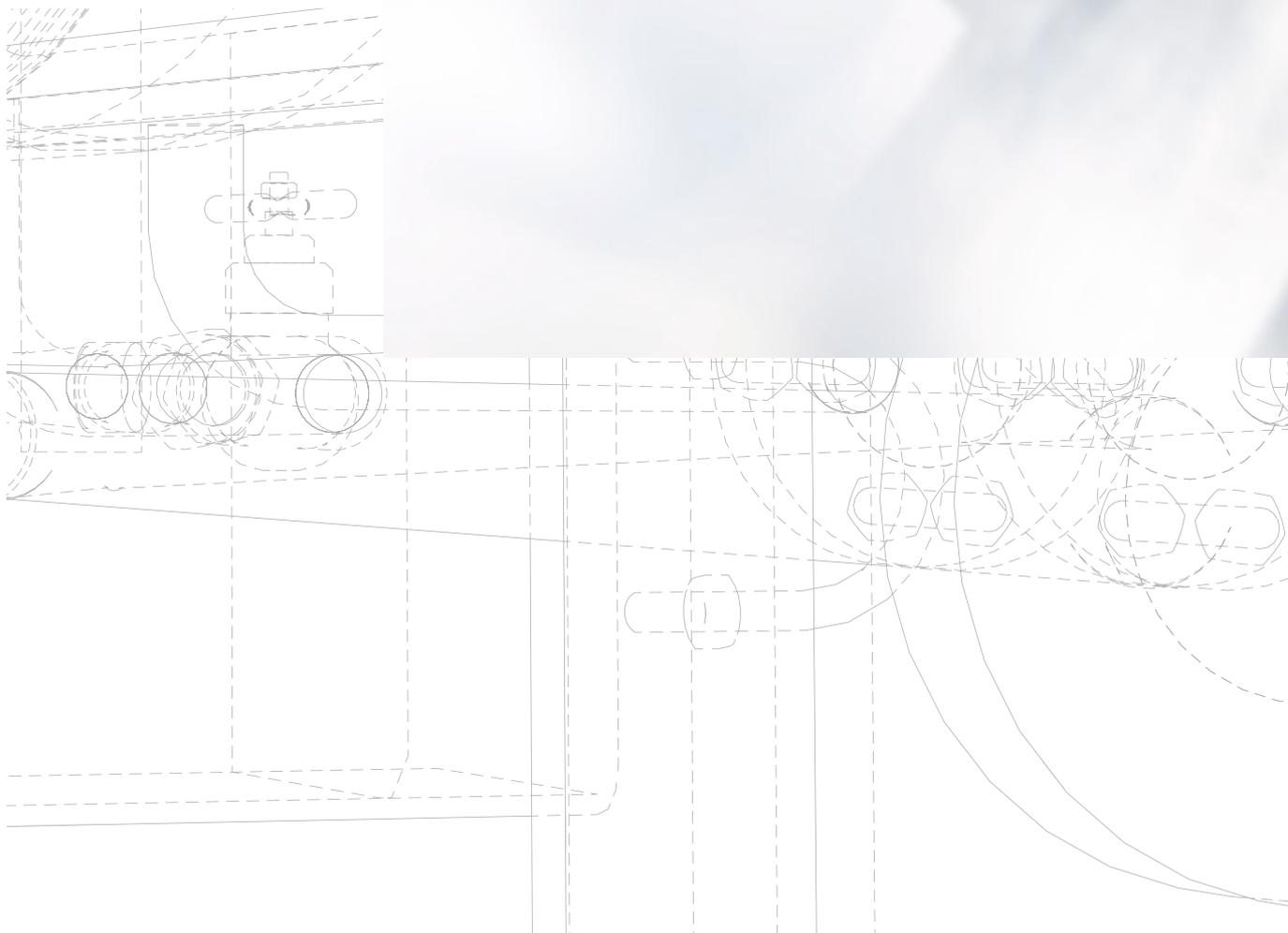
panies, a concrete example is now being implemented into a product. It consists of a functional modular line management system that combines the consistent translation between the standardized interfaces of the machines and the IT environment. “This product enables all kinds of machines that support the standardized interface to be connected to an existing IT system,” says Sauer mann. Messmer adds: “These standards provide the basis for networked systems, which, in turn, serve as the basis for additional Industry 4.0 applications.”

TAILORED PACKAGING



More and more legal regulations, the increase in the number of language- and country-specific versions, the wider range of concentrations of active ingredients, and the trend towards personalized medicine are all causing secondary packaging to become steadily more complex. “The pharmaceutical industry now needs many different types of outer packaging in small lots,” says Hans-Peter Süsslack, Business Process Manager at Rondo. “We supply the right solution for precisely this purpose.” The manufacturer of folding boxes has closely examined its internal processes and made them much more efficient. The result of these optimization measures is a supply-on-demand solution that enables pharmaceutical companies to order outer packaging as needed and receive even smallest lot sizes on time. “We have improved our organizational processes, further automated production, shortened changeover times, and introduced a special IT solution that closely connects customers to our workflow,” says Süsslack. “As a result, we can supply pharmaceutical companies with the requested outer packaging in almost no time at all.” Rondo’s supply-on-demand solution is setting new benchmarks. Because the folding boxes are delivered directly to the production line in just the right amounts, customers do not have to provide cost-intensive storage for them. The pharmaceutical companies also benefit from the fact that the solution reduces the costs of ordering and processing. “That is because we also inspect the folding boxes and check the incoming goods,” says Süsslack. “This generates even more added value for the customers.”

SINCE 2017, A MOBILE WORKSTATION AT HAUNI HAS ENABLED EMPLOYEES TO DIRECTLY ACCESS ALL OF THE PRODUCTION-RELATED INFORMATION THAT IS NEEDED FOR MACHINE ASSEMBLY. WHAT'S MORE, CUSTOMERS CAN ALSO USE THE DATA IN ORDER TO BOOST THE EFFICIENCY OF THEIR PROCESSES





BUSINESS AREA TOBACCO

ROLLING THE DATA WORLD

As a globally leading provider of innovative solutions for the tobacco industry, Hauni has traditionally played a pioneering role in this sector. The company's future-oriented concepts consistently raise topics such as the comprehensive digitization of production to an even higher level. The company has been vigorously pursuing this digitization process for years. In doing so, Hauni takes a close look at all process components and analyzes how the use of digital technologies can greatly optimize production. "This will ultimately benefit both sides – our customers and us," says Dr. Günter Schweitzer, Head of the Unit Secondary at Hauni. One example of the smart use of digital technologies is paperless assembly. This solution does not just eliminate piles of paper; it also provides valuable input with regards to sustainability and increased efficiency. "We've introduced a paperless assembly concept. This involves providing our employees with all of the information they need for the production of our highly complex machines in digital form on a mobile workstation," explains Schweitzer.

LINKING DATA WITH PROCESSES

Part of the solution for paperless assembly is an ergonomically designed mobile workstation on rollers. Equipped with a computer, a screen, a keyboard, a mouse, and a powerful rechargeable battery, the workstation enables the assembly workers to directly access information in the workshop, instead of having to look through thick files containing handbooks, safety data sheets, and documentation, as used to be the case. Moreover, users can call up 3D images, note quality assurance measures, and determine the availability of components. A handy tablet is also included in the

equipment. It is used whenever the assembly technicians have to go deep inside a machine. "In addition, the solution enables our employees to quickly give each other feedback and share information. The trend toward linking data and processes is thus already reality in our assembly operations," says Schweitzer. In this way, the company's digital advancement makes it possible to save

Paperless assembly: Employees have digital access to all important information.





“THE 3D DATA CONTAINS PRECISE IMAGES OF THE ENTIRE MACHINE.”

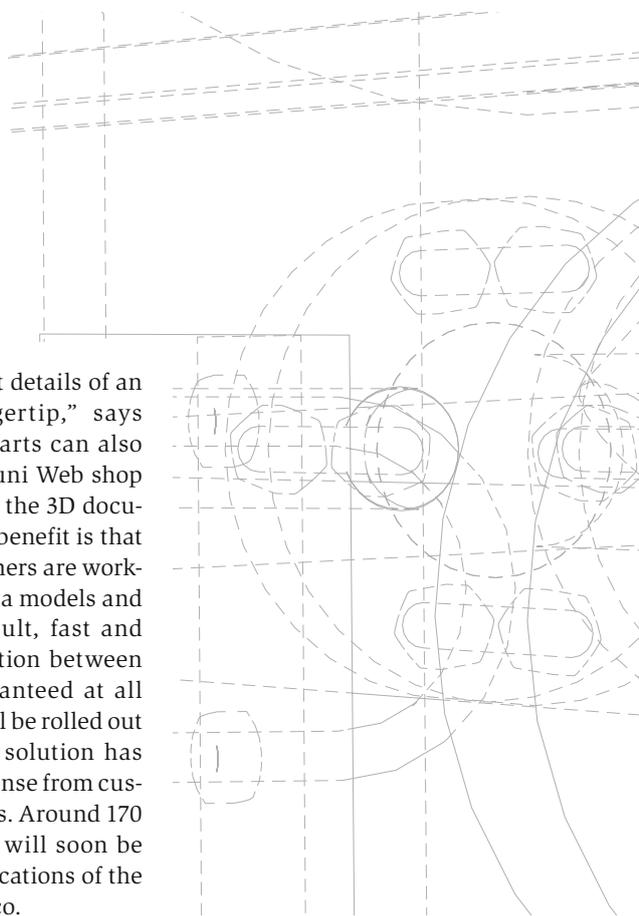
DR. GÜNTER SCHWEITZER, UNIT HEAD SECONDARY AT HAUNI

time and resources during the production process for the highly complex machines.

FAST CUSTOMER COMMUNICATION

This directly benefits customers. The introduction of 3D smart documentation also permits the machine operators to access all of the information they need to handle, clean, and maintain the machines digitally. The integrated browser solution enables users to call up all of the relevant parts for a format change within seconds. “The 3D data contains precise images of the entire machine. The images can de-

pic even the smallest details of an assembly at a fingertip,” says Schweitzer. “Spare parts can also be ordered at the Hauni Web shop via a direct link from the 3D documentation.” Another benefit is that Hauni and the customers are working with the same data models and 3D images. As a result, fast and flawless communication between both parties is guaranteed at all times. The project will be rolled out even further, as the solution has met with a great response from customers and employees. Around 170 mobile workstations will soon be used at the various locations of the Business Area Tobacco.



BUSINESS AREA TISSUE

A COMPLETELY NEW DIMENSION



FABIO PERINI IS RAPIDLY FORGING AHEAD WITH ITS IMPLEMENTATION OF DIGITIZATION AND INDUSTRY 4.0. THE LATEST PRODUCT DEVELOPED BY THE TISSUE SPECIALISTS IS A DIGITAL MONITORING SYSTEM WITH WHICH CUSTOMERS CAN SIGNIFICANTLY IMPROVE THE AVAILABILITY AND EFFECTIVENESS OF THEIR EQUIPMENT



Smart application: "Tissue Data" identifies the causes of sudden machine stoppages.

In pursuit of an ambitious goal, Fabio Perini aims to establish a new culture in the tissue industry and to support its customers – such as manufacturers of paper towels and toilet paper – as they move into the digital future. "Digitization and Industry 4.0 are not yet the first items on the agenda of all the companies in our sector," explains Luca Frassetto, Chief Technology Officer at Fabio Perini. "We want to change that by leading the way and developing innovative solutions based on digitization options – solutions that inspire and convince our customers that those new technologies offer

them a wide range of possibilities." The ideal conceived by Fabio Perini S.p.A., which has its headquarters in Lucca, Italy, is a network of connected factories in which customers use smart hardware and software to run networked production processes that are perfect in terms of quality and productivity. In order to realize this vision of the rapid implementation of digitization and Industry 4.0, Fabio Perini is making a massive effort in this area through a program called "Digital Tissue." The program combines three components that are closely related and interactively form the cornerstones for

the establishment of a smart factory: smart machines, smart software applications, and smart services.

PERMANENTLY ELIMINATING SOURCES OF ERROR

These three components are based on the collection of large amounts of data at every moment of ongoing production. The opportunities opened up by this information are revealed by another smart software application from Fabio Perini: "Tissue Data." This new, innovative monitoring system makes it possible to save, analyze, and transmit large volumes of machine data from the production process of all state-of-the-art processing and packaging machines in the tissue sector. As an example, customers can use this information to further increase the availability of their machines. Technicians at the customers' plants can use a touch-screen monitor to quickly and easily view all the information about an unplanned machine downtime, whether the technicians are sitting at a desktop computer in an office or

using a mobile terminal directly on site at the production plant. "If a machine suddenly shuts down, the customer's technician can identify the causes by means of the data that has been safeguarded and prepared for analysis by our software. Now the problem can be permanently remedied. That prevents unplanned interruptions of the production from happening again," says Frasnetti.

MAKING PRODUCTION TRANSPARENT

But that's not all – "Tissue Data" also enables the innovation leader's customers to gain a detailed overview of their downtimes, rate of production, and rejects. In other words, tissue companies now have a tool that for the first time ever makes the most important key performance indicators of a production line transparent on a large scale. This enables the companies to perform tasks such as comparing planned production results with actual ones and finding out the causes of any deviations. These are the ideal prerequisites for coordinating production processes



“WE PREVENT
UNPLANNED
INTERRUPTIONS OF
PRODUCTION.”

LUCA FRASNETTI, CTO AT BUSINESS AREA TISSUE

even more precisely, further optimizing individual production steps and, ultimately, permanently increasing the overall effectiveness of a production plant. However, according to Frasnetti, “Tissue Data” will develop its full potential only if the vision of Industry 4.0 becomes a reality. “The data that can be collected and evaluated in a fully connected cross-factory environment are an immensely valuable treasure,” he says. “The use of this information can elevate our customers’ production processes into a completely new dimension. We want to, and we will, support them as they take this leap.”

Efficiency gain: Important characteristic data can be evaluated using “Tissue Data.”



BUSINESS AREA MACHINE TOOLS

MORE TRANSPARENCY



A NEW PRODUCT LINE FROM THE BUSINESS AREA MACHINE TOOLS REDUCES THE NUMBER OF UNPLANNED DOWNTIMES AND OPTIMIZES MAINTENANCE PROCESSES. THIS RESULTS IN A SIGNIFICANT INCREASE IN PRODUCTIVITY FOR CUSTOMERS



Mobile solution: "Digital Solutions" makes data accessible everywhere and at all times.

One of the main day-to-day tasks at Körber is the continuous advancement of existing technology. Thanks to new digitization options, the optimization of the existing comprehensive lifecycle monitoring of machines at the Business Area Machine Tools has led to the creation of a product range called "Digital Solutions," which was unveiled at the EMO trade fair in Hannover last year. "Digital Solutions" encompasses three individual solutions: Production Monitor, Remote Service, and Service Monitor. Each one of these solutions takes its very own approach to achieve one single goal: to increase machine availability and thus continuously and substantially improve productivity in the customers' assembly operations.

INFORMATION AVAILABLE EVERYWHERE AND AT ANY TIME

"Digital Solutions" is based on software that continuously collects and analyzes data during machine operation. "The continuously updated information provides key insights into the operating status of the respective machine, and it does so at all times," explains Erich Schmid, Director Strategic Projects at the Business Area Machine Tools. This data is very valuable for the customer. For example, the Production Monitor uses this information to create an overview of the current capabilities and productivity of a particular machine. Customers can view this data from anywhere and at any time – either on a stationary monitor or on

“ ‘DIGITAL SOLUTIONS’ ENSURE MORE EFFECTIVE MONITORING.”

ERICH SCHMID, DIRECTOR STRATEGIC PROJECTS AT BUSINESS AREA MACHINE TOOLS



Optimized maintenance: "Remote Service" enables service requests to be sent at the push of a button.

a mobile device via an app. "This enables our customers to evaluate how productive their machine was during a variety of time periods," says Schmid. "It also enables them to recognize and exploit productivity reserves in their manufacturing process."

ANTICIPATORY PLANNING

The Service Monitor helps to boost transparency in machine maintenance. This solution provides all of the necessary information about upcoming maintenance work – succinctly, reliably, and on time. This gives customers the opportunity to plan maintenance intervals and adapt them to the production process. "As a result, unpredicted machine downtimes associated with maintenance work belong now to the past. This also boosts productivity," says Schmid.

The third component of “Digital Solutions” is Remote Service, which also offers decisive benefits for the Business Area’s customers. This feature is an online service support that enables users to request services at the push of a button. Doing so also automatically transmits all of the relevant information about the machine’s status to the customer service center, enabling the service employees at the Business Area to immediately start looking for a solution without having to ask questions first. As a re-

sult, the affected machine is put into operation mode again much sooner after service assistance has been requested.

“Digital Solutions’ ensures the effective monitoring of manufacturing, maintenance, and service issues,” says Schmid about the advantages of the product series. But this is only the first step. “We will continue to extensively address the issues of digitization and lifecycle monitoring in order to offer our customers additional data-based solutions for this future-oriented sector.”

Transparency:
Mobile terminals
offer customers
detailed insight
into the state of
their machines.



KÖRBER WORLDWIDE

OUR MARKETS ARE INTERNATIONAL – JUST LIKE OUR CUSTOMERS. THAT'S WHY WE HAVE PRODUCTION LOCATIONS, EXTENSIVE SERVICES, AND HIGHLY MOTIVATED EMPLOYEES ALL OVER THE GLOBE. AND THAT'S WHAT WE MEAN BY BEING CLOSE TO OUR CUSTOMERS





OUR BUSINESS AREAS

IN ITS BUSINESS AREAS, THE KÖRBER GROUP OFFERS ITS CUSTOMERS A BROAD SPECTRUM OF NEW, INNOVATIVE, AND SUCCESSFUL PRODUCTS, SERVICES, AND SOLUTIONS

AUTOMATION

The Business Area Automation develops, produces, and markets high-quality, innovative products and services for international markets in the fields of motion and automation technology, sensor technology, and energy technology. Its three Business Units – Motion Technology, Sensor Technology, and Energy Technology – are renowned for their technologically leading products and set new standards to guarantee their customers long-term competitive advantages.

LOGISTICS SYSTEMS

The Business Area Logistics Systems is a leading provider of fully integrated applications for optimizing complex internal and external logistics processes. Under the Körber Logistics umbrella brand, this Business Area supplies digitized solutions for smart factories (production logistics), warehouses, e-commerce, and the controlling of entire supply chains. The umbrella brand unites the companies Aberle and Consoveyo (systems integration), Langhammer and Riantics (product solutions), as well as Aberle Software, DMLogic, HighJump, and Inconso (software) in three Business Units. These offer a comprehensive range of products and services encompassing everything from systems integration to warehousing, palletizing, depalletizing, materials handling technology, and software.

PHARMA SYSTEMS

The Business Area Pharma Systems offers solutions for safe, efficient processes in the manufacturing, inspection, and packaging of pharmaceutical products as well as for pharmaceutical traceability. This Business Area's unique combination of process know-how and cutting-edge technology makes it one of the leading systems providers to the pharmaceutical and biotech industries. It brings together international leading companies Dividella, Fargo Automation, Mediseal, Rondo, Seidenader, Systec & Services, and Werum IT Solutions.

TOBACCO

The Business Area Tobacco, comprising the Hauni, Borgwaldt, Borgwaldt Flavor, Decouflé, Garbuio Dickinson, and Sodim brands, is the leading supplier to the international tobacco industry, thanks to its comprehensive product range and global presence. At locations around the world, the companies in this Business Area support customers in the fields of tobacco processing, filter and cigarette manufacture, measuring and analysis equipment, as well as flavors.

TISSUE

The Business Area Tissue encompasses the brands Fabio Perini, Casmatic, and MTC. It stands for innovation, cutting-edge technologies, and complete solutions for processing and packaging machinery that handle toilet paper, folded tissues, and paper towels. Innovations and a systematic customer orientation make the Business Area a technology and market leader in the sector.

MACHINE TOOLS

The Business Area Machine Tools is the world's leading supplier of precision grinding machines. The Business Area's eight brands — Studer, Schaudt, Mikrosa, Walter, Ewag, Mägerle, Blohm, and Jung — have broad application know-how, a large product portfolio, and an extensive range of services in the international market.

CORPORATE VENTURES

The Körber Group plans to continue its growth in the years ahead. That includes expanding its strategic investments. The Group is therefore focusing on key future technologies and markets. The Business Area Corporate Ventures offers the ideal framework for those companies that represent new territory for the Group.

KÖRBER DIGITAL

The Business Area Körber Digital shapes and promotes the digital advancement of the Körber Group. This Business Area serves as a nucleus for digital innovation and new digital business models — and that makes it a central contact point for all topics related to the digitization of the Group. With headquarters in Berlin, Germany's hotspot for startups, Körber Digital combines the speed and entrepreneurial spirit of a startup with the long-term strategic orientation of the Körber Group. Körber Digital has set itself the goal of operating at the forefront of the digital revolution in industry.

OUR STRATEGIC GROWTH TARGET

OUR CLEARLY DEFINED LONG-TERM GROWTH TARGET FOR THE PERIOD UNTIL 2025 IS AN AMBITIOUS ONE. WE WILL ACHIEVE THIS GROWTH BY CONTINUING TO IMPRESS OUR CUSTOMERS ON A PERMANENT BASIS. WE INTEND TO MORE THAN DOUBLE OUR TOTAL SALES BY COMPARISON WITH 2013 THROUGH ORGANIC GROWTH AND STRATEGIC ACQUISITIONS.

OUR KÖRBER VISION

THE FUTURE IS OURS TO CREATE! WE ARE TECHNOLOGY LEADERS, STRONG TOGETHER, AND INSPIRE OUR CUSTOMERS AND PARTNERS AS SECTOR EXPERTS IN ALL BUSINESS AREAS.

OUR KÖRBER MISSION

AS AN INTERNATIONAL TECHNOLOGY GROUP WITH A STRONG REGIONAL PRESENCE, WE CREATE MEASURABLE BENEFITS AND ADDED VALUE FOR OUR CUSTOMERS. AS A RELIABLE, SOLID PARTNER, WE DEVELOP AND SUPPLY PIONEERING, INNOVATIVE SOLUTIONS AND PERFECTLY TAILORED SERVICES WORLDWIDE WITH AND FOR OUR CUSTOMERS.

OUR VALUES

OUR GROUP-WIDE UNIFORM CORPORATE VALUES FORM THE FOUNDATION OF EVERYTHING WE DO. THEY MAKE CLEAR WHAT STRENGTHENS AND CONNECTS US ACROSS ALL THE COMPANIES AND FUNCTIONS IN THE GROUP AND WHAT WE PLEDGE TO UPHOLD IN ALL OUR DEALINGS WITH ONE ANOTHER AND WITH THIRD PARTIES

CUSTOMER SATISFACTION

We are Körber, and we add value for our customers by inspiring our customers and partners as industry experts. We are a solid, dependable partner who supplies innovative, cutting-edge solutions and highly tailored services worldwide with and for our customers.

INNOVATION

We are Körber, and we create innovations by putting our experience, expertise, and creativity to work for our customers. We defend our technological leadership through tireless innovation and the improvement of our products, services, and business processes.

CONNECTING PEOPLE AND KNOWLEDGE

We are Körber, and we connect people and ideas by recognizing and leveraging the full breadth of our know-how and experience. We encourage and require everyone within our international Group to share ideas and experiences in order to apply all of our knowledge to developing efficient, best-practice solutions.

RESPONSIBILITY

We are Körber, and we take responsibility by putting our corporate values at the heart of everything we do. We keep our promises and act reliably toward employees, partners, and customers. Our success depends on close, long-term relationships with our employees and business partners.

FOCUS ON THE FUTURE

We are Körber, and we strive for sustained and profitable growth by viewing long-term success and financial independence as a motivating challenge. Together, we develop profitable and sustainable solutions. We count on our employees worldwide and support everything they do with modern, attractive work conditions.

A GLOBAL NETWORK

THE KÖRBER GROUP UNITES TECHNOLOGICALLY LEADING COMPANIES WITHIN ITS BUSINESS AREAS WITH MORE THAN 140 PRODUCTION, SERVICE, AND SALES COMPANIES

BUSINESS AREA AUTOMATION

- **Dressel GmbH**, Unna/Germany
- **Heinz Fiege GmbH**, Röllbach/Germany
- **Körber Automation GmbH**, Lahnau/Germany
- **LTI Motion Deutschland GmbH**, Lahnau/Germany
- **LTI Motion GmbH**, Lahnau/Germany
- **LTI Motion GmbH**, Wasserburg (Lake Constance)/Germany
- **LTI Motion Italia S.r.l.**, Settimo Milanese/Italy
- **LTI Motion Österreich GmbH**, Wels/Austria
- **LTI Motion Schweiz GmbH**, Rüti/Switzerland
- **LTI Motion (Shanghai) Co., Ltd.**, Shanghai/China
- **LTI REEnergy A.S.**, Van/Turkey
- **LTI REEnergy Co., Ltd.**, Hsinchu City/Taiwan
- **LTI ReEnergy GmbH**, Unna/Germany
- **LTI USA Ltd.**, Mechanicsburg/USA
- **Sensitec GmbH**, Lahnau/Germany
- **Sensitec GmbH**, Mainz/Germany
- **Aberle Software GmbH**, Stuttgart/Germany
- **Consoveyo, S.A.**, Moreira da Maia/Portugal
- **Consoveyo Singapore Pte. Ltd.**, Singapore/Singapore
- **DMLogic, LLC**, Pittsburgh/USA
- **Godrej Consoveyo Logistics Automation Limited**, Mumbai/India
- **HighJump Acquisition LLC**, Dover/USA
- **HighJump (Shanghai) Software Technology Co., Ltd.**, Shanghai/China
- **HighJump Software Asia Pacific Pty. Ltd.**, Sydney/Australia
- **HighJump Software Canada Inc.**, Waterloo/Canada
- **HighJump Software I Ltd.**, Bloomington/USA
- **HighJump Software UK Ltd.**, Bristol/UK
- **inconso Aktiengesellschaft**, Bad Nauheim/Germany
- **inconso Beteiligungs GmbH**, Bad Nauheim/Germany
- **inconso SASU**, Lyon/France
- **inconso Software, S.L.**, Sant Cugat del Valles/Spain
- **Körber Logistics Systems GmbH**, Bad Nauheim/Germany
- **Langhammer GmbH**, Eisenberg/Germany
- **Langhammer GmbH**, Branch Office, Freiberg/Germany
- **Riantics A/S**, Arden/Denmark
- **Körber Medipak América Latina Soluções Farmacêuticas Ltda.**, São Paulo/Brazil
- **Körber Medipak Systems AG**, Winterthur/Switzerland
- **Körber Medipak Systems GmbH**, Hamburg/Germany
- **Körber Medipak Systems Machinery s.r.o.**, Kurim/Czech Republic
- **Körber Medipak Systems NA Inc.**, Clearwater/USA
- **Körber Medipak Systems NA Inc.**, Fargo/USA
- **Körber Medipak Systems (Shanghai) Co., Ltd.**, Shanghai/China
- **Mediseal GmbH**, Schloß Holte-Stukenbrock/Germany
- **Mediseal GmbH**, Shanghai Representative Office, Shanghai/China
- **Rondo AG**, Allschwil/Switzerland
- **Rondo obaly s.r.o.**, Ejpvovice/Czech Republic
- **Rondo-Pak Inc.**, Norristown/USA
- **Rondo-Pak, LLC**, Camden/USA
- **Seidenader Maschinenbau GmbH**, Markt Schwaben/Germany
- **SYSTEC & SERVICES GMBH**, Karlsruhe/Germany
- **Systec & Services Schweiz GmbH**, Basel/Switzerland
- **Werum IT Solutions America Inc.**, Parsippany/USA
- **Werum IT Solutions America Inc.**, Branch Office, Cary/USA
- **Werum IT Solutions America Inc.**, Branch Office, San Francisco/USA

BUSINESS AREA LOGISTICS SYSTEMS

- **Aberle GmbH**, Leingarten/Germany
- **Aberle Logistics GmbH**, Leingarten/Germany
- **Aberle Logistics GmbH**, Siegen/Germany

BUSINESS AREA PHARMA SYSTEMS

- **Dividella AG**, Grabs/Switzerland

- **Werum IT Solutions GmbH**, Lüneburg/Germany
- **Werum IT Solutions GmbH**, Hausach/Germany
- **Werum IT Solutions GmbH**, Sankt Augustin/Germany
- **Werum IT Solutions GmbH**, Branch Office Allschwil, Allschwil/Switzerland
- **Werum IT Solutions K.K.**, Tokyo/Japan
- **Werum IT Solutions Ltd.**, Bangkok/Thailand
- **Werum IT Solutions Pte. Ltd.**, Singapore/Singapore
- **Werum IT Solutions SARL**, Toulouse/France

BUSINESS AREA TOBACCO

- **Baltic Metalltechnik GmbH**, Hamburg/Germany
- **Borgwaldt Flavor GmbH**, Hamburg/Germany
- **Borgwaldt KC GmbH**, Hamburg/Germany
- **Decouflé s.à.r.l.**, Chilly-Mazarin Cedex/France
- **Dickinson Legg, Inc.**, Richmond/USA
- **Dickinson Legg Limited**, Winchester/UK
- **Garbuio Dickinson Group Holding S.r.l.**, Paese (Treviso)/Italy
- **Garbuio (Shanghai) Trading Company Limited**, Shanghai/China
- **Garbuio S.p.A.**, Paese (Treviso)/Italy
- **Hauni do Brasil Máquinas e Equipamentos Para Tabaco Ltda.**, São Paulo/Brazil
- **Hauni Far East Limited**, Hong Kong/Hong Kong
- **Hauni Far East Ltd.**, Kunming Representative Office, Kunming/China
- **Hauni Hungaria Gépgyártó Korlátolt Felelősségű Társaság**, Pécs/Hungary
- **Hauni Japan Co., Ltd.**, Tokyo/Japan
- **Hauni (Malaysia) Sdn. Bhd.**, Petaling Jaya/Malaysia
- **Hauni Maschinenbau GmbH**, Hamburg/Germany
- **Hauni Maschinenbau GmbH**, Dubai Branch, Dubai/United Arab Emirates
- **Hauni Primary GmbH**, Schwarzenbek/Germany
- **Hauni Richmond, Inc.**, Richmond/USA
- **Hauni Singapore Pte. Ltd.**, Singapore/Singapore
- **Hauni South Africa (Pty.) Ltd.**, Cape Town/South Africa
- **Hauni St. Petersburg Ltd.**, St. Petersburg/Russia
- **Hauni Teknik Hizmetler ve Ticaret Limited Sirketi**, Izmir/Turkey
- **Hauni Trading (Shanghai) Co. Ltd.**, Shanghai/China
- **ISIS S.r.l.**, Paese (Treviso)/Italy
- **Sodim S.A.S.**, Fleury-les-Aubrais/France
- **UNIVERSELLE Engineering U.N.I. GmbH**, Schwarzenbek/Germany

BUSINESS AREA TISSUE

- **Engraving Solutions S.r.l.**, Lucca/Italy
- **Fabio Perini (Shanghai) Co., Ltd.**, Shanghai/China
- **Fabio Perini Germany GmbH**, Neuss/Germany
- **Fabio Perini Indústria e Comércio de Máquinas Ltda.**, Joinville/Brazil
- **Fabio Perini Japan Co. Ltd.**, Shizuoka/Japan
- **Fabio Perini North America, Inc.**, Green Bay/USA
- **Fabio Perini S.p.A.**, Lucca/Italy
- **Körber Engineering (Shanghai) Co. Ltd.**, Shanghai/China
- **MTC Macchine Trasformazione Carta S.r.l.**, Porcari (Lu)/Italy

BUSINESS AREA MACHINE TOOLS

- **Blohm Jung GmbH**, Hamburg/Germany
- **Blohm Jung GmbH**, Göppingen/Germany
- **Ewag AG**, Etziken/Switzerland
- **Fritz Studer AG**, Steffisburg/Switzerland
- **Fritz Studer AG**, Biel/Switzerland
- **Irpd AG**, St. Gallen/Switzerland
- **Mägerle AG Maschinenfabrik**, Fehraltorf/Switzerland
- **Schaudt Mikrosa GmbH**, Leipzig/Germany
- **StuderTEC K.K.**, Tokyo/Japan
- **United Grinding GmbH**, Moskau/Russland
- **United Grinding GmbH**, India Branch Office, Bangalore/India
- **United Grinding Group AG**, Bern/Switzerland
- **United Grinding México Sociedad Anónima de Capital Variable**, Querétaro/Mexico
- **United Grinding North America, Inc.**, Miamisburg/USA
- **United Grinding (Shanghai) Ltd.**, Shanghai/China
- **United Grinding (Shanghai) Ltd.**, Branch Office Beijing, Beijing/China
- **United Grinding (Shanghai) Ltd.**, Branch Office Chongqing, Chongqing/China
- **Walter Ewag Asia-Pacific Pte. Ltd.**, Singapore/Singapore
- **Walter Ewag Italia S.r.l.**, Bregnano/Italy
- **Walter Ewag Japan K.K.**, Anjo City/Japan
- **Walter Ewag UK Limited**, Warwickshire/UK
- **Walter Maschinenbau GmbH**, Tübingen/Germany
- **Walter s.r.o.**, Kurim/Czech Republic

CONSOLIDATED INCOME STATEMENT

From January 1 to December 31, 2017

| In thousands of euros | 2017 | 2016 |
|---|------------------|----------------|
| Sales | 2,608,884 | 2,214,577 |
| Change in finished goods and work in progress | 38,073 | 48,159 |
| Other own work capitalized | 4,980 | 3,890 |
| Other operating income | 143,816 | 129,734 |
| Cost of materials | | |
| Cost of raw materials, consumables, and supplies, and of purchased merchandise | 871,548 | 731,458 |
| Cost of purchased services | 156,196 | 136,587 |
| | 1,027,744 | 868,045 |
| Personnel expenses | | |
| Wages and salaries | 758,657 | 697,520 |
| Social security, post-employment, and other employee benefit costs | 150,452 | 139,206 |
| of which in respect of old age pensions | 28,358 | 26,014 |
| | 909,109 | 836,726 |
| Depreciation, amortization, and write-downs of intangible assets and tangible assets | 125,503 | 104,750 |
| Other operating expenses | 556,072 | 466,267 |
| Income from long-term equity investments | 284 | 116 |
| of which from affiliated companies | 284 | 116 |
| Income from other securities and long-term loans among the fixed assets | 32 | 33 |
| Other interest and similar income | 7,494 | 7,157 |
| of which from affiliated companies | 232 | 496 |
| Write-downs of long-term financial assets and securities classified as current assets | 2,250 | 100 |
| Interest and similar expenses | 25,763 | 26,425 |
| of which from affiliated companies | 9 | 4 |
| Taxes on income | -92,366 | -41,650 |
| Result after taxes | 64,757 | 59,703 |
| Consolidated net income | 64,757 | 59,703 |
| Minority interest in net income | -1,321 | -1,386 |
| Consolidated retained net profits | 63,436 | 58,317 |

CONSOLIDATED BALANCE SHEET

As of December 31, 2017

| In thousands of euros | 2017 | 2016 |
|--|------------------|------------------|
| Assets | | |
| Fixed assets | | |
| Intangible fixed assets | 939,228 | 248,937 |
| Tangible fixed assets | 341,949 | 337,035 |
| Long-term financial assets | | |
| Shares in affiliated companies | 12,602 | 17,937 |
| Other long-term equity investments | 16,092 | 9,577 |
| Other loans | 9,334 | 10,396 |
| | 38,028 | 37,910 |
| | 1,319,205 | 623,882 |
| Current assets | | |
| Inventories | 769,449 | 676,347 |
| Receivables and other assets | 668,608 | 549,748 |
| Securities | 525,357 | 813,967 |
| Cash on hand, balance at the Bundesbank, bank balances | 315,015 | 658,074 |
| | 2,278,429 | 2,698,136 |
| Prepaid expenses | 10,965 | 6,833 |
| Deferred tax assets | 61,365 | 96,097 |
| Goodwill arising from asset offsetting | 7,217 | 8,916 |
| Balance sheet total | 3,677,181 | 3,433,864 |
| Equity and liabilities | | |
| Equity | 1,837,585 | 1,814,776 |
| Accruals | 345,983 | 329,535 |
| Liabilities | 1,492,953 | 1,286,505 |
| Prepaid expenses | 660 | 3,048 |
| Balance sheet total | 3,677,181 | 3,433,864 |

KÖRBER GROUP KEY FIGURES

| In millions of euros | 2013 | 2014 | 2015 | 2016 | 2017 |
|--|--------|--------|--------|--------|---------------|
| Operating business | | | | | |
| Incoming orders | 2,252 | 2,320 | 2,191 | 2,357 | 2,901 |
| Sales | 2,194 | 2,342 | 2,317 | 2,215 | 2,609 |
| EBITA ¹ | 222 | 258 | 141 | 171 | 239 |
| Return on sales (EBITA) ¹ | 10.1% | 11.0% | 6.1% | 7.7% | 9.2% |
| Net income after taxes ² | 137 | 150 | 34 | 60 | 65 |
| Cash flows from operating activities ³ | 218 | 167 | 244 | 181 | 194 |
| Payments for investment in intangible fixed assets and tangible fixed assets | 54 | 58 | 65 | 46 | 61 |
| Research and development expenses | 120 | 129 | 145 | 127 | 138 |
| Research and development ratio | 5.4% | 5.5% | 6.2% | 5.7% | 5.3% |
| Balance sheet indicators as of December 31 reporting date | | | | | |
| Equity | 1,578 | 1,727 | 1,769 | 1,815 | 1,838 |
| Balance sheet total | 2,352 | 2,535 | 3,241 | 3,434 | 3,677 |
| Equity ratio ⁴ | 67.1% | 68.1% | 54.6% | 52.8% | 50.0% |
| Employees as of December 31 reporting date | | | | | |
| Employees ⁵ | 11,190 | 11,950 | 11,578 | 11,246 | 12,721 |

¹ Earnings before interest, taxes, and amortization of intangible fixed assets from acquisitions (Earnings before interest, taxes, and amortization — EBITA)

² Includes scheduled amortization of goodwill in accordance with the HGB

³ Since 2014 according to DRS 21

⁴ Equity as a percentage of total equity and liabilities

⁵ Including unconsolidated companies

MASTHEAD

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This annual report is published in German and English.
Note: The results can differ due to rounding.



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