

Körber AG Annual Report 2018

We are innovation



We are makers
We are engineers
We are inventors
We are Körber

Curiosity and a pioneering spirit are our motivation. Delivering the best solutions to our customers is our promise. Welcome to our world of innovations.

Körber AG Annual Report 2018

**We are
innovation**

We are close by. Worldwide.



Markets are international and innovation does not stop at borders. That's why we are located wherever innovation is happening. Whether it is **research, production or service** — our employees are always where they are needed.

● Körber Digital ● Logistics Systems ● Pharma Systems ● Tissue ● Tobacco

“We want to continue being the first to do the right thing at the right time.”

**Dear Ladies and Gentlemen,
Dear Business Partners,**

New ideas and innovations are crucial drivers of our daily work and a key source of motivation in our cooperation with our customers and business partners. With our claim to “market leadership through technology leadership”, we at the Körber Group want to do more than merely reacting to the industrial and technological change — we want to shape it. Even more, we want to be lead this change.

“To be the first to do the right thing at the right time” — that was one of the guiding principles of our founder, Kurt A. Körber. This fundamental entrepreneurial attitude to be the first to recognize, address, and shape changes and opportunities is more important for us today than ever before. It’s the only way we can offer our customers a genuine and future-focused competitive advantage in the long term.

That’s why our guiding principle for 2018 was **“We are innovation.”** Together with our customers, partners, and employees, we have once again propelled an extremely diverse range of ideas and innovations to broad-based market success and success for our customers. In the following pages we give detailed insights in a number of examples.

For instance, Bubble-X is an innovative high-speed inspection tool for the manufacturing of pharmaceutical products. It significantly reduces the false rejection rate and thus slashes production costs significantly. We’ve also developed a completely new, automated, and scalable comprehensive solution for our customers’ logistics processes — one that sustainably improves layer order-picking operations. The advantage it offers to our customers is a significantly optimized area utilization combined with greater flexibility in filling orders. Furthermore, our new augmented-reality application in the area of services enables us to react directly to customer requirements all over the world, thus significantly increasing the short-term availability of plant systems.

Another central focus of our work was on the further development of our process for managing ideas and innovations. Our goal is to always work together with our customers, partners, and employees to implement new ideas as quickly as possible



and launch innovative products and solutions on the market.

During the past year we also invested extensively in new technologies and expanded our portfolio as well as our ecosystem. For example, we acquired the company Centriq in recognition of the growing significance of voice control. In our Business Area Logistics Systems, we are now one of the world’s leading providers of such systems. Through our acquisition of Connyun and our long-term equity investments in Magazino, the Next Logistics Accelerator and the High-Tech Gründerfonds, we have reinforced our technological expertise and ecosystem. At the same time, as part of our strategic development program, we sold our Business Areas Machine Tools and Automation to investors, who will offer their companies additional opportunities for development and growth.

Our long-term orientation and continuity, as well as our systematic focus on the future, have made us successful. This conclusion can be confirmed by a look at the past fiscal year. Our incoming orders totaled €2,657 million, our Group sales amounted to €2,545 million, and our EBITA totaled €229 million. Taking these figures as well as our sales to investors into account, this is one of the most successful annual results in our Group’s history.

We would like to express our special thanks to our employees and managers, who during this past year once again played a key role in shaping the success of our customers and our Group with tremendous commitment, responsibility, and expertise. I would also like to sincerely thank our customers and business partners, both personally and on behalf of the entire Group Executive Board and all of our employees, for the trust placed in us and for the very intense and successful cooperation. We look forward to continuing to actively and sustainably support your business success with our innovations, customized solutions, and focus on the future.

Hamburg, April 2019

A handwritten signature in black ink, appearing to read 'St. Seifert'. The signature is fluid and cursive.

Stephan Seifert
Chairman of the Group Executive Board of Körber AG



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We are Körber

Many teams, one **goal** —
Creating a successful future together

CHRISTOPHER
SOMM

Member of the Group Executive Board
of Körber AG

DR. CHRISTIAN
SCHLÖGEL

Member of the Group Executive Board
of Körber AG

STEFAN
KIRSCHKE

Member of the Group Executive Board
of Körber AG

STEPHAN
SEIFERT

Chairman of the Group Executive Board
of Körber AG

ERICH
HOCH

Member of the Group Executive Board
of Körber AG



FRANK GROTHAUS

Drive System Specialist,
Hauni

Frank Grothaus is a member of the team that invented the “knife carrier with single-motor drive,” a machine for cutting rolls of tobacco. Hauni has applied for a patent already. In 2018 the team received the Ulrich Riegger Memorial Award in recognition of its invention. With this annual award, which was established by the company founder Kurt A. Körber in 1968, the Business Area Tobacco honors the best invention of the year.



TERESA VIERK

Third-year apprentice in industrial mechanics,
Hauni

Teresa Vierk is an apprentice at Hauni who is helping to create an optimal learning environment for trainees. Her commitment is driven by her enthusiasm for developing machines and innovations, which she communicates to new apprentices from the very first day on. She also helps trainees get started at the company, organizes group activities, and answers their questions.



FELIX RAAB

Product Owner,
Körber Digital

Felix Raab has a wealth of experience in the areas of industrial automation and the Internet of Things (IoT). He loves to push forward with new ideas, using his vast network of contacts within the sector. The IoT solution Uptime was the first idea of his own that Raab introduced into the digital innovation process at Körber. Uptime has already successfully passed three Stage Gates.



CHRISTIANE DICKEL

Product Manager,
Werum IT Solutions

Christiane Dickel worked together with her colleagues on an innovation project to develop an idea for a smart biometric authentication solution. She successfully presented the result of their work as part of the digital innovation process at Körber. Since December 2018, the team has been refining the initial simple variant of this idea, the minimum viable product (MVP), which is now being tested by customers.

JÁNOS DOLMÁNY

Warehouse logistics employee,
Hauni Hungaria

János Dolmány has submitted six suggestions for improving the production process so far. Five of them have already been implemented. For example, he suggested lengthening the stand-by time of the portable label printers. Now his colleagues no longer have to wait minutes for the printers to start up every time they want to print. That saves valuable time.

KRISTIN HOFFMANN

Business Development Coordinator,
Körber Digital

Kristin Hoffmann has been coordinating and organizing the Stage Gate Meetings at Körber Digital in Berlin since the summer of 2018. Through her commitment and enthusiasm, she's playing a major role in the success of the group-wide digital innovation process.

DANIEL WESTERLUND

Senior Strategic UX Designer,
Körber Digital

Daniel Westerlund supports diverse teams that are working on projects focusing on the digital innovation process. As a User Experience (UX) Designer, he needs to precisely understand customers' problems and find innovative and extremely user-friendly solutions for them. He is convinced that "productive failure" is part of the road to success. This approach requires everyone to always share what they've learned with the entire team so that all of them can quickly improve and promote a culture of learning.



ANDREA FORNAI

Assembly Supervisor,
Fabio Perini

MASSIMILIANO ADALBERTI

Head of Testing,
Fabio Perini

Andrea Fornai and Massimiliano Adalberti played a major role in the development of Moonlight, a machine for unrolling rolls of paper that can automatically change its spools. At the specialist trade fair "IT's Tissue" in 2018, Fornai and Adalberti successfully presented this innovation to customers from the international tissue industry.

**ANA RITA ANTUNES**

Digital Transformation Officer,
Körber Logistics Systems

At the Körber Group company Consoveyo last year, Ana Rita Antunes and her team created spaces for brainstorming, organized meetings with external experts on themes such as augmented-reality, and taught new methods for solving problems. As a result of her work, innovations for customers are being created even faster than before. Her know-how and her experience are now benefiting the entire Business Area Logistics Systems.



We deliver innovations

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→ **Logistics Systems:**
Automated, flexible,
scalable: How Layer Picker
Solutions makes layer or-
der-picking easier.

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→ **Pharma Systems:**
Bubble-X distinguishes air
bubbles from other
foreign bodies — and makes
huge savings possible.

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→ **Tissue:**
The data glasses from Fabio
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to set new standards
for maintenance and service.

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→ **Tobacco:**
MSM, which was developed
by Hauni using agile
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→ **Körper Digital:**
From the idea to the prototype
in a short time: The internal
Stage Gates are pacemakers
of digital innovation.



An innovative joint application: Layer Picker Solutions was introduced by means of a 3D Lego® model at the LogiMAT trade fair in Stuttgart.

Everything is under control

Concentrated expertise, one product: **Layer Picker Solutions** is a unique stand-alone application for automated, flexible, and scalable layer order-picking that was developed by the Business Area Logistics Systems.

It all began with a pallet of whiskey. Because of the bottles' rounded shape, they are packed in special cartons. Even if the distribution of the bottles is optimal, the cartons do not cover the entire pallet. There's a gap in the center that makes loading the pallet difficult — that's why about 30 years ago, the Danish company that is called Riantics today, received a request from the whiskey producer to build them a machine that could handle this loading problem. The Danes answered, "No problem!" and promptly developed a machine that became a worldwide success: the Layer Picker, which used clamps to grasp the layers of cartons not only from outside but also from inside the gap. The system reliably caused no breakage.

Today many logistics companies face challenges that are much more complex than that, especially in the areas of FMCG and 3PL (Fast Moving Consumer Goods and Third Party Logistics), where goods of different kinds and shapes have to be transported very quickly and in large quantities. Companies want complete solutions that allow them to fully automate their warehouse processes. "Today the challenge is no longer to simply develop outstanding machines or software. We also have to combine them flexibly and, above all, scalably, in ways that are exactly adapted to the customer's needs," says Andreas Ebert, CSO of the Business Unit System Integration of Körber Logistics Systems. The Business Area is using the expertise of its companies in order to develop solutions of exactly this kind. One good example of that is Layer Picker Solutions, with the Layer Picker at its heart.

FAST, EFFICIENT, SECURE

"Thanks to the Layer Picker technology, Riantics has become the leader in the field of de-palletizing and pallet-to-pallet picking systems — in other words, machines that remove layers from pallets," says Hans-Henrik Jensen, CEO of Riantics. This machine can handle almost every product and every type of packaging that can be stacked in layers on pallets: beer cans →



“Due to its versatility, the Layer Picker technology is especially appreciated by FMCG and 3PL customers.”

ANDREAS EBERT
CSO Business Unit System Integration

in sixpacks, pickles in jars, potato chips in bags, milk in beverage cartons, paint in cans, deodorant spray cans in cardboard packages, and fruit and vegetables in open wood or plastic boxes. Almost everything that has a flat bottom and can be stacked in layers on pallets can be moved by the Layer Picker quickly, efficiently, and safely.

The machine stops above the targeted pallet, then lowers a four-cornered lifting head with a soft hiss and surrounds the carton layer with a framework of plastic pockets that inflate themselves in fractions of a second, creating a secure buffer. At the same time, 247 valves suck in air from above, creating a vacuum. The goods, which are being held gently and safely, can now be lifted up and moved around. With this technology, which has received a number of patents, 98 percent of all products in food retail can be handled fully automatically today. This is an undisputed top rate in the sector — no other layer picking system has reached it. “Due to its versatility, the Layer Picker technology is especially appreciated by FMCG and 3PL customers. That’s because it can pick up single or multi-

ple layers and re-order them, even if they are incompletely filled,” says Andreas Ebert.

SMOOTH TRANSPORTATION

In order to fulfill individual requirements, the technology needs the right software. For example, some customers combine products of various brands, for example a layer of brand A washing powder with a layer of brand B and another layer of brand C. Other customers may combine completely different products on a single pallet. In a third variant, pallets that are covered with only one layer of products are stacked on top of other pallets, because the customer only needs one layer of each product but nonetheless wants to be able to transport each delivered layer with a forklift.

Each operation of Layer Picker Solutions is controlled by software that has been specially developed for this purpose and can be easily integrated via plug-and-play into the customer’s IT landscape. For example, the Layer Picker always knows precisely which products should be picked in which combination, →

98

PERCENT
of all products in
food retail can be
handled reliably and
completely automatically
using the Layer Picker
technology.





Up to

10,000

PALLET LAYERS
per day can be handled by
Layer Picker Solutions.

A digital
overview: The
Layer Picker
configurator can
virtually simulate
material flows.



“Automated holistic processes are becoming increasingly important in logistics. That’s why we offer our customers a reliable, flexible, and scalable solution.”

PIETER FEENSTRA
CEO Business Unit System Integration

and it also ensures smooth transportation within the warehouse.

ALL THE COMPONENTS COME FROM A SINGLE SOURCE

A new trend is that more and more customers are relying on automated high-bay warehouses to save expensive floor space and thus costs; some companies are already planning warehouses that are up to 40 meters in height. Here, the solution combines high-bay warehouse and conveyor technology, both expertise and products from the Business Area Logistics Systems. The conveyor technology moves the pallets into and out of the warehouse and supplies the Layer Picker with material for picking up the mixed pallets. Autonomously moving cranes take over the automated intermediate storage.

In the past, companies had to buy individual components from various producers, which they then built around the Layer Picker to form a system. However, in many cases off-the-shelf products could not be integrated into existing warehousing systems. That problem is solved by Layer Picker Solutions: All of its com-

ponents come from a single source and fit together perfectly. “Automated holistic processes are becoming increasingly important in logistics. That’s why we offer our customers a reliable, flexible, and scalable solution,” says Pieter Feenstra, CEO of the Business Unit System Integration. What’s more, a specially developed configurator offers the possibility of digitally visualizing an installation of Layer Picker Solutions and virtually simulating every imaginable material flow. Unmatched capacity: Depending on the size of the warehouse, the product, and the number of pallets, customers can use Layer Picker Solutions to process up to 10,000 picks of pallet layers per day.

At the beginning of 2019, this innovative stand-alone application was effectively presented by means of a 3D Lego® model at the LogiMAT trade fair in Stuttgart. “We are creating genuine added value for our customers with Layer Picker Solutions,” says Feenstra. “They are receiving a more reliable system, because our technologies are perfectly coordinated with one another and no additional adaptation work is required.”

Searching for air bubbles

Until recently, inspection cameras were unable to distinguish between harmless air bubbles and harmful foreign bodies in syringes and ampoules. An **innovation from Seidenader** now immediately recognizes the difference between the two, thus offering extensive benefits to the pharmaceutical industry.



The engineer Werner Halbinger has been working at Seidenader for twelve years on the detection of foreign bodies and air bubbles in pharmaceutical products.



W

hen the conversation turns to air bubbles, Werner Halbinger gets very serious. "I've declared war on them," he says. That's because "they cause all kinds of problems" for him as the image-processing and laboratory engineer at Seidenader Maschinenbau GmbH in Markt Schwaben (near Munich), not to mention the company's customers. The company, which is part of the Business Area Pharma Systems, manufactures high-tech machines that check syringes, ampoules, and vials of all sizes for the presence of foreign particles and production errors.

Different inspection techniques are used depending on the product and receptacle in question. Most of the products tested are clear liquids in transparent and colorless glass receptacles, which undergo stringent quality assurance screenings. Anything that creates a shadow could or could not be a foreign body. "Unfortunately, air bubbles are also registered as shadows by the detectors," Halbinger explains. Such bubbles used to present a major challenge to Halbinger, his colleagues, and customers throughout the entire pharmaceutical industry.

SAFETY IS THE TOP PRIORITY

It's often difficult to clearly distinguish between harmless bubbles and problematic particles. Unfortunately, it's not possible during high-speed inspections to simply wait until the unidentified objects sink to the bottom of a receptacle and thus become clearly identifiable as foreign bodies. For this reason, all products in which image processing software detected a shadow during screening were rejected. After all, safety is the top priority and the fundamental promise to customers.

These rejects are a problem in the case of some medications and other medical products such as distilled water or vitamin solutions that are manufactured in large quantities. But they are a key cost driver for manufacturers of expensive active ingredients, especially biopharmaceuticals such as cancer medications, vaccines against infectious diseases, and drugs that slow the progress of multiple sclerosis. Substantial savings could be achieved by preventing the destruction of even a small portion of the syringes, ampoules, and vials containing solutions of synthesized molecules that are often difficult and costly to manufacture. →

Long before Halbinger discovered a possible approach to solving the bubble or foreign-substance mimicry problem, he and many other engineers looked for ways to minimize the number of rejects. This approach focused on preventing the bubbles from being formed and ensuring that those that were formed were removed. Although the Seidenader engineers played an important role in the steady decline of the reject rates, the problem was still not resolved.

Halbinger faced major challenges when a customer approached Seidenader to request that a new feasibility study be performed. Halbinger took test receptacles into his laboratory and began experimenting with polarization filters that raised contrast levels. He also experimented with color filters and a color camera. He kept on building makeshift apertures out of black cardboard and worked with different distances, filters, and sensitivity settings for image recognition software. "I wanted to take advantage of the fact that the air bubbles behave like optical lenses under certain conditions," Halbinger, an optical expert himself, explains.

SOLUTION WITH A LENS

Halbinger understood that his "enemies" were transparent spherical objects, and at some point he noticed that the red-green-blue (RGB) pattern of the background light used for illumination was being reflected in a very big air bubble. "Interesting," he thought to himself. He then continued his experiments, changed settings, and kept observing how the light pattern in the bubble behaved. And even though he still couldn't clearly detect air bubbles, especially very small ones, he nevertheless couldn't get what he had observed out of his mind.

Ultimately, it was a Fresnel lens that enabled him to achieve the breakthrough he had long been waiting for. Fresnel lenses are used to raise the contrast in error detection processes. In the beam path that is focused by the lens, even relatively small particles stand out significantly from the background, which makes them easier to detect and identify. In order to examine the properties of the Fresnel lens, Halbinger placed it in front of his computer screen. He then used a graphics program to draw in the colors red, green, and blue. There they were — regular patterns. "This looks promising; the same thing has got to work with air bubbles too!" he thought — and this turned out to be exactly the case.

When illuminated with RGB light through a Fresnel lens, air bubbles always betray their presence with a characteristic pattern — red at the top, green in the middle, and blue at the bottom. Just as importantly, Halbinger also discovered that optically transparent particles — the classic example is glass — displayed either no color pattern, random color patterns, or a pattern opposite that produced by the air bubbles. These effects are caused by differences between the refractive properties of air bubbles and those of particles made of solid transparent materials.

"It took me a second to understand what Werner had done after he showed me — but then I immediately realized how much potential his discovery offered," says Halbinger's boss, Andreas Böhme, Manager Vision Engineering at Seidenader. Böhme then began to consider just what could be achieved with such a technology. However, he also understood that they needed to figure out how to install a functioning system in a machine. As Böhme well knew, even the best idea only accounts for 10 to 20 percent of the total development process: "The rest is implementation."

Böhme, Halbinger, and many other colleagues from Seidenader got down to work. Meanwhile the patent registration was →



The Bubble-X station (on the left) screens a test container. It can perform this operation in just fractions of a second.

"Air bubbles behave like optical lenses under certain conditions."

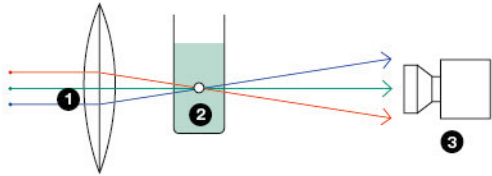
WERNER HALBINGER
Image-processing and lab engineer at Seidenader



The sensitivity of Bubble-X stations (the boxes in the foreground and center) can be individually adjusted.

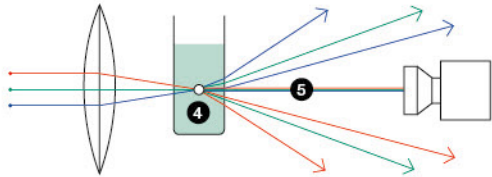
How Bubble-X works

Three light sources (red, green, and blue — RGB illumination) are arranged in such a manner that the green beam in the middle can pass straight through the convex lens (1) and thus always falls on the detector camera (3). The lens refracts the red and blue beams in a way that ensures they pass by the camera very closely when there is no problem. The three most common cases:



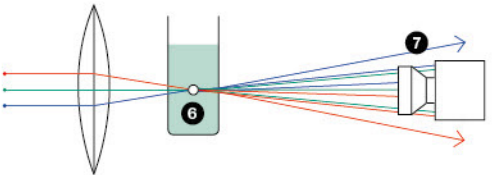
Non-transparent foreign bodies

If such a foreign particle (2) moves within the liquid, it will shade all of the light beams and be seen clearly as a dark spot in front of a green background.



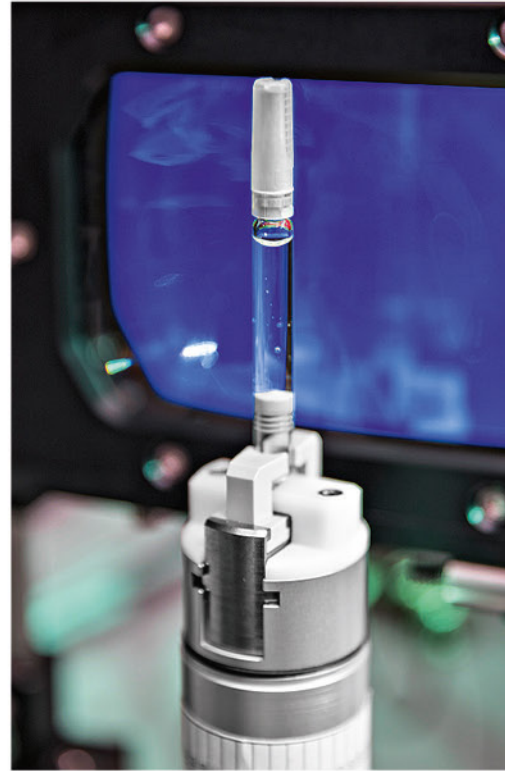
Air bubbles

An air bubble (4) acts like a lens and also deflects some of the red and blue beams onto the detector (5). Unlike the case with diffuse background lighting, air bubbles exposed to the Bubble-X lighting system reveal themselves through a consistent color pattern: red above, green in the middle, and blue below.

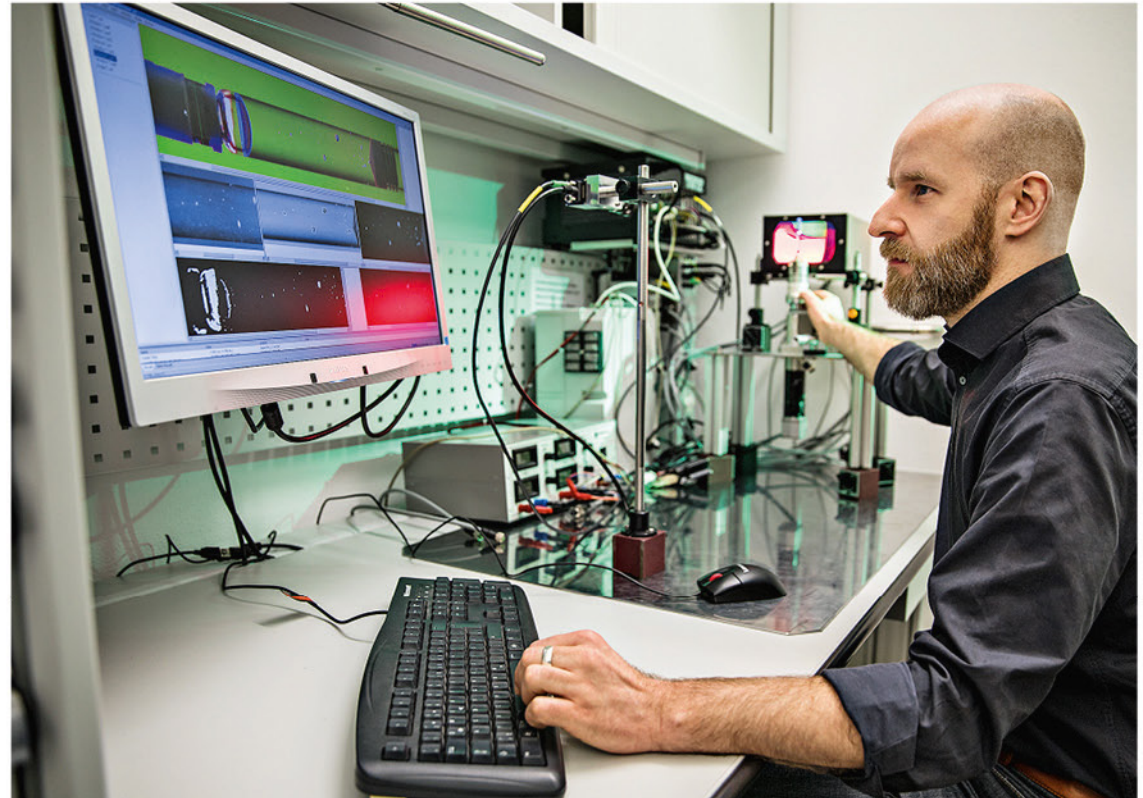


Transparent particles

Transparent particles (6) are also clearly identified by Bubble-X. Glass is the classic example: Because the refractive properties of glass are different from those of air, glass particles refract the beams (7) in such a manner that the color pattern is inverted — i.e. blue above, green in the middle, and red below.



Air bubble or foreign body — Bubble-X knows what's floating in the lower part of the syringe.



Werner Halbinger spends most of his working day in the laboratory where Bubble-X was created.

handed in — and Bubble-X is doing well on the market. Indeed, several pharmaceutical companies have already ordered the first machines equipped with this innovative inspection technology. “There’s a huge amount of interest when I present it at conferences,” says Seidenader’s Sales Director, Christian Scherer. “We’ve acquired many new customers over the last few years especially, and one of the main reasons for this is definitely our expertise in technical innovation.”

To ensure that this remains the case, Halbinger has already identified a new “enemy,” which is basically another version of the old one. The issue here involves the fact that Bubble-X reliably detects air bubbles down to a size of 200 micrometers. This figure will gradually decrease to 100 micrometers over the next few years as camera resolutions and image-processing systems improve. After that, the goal will be to move into the realm of micro-bubbles. “That will be difficult, but those micro-bubbles are already on my list,” says Halbinger.

200

MICROMETERS
That’s how small the air bubbles are that Bubble-X can now reliably distinguish from all types of foreign body. Halbinger is already working on ways to detect even tinier air bubbles.

Looking into the future

A colleague from the support team puts on the glasses – and is there to help the customer in the production site at the other end of the world. **Augmented-reality technology** is revolutionizing customer support at the machine manufacturer Fabio Perini.



Augmented-reality: The Wearable Glasses from Fabio Perini.



Remote control: Giulio Ricci is led through the production hall in Lucca by a colleague via his Wearable Glasses.



Worldwide support: From his office desk in Lucca, Giulio Ricci can help customers all over the world.

G

Giulio Ricci used to practically live out of his suitcase. He reels off a list of countries: “Japan, Brazil, South Africa, USA ... Except for Australia, I’ve been almost everywhere.” That means wherever customers of Fabio Perini, the market leader in machines for manufacturing and processing tissue products, operate. All those places from where they call to say, “Lucca, we have a problem. Things are at a standstill.”

Ricci and three colleagues provide customer support from Fabio Perini’s headquarters in Lucca, Italy. They can be reached around the clock if ever a paper web tears, a motor malfunctions or a warning light flashes somewhere in the world and the local technicians can’t deal with the problem. “Machines are constantly becoming more complex,” Ricci says. “Today it often happens that several engineers are responsible for a single machine. Just a few years ago, only one engineer was needed. But today a single person can no longer know every detail.” Meanwhile, some machines have already been in operation for up to 40 years — and experts like Ricci are needed to get them going again. Ricci can correct many malfunctions via telephone, Skype or e-mail, but some problems are too complicated to solve in these ways. “In two cases out of five, I used to have to travel to our customers — and sometimes I’d work there for only a very short time,” he says.

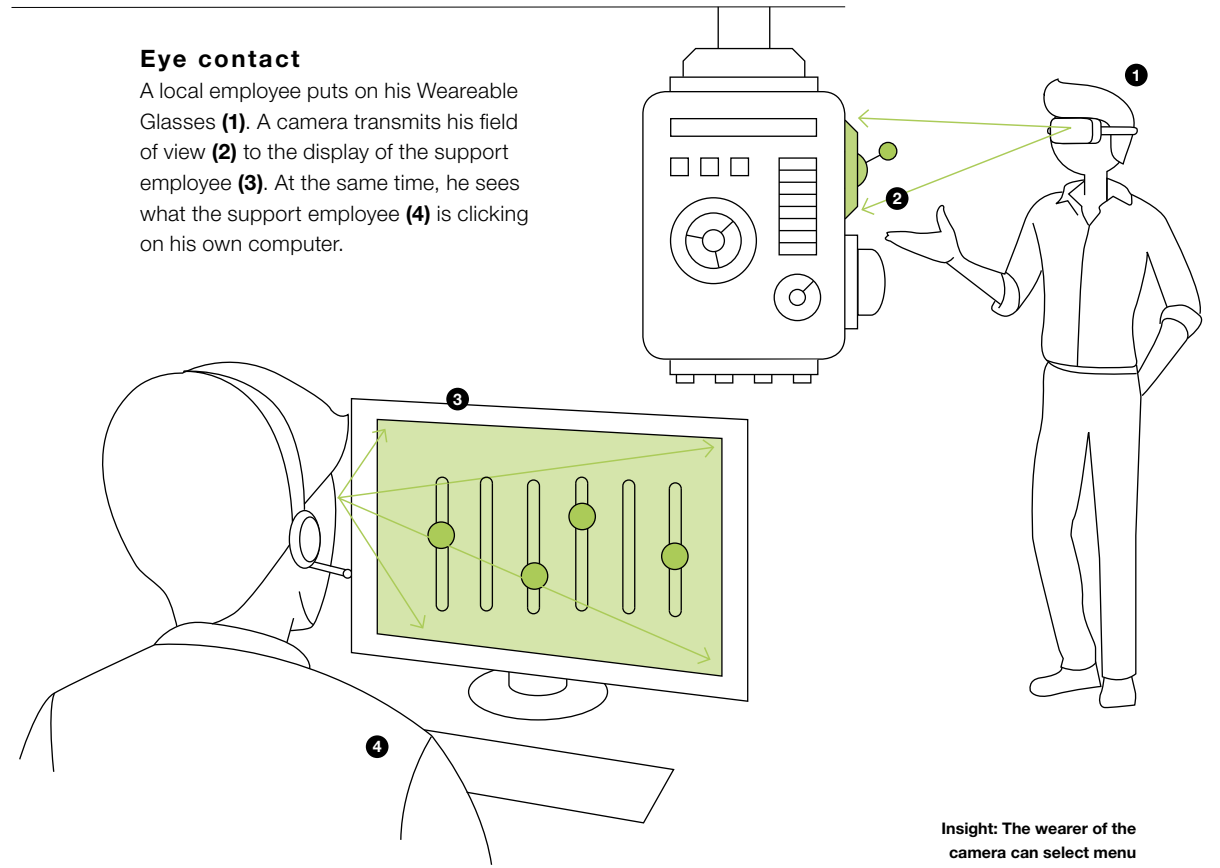
SUPPORT FROM AN OFFICE DESK

This situation will soon be a thing of the past, thanks to an innovation that Ricci proudly demonstrates. On his computer display, he’s looking into the open switching cabinet of a packaging machine. He picks up his mouse, and speaks into the microphone of his headset: “Take a look here and see if the cable is broken.” A hand instantly appears on the display and reaches for the cable. It seems as though it’s Ricci’s hand, but it actually belongs to a colleague who is standing at this moment in front of a machine in the production hall — 200 meters away on the factory grounds. “He’s seeing what I see, and I’m seeing what he sees,” Ricci explains. The technician in the production hall is wearing augmented-reality glasses that weigh only 600 grams and are called Weareable Glasses. Cameras in the eyeglass frame transmit the wearer’s field of view to the display of Ricci’s computer. And whatever Ricci draws on his display with his mouse is transmitted back and projected onto the eyeglass lenses. The circle appears in front of the machine operator’s eyes and shows him where he needs to intervene.

Thanks to his Weareable Glasses, Ricci can work from his desk to guide not only his colleagues in the production hall nearby but also the employees of customers all over the world. “Through this technology, Fabio Perini →

Eye contact

A local employee puts on his Weareable Glasses (1). A camera transmits his field of view (2) to the display of the support employee (3). At the same time, he sees what the support employee (4) is clicking on his own computer.



Insight: The wearer of the camera can select menu points on the display in front of his eyes by looking at them directly.



40

PERCENT
of inquiries from international customers used to require the company's support experts to travel from Lucca to the customer. In the future, such trips will be the exception.

is starting to play a new role," says the Global Customer Service Director, Gianfranco Agnusdei. The industrial park where Fabio Perini has its headquarters is already known as the "Silicon Valley of Tissue." The company, which is the market leader in this sector, now aims to give this nickname a deeper meaning. "We are still a machine manufacturing company," says Agnusdei, "but in order to optimally respond to our customers' future needs we're systematically taking advantage of all the options offered by digitization." In the field of machine construction, digitization makes it possible for machines to "communicate" with one another and for algorithms to detect early on when the components of a machine could wear out. Digitization also means that the services related to machines are changing and expanding. An important point for Fabio Perini is the fact that today top-level customer support is already a distinguishing feature that makes companies appealing to existing and new customers — and this trend is growing.

That's why Fabio Perini introduced the Weareable Helmet technology back in 2016 in order to make its customer support activities more efficient. The Weareable Helmet consisted of a virtual reality helmet, a vest equipped with lots of electronics, and a battery belt, which was still very heavy in those days. "For some customers, it looked like a science fiction film," Agnusdei recalls. But the practical utility of this futuristic outfit was impressive. Many customers are now using this helmet. The Weareable Glasses

that Fabio Perini presented to the public for the first time in 2018 are much lighter than the original model and already one generation ahead in terms of technical sophistication. The wearer can select menu points on the display in front of his eyes simply by looking at them directly. If he lets his gaze rest on an item, the software registers it as a click and opens up the information "stored" behind it, such as a set of PDFs with operating instructions or animated videos. In this way a technician standing in front of a machine can see how the mechanisms inside it work. "This is another giant step forward," says Ricci, the support expert. Soon he will even be able to attach "tags" to the machines. These are virtual notes that open up as soon as the Weareable Glasses' wearer looks in their direction.

The first interested companies got in touch directly after the presentation of this new service tool, and the first opportunity to put it into practice occurred after only two weeks. The paper webs in the machines of a customer in Turkey had been stretched too far, and they tore. "There could be lots of causes for that. In the



Vision: Gianfranco Agnusdei is working to establish Fabio Perini even more strongly as a provider of innovative services.

past, we had to check out each possibility individually," says Ricci. But with the Weareable Glasses, the procedure was different. When the local machine operator wearing the glasses transferred his own gaze at the machine to Ricci's display, Ricci immediately noticed something. The paper reel seemed to be blocked. That made the tension too high and the paper kept tearing again and again. "Find out why the reel is blocked," said Ricci to his colleague. Half an hour later the problem was solved. And this half hour saved the customer a long downtime, because Ricci did not have to travel to the company in Turkey.

LESS DOWNTIME FOR CUSTOMERS

"With this new technology we are reducing machine downtimes to a minimum, and our customers' productivity is growing. This means we're offering genuine added value," says Agnusdei. "For the sake of our customers, we are combining the best aspects of our technology leadership, our know-how, and our sector experience with the opportunities that digitization offers for promoting innovation. This is the direction in which we are going." The Digital Transformation Officer of the Business Area Tissue has been supporting these processes since February. In regular future workshops on the company grounds in Lucca, employees from various departments meet with experts from start-ups and universities as well as other partners to develop new solutions. "Our Business Area stands for the future-oriented blending of engineering expertise and digital technology," says Agnusdei. "We want to demonstrate to our customers again and again that we are the best company in the sector in terms of technology and customer support. And with the help of digital solutions we'll be able to offer them the best solutions in the future as well."

Many of these solutions are changing the way the company interacts with its customers. "Pretty soon, I guess I won't be traveling as much as I used to," says Ricci with a smile. But one thing will stay the same: "We will continue to offer our comprehensive expert knowledge to help technicians directly on site. But now we'll be doing it much faster."



"We are still a machine manufacturing company, but we are taking advantage of all the options offered by digitization."

GIANFRANCO AGNUSDEI
Global Customer Service Director
of Fabio Perini



An agile team: Hauni employees Karsten Barsch (left), Christian Junge, and Nina Gröncke used new work methods to develop the MSM machine.

Sprinting to innovations

Flexible, fast, and consistently customer-focused: Hauni has realigned its product development operations and created the pioneering **Multi Segment Maker (MSM)** in record time.

And there it is: A huge elongated cabinet made of metal, with countless drum-shaped rollers behind its transparent doors. Up above runs a slim conveyor belt that transports the tobacco sticks. Next to the MSM is a flip chart, and there are also index cards on which the next production steps are noted. Karsten Barsch stood here many times last year to discuss the state of operations and progress during shop floor meetings with his team of installers, developers, and purchasers. “It was great how everyone regularly came together at the machine — it’s a lot of fun when you work that way,” says Barsch, who in his capacity as Project Manager Secondary is responsible for the production of the MSM machines scheduled for delivery in 2019. Each machine is individually configured from the modular concept so that it is matched to the customer’s specific application.

Put simply, a Multi Segment Maker brings together the basic technological features of a Protos-M with those of a KDF 5MF filter combiner. In other words, the performance capabilities of various successful machine types are consolidated into a model that can be used flexibly. Indeed, the modular concept used for the MSM is what offers customers the greatest benefit. This concept makes it possible to adapt the machine to all different types of customer products and ensures that it meets special requirements — for example, those involving additional inspection steps. “As a result, customers are able to react to market developments more quickly,” Barsch explains. “When consumer preferences change, the MSM is simply reconfigured.”

MORE FRAGMENTED MARKETS

The MSM is an example of the many forward-looking ways Hauni is responding to the transformation of the international tobacco industry. For many decades, companies focused on increasing manufacturing speed, but the market has been more fragmented and heterogeneous for several years now. Next-generation products such as e-cigarettes and tobacco heating products (THPs), which heat rather than burn tobacco, have established themselves alongside the traditional product range; the MSM also produces THP sticks, for example. It’s still not clear how consumer preferences will develop in this area in the future, so manufacturers need to be →

continue on p. 39



Rollers in the Multi Segment Maker: Its modular concept enables the MSM to be adapted to specific customer requirements.

“The combination of clear objectives and independent work strengthens motivation and the participants’ sense of personal responsibility.”

ANDREAS PLUMP
Scrum Master at Hauni



“Structures that ensure optimal teamwork”

Three questions for Scrum Master Andreas Plump

Mr. Plump, how does scrum differ from other development methods?

With the scrum method, the teams themselves decide on which approaches to use. To this end, goals are defined and sprints that run for two to four weeks are organized. During this time, each team meets several times a week, with each team member reporting on what they’ve achieved in the interim, what they plan to do next, and what might be preventing them from completing their tasks.

What’s the biggest benefit to you?

Scrum is interdisciplinary — all of the functions pull together. However, scrum is also a very flexible work method that allows customers to directly influence the development process via their discussions with the product owners. At Hauni, we utilize a quality gate process that can be combined with the scrum method.

What is your main task as a Scrum Master?

My role is clear: I’m responsible for creating structures that ensure optimal teamwork. If a team member encounters a problem, I work together with him or her to eliminate it. Every scrum process also has a product-related and a social side to it, so I also make sure everyone can work together smoothly in a constructive atmosphere with in-depth discussions.

prepared to react flexibly to any changes. “For us, this means working more closely with our customers at an earlier stage and ensuring that our machines become even more adaptable,” says Barsch.

To this day, the entrepreneurial spirit of company founder Kurt A. Körber is reflected in Hauni’s well-maintained brick buildings and huge production halls in the Bergedorf district of Hamburg — a place steeped in tradition and brimming with inventiveness. The MSM is just the latest example of a type of customer focus and innovative spirit that’s embedded in the company’s DNA. Developed in record time, the MSM offers customers a new dimension of flexibility. The project that led to its development was also ground-breaking in terms of its use of new and even more agile work methods and processes for product development at Hauni. Such a project requires a gradual and cross-functional approach. It all began when a development team led by Dr. Hans-Heinrich Müller developed the foundation for modular machines that incorporated all the required functions from the very beginning. In the project, work was performed using agile methods that included daily shop floor meetings, sprints, and the formation of small teams that organized their tasks independently. All of this was managed by the MSM product owner team, whose members regularly coordinated with one another in a scrum project room, where the tasks for each sprint were defined.

“Agile work methods like scrum make functional areas more permeable and intensify communication between departments,” says Andreas Plump, a scrum master and agile coach who together with his colleagues develops the key processes and structures required for projects. Plump is the one who makes sure that teams can work without restrictions and that information can flow freely (see interview on the left). Other scrum participants include the developer team and the product owner, who, among other things, passes on customer requirements to the developer team.

The walls in the scrum room are covered with sticky notes of various colors containing information on the sprint results that need to be achieved and the tasks that need to be performed. The teams (of which there were seven for the MSM project) meet here several times a week. Plump, who studied mechanical



Consistent customer focus: Nina Gröncke will accompany the technicians on their visits to one of the first MSM customers in order to obtain important customer feedback and determine whether the customer wants any configuration changes to be made.

engineering, makes sure the coordination meetings focus on results and participants stick to the time limits, which means he steps in if discussions get bogged down in details that inhibit progress. “The combination of clear objectives and independent work significantly strengthens motivation and the participants’ sense of personal responsibility,” he explains.

Hauni has been utilizing the scrum method for machine development for several years now, one example being the Ventis logistics solution developed especially for THP production operations. Compared to conventional development processes, in which specialists complete their tasks independently and don’t meet up until the late stages of development, the scrum method offers the benefit of a faster and more flexible iterative approach. Here, what works is continued and what doesn’t work is canceled. →



Karsten Barsch, who is responsible for the order completion process, operates the production of the MSM machines. The project status is regularly reviewed in Hauni's "Atlas" room in Hamburg-Bergedorf.



CONSISTENT CUSTOMER ORIENTATION

Speed is the decisive factor in a rapidly changing market. This led to yet another innovation with the Multi Segment Maker: for the first time ever, the order completion process (OCP), i.e. production, was launched in parallel with the machine development process. "We redefined processes, space arrangements, and delivery locations," says Barsch, who is also responsible for the OCP. Product and OCP managers met every day to coordinate, and two OCP teams worked on overlapping schedules between 6 a.m. and 8 p.m. in order to ensure that the ambitious project goals could be achieved. "Everyone was highly motivated because the successes we achieved over and over again showed us that our approach was paying off," Barsch explains. The new approach has thus proved its worth and is now being used in many other projects.

It's not just customers who benefit from early involvement in projects, as this approach offers advantages to other specialist departments as well. "We were involved from the very beginning when the decision had to be made as to which types of testing systems would be installed and where," says Christian Junge, Group Manager for Software Development and Sensor Systems. Junge's team develops the sensors that check each cigarette or stick for capsule defects, leaks, and the presence of foreign substances. Junge was very impressed by the extensive cooperation with others in the MSM project. "We worked together on ways to ensure the viability of the machines for future operations by addressing everything from the use of new materials to the implementation of new inspection procedures," Junge explains. "The amount of space available in the MSM for testing systems

is now so large that the installation of additional sensors and testing drums won't pose any problems at all in the future, which means greater flexibility for customers."

A key aspect of the MSM project was to ensure a consistent focus on the customer in terms of everything from the initial idea to the agile work methods used and the finished product itself. Customer focus also extends beyond the finished product. For example, Nina Gröncke, a project engineer in the Technical Customer Service department, will be accompanying the technicians on a visit to one of the first customers for the MSM. Prior to setting out for her visits, she extensively studied the machine and all of its details in order to support the technicians on a site and ensure optimal operation of the MSM. However, she's also interested in obtaining additional customer feedback and determining whether the customer wants any changes made to the way the modules are combined. "That's because the suggestions customers make are valuable," Gröncke explains. "Ultimately, it's their individual requirements that count." •



"We focus first on gaining an understanding of customer requirements and then develop a solution that meets them," says Dr. Bernd Pape, Head of Digitization at the Business Area Tobacco.

Agile methods in digital projects

Agile work methods are used not only for the MSM but also in digitization projects. The gradual approach has proved itself in projects involving digital solutions in particular. Examples include projects for smart factories, where more and more information and processes are migrated from paper to computer monitors and databases, as well as projects related to maintenance and customer services. The goal here is always the same: To be able to respond more rapidly to customer requirements and thus offer customers greater added value. "Instead of providing customers with fully developed solutions, we focus first on gaining an understanding of customer requirements and then develop a solution that meets them," says Dr. Bernd Pape, Head of Digitization at the Business Area Tobacco.

Here it's also useful to try out various approaches to a solution in dynamic environments. Additive manufacturing is a good example of this in a field of increasing importance. The Business Area Tobacco has been working with all the other Business Areas in the Group for some time on the development of a solution that will enable parts to be printed close to the customer. "When we began the project, printing technology still wasn't advanced enough for our needs," says Pape. "Nevertheless, it was a good idea to start the project when we did, because if we had waited, we would have been too late on the market."

Anneke Barsch, a product owner at Hauni, made a successful first Stage Gate pitch.

STAGE GATE MEETING
Your time to innovate

One round further

Other companies have employee suggestion systems — at Körber, the employees themselves implement their **ideas for digital innovations** in projects and submit them to a jury once a month.



A critical gaze: At every Stage Gate Meeting, a jury poses critical questions. In this case, it's Dr. Stefan Kusterer (Körber Digital, right), Dr. Sina Mohr (Pharma Systems), and Dr. Andreas Bahke (Logistics Systems).

Don't focus so much on your technology. Pay more attention to your customer's problem." "Next time I want to see more progress on the business model." "Why is your solution better than the one I can already get on the market?" Comments like these, which make one think of the TV show "The Dragons' Den," are typical at a Körber event that is held monthly in the film theater on a start-up campus in Berlin. Here, highly motivated pioneering thinkers present their ideas on a brightly lit stage. The jury asks tough questions and reaches a judgment: Should the project continue or not?

But this is where the similarities with the TV show, which features would-be company founders, come to an end. At Körber's Stage Gate Meetings, the tone is objective, the feedback is well-qualified, and the audience represents concentrated expertise. Other Körber locations are connected via livestream; anyone who has the time can watch. Some of the observers in the hall or in the network have participated in these projects, while others are curious or want to ask questions that will help the teams refine their ideas swiftly and with a focus on the customer. The presenters who pass will be permitted to move towards their next Stage Gate — that is, the next milestone in the innovation process at Körber Digital.

The ideas that are presented might deal with real-time simulations for warehouse management. Or with augmented-reality support for technicians who are converting assembly lines.

Or machine learning systems for the smooth supply of spare parts.

The Stage Gate Meetings, which Körber Digital holds once a month together with the Group's other Business Areas, are one of the many pacemakers of the digital innovation process, says Thomas Zedler, Vice President Operations at Körber Digital. "Here at Körber we work differently from the ways that are customary at industrial groups. We support ideas that are based on practical operations by subjecting them to a quick and precisely timed process that leads to prototypes in just a few months."

GOOD IDEAS ARE THOSE THAT HELP THE CUSTOMER

Of course not every idea is successful. Every idea has to prove itself to the jury again and again in order to pass the Stage Gates, and there are six of them in total. An idea needs to pass through these Stage Gates in order to continue receiving resources, a budget, personnel, time, and technical support from the Körber Digital team or advice from other expert teams in the Group.

Passing the first three Stage Gates means going from the idea to a concrete concept and then to an initial practicable version for test customers — the minimum viable product (MVP). Each of these Stage Gates poses tough requirements. "Of course this is an unfamiliar situation for many colleagues," says Zedler. Accepting the questions and the jury's criticisms and using them to decide on the team's next actions is a learning process. However, all →



Support and networking: Daniel Westerlund is a Senior Strategic UX Designer at Körber Digital. He advises various project teams during the digital innovation process.

participants agree that it's important to receive exactly this kind of feedback. The questions coming from various perspectives help the project teams to focus again and again on the most important question of all: Are we doing this well enough for the benefit of our customers?

"It's not always easy to keep this question in mind every moment," Zedler says. Especially when it's a matter of the latest technological trends. "People very quickly get enthusiastic about them, and they say, 'We have to do something with augmented-reality. What would be a possible application?' By contrast, we say, 'Our customer has a problem. How can we solve it?' And at that point we're not yet thinking of the technology at all."

For example, some customers are facing the challenge of having to produce ever smaller batches of their products. As a result, they have to frequently retool their assembly lines, and every time they do that they lose lots of valuable time. "So we look at the problem together. Where should a solution be applied, what specific requirements do the people have for a certain machine, what frustrates them, and where are they losing time?" says Zedler. "Only then an idea can emerge — for example, 'This could be very effectively supported by means of augmented-reality glasses.' But there could also be a completely different approach to a solution."

Cooperating closely with the customer from the very start, and not committing to a definite technology too early — these are two important basic principles of the digital innovation process. The third basic principle is trans-

parency. Another function of the Stage Gate Meetings is to make the projects known within the Group. "That way we prevent situations in which departments or Business Areas are working on digital initiatives with similar business models without the knowledge of others in the Group," says Kristin Hoffmann, a Business Development Coordinator at Körber Digital. "For every new idea, we always ask whether someone else within the Group is doing something similar. Can we rely on our existing knowledge? Can we create networks between teams?" One key to answer these questions is close cooperation between the Business Areas. Before each Stage Gate Meeting, the presentations are assessed cooperatively by colleagues responsible for digital advancement at Körber Digital.

"One of our most important tasks is to make the digital innovation process and the role played by the Stage Gate Meetings in this process better known within the Group," says Hoffmann. "After all, we don't want to specify what topics are important at the moment. Our colleagues in the Business Areas know that best, because they are in direct contact with our customers. That's why we're happy about every team that contributes an idea. That's how we develop the best solutions for our customers." And this is also why all Körber employees are invited to watch the pitches via the livestream. "That way people will realize that at Körber we don't file good ideas in a box, and after that nobody hears about them ever again. At Körber, people can implement their ideas themselves." •

"Accepting the jury's criticisms and using them to decide on the team's next actions is a learning process."

THOMAS ZEDLER
Vice President Operations Körber Digital



Focus on the customer: Thomas Zedler (top) and his colleague Kristin Hoffmann (left) from Körber Digital organize and host the events.

We invent new things

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→ Do it yourself:
Körber employees who have a good idea can implement it directly, if they can convince the jury that meets once a month.

50

→ Smart data:
K.Edge Solutions combines the know-how of machine operators with live data from shift operations.

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→ New partners:
Körber is using targeted equity investments to gain secure access to new key technologies.

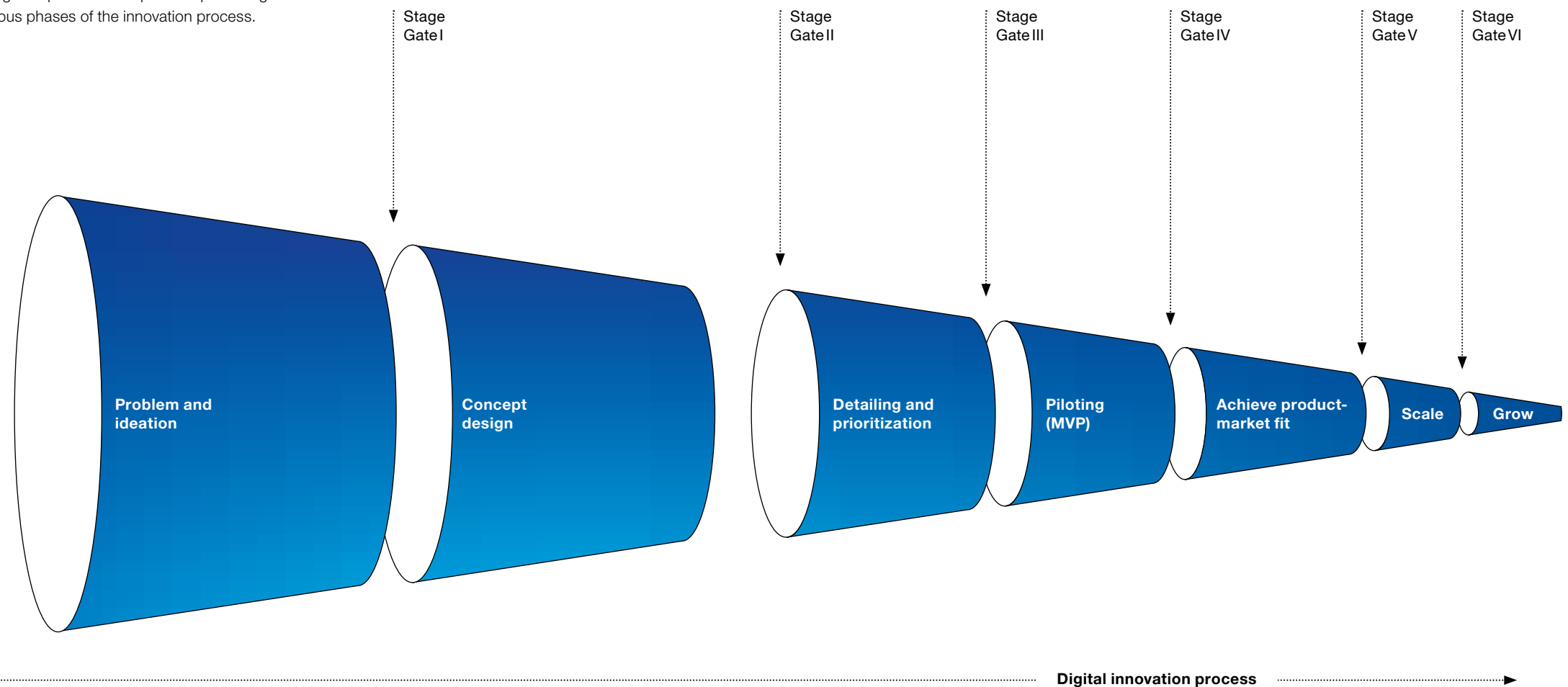
58

→ A good listener:
Voiteq is using innovative voice technology to improve the warehousing processes of its international customers.

Catalyst for innovations

From an initial idea to a prototype and then to a product with strong growth potential in just a few months: In its group-wide innovation process, which comprises seven phases, Körber supports teams that develop new digital solutions, services or business models with and for their customers and want to take them quickly to market maturity. In order to move from one phase to the next, the teams' projects must pass examinations by a jury in a series of Stage Gate Meetings at Körber Digital in Berlin.

On the inner page we present a snapshot of promising projects at various phases of the innovation process.





Machine optimizers are on the way

Back to the beginning: During the digital innovation process, the Machine Optimizer team very quickly realized the value of in-depth professional feedback. That's because on the way to the first prototypes it became clear that the original development path did not match the market potential. "With the help of intensive coaching, we developed the original idea into two new ideas that were much more powerful. We are now pitching the two new ideas for Stage Gate1," explains product owner Daniel Reinhardt. "Thanks to the Stage Gate process, our work has become more dynamic and target-oriented, our learning cycles are shorter, and our successes are occurring faster, because we're focusing on the right things."



Is optimization required? Ask the virtual twin

Density, moisture, and sugar content: If a natural product used as a raw material varies from batch to batch, it poses a great challenge to the machine operators who are processing it. They must continually adapt the machines' settings and processes to the raw material and find the right balance as best they can. To make sure that as little as possible of the valuable raw material is wasted, a team is using PROM to develop digital twins of the machines and equipment that process tobacco. This enables the machine operators to conduct tests ahead of time and thus find out the optimal parameters for the current shift.



Smart management of spare parts

Modern machines have thousands of components, which in many cases were made by different manufacturers and have different product life cycles. As a result, it may no longer be possible to obtain a spare part because the manufacturer has dropped it from its product range. To solve this problem, Körber employees are developing EnoLaaS (End of Life as a Service) — a kind of Wikipedia for spare parts, which provides the latest information about the life cycles of thousands of products. The developers want smart additional functions to take spare part management to a new level. "We learned a lot especially when we were trying to persuade industrial partners to join us in the development process," says product owner Nizar Manzli. "This kind of cooperation requires a great deal of trust. You have to earn this trust, but it's essential if you want to have quickly available and market-ready results."

Why the problem is the right starting point for innovations

**"It doesn't matter how well you are building the wrong thing."
Alan Stevens**

Products and services are good if customers like to use them and if they make work easier. If you want to make work easier, you first have to find out what factors are making it unnecessarily hard. That's why you need to understand the challenges the users are facing and develop empathy for them before you can start to develop solutions for their daily lives. Developers who heed this principle will thrill customers and be successful.

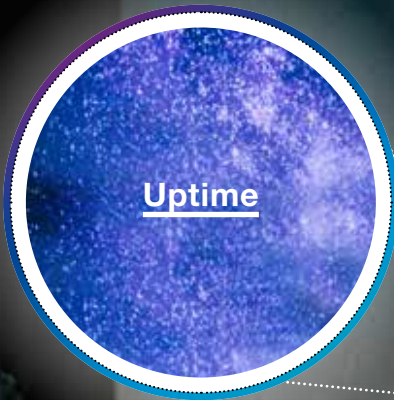




DISCO

Deeper insight into reconfiguring

A central problem of the pharmaceutical industry is the fact that manufacturers are having to reconfigure machines and production lines more and more often. Why is that? Because they are producing more and more small and very small batches. DISCO stands for “Digitally Supported Change-Over” — digital support for reconfiguration processes, here in the form of augmented-reality glasses for the technicians working on the machines. Further development stages of this system are being planned. The developers are benefiting from the smart factory expertise that other Körber teams have accumulated in the course of their innovation projects.



Uptime

More transparency

Through the development of K.Edge Solutions (see the comprehensive innovation report starting on page 50) Körber Digital gained a wealth of experience regarding the networking of machines. “We often notice that hardly any of our colleagues working in production know how ‘their’ machines have been programmed,” says product owner Felix Raab. “At first glance, that makes networking almost impossible.” That’s why his team is currently developing Uptime, an application that does in fact make it possible to access the necessary data of any machine. What has been his biggest lesson learned so far? “Decision-makers in companies often specify functions that are not oriented to the users’ needs. We get both parties to sit down together at a table at an early stage, and thus we find better solutions that offer genuine added value.”

Eliminate all sp
losses by taking
approach to
manage



What data do the engineers need to see, and what helps them in their work? Gerardo Lopez, Interface Designer at Körber Digital, works on the basis of user interviews.

Start with the simplest solution

Speeding in just three months from the initial idea to a prototype that is used by the customer — the intelligent **software K.Edge Solutions** shows how fast innovation in machine construction can be.

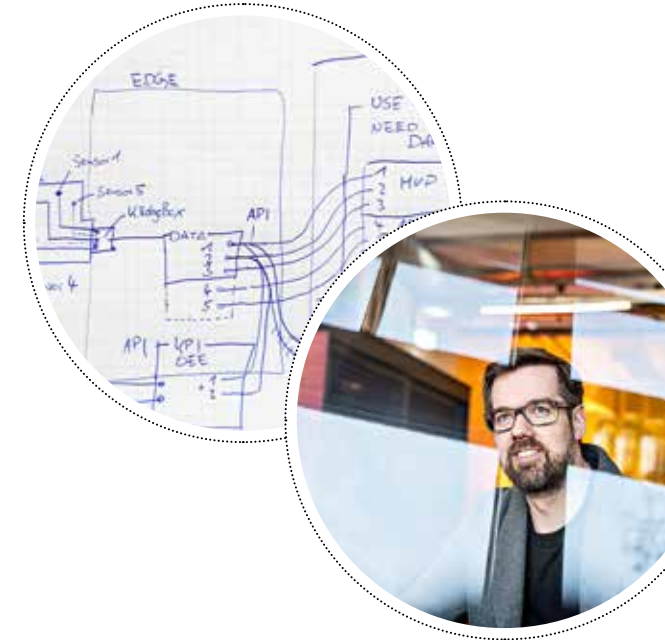
During the first pitches at the group-wide sprints focusing on the smart factory, I knew: We have to implement this — fast!” says Jens Delventhal as he recalls the start of the joint work. Steffen Cords also likes to look back at the early days. On his smartphone he still has a photo of the first ballpoint-pen sketch of his idea. It consists of a couple of boxes and a couple of data cables. If you squint a little, it almost looks like a machine. At the bottom left of the sketch is an element that is often neglected in traditional product development: the human being who is supposed to use this thing.

According to both, that was on July 22, 2017. The next photo is dated October 2, 2017. It shows an empty office in a co-working space in Hamburg. No computer, no telephone, and no people. Scrawled on the glass wall in chalk is a message: “82 days to launch.”

This means the team went from the initial idea to the minimum viable product (MVP) in use by the customer in just three months. “That was an ambitious goal,” says Delventhal, Vice President Product Development at Körber Digital, with a touch of pride. “But we knew we had the know-how, the skills, and the passion we needed to reach this goal.”

K.Edge Solutions combines the know-how of machine operators with the live data from shift operations to form a comprehensive picture — something that was not possible in the past. It answers a number of questions, such as: Why was the production process slower than usual during the last shift? Where did drop-outs, malfunctions or production stoppages occur? What can we deduce from this information in order to improve the next shifts? What kinds of problems should we expect to see at specific machines and when? How can we prepare to deal with them? Which spare parts should we have on hand?

“Today many companies are talking about condition monitoring or predictive maintenance without knowing what they really need,” says Cords. He studied shipbuilding and subsequently worked in the field of social research and futurology before joining Körber Digital,



“After the machine operators realized that we really wanted to learn from them, they developed trust.”

STEFFEN CORDS
Head of Ideation and Scouting at Körber Digital

where he is the Head of Ideation and Scouting and is in charge of the early phase of innovations. “In many cases, companies set up development programs and work on solutions that are much too complex and therefore often dropped within three years or less,” he says.

THE DAILY CHECK: WHAT’S THE STATUS QUO?

The situation is different with K.Edge Solutions. This software is already being used by a hygiene paper manufacturer in factories in various locations across Europe. Several customers from the Group’s Business Areas Tissue and Logistics Systems are also interested in this solution and have started testing it. And the K.Edge office at Körber Digital’s Berlin location is extremely full. “Thanks to the cooperation of three Business Areas, we developed our first product to the MVP phase in practically no time at all. Now that we’ve got this product →

in real operation and are continually enhancing it, we've reinforced the team once again," Delventhal says. At today's daily stand-up meeting, colleagues are taking turns to describe what they have accomplished during the current sprint, what they are working on at the moment, and what's holding up progress. Some of the colleagues are physically present, while others are participating online. In agile projects like this one, distributed working is normal.

Cords continues his story about the early days. "I'll never forget the experience of standing in our customer's factory for the first time and seeing all the things that start happening at the moment when these gigantic paper rolls are delivered, what the machines do with the paper, what kind of technology is involved, and what kinds of process steps are used," he says. From the very first day on, this kind of detailed understanding has been the basis of K.Edge Solutions. And this understanding is gained primarily by talking with the people who operate the machines. "Initially they were mainly skeptical. But after they realized that we really wanted to learn from them, that we were designing all this software for them, and that they could really influence the design of the interface, they developed trust."

One of the secrets behind the success of K.Edge Solutions is a rule from the field of design thinking: When you're developing something, always keep in mind the user who will be working with it every day. Another important principle is: Start with the simplest solution. "We carried out the first tests at our Fabio Perini factory in Lucca. Then we took some simple hardware to our pilot customer's factory, where we recorded only one measured value of the machine: its speed. Nothing more," says Delventhal.

That doesn't sound like big data at all. "But you can use it as a foundation for many other things — for example, answers to questions such as: Why were there fluctuations in the operating speed? Is this the beginning of a problem? Why was there a stoppage?" This is where the machine operators come into play. The K.Edge Solutions team worked together with them to develop a touchscreen interface where the operators can record events and enter their observations during a shift. "We use this information to look for and identify patterns."

DATA BECOMES IMAGES

"This is more or less the way that companies train their software for autonomously driving cars," Cords explains. "Have you ever logged



What's our situation today? Alexander Kinstler (center) is a product owner who manages the daily operations of K.Edge Solutions.



How are things going for you? Where are you having problems? Who can help? The daily stand-up meetings are a basic element of the team's work.



onto a website and had to solve picture puzzles by clicking on the photos where you can see a store, bridge, or bike?" In the same way, algorithms recognize patterns in the images captured by the vehicle's camera. K.Edge Solutions uses the entries of the machine operators to detect patterns in the fluctuations of the operating speed. "Today we are recording many more parameters, which we can use to construct fairly complex models and predictions," Cords adds.

The more extensive and varied the data are, the tougher it is to visualize them. "In addition to the support we're providing to the shift workers, we're focusing on data analyses for the engineers who bear overall responsibility for the machines' performance at the moment," says the interface designer Gerardo Lopez. How much information on the display is too much? Which data should be emphasized? Where do graphics help and where are they a distraction?

It's also very important to make sure the users can directly see where they can intervene to solve problems.

"We have a very strong focus on precisely understanding the users: their age, their visual habits, and how tech-savvy they are," says Lopez. Here too, nothing works without interviews, according to Ouafae Aamer and Alexander Kinstler, the product owners who manage the daily operations at K.Edge Solutions: "We go to the factory every few weeks, and we talk to the machine operators there. This is a vital part of the process."

One reason for this is that the potential of K.Edge Solutions is far from being fully exploited. "We will soon be able to support the machine operators' work even more effectively by means of automated recommendations for optimization," says Delventhal. "Things are becoming really exciting right now."

A perfect match: The start-up Connyun has been part of the Körber Group since 2018.



A network of innovations

You don't have to invent everything yourself or alone: Körber is systematically expanding its ecosystem, joining investment funds, and investing in start-ups that are developing **relevant future-oriented technologies** for and with the Group.

In the future, Körber's claim to market leadership through technology leadership will be based on three factors: the successful interaction between machines and production systems, the use of customized operational software, and the development of industrial IoT and digitization solutions. A crucial aspect of this strategy is a well-functioning, flexible ecosystem that the Körber Group is expanding and reinforcing for and with its customers.

Dr. Hartmut Ruh, Head of Corporate Development at Körber, is well aware of the importance of such an ecosystem. That's why he and his team are searching the market for partners, including start-ups, that would fit in well with the Group. "We want to learn about innovative and disruptive technologies and build up contacts with the teams that are developing them," he says. "We're doing this so that we can strategically invest in areas that are already important for us and our Business Areas or will certainly become important in the future. These areas include robotics, sensor technology, artificial intelligence, and machine learning."

Start-ups are playing an important role in the construction of the Körber ecosystem. In the category of traditional acquisitions, the Group's investments aim to completely take over a company and its technology from the very start. That has been the case with Connyun, for example. Körber bought this German start-up in 2018 and integrated it into its Business Area Körber Digital. "We immediately realized that Körber's existing

core expertise would be perfectly complemented by the expertise of the new team," says Ruh.

By contrast, Körber's equity investments in start-ups are primarily aimed at ensuring that both sides learn with and from each other very quickly and intensely. That way, each side offers what the other one is seeking. "Start-ups in particular give us access to new technologies, business models, and markets, as well as speed and new ideas," says Ruh. "We contribute many years of valuable industrial and sector experience to our cooperation."

Many of the start-ups that Hartmut Ruh and his team are looking at have developed fascinating solutions but are not always relevant to Körber's Business Areas at first glance. However, that can change quickly, because start-ups are very close to the market and rapidly adapt themselves to constantly changing requirements. One good example of that is the Munich-based robotics start-up Magazino, in which Körber



"We want to learn about innovative and disruptive technologies."

DR. HARTMUT RUH
Head of Corporate Development at Körber AG





Series-produced safety: Magazino's picking robot Toru perceives its surroundings via 3D cameras and avoids collisions with humans.

has invested since the beginning of 2018. "When we first had Magazino on our radar years ago, they were still building commissioning robots for pharmacies," Ruh explains. Today Magazino is supplying gigantic retailers such as Zalando and Fiege with intralogistics robots that move around in warehouses autonomously. It is also a strategic partner of the Group's Business Area Logistics Systems.

A VALUABLE FUTURE-ORIENTED NETWORK

Last year Magazino received The Spark – The German Digital Prize for its new robotics operating system Acros. This cloud-based software enables robots to develop a "shared" intelligence inside a warehouse. The robots learn from the experiences of their "colleagues" and can react much faster and more appropriately in the network to unfamiliar and changing situations.

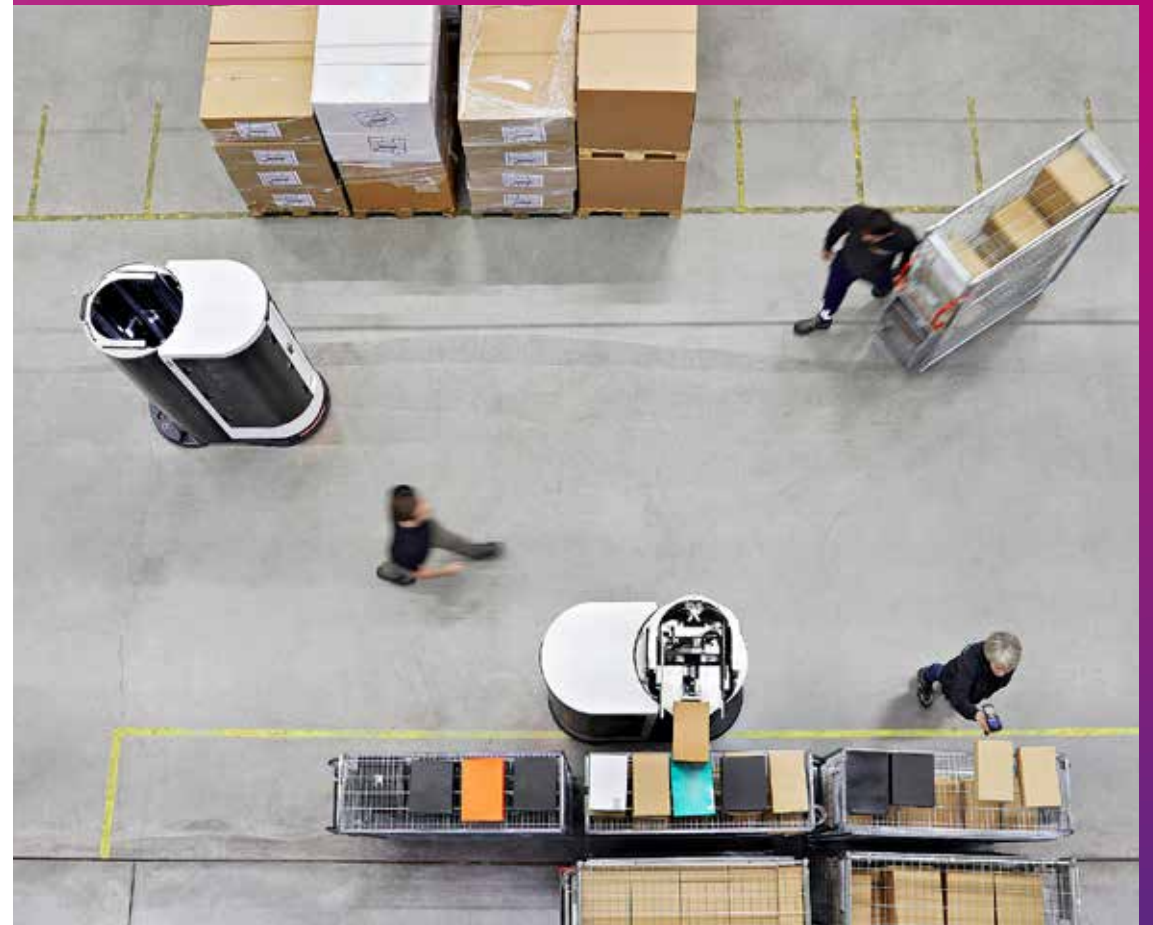
The example of Magazino illustrates the Körber Group's investment strategy, whose main goal is to gain access to new technologies, solutions, and business models in this way. "Of course the expected long-term return is important for us, just as it is for a traditional venture capital investor," Ruh explains. "So when we evaluate the investments that we make in close cooperation with our colleagues

from the Business Areas, we look for companies or start-ups that have a clear unique selling point, a good management team, and sustainable market potential."

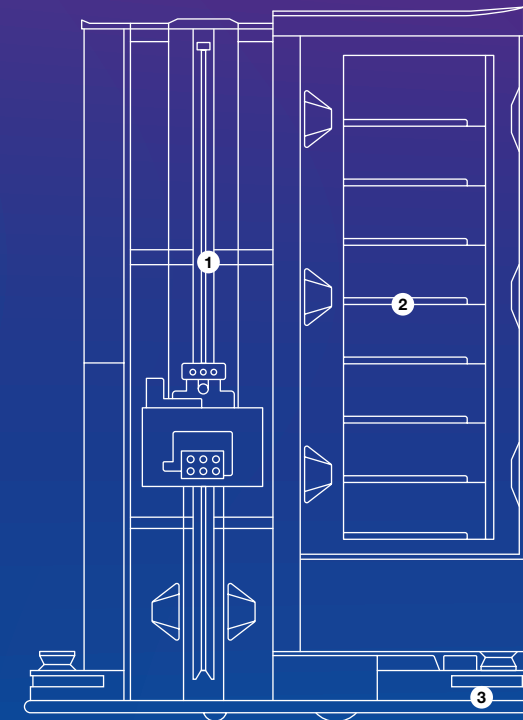
Investors who want to get to know promising start-ups and find out about investment opportunities at the right moment need one thing most of all: the right contacts in the start-up scene. That's why Körber has invested in funds such as the High-Tech Gründerfonds (HTGF) and, in 2018, the Next Logistics Accelerator (NLA). HTGF is the biggest venture capital investor in technology companies in Germany. NLA, which is more focused on specific areas, guided the first two groups of logistics start-ups through its six-month program last year. "Among other things, we are members of the Advisory Board of NLA, and so we're getting to know the start-ups and their business models in detail at an early stage," says Ruh. "We're also supporting the start-ups in areas where we have a great deal of expertise."

All of these processes are creating a valuable future-oriented network that is systematically reinforcing Körber's innovative strength. Ruh is convinced that the key to future success lies in fast, flexible, and comprehensive ecosystems of this kind. The positive experiences he has had in his cooperation with start-ups encourage him to press ahead with this investment strategy and to make it even more international – an approach that also includes paying attention to Asia and North America. •

A careful grip: Toru grasps cartons by means of a suction unit.



Shifts that do not cause backache: Toru robots assemble shipments.



An agile and hard worker

With its lifting column **(1)** Toru can reach objects on shelves that are between 8 and 250 centimeters high. The gripper mounted on the lifting column can move objects weighing up to 5.8 kilograms. Toru's backpack shelf **(2)** can hold 16 cartons. On its flat and flexible mobile base **(3)** Toru moves securely through the warehouse.

Hands-free: The Warehouse Execution System leads warehouse employees through a series of work processes such as commissioning and inventory via spoken dialogue.



Straight talk: The use of VoiceMan solutions helps customers boost efficiency between 10 and more than 30 percent. "Voice technology takes business operations to the next level," says Anton du Preez, the Group Sales Director at Voiteq (bottom).



Modern Talking

Voiteq develops market-leading **voice-directed solutions for customers of the Business Area Logistics Systems.** This UK company was acquired by Körber in 2018 — and it's enhancing both side's innovative power.

Time is pressing — constantly. Ordered today, delivered tomorrow — this claim is almost standard today in the logistics sector. Companies that want to keep up must develop processes that can work faster and more precisely. And in warehouses there are many opportunities for this type of optimization. "Companies have realized that they can't master these challenges without efficient warehousing processes," says Anton du Preez, the Group Sales Director at Voiteq. Voiteq, a company with headquarters in Blackpool, UK, develops the innovations that are needed for this kind of optimization.

Since 2000 the company has been developing voice-directed solutions under the name of VoiceMan that improve the warehousing processes of its globally operating customers. One of these solutions is the Warehouse Execution System (WES), which can be smoothly integrated into customers' existing warehouse management systems. WES equips warehouse employees with headphones and a receiver that is not much larger than an electric shaver, then leads them via spoken dialogue through various work processes such as goods receipt, storage and transfer processes, picking, loading, and inventory — without requiring a keyboard or paper. "That speeds up the entire process," says du Preez. "Adding voice technology takes business operations to the next level." Efficiency is the crucial advantage it provides. "Functions, dialogue, and commands are reduced to the basics: the business operations and the action that has to be carried out at the moment," du Preez adds.

THE DISPLAY SPEAKS

Voiteq's voice-directed solutions are being used successfully across many sectors and countries. The company's customers range from price-sensitive trading companies to the fiercely competitive automotive market. Thanks to voice technology, customers can increase their efficiency between 10 and more than 30 percent. At the company's headquarters in Blackpool, IT experts, software developers, consultants, and technicians are constantly tinkering in order to further simplify and accelerate the multilayered, linked processes

of the logistics sector through voice technology. For example, the VoiceMan Screen-to-Voice connector transforms processes that are normally only visible on displays into spoken commands. This transformation enables all display-based processes to be activated via voice control easily and without any special interfaces.

The state-of-the-art analytical tool VoiceMan Data Analysis can do even more. Warehouse managers can call up data from the voice system in real time — and also use this data for long-term analyses of information about performance trends, benchmarking, and training opportunities, for example.

Voiteq has been part of the Körber Group since June 2018. This has benefited both sides in the field of innovation. Other companies from the Business Area Logistics Systems, such as Inconso, also rely on technologies from Voiteq. Meanwhile, Voiteq is also benefiting from the development of new innovations. "Ever since we became part of Körber, we've been seeing synergies that enable us to develop offers for our customers. That's because we can now rely on the Group's global network of experts, which is bringing us tremendous benefits," says du Preez. "Today we have even more worldwide contacts who can help us to improve our products and expand our business operations."

Many more exciting opportunities are opening up for the voice specialists, because customers now pose a very diverse range of challenges. For example, in the e-commerce sector the return rates can be as high as 40 percent, and that can quickly lead to massive amounts of logistics work. Creativity is needed here — and at Voiteq, creativity is a key component of the corporate culture. "Innovations become reality when creativity is part of everyone's daily work," says du Preez. "That's why our employees are creative and flexible as they advise customers and look for the best solutions. We encourage everyone at Voiteq to share their new discoveries during spontaneous stand-up meetings and to share ideas with their colleagues both during and outside their work hours." He is convinced that "the most important aspect of product development is the process of listening to our customers and understanding their problems." •

We work smart

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→ Tissue:

In Brazil, Fabio Perini creates an atmosphere that promotes creativity and innovation.

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→ Tobacco:

How Hauni Hungaria uses continuous improvement to make production processes in Pécs more efficient and more flexible.

Succeeding together



Fabio Perini Brazil, one of the companies in the Business Area Tissue, has an outstanding work culture. That's good, because **innovation for customers** and markets requires committed employees who are keen to promote it.

Fabio Perini in Brazil is growing: The new production hall covers an area of 2,800 square meters. "Now we've got room for two more production lines," says Dineo Silverio as he gazes with satisfaction at tidy rows of machine components that are ready for assembly. Silverio is the President of Fabio Perini Brazil, which is located in the city of Joinville, about 500 kilometers south of São Paulo. A new production line for folded paper napkins — the first of its kind in South America — will also be built in this hall.

Fabio Perini, which has its headquarters in Lucca, Italy, and has been part of the Körber Group since 1994, builds machines for the production of toilet paper and paper towels. The company's location in Brazil supplies the entire continent of South America from its factory in Joinville. In 2017 Körber acquired the MTC company, which produces machines for processing tissue paper and paper napkins. Now

production lines for folded paper will expand the product range of the Business Area Tissue in the Brazilian market. "South Americans are using more and more paper napkins, for example," Silverio explains. Thanks to the new production hall, which has increased the production area by more than a third, Fabio Perini Brazil is optimally set up for this trend. "We're prepared," he says.

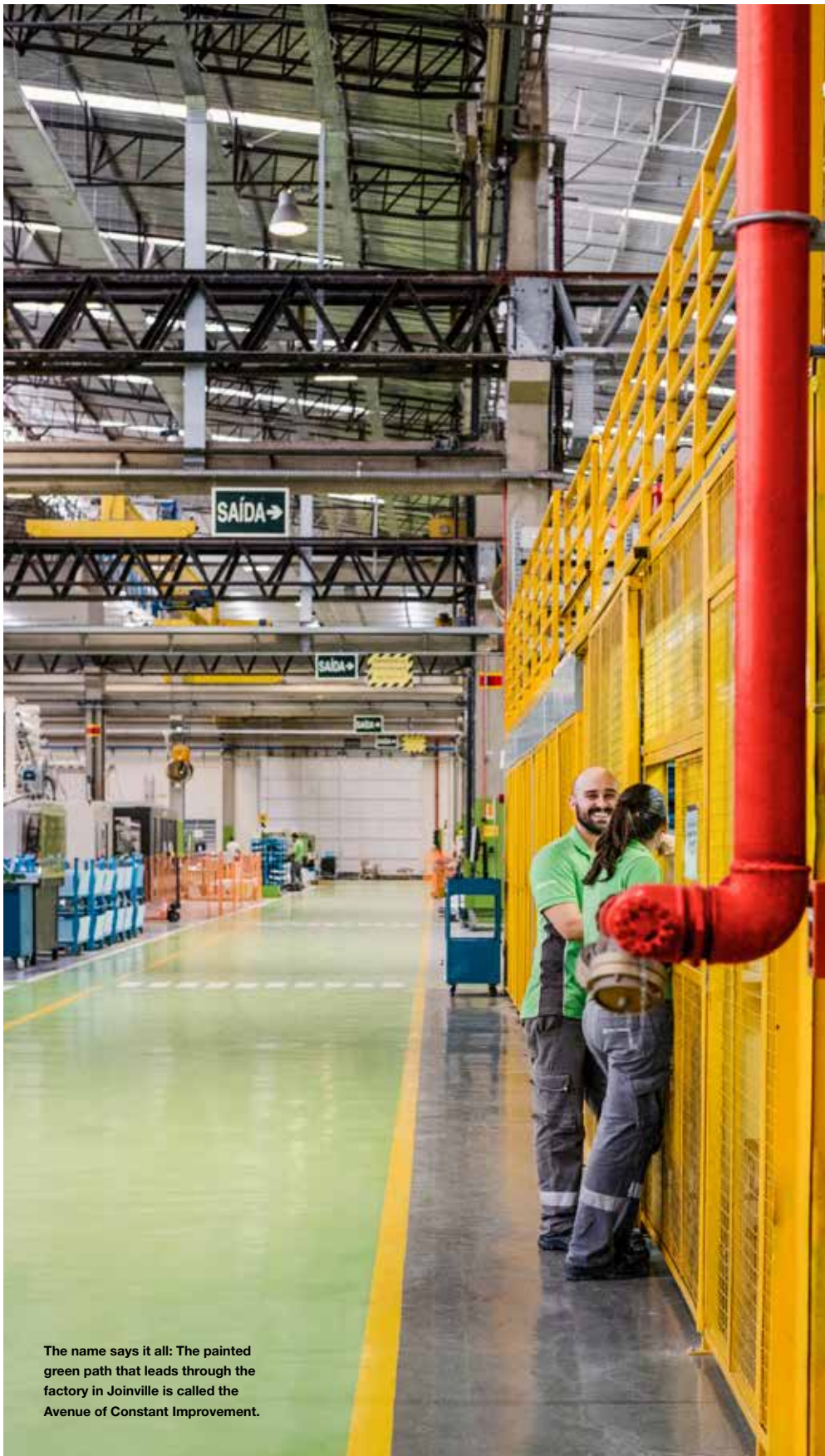
This is the mindset that makes Körber stand out. It anticipates future developments and addresses them early on in order to provide customers with the right added value. Boosting efficiency in production: Above all, Körber is creating a work environment in which employees can fully develop their creativity and commitment for the benefit of the customers.

AVOIDING ERRORS, REDUCING COSTS

About 180 employees work in Joinville. The factory halls are large and bright. Daylight streams through the skylights. Gilberto Arndt, the



Fabio Perini Brazil gives its employees responsibility and thus creates a productive working atmosphere.



The name says it all: The painted green path that leads through the factory in Joinville is called the Avenue of Constant Improvement.



“South Americans are using more and more paper napkins. We’re prepared.”

DINEO SILVERIO
President, Fabio Perini Brazil

assembly process coordinator, points to two hydraulic cylinders that are used to lift the enormous paper feed rollers. “We developed them together with a Brazilian supplier,” he says. About 60 percent of the components installed here were produced in Brazil — most of them by manufacturers located around Joinville, Brazil’s fourth-largest industrial center. That results in cost savings of 25 to 40 percent per component and avoids delays due to customs. “We’re always on the lookout for ways to become more efficient,” says Arndt.

Digital Tissue is part of the digital offensive of the Business Area Tissue, which is taking it in the direction of the smart factory. In Joinville, many digitization projects are in the preparation stage or have already begun. They also include the Material Tracking System and Skynet, which are designed to ensure that each work material is lying in exactly the right place. These systems also make it possible to check the production status of every machine in real time, so that additional components for the assembly process can

be ordered promptly. At their work stations, the assembly workers can see on their tablets which components have already been delivered, and can plan their work accordingly. In the past, they spent 15 percent of their working time searching for information. This time has now been freed up for production.

The key to the success of these digital efficiency projects are the people. As the employees walk through the factory, they use a painted green path that’s known as the Avenue of Constant Improvement. Employees like Gilberto Arndt are motivated by the goal of becoming ever better. There’s a good reason for their strong motivation, which often generates ideas for innovations: The employees enjoy working here and identify themselves with Fabio Perini. “We’re growing together, and we’re a strong team,” they say. In early 2019, Fabio Perini Brazil was honored for the third time in a row with the “Great Place to Work” award of the certifier of the same name. In the survey, the employees had anonymously expressed their →



“Our employees feel that they’re important. That motivates them to keep getting better.”

SILVANA DALLACQUA
Head of Human Resources, Fabio Perini Brazil

opinions about aspects such as the company’s working atmosphere and leadership style. They gave the plant a very positive evaluation of 86 percent. This satisfaction is also expressed by the low rate of staff turnover. In comparable companies it’s three percent, but at Fabio Perini Brazil it’s only 0.7 percent.

EVERYONE BEARS RESPONSIBILITY

The positive working atmosphere is based on many factors. “We’re guided by the 5S philosophy, which originated in Japan,” explains the Head of Human Resources, Silvana Dallacqua. The five pillars of this philosophy are: Sort, Set in order, Shine, Standardize, and Sustain. The assembly workstations in the factory are uniformly organized. They are brightly lit, clearly organized, and safe. No tools or cables are lying around. Shavings that have sifted down from a milling bench are swept up right away. “Everyone takes on responsibility for pleasant cooperation and a productive daily work routine,” says Dallacqua.

Equally important is the employees’ continuing professional development. Every year, several employees from various units such as assembly, project planning, administration or sales spend up to four weeks at the company headquarters in Italy in order to learn new techniques and working methods. It’s an enjoyable trip for the employees — and at the same time it helps the company to standardize its production methods. “In order to continuously improve our efficiency and come up with new innovations, we need people who are well-qualified and highly motivated,” says Dallacqua. Small details also strengthen the sense of belonging in the workplace: fresh fruit provided daily, weekly fitness sessions, a running group, an air-conditioned breakroom with pool tables, and high-quality food in the canteen. “Our employees feel that they’re important,” says Dallacqua. “That motivates them to keep getting better.” And that benefits the employees, their employer, and ultimately the customers. It’s a win-win-win situation. •



0.7

PERCENT

is the rate of staff turnover at Fabio Perini Brazil. In comparable Brazilian companies, the rate is three percent.

Faster, leaner, more connected

In Hungary, Hauni is using innovative solutions to develop production processes towards the **smart factory**. The company's customers are benefiting from its increased efficiency whilst keeping the high quality.



Targeted welding:
When Ferenc Brozovác (with helmet) needs important information for his work, he can access it digitally. The innovation expert Beáta Szolnok (left) is one of the developers of this e-documentation.

Ferenc Brozovác puts on his welding helmet, checks the ventilation hose, and chooses his first welding spot. The piece of steel he's working on stands on a workbench. Behind him, on a touchscreen, are glowing key figures, construction drawings, and DIN standards. "Ferenc can check this display at any time to find out where he needs to make the next weld spot — or to get other information that's relevant to his job," says Beáta Szolnok. She's one of the experts in the Lean program FAST at the Hauni plant in Pécs, Hungary. E-documentation — the availability of important electronic documents directly at the workplace — is one of several dozen FAST projects in Pécs. It's a crucial step toward paperless production processes. Today more than 300 employees at this plant are working with it.

FAST stands for "Flexible accomplishment, in synch and on time." This program has been implemented throughout the entire Business Area Tobacco since 2013 in order to make production processes faster, more efficient, and more flexible. Among other goals, the program aims to decrease the throughput time of machines and installations and increase productivity by 2021. Digital advancement and the connected factory are providing the Hauni company in Hungary with the tools it needs. "However, the really crucial thing is to internalize the goal of continuous improvement as a basic working principle," says CEO Gábor Katona.

His attitude reflects the vibrant spirit of this city. Pécs can look back on a 165-year tradition of machine construction. In addition, Hungary's first university was founded here in 1367. Pécs, which is located in a wide valley south of a mountain range in southern Hungary, has a population of 150,000, including many students. The Hauni plant, which is celebrating its 25th anniversary in 2019, produces the entire product range of the Business Area Tobacco: tobacco processing machines (primary); cigarette, filter, and logistics machines (secondary); machine parts (mechanical production); sheet metal assemblies and safety housing for machines (sheet metal pro-

duction), as well as engineering and design. The plant is investing massively in IT and digital projects. "We are forging ahead with our transformation into a smart factory — and our efficiency improvements are benefiting our customers as well," says Katona. One of these improvements is the comprehensive digitization of the inventory, which was completed in 2018. Another one is the one user interface project, which ensures that every employee works with the same user interface, while various programs and applications run in the background.

SMALL PROJECTS, BIG IMPACT

The innovations are benefiting many employees. A total of 1,250 women and men work at the plant in Pécs, which is Körber's second-largest production location globally. The plant grounds cover an area of more than 53,000 square meters, which is the equivalent of about seven and a half soccer fields. Meter-long steel pipes weighing several tons lie on a high outdoor rack. Inside the plant, workers are installing precision elements, some of which have a tolerance of only fractions of millimeters. In the enormous production halls, machines are humming, smaller devices are buzzing, and forklifts are beeping as they drive along marked paths. Large displays show daily targets and error rates. Logistics workers are carrying out their tasks by means of tablets, scanners, and mobile printers. This is a coordinated operation that is conducted by people, machines, and monitors.

In concrete terms, modern — that is, lean — production aims to reduce machine breakdowns and downtimes, avoid waste, and make processes more efficient. "Networking, digitization, and transparent processes are our most important innovation levers," explains István Inotai, the Head of the FAST program. Every two weeks he holds a meeting with experts from the specialist departments, including Beáta Szolnok. The meeting participants share information about areas of progress and decide on the next steps to be taken. Instead of pursuing mammoth goals, Inotai relies on many →



1,250

PEOPLE

work at Hauni Hungaria in Pécs. It's Körber's second-largest production location globally, with plant grounds covering an area of 53,000 square meters.



Whether it's construction drawings or DIN standards, Ferenc Brozovác has all the information he needs at his fingertips via touchscreen at his workplace, thanks to e-documentation.



"The crucial thing is to internalize the goal of continuous improvement as a basic working principle."

GÁBOR KATONA
CEO Hauni Hungaria



Tool dispensing at the touch of a button: At Hauni Hungaria, each tool and spare part has a code. When an employee requires an item, he types the code into the digital tool dispensing system — and the right drawer opens up.

smaller projects. Most of the time he forges ahead in a dozen or more areas simultaneously. The focus is always on improving efficiency.

WAITING IN LINE IS OUT OF DATE

The digital tool dispensing system consists of a cupboard standing about as tall as a person and equipped with a touchscreen. Inside of it are tools such as attachments, screws, and milling heads. The cupboard stands in a production hall that also houses dozens of machines. Here workpieces are being machined and milled, shavings are pouring into waste bins, and workers are watching over their machines on monitors.

In the past, if an employee needed a certain tool or a spare part for “his” machine, he would walk over to the tool dispensing center, stand in line, and then wait for a colleague to find the right item for him. “Today each tool and each spare part has its own individual code,” says János Nagy, who works in the tool dispensing center. “An employee simply chooses the tool he wants on his display — and seconds later he’s holding it in his hand.” The system, which went into operation at the beginning of 2018, handed out more than 13,000 items last year. It was used about 1,700 times — and that means 1,700 trips saved.

Two smaller cupboards stand next to the big central one. They hold the calipers that are used to measure the diameter of drill holes,

for example. In the past, calipers would often lie around for months at the workstation where they were last used. If someone needed calipers, he would have to make extended inquiries in order to find them. Today, a worker selects a caliper on a display, a green light indicates the right drawer, and that’s it. The worker can then use the calipers for up to 24 hours. If he still hasn’t returned them at the end of that time, he is sent a reminder. “That’s how we were able to reduce the number of calipers that we need in this hall by 30 percent,” Nagy says proudly. The new tool dispensing system also shows which tools are most often in demand or need to be reordered. This is exactly the kind of transparency and data networking that Lean System Manager Inotai aims to use productively. The benefits are two-fold: The employees’ work processes become more efficient — and customers receive their machines and devices faster, in the top quality they are accustomed to.

Every department has the potential to reduce the waste caused by time-consuming processes. For example, until recently the procurement department would order a

1,700

TIMES
employees used the digital
tool dispensing system in 2018.
That’s a lot of saved time.



Data collection made easy: Beáta Szolnok (left) and Regina Kövesdi developed four apps and a hand scanner for the procurement department. That saves time and eliminates the need for filling out delivery slips by hand.



“Networking, digitization, and transparent processes — these are our most important innovation levers.”

ISTVÁN INOTAI
Head of the FAST program at Hauni Hungaria

certain workpiece from a supplier and fill out the address, the work order, and any necessary changes by hand on yellow delivery slips. “The employees would spend a lot of their valuable time recording data and walking back and forth. Fortunately, that’s no longer necessary,” says Beáta Szolnok. Together with her colleague Regina Kövesdi, she has developed four apps and a small scanner. Today all the necessary information is entered via an app, and it is recorded at every process step by scanning a barcode. The delivery slips are created using a mobile printer. As a result, data recording proceeds much faster and the time saved can be used for other projects.

Kövesdi, an IT expert, worked with three developers to program the apps. “We’re delighted that our work has created measurable added value that has directly benefited our production performance,” she says.

E-documentation, digital tool dispensing, delivery apps: three smart factory projects that

have a strong impact. And these are only three of the dozens of initiatives that are exploiting efficiency-boosting potential at Hauni in Pécs. This process is being enhanced by knowledge sharing and intense cooperation between all of Körber’s Business Areas. For example, the software specialists from Inconso, which is part of the Business Area Logistics Systems, worked together with their colleagues in Pécs to optimize production logistics. A completely modernized system landscape consisting of a tablet app for the ergonomic control of goods received as well as automated storage and retrieval systems was put into operation. Among other things, the time it took for incoming goods to be stored was significantly shortened.

Exchanging knowledge, passing along expertise — innovation develops its greatest impact when it’s shared, and also if it’s rethought and promoted again and again. As István Inotai puts it, “In a world of permanent change, there’s no stop sign for innovations.”

We count

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→ Our way:
Forging ahead with innovations, creating added value for customers, that's how we aim to meet our growth targets.

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→ Our Values:
Our Corporate Values unite us and form a strong foundation for our behavior.

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→ Our Business Areas:
Körber Digital, Logistics Systems, Pharma Systems, Tissue, and Tobacco.

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→ On site:
Körber has more than 100 production, service, and sales locations all over the world.

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→ The most important figures:
An overview of the Group's income statement, consolidated balance sheet, and key performance indicators.

Our course

Thinking in international terms, driving innovation, creating added value for our customers – that's what makes Körber stand out. That's how we want **to shape the future** and reach our growth targets.

Our strategic growth target

We've set ourselves a very ambitious goal with our clearly defined long-term growth target. Through organic growth and strategic acquisitions, we aim to increase our total sales to €5 billion and attain a group value of €6 billion by 2025.

Our Körber Vision

Körber is creating the future! We are technology leaders, strong together, and inspire our customers and partners as sector experts in all business fields.

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 solid, reliable partner, we develop and supply pioneering, innovative solutions and perfectly tailored services worldwide with and for our customers.

5.6 in 2025

This is how we will reach our strategic growth target



Strategic Goals

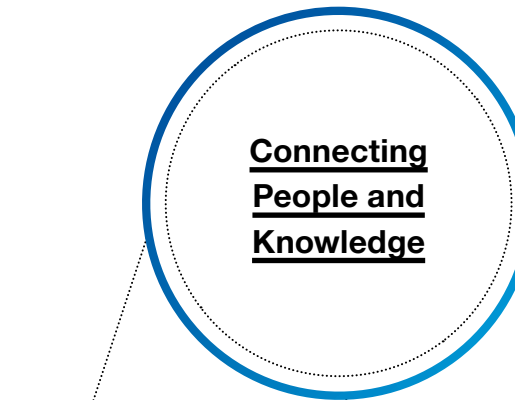
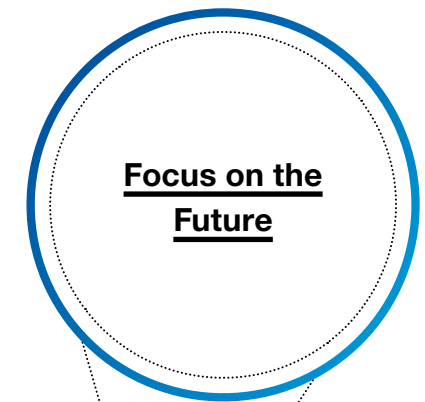
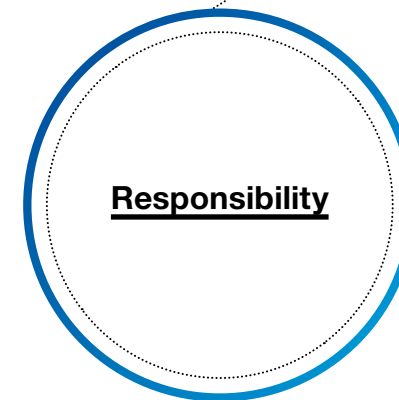
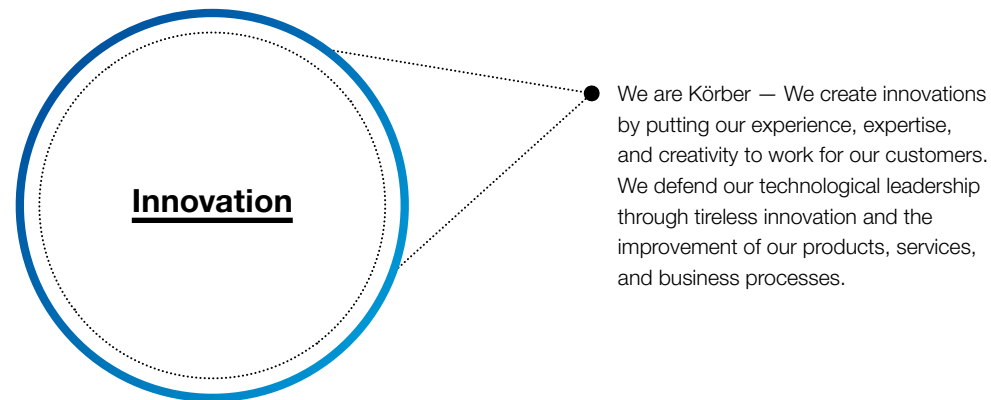
- **Grow faster than the market**
- **Expand service business**
- **Improve operational excellence**
- **Push innovations**
- **Increase profitability**
- **Reduce working capital**



Digitization

What guides us

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.



Our Business Areas

With our five Business Areas, we offer our customers a broad spectrum of **new, innovative, and successful** products, services, and solutions.

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 advancement, digital innovation, and new digital business models. That makes it a central contact point for all topics related to the digitization of the Group. Körber Digital drives and supports the development of new digital products, services, and solutions for Körber as a whole and individually for all Group companies. Körber Digital combines the speed and entrepreneurial spirit of a start-up company with the long-term strategic orientation of the Körber Group.

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), warehouse distribution centers, 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, Cirrus Logistics, DM-Logic, HighJump, Inconso, and Voiteq (software) in three Business Units. These companies 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 holistic solutions for safe, efficient processes in the manufacture, inspection, and packaging of pharmaceutical products as well as for pharmaceutical traceability. The unique combination of process know-how and cutting-edge technology makes this Business Area one of the leading system suppliers for the pharmaceutical and biotech industry. Pharma Systems brings together the internationally leading companies Dividella, Fargo Automation, Mediseal, Rondo, Seidenader, Systec & Services, and Werum IT Solutions, as well as the corporate brand Traxeed.

Tissue

The Business Area

Tissue comprises the brands Fabio Perini, MTC, Engraving Solutions, and Sheer. It stands for innovation, cutting-edge technologies, and complete solutions for processing and packaging machines that handle toilet paper, folded tissues, and paper towels. Outstanding innovations and a systematic customer orientation make this Business Area a technology and market leader in its sector.

Tobacco

The Business Area

Tobacco, comprising the Hauni, Borgwaldt, Borgwaldt Flavor, Decouflé, Garbuio, 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 Business Area's companies support their customers in the fields of tobacco processing, filter and cigarette manufacture, measuring and analysis equipment, as well as flavorings.

On site

The Körber Group unites technologically leading companies with more than 100 production, service, and sales companies all over the world. **Our global network:** professional, innovative, always available.

● Business Area Körber Digital

Körber Digital GmbH Berlin, Germany

Körber Digital GmbH Karlsruhe, Germany

● Business Area Logistics Systems

Aberle GmbH Leingarten, Germany

Aberle GmbH Dahn, Germany

Aberle GmbH Markdorf, Germany

Aberle GmbH Neuss, Germany

Aberle GmbH Sindelfingen, Germany

Aberle GmbH Schwarzenbek, Germany

Aberle Logistics GmbH Leingarten, Germany

Aberle Logistics GmbH Hildesheim, Germany

Aberle Software GmbH Stuttgart, Germany

Centriq Group Limited Blackpool, United Kingdom

Cirrus Logistics Limited Blackpool, United Kingdom

Consoveyo, S.A. Moreira da Maia, Portugal

Consoveyo, S.A., Netherlands Branch Amsterdam, Netherlands

Consoveyo, S.A., odštěpný závod v České republice Prague, Czech Republic

Consoveyo, S.A., Succursale en Belgique Brussels, Belgium

Consoveyo, S.A., Sucursal en España Alcobendas (Madrid), Spain

Consoveyo, S.A., United Kingdom Branch London, United Kingdom

Consoveyo Singapore Pte. Ltd. Singapore, Singapore

DMLLogic, LLC Pittsburgh, USA

Godrej Consoveyo Logistics Automation Limited Mumbai, India

HighJump (Shanghai) Software Technology Co., Ltd. Shanghai, China

HighJump Software Asia Pacific Pty. Ltd. Sydney, Australia

HighJump Software Canada Inc. Markham, Canada

HighJump Software Inc. Minneapolis, USA

HighJump Software UK Ltd. Bristol, United Kingdom

inconso Aktiengesellschaft Bad Nauheim, Germany

inconso Aktiengesellschaft Bremen, Germany

inconso Aktiengesellschaft Dresden, Germany

inconso Aktiengesellschaft Essen, Germany

inconso Aktiengesellschaft Gallin, Germany

inconso Aktiengesellschaft Hamburg, Germany

inconso Aktiengesellschaft Heidelberg, Germany

inconso Aktiengesellschaft Cologne, Germany

inconso Aktiengesellschaft Münster, Germany

inconso Aktiengesellschaft Sindelfingen, Germany

inconso SASU Lyon, France

inconso Software, S. L. Sant Cugat del Valles, Spain

Körber Logistics Austria GmbH Wels, Austria

Körber Logistics Systems GmbH Bad Nauheim, Germany

Langhammer GmbH Eisenberg, Germany

Langhammer GmbH Freiberg, Germany

Riantics A/S Arden, Denmark

Voiteq France SAS Sainte Savine, France

Voiteq GmbH Berlin, Germany

Voiteq Inc. Alpharetta, USA

Voiteq Limited Blackpool, United Kingdom

● Business Area Pharma Systems

Dividella AG Grabs, Switzerland

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. Kuřim, Czech Republic

Körber Medipak Systems NA Inc. Cary, USA

Körber Medipak Systems NA Inc. Fargo, USA

Körber Medipak Systems (Shanghai) Co., Ltd. Shanghai, China

Mediseal GmbH Schloß Holte-Stukenbrock, Germany

Rondo AG Allschwil, Switzerland

Rondo obaly s.r.o. Ejovice, 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. Cary, USA

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 India Private Limited Mumbai, India

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 Tissue

Engraving Solutions S.r.l. Lucca, Italy

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 (Shanghai) Co., Ltd. Shanghai, China

Fabio Perini S.p.A. Lucca, Italy

M.T.C. Macchine Trasformazione Carta S.r.l. Porcari (Lu), Italy

Sheer Machinery (Foshan) Co., Ltd. Foshan, China

● 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

Garbuio Dickinson Group Holding S.r.l. Paese (Treviso), Italy

Garbuio, Inc. Richmond, USA

Garbuio Limited Winchester, United Kingdom

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 Maschinenbau GmbH, Korea Branch Busan, South Korea

Hauni Polska Sp. z o.o. Warsaw, Poland

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 Şirketi 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

Status: December 31, 2018

Consolidated income statement

For the period from January 1 to December 31, 2018
In thousands of euros

	2018	2017
Sales	2,545,361	2,608,884
Change in finished goods and work in progress	101,264	38,073
Other own work capitalized	5,505	4,980
Other operating income	449,734	143,816
Cost of materials		
→ Cost of raw materials, consumables, and supplies, and of purchased merchandise	845,577	871,548
→ Cost of purchased services	173,992	156,196
	1,019,569	1,027,744
Personnel expenses		
→ Wages and salaries	759,113	758,657
→ Social security, post-employment, and other employee benefit costs	148,595	150,452
→ of which in respect of old age pensions	23,543	28,358
	907,708	909,109
Depreciation, amortization, and write-downs of intangible assets and tangible assets	154,980	125,503
Other operating expenses	607,713	556,072
Income from long-term equity investments	0	284
→ of which from affiliated companies	0	284
Income from other securities and long-term loans among the fixed assets	8	32
Other interest and similar income	3,583	7,494
→ of which from affiliated companies	160	232
Write-downs of long-term financial assets and securities classified as current assets	16,402	2,250
Interest and similar expenses	29,686	25,763
→ of which from affiliated companies	23	9
Taxes on income	-52,949	-92,366
Result after taxes	316,448	64,757
Consolidated net income	316,448	64,757
Minority interest in net income	-164	-1,321
Consolidated retained net profits	316,284	63,436

We count

Körber AG Annual Report 2018

Consolidated balance sheet

As of December 31, 2018
In thousands of euros

	2018	2017
ASSETS		
Fixed assets		
Intangible fixed assets	883,525	939,228
Tangible fixed assets	214,452	341,949
Long-term financial assets		
Shares in affiliated companies	5,431	12,602
Other long-term equity investments	9,838	16,092
Other loans	1,508	9,334
	16,777	38,028
	1,114,754	1,319,205
Current assets		
Inventories	709,597	769,449
Receivables and other assets	597,663	668,608
Securities	1,018,361	525,357
Cash on hand, balance at the Bundesbank, bank balances	173,645	315,015
	2,499,266	2,278,429
Prepaid expenses	9,022	10,965
Deferred tax assets	84,198	61,365
Goodwill arising from asset offsetting	9,254	7,217
Balance sheet total	3,716,494	3,677,181
EQUITY AND LIABILITIES		
Equity	2,094,632	1,837,585
Accruals	308,616	345,983
Liabilities	1,311,438	1,492,953
Prepaid expenses	1,808	660
Balance sheet total	3,716,494	3,677,181

Körber Group Key Figures

In millions of euros

	2014	2015	2016	2017	2018
OPERATING BUSINESS					
Incoming orders	2,320	2,191	2,357	2,901	2,657
Sales	2,342	2,317	2,215	2,609	2,545
EBITA ¹	258	141	171	239	229
Return on sales (EBITA ¹)	11.0%	6.1%	7.7%	9.2%	9.0%
Net income after taxes ²	150	34	60	65	316
Cash flows from operating activities ³	167	244	181	194	18
Payments for investment in intangible fixed assets and tangible fixed assets	58	65	46	61	59
Research and development expenses	129	145	127	138	151
Research and development ratio	5.5%	6.2%	5.7%	5.3%	5.9%
BALANCE SHEET INDICATORS as of December 31 reporting date					
Equity	1,727	1,769	1,815	1,838	2,095
Balance sheet total	2,535	3,241	3,434	3,677	3,716
Equity ratio ⁴	68.1%	54.6%	52.8%	50.0%	56.4%
EMPLOYEES as of December 31 reporting date					
Employees ⁵	11,950	11,578	11,246	12,722	10,538

¹Earnings before interest, taxes, and amortization of intangible fixed assets; from acquisitions

²Includes scheduled amortization of goodwill in accordance with the HGB

³Since 2014 according to DRS 21

⁴Equity as a percentage of balance sheet total

⁵Including unconsolidated companies

Masthead

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