10 ERP & MES trends that will shape the year 2021

Digitization Strengthens Competitiveness

PSI

EDITORIAL

Dear Readers

Once the Corona crisis is over, nothing will ever be the same again. The effects and aftermath have had too deep impact on industry and our daily lives.

Digitization has received an enormous boost in and through the crisis, for many involuntarily and compulsively. The task for the industry now, is not only to combat the negative after-effects, but to exploit this thrust "now more than ever" for digital transformation and to digitally modernize business processes and make them intelligent. Business processes are becoming increasingly intertwined and only those who can network optimally and at high speed will be able to survive in the competition. This means

that the intelligent ERP and MES system of the future will have the task of generating agile, service-oriented and highly networked process chains possible as the basis for value creation.

The flood of data and information can be mastered with integrated AI

technologies. These are becoming increasingly "engineer-able" and usable in many applications. State-of-the-art and easy-to-use ERP and MES solutions thus form the backbone of intelligent order processing.

Thus, it will be possible to control the uncertainties in the supply chains and the processes in the highly complex production systems and to optimally serve the increasingly individual customer requirements.

Yours sincerely

Dr. Herbert Hadler
Managing Director
PSI Automotive & Industry GmbH

You can also read Production manager online: www.psi.de/de/psi-pressevents/kundenzeitschriften/

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10 ERP & MES trends that will shape the year 2021

Digitization Strengthens Competitiveness

The past year many companies have aced special challenges and made it clear how indispensable digitized processes are. We will show you why it is worthwhile to constantly develop your own ERP and MES and thus strengthen your own competitiveness and your value chain.

In order to drive digitization forward, companies are asked to actively shape this change. Therefore, they have to create and maintain a space for ideas and an open culture of innovation. Acceptance of possible failure is also an indispensable part of this culture. It is important to be aware of the risks and still dare to innovate.

1. Less is more—user-friendliness is demanded

One, still essential metric for evaluating the suitability of ERP solutions for one's own and operational requirements, is the richness of functionality. Since the functionality offered in the standard is different or sometimes less rich, users, not infrequently, buy this diverse functionality with customizing and special solutions.

At this point, apps and mobile applications have long since established themselves. In this world, things are again rather minimalist: few fields, a manageable and yet sufficient range of functions—accompanied by little learning effort and customer-oriented usability.

The top trend in the ERP and MES world in the coming year will therefore continue to be breaking down the large functional silos and making the data with its processes easily accessible to users. Less is more!

2. Data-based knowledge management

With the increasing integration of all applications and advancing digitalization, more and more data is becoming available with its context. The next step is to extract information from data and use it to generate knowledge about operational contexts and processes. ERP and MES systems in combination with PLM and logistics systems are able to provide the necessary data. On this basis, it is possible, for example, to monitor supply and demand chains or the efficiency of the company's own value-adding processes.

3. Software-driven manufacturing as a goal

One of the essential goals of all ongoing efforts for standardization in con-

nection with the Industrie 4.0 component is the simple networking of all participants of a production system with each other.

Even though implementation is still in its infancy, it is important from the perspective of ERP and MES to be close to these activities. Fixed, hierarchical systems are being replaced by flexibly networkable and changeable systems. Network structures from telecommunications are the model for such production systems. Today, we talk about SDN—Software Defined Networking.

Here, the possible connections are controlled by software. It can work in exactly the same way in a production system. Here, the capabilities of individual machines and systems are dynamically "interconnected" in interaction with tools, programs and automation, so that new skills are created. This is the only way to bring adaptability to the store floor.

4. The shop floor will get a digital twin

The integration and networking of the shop floor with all systems across all levels continues to progress. This creates a digital image of the production system and the products running through it. This digital twin is continuously updated and contains all the data of a product—from product development to its use in a factory. All processes are traceable and upcoming situations can already be taken into account during order processing.

ERP systems provide the context of all data and allow the allocation and evaluation of information. And, planning functions get a reliable data basis and decision.

5. Compliance & data protection in a networked world

In the digital world the amount of communication and data exchange has multiplied. This includes data from the company itself, but also data from business partners or even op-

erating data from machines and systems on site. This results in constantly growing demands on data security and protection. Secure communication channels are only one side of the coin. To the same extent, systems must also be protected against attacks of any kind.

The same applies to compliance. It is not enough to consider this topic from the perspective of data protection and a secure document flow. Rather, it includes compliance with assured properties of a product or safeguarding the operation of the company's own systems at customers' sites.

6. Using Cloud computing reasonably

ERP systems must be prepared for the path to the cloud. This is a lengthy process that often results in completely new but, also modern architectures. A fixed component is the redesign of certain processes and applications using cloud and container technologies.

The goal is to break down the large functional blocks into smaller, more manageable services and thus concentrate on the essentials. This not only supports provision as a cloud service, but also limits the excessive range of functions.

7. Securing the future through sustainable production

Material production consumes vast amounts of resources and energy and emits pollutants into the environment. Against this background, ERP and MES solutions will also have to do more in terms of sustainability in the future. One lever, for example, is the use of advanced algorithms that determine quantities and deadlines also from an environmental perspective, optimize sequences, and make the best possible use of resources. AI-based forecasts of future demand can be used to avoid overproduction and waste, among other things.

Innovations in technologies for the gradual transformation of production
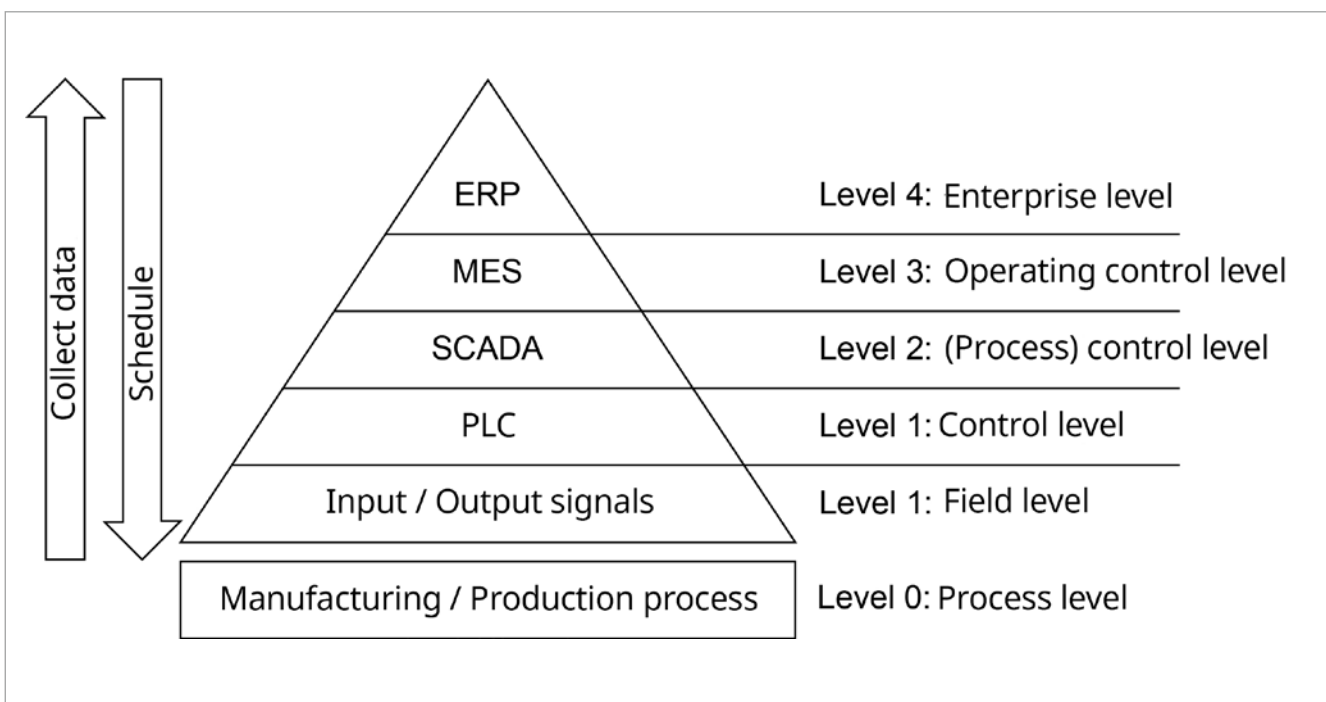
Automation pyramid of levels in industrial manufacturing.

systems into a smart factory contribute to defusing the positions in the current climate debate. In this way, industry becomes part of the solution and is no longer exclusively part of the problem.
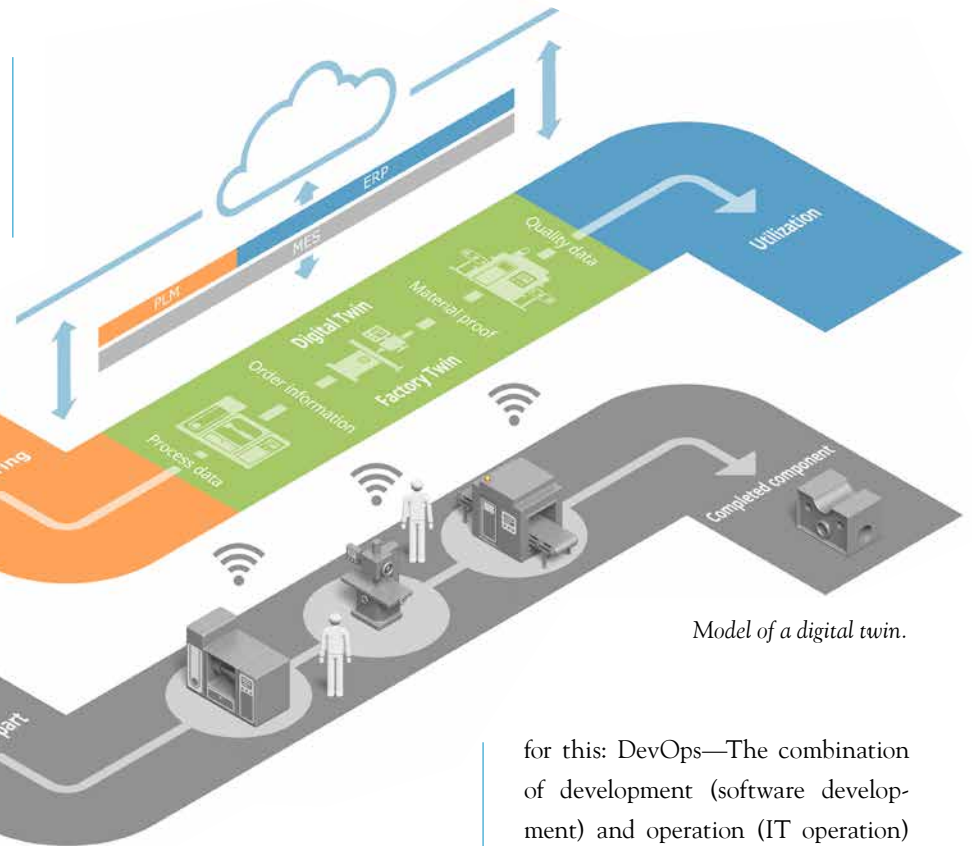
8. Data management and data quality

In times of AI, analytics and increasing automation of processes, good data management is one of the most important success factors in digitization, alongside the management of the processes themselves.

Model of a digital twin.

Only the completeness and accuracy of all data make digitization possible. In addition to organizational anchoring in companies, it is important to ensure that the processes for creating, maintaining and harmonizing master data, especially in ERP systems, are stable, controlled and secure. Integrated workflow management systems can now be used here to stabilize processes and increase traceability.

9. User-centered usability and process optimization

The usability of ERP solutions is a perennial issue on the agenda of users and manufacturers. Any support is accepted to simplify or stabilize order throughputs or the handling of exceptions. The goal is to get the process orientation in the companies onto the surface of the ERP systems. Data correlations will be able to be created and visualized in the simplest possible way—depend-

ing on the task or the preferences of the user. Ideally, only a few dashboard-style screens will be used. Only relevant information and the functions required in the current context will be offered to users.

10. Customer-in-the-loop— constantly involving customers in the development process

In the future, it will be increasingly important to integrate the customer into the company's own innovation and value creation processes. "Customer in the Loop" means continuous development from the customer's request to the provision of services.

The prerequisites for this are a constant exchange of knowledge and success-oriented collaboration. The focus is not on the efficient adaptation of software solutions, but on the development of functional and non-functional properties of ERP systems in the standard from the outset. The software industry has coined a term

for this: DevOps—The combination of development (software development) and operation (IT operation) with the constant involvement of the customer.

Successfully into the future with the best from ERP & MES

One thing is certain—with regard to digitization, there are numerous topics that will present users and providers with major challenges in the future.

But especially in the time of the pandemic, it shows that great success can also be achieved with new ways. Moving together makes us all strong and helps to effectively counter the adversities of markets and supply chains. Digitalization is a tool—not the goal! Industry 4.0 or smart factories are by no means the sole focus. Increasingly, it is also about Society 4.0 and thus about people. ◉

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Product report: Learning algorithm for automated calculation of KPI preferences

Learning from Decisions in Real Time

Until today, optimization of performance measurement systems in companies has been based primarily on the empirical knowledge of individual participants. In the daily planning and control of processes, this leads to the fact that interactions between individual key figures are usually evaluated based on average simplifications. With the novel learning algorithm F9118, which has been included as a new functionality in the decision tool PSIqualicision, results significantly better and to the second can be achieved, making decisions much more precise.

a component of optimization strategies in various algorithmic previous versions. With the extension PSIqualicision/F9118, it is also available for interactive use for the first time. The connection with PSIasm (Advanced Scheduling and Monitoring) exists so that the learning proce-

Some machine learning methods can automate the recognition of interactions between KPIs in business processes. The combination of historicized and current process data allows calculating very reliable decisions to the second. Based on these decisions slightly different scopes for decision-making and adequate KPI preferences can be identified in the current situation. Thus, the user systematically is provided with a better basis for his decision-making process.

Avoid mis-settings by using KPI preferences

PSIqualicision balances conflicting goals from the perspective of the current situation in real time. Balancing is controlled by automatically calculated KPI goal conflicts and KPI goal compatibilities so that different solutions are generated according to the specified KPIs. The generation of solutions follows the interactions between KPIs by moving goal-compatible KPIs in a common direction and conflicting KPIs in opposite directions, respectively. The interactions of the KPIs derived from these different solutions are summarized in point-in-time goal conflict matrices. From this, the PSIqualicision/F9118 learning software determines mean-

Figure 1: KPI preferences learned automatically with PSIqualicision/F9118.

ingful constellations of KPI preferences that are neither contradictory nor unattainable in the current process situation. Non-sensible preferences are eliminated so that the risk of incorrect settings can be excluded. The remaining constellations of KPI preferences are visualized in the form of achievable goal parameters as valid decision recommandations either via the GUI of PSIqualicision (see Figure 1) or fed to further processing (Qualicision) optimization algorithms.

Learning method can be integrated into many applications

The learning algorithm F9118 has already been used productively as

dure can be integrated into scheduling applications.

The embedding of PSIqualicision in BPM applications (Business Process Modeling) opens up another broad spectrum of application scenarios. PSIqualicision has already been linked with the BPM tool Camunda. The integration of PSIqualicision/F9118 in all software tools of the PSI platform is pending.

Figure 1 shows the main steps of the learning algorithm. In step 1, the current point-in-time data of the business process is retrieved from the surrounding systems and loaded into a data table. Each row of the data table represents a possible decision alternative in the current situation.

The columns of the table represent data values that map a raw measurement of the alternatives for a KPI. For example, the decision alternatives may be possible production start times for an order. One column of the data table can then stand for the forecast delivery date (KPI: delivery reliability), for example, and another for the forecast earnings (KPI: contribution margin) of the order.

Organized data becomes micro labels

Once the data is organized in the table as described above, in step 2 the data is qualitatively micro-labeled by the goal functions qualifying the KPIs. In step 3 it is then stored as micro labels in a so-called impact matrix. This scales the raw data from step 1 and standardizes their evaluation on a scale from -1 to +1. The closer the evaluation is to the value +1, the better the related KPI is fulfilled in the current situation. The closer the evaluation is to the value -1 the less satisfactorily the KPI is currently performing.

If, for example, the delivery date of an order is to be evaluated as a date, then meeting the deadline precisely is given the value +1 as a KPI. The further the delivery date is exceeded, the more the value of the KPI micro label moves in the direction of -1. In step 4, the Qualitative Labeling is condensed further from the KPI micro labels by aggregating the current goal conflicts and goal compatibilities between the KPIs in a goal relation matrix.

Adjustments via preference slider

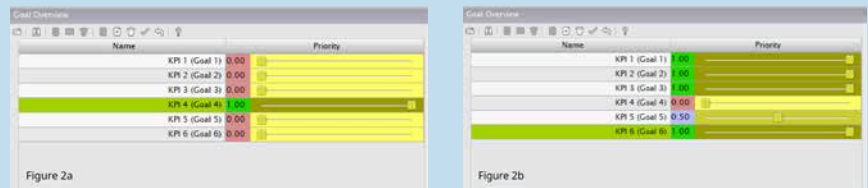Step 5 of the F9118 learning algorithm is the decisive one. Now, the

Figure 2: Learned preference settings and scope for decision-making with F9118.

Learned KPI compatibilities and KPI goal conflicts result from the goal conflict analysis. The learning algorithm F9118 learns from this, which preferences on the set of KPIs harmonize or mutually exclude each other and how. If, for example, the user (or an optimization algorithm) sets the preference to KPI 4 (Figure 2a) by moving the slider for this to the right, the preferences of the other sliders are automatically set to low (here to the value 0) according to the learned relations because in this case the remaining KPIs are obviously in conflict with KPI 4. If, on the other hand, KPI 3 is assigned a high preference (Figure 2b), the conflicting KPI 4 automatically sets itself

to a low value (0 in this case) due to the relations learned by F9118. However, KPIs 1, 2, and 6, which are compatible to KPI 3, increase in terms of preference, and related sliders automatically move toward high (here 1). In this example, KPI 5 is neutral to KPI 3 and to the other KPIs. It remains in a neutral position (here 0.5) and can be further readjusted manually or algorithmically, if necessary, because it has a corresponding scope for decision-making. If the data ratios in raw data of business process change, the F9118 learning algorithm automatically adjusts to the new ratios because it continuously monitors the raw data and relearns in the event of changes.

consistent preferences are learned and visualized via specially designed preference sliders. Whenever the user readjusts the individual preference sliders, the other sliders automatically adjust according to the learned correlations either increasing or decreasing them, so that the shifts best match the setting of the preferences (see Figure 2, box).

Result calculation by decision ranking

The related decisions resulting from this as step 6 are calculated and visualized as a result in the form of a decision ranking. In this process, the user (or an optimization algorithm)

has the certainty that the preferences set and thus also the decisions calculated are selected in such a way that they correspond as best as possible to the empirical values (described via the micro labels of step 2) of the current business process situation. In this way, the learning and decision-making process takes place exclusively within the scope of what is currently feasible with the best possible certainty. ◉

Interview: Insights into the successful cooperation between Gerdau and PSI Metals

"Digital Transformation is Top Priority!"

Since PSI Metals was founded, the business has changed dramatically. Back then like today, people—customers and employees—made the company what it is. In his LinkedIn interview series "Detlef keeps people from working" PSI Metals Director of Business Development Detlef Schmitz introduces some of them to you! In the latest interview, he talked to Claudio Fuhrmann-Schneider, IT Global Architecture Manager at Gerdau, who has worked together with PSI on several projects since 2012.

Claudio, I always wanted to ask you if it's true that you became a father during the go-live of our software?

Yes, my wife Samira was pregnant during our joint project. I had to spend a lot of time at the plant. She even claimed that I spent more time with PSI colleagues than with her. But in the end, both "projects" were very successful.

Let's start from the beginning. How did you find your way to IT and steel?

My father had a small company related to construction and I planned to pursue a career in that traditional field. Already as a teenager I liked programming. I studied civil engineering and did internships in construction companies, but always ended up at their IT departments.

When I decided to do a master's degree in Production Management, I decided to spend my life in IT. I never regretted going down this road.

How did you start your career?

I was very familiar with the use of spreadsheets. A friend asked me to help with data loads for one week in a SAP project. As the result, I stayed for 3,5 years there and even became the IT manager of the company.

How did you find your way to Gerdau?

First, I worked for some months as a consultant for Gerdau in the production, maintenance and quality areas.

Detlef Schmitz and Claudio Fuhrmann-Schneider during the interview.

Then Gerdau hired me as an SAP analyst and I also did several projects in the MES field as project manager.

What significance has IT in Gerdau?

Our founders, German emigrants, had a strong entrepreneurial spirit when they founded a nail factory in 1901*: Gerdau is focused on improving, optimizing processes and using best practices.

IT was recognized as a success factor very early—we were one of the first companies using a mainframe in our region. Two of our CEOs have been CIOs before. Optimizing business with the help of Digital Transformation is a top priority within Gerdau. I feel very comfortable to work in a company where innovation and IT have such a high importance. Especially in the last years, we have been working on a cultural transformation project to become faster, more agile and to do things in a simpler way. Our purpose is to empower people who build the future. That includes employees, customers and suppliers as well. My job is to make that happen.

You have worked in five different Gerdau plants?

Over the years, Gerdau grew a lot by acquisition of other companies. Our top management knew that IT was key if we were to integrate the acquired companies and to exploit their full potential.

Gerdau needed IT people to make that happen. I am thankful that I had

Editor's note: The shortage of raw materials after World War II led Gerdau to start actual steel production in 1948, originally to secure nail production.

the chance to do new, challenging jobs and to work in different plants with so many different colleagues.

How was the cooperation with the PSI colleagues?

We have worked very closely with the PSI colleagues on various projects over the years. Our good cooperation was the basis of our success. We learned a lot from each other and survived many challenges. At one point, I even dreamed that I was meeting with Broner management talking about the projects!

How did you feel about PSI taking over Broner in 2014?

It was very good news for us since we were very satisfied with the local service. We kept our counterpart that knows our systems and plants. With PSI we got a larger company with a bigger footprint in all countries.

What do you think PSI should ensure?

Gerdau benefits from your success. You are using the knowledge and the license you earn to improve your product. Thank you that you give us a chance to discuss with your top management your strategy and to influence your roadmap. The discussion is always very helpful for both sides.

I also like your 50 years old Volkswagen bus that you showed us in Berlin and that you open your product with the PSIbus. Your strategy to make your product more configurable is right. We're now able to change the human interface, the communication to other systems,

and to change the business flow—thanks to PSI Click Design.

What could we improve?

We profit from your local service with your 20 employees in Brazil. It would be nice if you could hire more people locally.

How are you spending your free time?

Spending time with my family is the best way to relax. My boys like to play their new video games with me. I'm afraid they enjoy the fact that I don't have a chance to win against them— I'm like their bot.

Do you have a game where you are better than your kids?

I have been playing poker for many years with my neighbors (for medals and trophies, not for money). Luck helps but the knowledge and a good technique is more important. You need to read people and decide when to take a risk. I think that helps also for my daily life, at least for negotiations.

Want to read more of interviews like this? Then follow us on LinkedIn by scanning the QR code!

User report: Würth Elektronik orders extended range of functions for PSIwms

Solid IT Basis—Good Development Perspective

To cover growing requirements and the complexity of changing intralogistics processes, Würth Elektronik eiSos GmbH & Co. KG relies on the warehouse management system PSIwms. The future-proof IT system supports the respective development steps and offers the company long-term investment security.

The Würth Elektronik eiSos Group, based in Baden-Württemberg, Germany, is one of the largest manufacturers of electronic and electromechanical components. At the end of 2011, the global dispatch warehouse for electrical parts of Würth Elektronik eiSos GmbH & Co. KG was set up. The equipment and processes of the distribution center are designed for maximum scalability and further corporate growth.

"With the implementation of a flexible warehouse management system, from the very beginning we have relied on an IT system that supports the planned plant expansions and process automations and continuously opens up further options for us to optimize and increase efficiency in order processing," explains Uwe Graf, logistics manager at Würth Elektronik eiSos in Waldenburg. The warehouse management system PSIwms from the PSI Logistics Suite was awarded the contract. "Since then, PSIwms has offered us maximum flexibility to plan the processes, which have changed several times, and to continuously cover them with the necessary IT support," Graf emphasizes.

Already in the product standard, the system offers all functions to map, control and coordinate the business processes of all relevant warehouse forms, strategies and technologies. In addition, PSIwms has extensive management and scheduling functions for optimizing inventory management and for cost-efficient resource management.

Fast, internal material flow

With the completion of a third expansion and automation phase in December 2019, the company has almost doubled warehouse capacity in Waldenburg, further optimized processes and made them more efficient. In addition, the current measures already take into account a possible fourth expansion phase starting in 2023. "We have implemented all adjustments since 2011 during ongoing operations," says the logistics manager. "The new automation components and topologies as well as the changed processes could be covered effortlessly with PSIwms." Around 2000 B2B and B2C orders with more than 4500 items are picked by the employees at the Waldenburg distribution center every day.

Nearly 30 000 items, passive components for industrial applications, are stored there for worldwide shipment. After the most recent expansion, there are almost 4400 pallet spaces in the forklift-operated high-bay warehouse (HRL) and around 200 000 container spaces in the small parts shuttle warehouse, which has been expanded to nine aisles, available for storing the articles. Würth Elektronik eiSos controls the internal transport orders and route-optimized

The logistics center in Waldenburg.

processes of the forklifts with the fork-lift control system (SLS) Transport Control integrated in PSIwms.

Highly dynamic conveyor technology, controlled by PSIwms, ensures fast, internal material flow between goods receipt, shuttle warehouse, picking stations, packing stations and goods issue. For this purpose, PSIwms integrates an automatic goods receipt registration and receipt of full cartons and individual products stored in totes on the conveyor system.

Order picking is supported by pick-by-light and pick-to-light systems at 20 stations. With its user-friendly interface, PSIwms guides the employees at the stations through the picking and shipping processes. Up to four orders can be processed in parallel at each of the picking stations. The processes are pick-to-tote directly into the shipping carton.

Logistics intelligence lies in PSIwms

For this purpose, PSIwms uses an integrated case calculation to determine a shipping-optimizing packing scheme for the order packages based on the current order and stored article data. "Thus, we cover the changed order structures with the increased number of orders with increasingly small orders," explains Marko Kübler, who is primarily responsible for logistics software and process control at the Würth Elektronik eiSos logistics center.

From the picking stations, the conveyor system forwards the target containers to one of 21 packing stations for shipping. There, all necessary shipping documents such as delivery bill and package contents list are completed, optional value added services are performed and the shipping carton is closed with the appropriate lid.
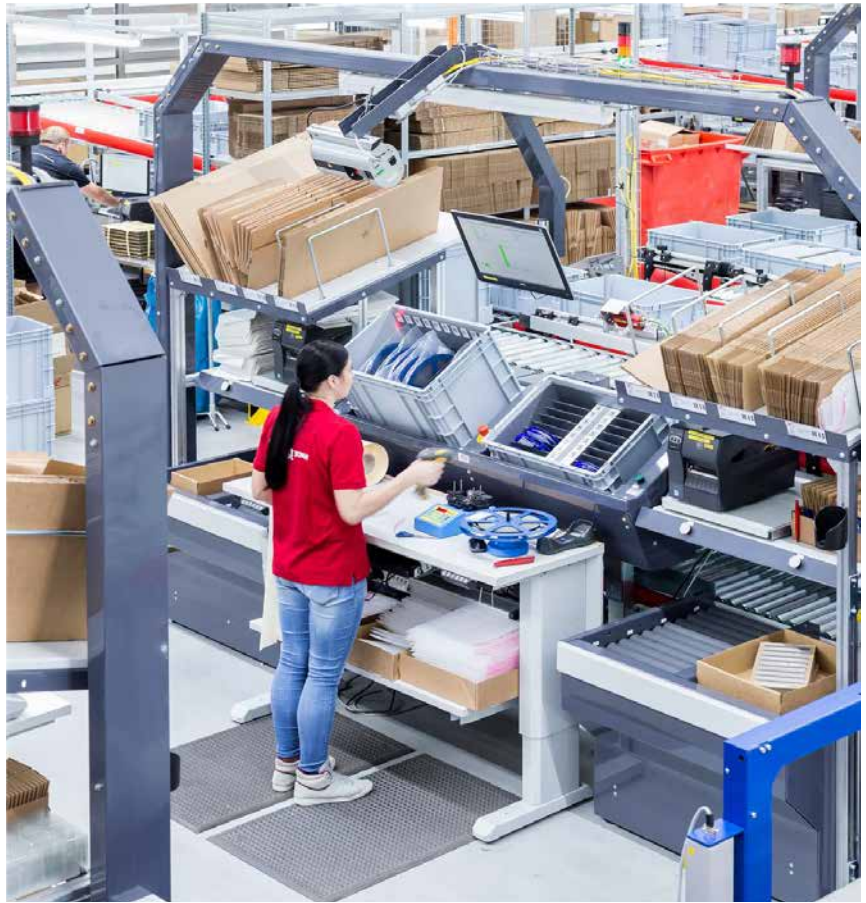
Shipping-optimized order picking at Würth Elektronik.

Via the conveyor system with four integrated label printers, the shipping packages finally reach a sorter circulation system that serves 27 shipping lanes for different destinations and service providers in the outgoing goods area.

Multisite for international control

PSIwms takes care of the order and group-related assignment of packages, controls the circulation of the packages and triggers the printing of the individual shipping labels. The multisite capability of PSIwms also allows Würth Elektronik eiSos to control the inventory management and order processing of the replenishment as well as the coordinated order processing of the Würth Elektronik France warehouse in Lyon.

With its state-of-the-art shuttle and Industry 4.0 implementations, the fully automated distribution center in Waldenburg is now considered by the company to be a model factory for individual customer requirements and a high level of service. Fast, error-free order processing with control of optimally coordinated processes—"the logistics intelligence and efficiency of our processes clearly lies in PSIwms," Graf sums up. "At the same time, the future viability of the IT system offers us long-term investment security. A solid basis for further good development prospects." ◉

Product article: How to trace the DNA of a coil with coilDNA

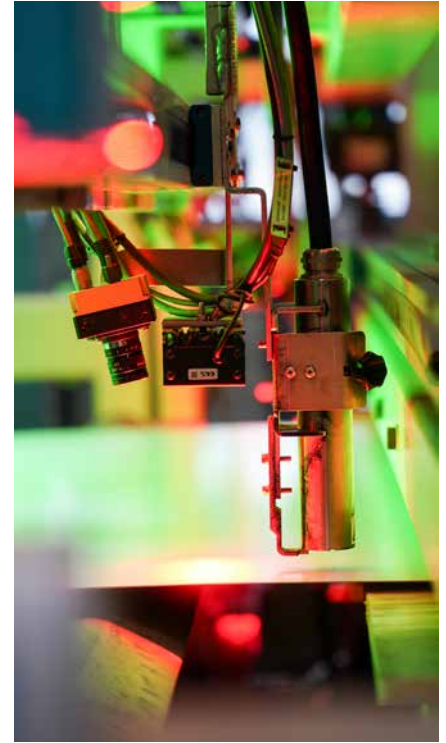# From Internet of Things to Internet of Metals

When people think of DNA analysis they often think about shows like CSI, which portray DNA samples coming into a lab and pulling up a picture of the suspect within a short period of time. Indeed, it is fascinating how only a single DNA fragment can be used to draw conclusions about a person! This concept can also be transferred to the metals industry.

Inspired by the human DNA, the company coilDNA has developed a revolutionary technology that gives individual pieces of metal an identity, tracks its history and turns them into an intelligent product. "The idea of coilDNA was born by the vision to bring IoT into the world of our products. Quality is crucial for the competitiveness of our customers," said Dr. Werner Aumayr, CEO of coilDNA. The start-up has partnered with PSI Metals to integrate CoilDNA technology into the MES systems of manufacturers and processors. The integration process is standardized via the future-proof PSImetals Service Platform so that this new technology is available to all PSI customers "out-of-the-box".

Human DNA as inspiration

Every single cell of the human body contains all genetic information like the hair color, height, blood group, etc. CoilDNA works similarly to the DNA sequencing principle which enables the reconstruction of all DNA information from a single DNA molecule. "The process we have now patented manages to preserve the entire quality data with 14 characters!" Mr. Aumayr points out. During production, a unique and consistent information code is continuously printed by laser or ink jet onto the surface of a parent product, e.g. a coil, a tube or a profile. This code makes all the information stored for the respective product clearly identifiable and thereby retrievable via an app regardless of how often the parent product is cut in subsequent production steps. "We work with PSI to integrate these services into production management systems," says Mr. Aumayr. Consequently, PSI acts as data or cycle generator that takes care of the generation of the coilDNA code, the application of the code to the material and the provision of all material-relevant data during ongoing production.

The coilDNA information code is printed on the surface of the material by laser or inkjet.

This turns an unknown piece of metal into an intelligent "smart product". From Internet of Things to Internet of Metals! ◉
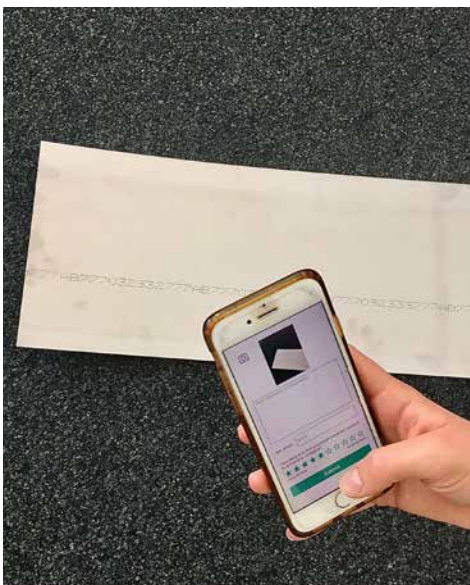
The code makes all information stored for the respective product uniquely identifiable and retrievable via an app.

Do you want to know more? Then request the link to the recording of the webinar "CoilDNA or better call the Internet-of-Metals" as part of our PSImetals Quality campaign by scanning the QR code!

News: Successful Go-live of PSImetals at Chinese Steelmaker HBIS TangSteel New District

PSImetals Controls Processes of Steel Mill

Chinese steelmaker HBIS TangSteel New District (former HBIS Laoting Steel) and PSI signed in November 2020 the go-live acceptance of the PSImetals modules Planning/Scheduling, Production, Quality, Order Dressing, as well as some PSI developed project-specific components.

PSImetals and the new plant were commissioned simultaneously and covered the entire process chain of current flat production facilities from sales to production. This includes order and line scheduling, order dressing, quality design and execution, steelmaking and hot rolling operation management, yard management, loading and shipping.

HBIS TangSteel New District will start the operation of its new "Special Steel Sale & Production Platform" in 2021, which is a newly built production mill for long products. It will cover a new melt shop and a rolling mill with two rod, two wires and one section rolling lines. The platform is also based on PSImetals, but

Control room at HBIS TangSteel New District.

is being implemented by HBIS IT team, which benefits from the product and know-how transfer from PSI in the original project. This is a first project in China, covering both flat and long production and sharing the synergy of a standard PSImetals platform.

Junan Xue, Assistant General Man-

ager of HBIS TangSteel New District in charge of IT business, summarizes: "I am very impressed with the smooth go-live process. PSI did this professionally and responsibly on the very first attempt, and with success!"

HBIS TangSteel New District was founded in 2017 with the mission to be the lighthouse site for technology, innovation, products, smart manufacturing and green manufacturing not only for China but also for the global metal industry. The company belongs to HBIS Group, one of the largest Chinese manufacturers of iron and steel materials and one of the most important providers of a comprehensive service portfolio. ◉

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User report: Time for the essentials at Mahr GmbH thanks to high-performance ERP system

High-Precision Solutions for Measurement Tasks

At the internationally operating Mahr Group, various manufacturing requirements meet complex corporate structures. This causes particular demands on the IT—and above all on the ERP system. The specialist for production measurement technology—that is what Mahr has been doing since 1861—successfully relies on the ERP system PSIpenta, which is specially tailored to the industry, and its integrated multisite control.

Automotive, mechanical and plant engineering, electrical and medical engineering, synthetic fiber and plastics industries—these are just a few of the countless application sectors in which Mahr's high-precision measuring solutions, ball bearing guides or pumps are used. This is done very successfully, because in the long company history of Göttingen-based Mahr GmbH, the sails are continuously set on growth course.

> *Another special feature is the part list designer. Thus, basic data part lists from the design department can be graphically prepared for production in a very flexible and simple way by drag-and-drop.*
>
> **Thomas Sommer**
> Head of Business Application Management at Mahr

Meanwhile, more than 2000 employees work for the medium-sized family-owned company worldwide. They work in subsidiaries, production plants and sales offices and some in a "dual function" or just as two-person sales office.

The growing complexity of this corporate structure places particular demands on the central IT department, which must provide reliable IT structures for cross-company transparency. For this purpose, Mahr has relied on the ERP system PSIpenta as a central element since 1992.

From small series to order manufacturing

The ERP system supports the entire process chain of an order flow across departments—from sales and purchasing to production and shipping. And it does so for a wide variety of production types. While measuring instruments are mainly manufactured in series, Mahr produces measuring machines in small quantities and individual productions according to the rules of order production.
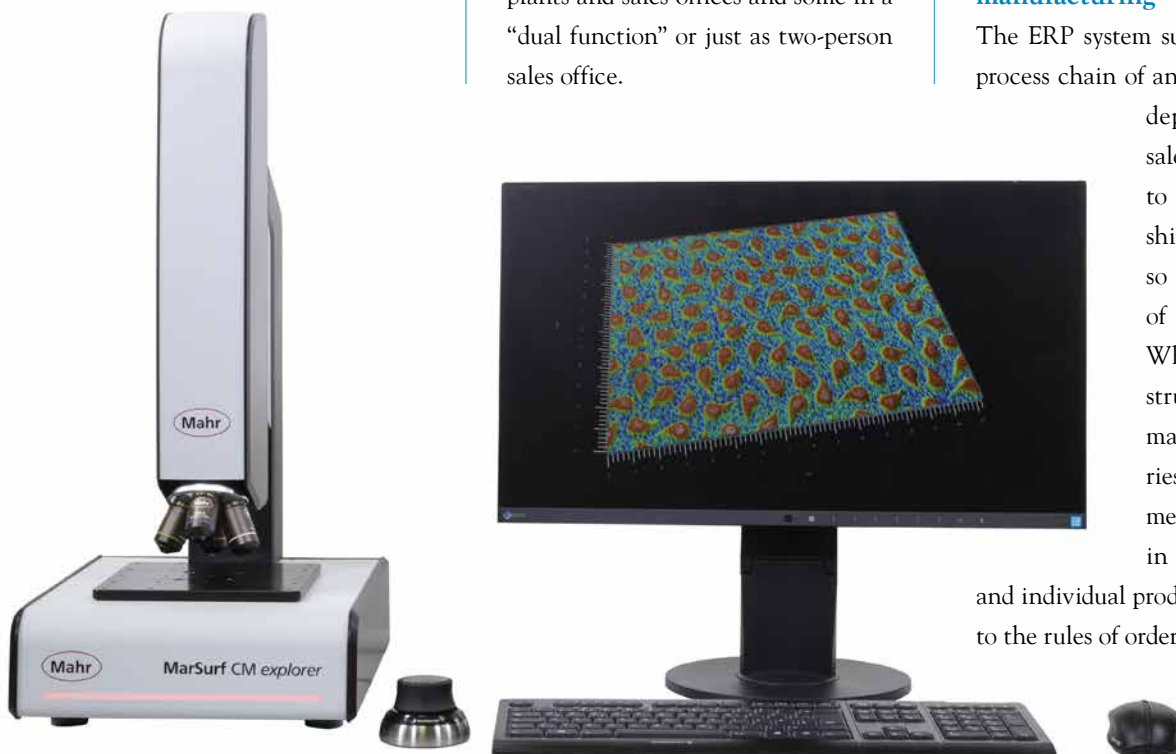
The MarSurf CM explorer is a complete solution for surface measurement and analysis.

Consequently, the list of ERP functions required and used to cover the various requirements is long. "However, the Adaptive modules for delivery date determination and inventory optimization, for example, play a special role for the manufacturing plants," says Thomas Sommer, Head of Business Application Management at Mahr. For cross-plant scheduling, Mahr is already planning to add the CTP—Capable-to-Promise module. For example, inquiries to plant 1 about a commodity that is not in stock in plant 2 can then be answered immediately with a reliable delivery date.
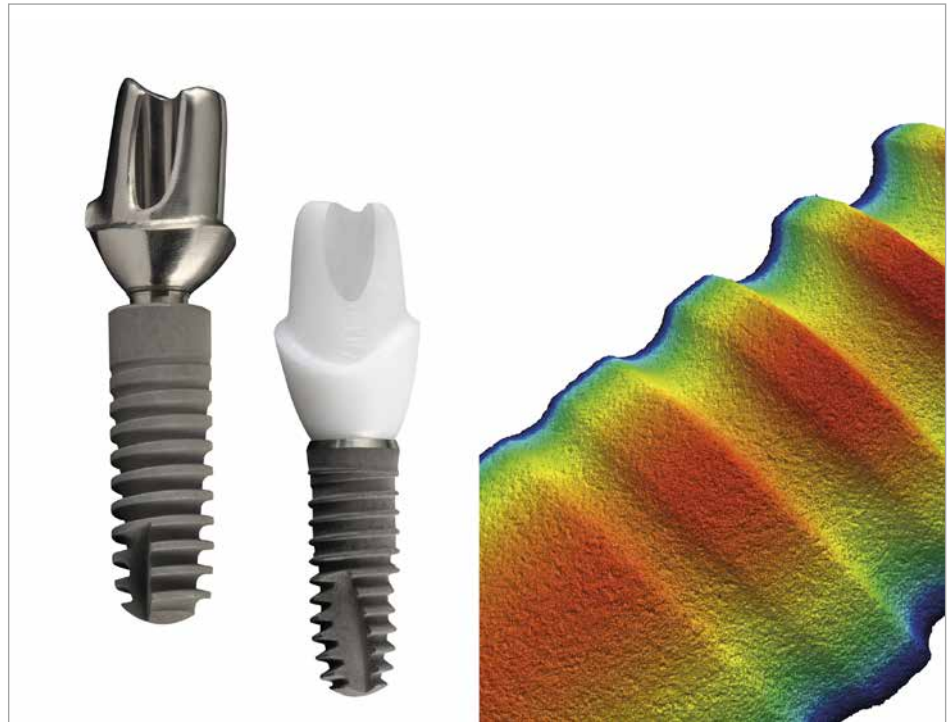
The MarSurf CM explorer is a complete solution for surface measurement and analysis.

Transparency with multisite control

In addition to the in-depth, industry-standard functions, however, the integrated multisite control system is of particular importance. "In 1999, initially only five sites had a single-site PSIpenta installation," describes Thomas Sommer. But as the company expanded, the need for cross-company transparency regarding the order status grew, as did the need for uniform data sets and processes. In 2013, the Multisite integration in the first three plants was the starting signal for the successive connection of all Mahr subsidiaries. With PSIpenta Multisite, any number of national and international plants can be managed and controlled in a corporate structure and geographical purchasing and sales activities can be bundled. Today, 12 plants from a total of eleven Mahr companies are already operating in Multisite mode. "Basically, anything you can imagine goes: Commercial in-

dependence with access to the same data pool, triangular deals with customers, or company-wide availability checks," explains Thomas Sommer. Wherever Mahr is already using Multisite, the most important thing is that time-consuming, redundant data entry is no longer necessary. In addition, end-to-end automatisms ensure a significant acceleration of processes.

"In addition to central purchasing and sales, it was important to us that a manufacturing plant can also sell directly, for example when large measuring machines are ordered in Göttingen. On the other hand, products that are ordered in one country should also be handled by the corresponding subsidiary," Sommer describes. Last but not least, the company wants to use the multisite installations to carry standardized processes for the various areas into the "Mahr world" so that employees can basically work in the respective departments regardless of location

and across national borders, each at the moment.

Equipped for the future thanks to flexible ERP

Companies like Mahr have long since matured into complex, international enterprises with extensive functional requirements, but above all with requirements for end-to-end data management and transparency. This includes overcoming the classic boundaries between logistics IT systems as well as national boundaries. With its ERP industry standard PSIpenta and integrated multi-plant control, the international group of companies is ideally positioned to meet current and future global economic developments and successfully continue the long history of the company. ◉

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News: RMD Logistics relies on PSIwms as SaaS version

Multi-cloud-based Warehouse Management System

The logistics service provider RMD Logistics GmbH has commissioned PSI Logistics with the delivery of the warehouse management system PSIwms from the PSI Cloud. At the same time, both companies agree on a strategic cooperation for the continuous further development of state-of-the-art features and functionalities.

Based in Mainaschaff, RMD Logistics is specialized in logistics services for e-commerce, wholesale and advertising materials.

For the first time, PSIwms was ordered by a customer via the PSI App Store.

It operates three sites in the Rhine-Main region with around 350 employees and almost 100 000 m² of logistics space. The customer portfolio includes companies of various industries and sizes—among them Eintracht Frankfurt, Sport2000, Hugo Boss and Alcon. With the multi-cloud-based PSIwms, the owner-managed family business is replacing a legacy system.

Flexible and up-to-date with SaaS from the PSI App Store

The logistics service provider has opted for the Software-as-a-Service (SaaS) variant of PSIwms from the PSI App Store in order to be able to react flexibly and on a daily basis to fluctuations in customer business. If necessary, RMD can book and activate additional device and/or license functions quickly and easily from the PSI App Store. This includes updates and upgrades. This means that all future product enhancements can be used immediately to improve logistics processes and customer satisfaction.

The project implementation will be carried out using agile methods in order to be able to quickly switch on clients and react dynamically to the business of logistics service providers, which is geared towards a high level of individual service. RMD will gradually take over services such as configuration and project implementation on its own in order to be able to offer its own customers maximum speed and flexibility. This includes supplementary functionalities via web service, for which RMD can build on existing logic and modules already developed in-house, such as the existing interface converter.

RMD Logistics and PSI Logistics will cooperate closely in the future in the development of new, practical modules and functions. To achieve these goals, both companies have agreed on a far-reaching strategic cooperation as part of the contract award. According to this agreement, RMD will be closely involved in the development of new features such as artificial intelligence methods with a mutual flow of information and exchange of experience as well as certifications as a reference project by the Fraunhofer Institute for Material Flow and Logistics (IML). In this context, RMD is available as a pilot customer for the use of new software technologies in controlled live operation.

In addition, the future partnership includes intensive cooperation with regional institutions such as the Aschaffenburg Chamber of Commerce and Industry, the Aschaffenburg Logistics Initiative and the Aschaffenburg University of Applied Sciences.

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News: Battery manufacturer BMZ Group orders Warehouse Management System PSIwms

Transparent and On-Time Production Supply

The battery manufacturer BMZ Group has commissioned PSI Logistics GmbH with the delivery of the Warehouse Management System PSIwms. In the future, this will optimize intralogistics processes in warehousing and production supply.

For the high-tech production of lithium-ion batteries, BMZ Group operates three production units and a central logistics center with 10 000 pallet spaces at its headquarters in Karlstein near Frankfurt/Main. The production supply and disposal is carried out with six tugger trains via inbound/outbound stations in the logistics center and the three production units.

Process control in goods inbound and outbound

After implementation, PSIwms takes over the process control in the goods inbound and outbound areas of the logistics center and the three production units. For the complex intralogistics processes for the on-time, time-critical equipping of the production with components for the batteries, PSIwms also manages a narrow and a wide aisle warehouse as well as a single-aisle tray warehouse.

Logistics control station ensures end-to-end process transparency

In addition to four pick-to-light picking, repacking and packing workstations, the software system coordinates the route train transports in particular. The logistics control station ensures end-to-end process transparency. In addition, the ERP system, the material flow calculator for the tray warehouse and a test system for battery and accumulator testing will be connected to the PSIwms.

The replacement of the previous warehouse management system is scheduled for the first half of 2021. The "billing" and "multi-client capability" modules of PSIwms, which will also be installed at that time, will offer BMZ the option of temporarily renting out part of the warehouse and storage locations and expanding the business areas to include third-party logistics. ◉

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Dashboard in the Warehouse Management System.

News: Intelligent optimization for sustainable energy supply, production and mobility

With Industrial AI to Green Business

The PSI Group is increasingly relying on Industrial Artificial Intelligence to support customers in the sustainable design of their business processes. Thus, a Group-wide working group has been formed in order to expand the existing optimization processes by including key performance indicators (KPIs) based on sustainability aspects and to integrate these into further PSI products. PSI has already been using Artificial Intelligence (AI) for two decades to optimize the flow of energy and materials in industrial processes.

On the basis of the highly-available PSI software platform, over fifty different AI methods are used productively in customer projects. In addition to classic business management goals, the focus is increasingly shifting to sustainability goals.

Sustainable grid management

By means of integrated AI processes, PSI products are already making an important contribution to sustainable energy supply and sustainable production. For example, in the management of power grids, precise feed-in forecasts based on machine learning and neural networks are used to predictively determine proposals for eliminating current and expected faults in the grid and evaluate them by using PSI's own Qualicision optimization software. This provides a self-learning grid autopilot, through which a higher proportion of renewable energy can be integrated into existing grids.

Optimized sequencing

When optimizing assembly sequences in the automotive industry using Qualicision, an average of 15 percent of resources can be saved, which corresponds to an annual CO_2 avoidance of several thousand tons for a vehicle factory. In the metal industry, AI algorithms from PSI optimize the use of energy and resources, and also accompany the structural change to low-CO_2 steel production.

Machine learning mechanism, increases efficiency

In logistics, routes in order picking can be shortened by 30 percent with a machine learning mechanism, and the efficiency of processes in the distribution center can be increased by over 10 percent overall. In transport logistics, the optimization of logistical networks enables emissions to be cut by 10 percent.

In the maintenance of electrical networks and other critical infrastructures, Qualicision improved business processes to handle the same workload with 15 percent less resource use and CO_2 emissions. By avoiding unnecessary workload peaks, employee satisfaction improved at the same time.

AI supports emission-free local public transport

A current example of the successful use of AI is the switch to emission-free local public transport with electric buses. With the holistic depot and charging management system PSIebus important influencing factors such as limited range, charging infrastructure along the route and in the depot, number of passengers and the outside temperature are taken into account and optimized with Qualicision. PSI's decision-supporting optimization is already being used by more than 15 transport companies in Germany, France and Poland. ◉

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News: PSI among Germany's top 10 climate-conscious companies

Sustainable Through Software

In a study conducted for the first time by the business magazine Capital together with the data portal Statista, the PSI Group was named one of Germany's climate-conscious companies in January 2021. The award, published in the Capital issue at the end of January, recognizes companies' commitment to reducing their greenhouse gas emissions. A total of 2000 companies were evaluated, among which PSI was the only software company to achieve a top 10 ranking at number 8.

For the ranking, the emissions data of more than 2000 companies with more than 500 employees and headquarters in Germany were analyzed. The question evaluated was which companies had reduced the intensity of their greenhouse gas emissions the most over the past five years. Only emissions data reported in accordance with the Greenhouse Gas Protocol's classification into scopes was taken into account.

For PSI, social responsibility and sustainability in customer projects and in own processes have been of particular importance since the company was founded in 1969. PSI supports the sustainable development goals of the United Nations and contributes significantly to the careful and sustainable use of energy, raw materials and labor in the energy, production and transport sectors with advanced software products. Since 2011, PSI has reported emissions data to the Carbon Disclosure Project (CDP) and consistently pursues the goal of avoiding CO_2 emissions and supporting customers in achieving their emission targets.

To the complete Capital article (available in German only):
http://www.capital.de/
klimabewusste-unternehmen-2021 ◉

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EVENTS

PSI will present intelligent software solutions for sustainable production, logistics, energy supply and mobility at HANNOVER MESSE 2021 Digital Edition from April 12–16.
www.hannovermesse.de/exhibitor/psi-software/N1458311

On our website you will find all current trade fair participations and conference offers.
www.psi.de/en/psi-pressevents/psi-events/

The PSI blog features more interesting and in-depth articles on production, logistics, AI, energy and mobility.

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