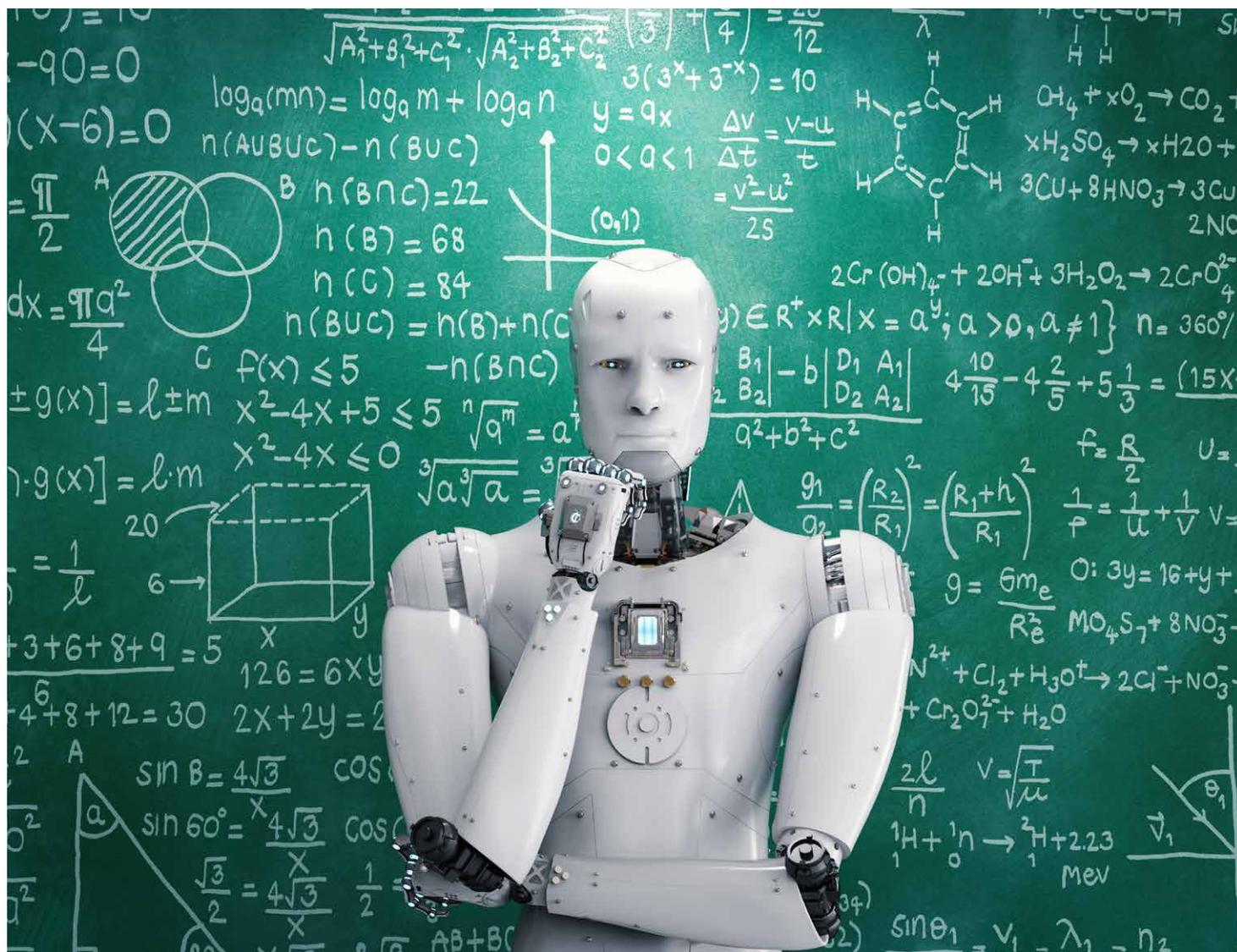


PRODUCTION manager

Magazine for logistics & production



Application of artificial intelligence in production control

Agile decision-making support in real time

User report

Consistent digitalization at thyssenkrupp Hohenlimburg
Complete transparency in the value chain

User report

Complete integration—PSIwms and PSIpenta in use at e.GO Mobile AG
Integration of ERP and WMS

Product report

Deep Qualicision connects the decision-making tool Qualicision with neural networks
Learning system settings

EDITORIAL

Dear readers,

In the 1960s, Starship Enterprise soared across our screens and Mr Spock elicited some complex analyses from his computer. For viewers, this seemed like a distant pipe dream that might never actually come to fruition. It was—quite literally—science fiction. Barely 50 years later, this vision is on its way to becoming a reality.

Critics may argue that the triumph of artificial intelligence (AI) has been heralded many times before. But the availability of affordable computing power and the growing accumulation of data in production and logistics are now fundamentally changing the game.

In the near future, AI will increasingly become a competitive advantage for companies. A study by McKinsey predicts that AI will increase returns in the automotive sector by up to



nine percent—and will do so by 2025. In service, chatbots—computer programs that automatically respond to requests—are becoming more and more widespread and may one day take over routine tasks from a conventional support team. Meanwhile, if marketing is automated using AI, it could help your sales department to target customers with utmost precision. The possibilities that AI opens up for the central data platforms of our time are just as important. Quali-

sion from PSI already uses AI to optimise production and sequence planning in an automated way and the technology is spreading into more and more industries. ERP and MES will soon be able to check the plausibility of data and correct it where necessary, or use predictive maintenance to prevent disruption in the production process.

You can find out what exactly is behind all of these developments in the lead article of this issue.

All that's left to say is: "Beam me up, Scotty".

Kind regards,

Handwritten signatures of Dieter Deutz and Dr. Herbert Hadler in blue ink.

Dieter Deutz Dr. Herbert Hadler
Managing Directors of
PSI Automotive & Industry GmbH

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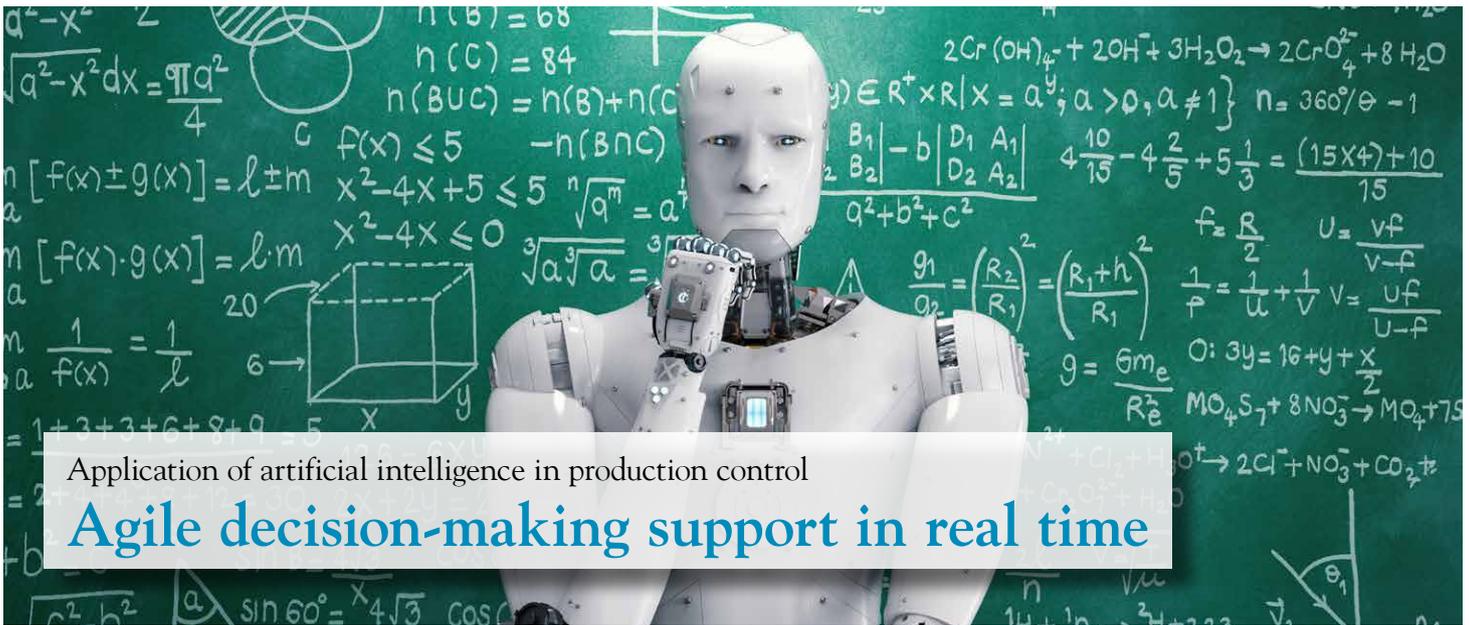
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Managing Directors of PSI Mines&Roads GmbH

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Application of artificial intelligence in production control

Agile decision-making support in real time

In discussions about digitalization, there is almost no other issue that occupies such a high-profile position as artificial intelligence (AI). In the past, this topic has often been set in the context of human ideals or tasks, such as the computer HAL 9000 in “2001: A Space Odyssey”, Number 5 in “Short Circuit” or the robot in Fritz Lang’s “Metropolis”.

Today, following a process of reaching maturity, our starting points are much more clearly defined and it is becoming possible to apply the technologies. Autonomous driving and voice-controlled assistants like Alexa, Siri and Cortana are already the subject of widespread public discussion. These are convenience tools that are intended to make everyday human life easier—and in all likelihood, they will achieve this goal, if they have not done so already.

But alongside these consumer-oriented considerations, it is also possible to identify technologies that will have a long-term impact on everyday working processes within companies. Today, we can already see that it will be difficult if not impossible to solve many future tasks without AI.

Agility in production, decision-making support in real time

These are tasks that will take place within a set of parameters that never existed in the past. Examples include agility in production or decision-making support in real time. Global competition and social megatrends are making processes increasingly complex while causing uncertainty and greater volatility in traditional and familiar business activities.

In this context, methods and technologies from the field of AI could be an effective means to an end, engendering social stability and prosperity.

ERP, MES & big data

MES and ERP systems form the backbone of manufacturing companies. Today, they are the starting point for all activities relating to the manufacture of goods or the provision of services.

At the same time, the increasing integration of processes along value networks (horizontal) and consistent integration from the manufacturing process to the ERP (vertical) are making more and more data available.

The relationships between the different forms of information are widely known. The ERP systems and MES provide a kind of context in which to understand the gathered or generated data. However, with processes becoming increasingly dynamic and conditions—which are sometimes uncertain—changing all the time, it is difficult to capture information from the available data.

Production systems are now able to provide vast quantities of data about their current status. But this pushes conventional analytical methods to their limits. Within companies, it is becoming more and more difficult to make the transition from simply monitoring statuses to predicting them.

Starting points for AI methods

The underlying rules are increasingly complex and the data base is too

large to be handled by human beings. Gaining insights and making decisions based upon them is becoming a more difficult task. These are the starting points for AI methods. For example, making decisions in shorter and shorter time frames will be increasingly critical.

One of the key requirements for the successful introduction or continued application of methods from the field of AI is a solid, reliable and growing data base.

Statistically significant quantities of synchronous data are needed. Other-

applications. ERP and MES as the suppliers of data and information, but also as tools for the people involved in the production process, are ideally suited to the application of these technologies.

Particularly in the field of production-related applications, there are three technologies that can be identified as having a significant influence on the future development of these systems¹:

Cognitive automation is focused on knowledge-based process control. Ex-

Intelligent automation goes one step further. Rather than being about predictable processes and decisions based on rules that are more or less known, it focuses on handling unpredictable events or situations. One popular form of implementation is speech recognition and its associated control of applications. But in these cases, the applications are often very specific.

Computer vision focuses on issues like text recognition or automated analysis of trend graphs or charts (pattern recognition, visual computing). In the field of ERP, OCR-based (optical character recognition) document processing is a widely used solution. But computer vision goes even further by also enabling image recognition, for example (analysis of damage patterns, facial recognition). The technology is based on deep learning mechanisms and is on its way to reaching maturity and thus wider applicability.

AI technologies in production planning and control

One large field of application for AI technologies is production planning and control in its broadest sense. This includes, for instance, determining the processing sequences that are most logical from a technological standpoint (sequencing) in assembly line production using fuzzy logic. It also includes predicting material requirements on the basis of sales forecasts.

The growing diversity of sensors and their installation in production systems opens up further opportunities. The automatic and flexible consolidation of large quantities of sensor



AI provides decision-making support in production control.

wise, data fusion, data mining and other data consolidation methods will have no chance of generating relevant data. Just as human intelligence gathers experiences over time and learns to make decisions, AI must also undergo this process on the basis of large quantities of data.

Technologies and example application scenarios

These methods are consistently spreading into a broader range of ap-

amples include enquiry procedures relating to service cases or monitoring of data entry in the field of master data and transaction data. The system learns which data entries are typical or logical and can notify the user of any implausible configurations at the moment the data is entered. Processes that are run on a completely automated basis are also possible. This would remove the need for users to perform routine tasks (robotic process automation).

¹Source: <https://it.toolbox.com/blogs/erpdesk/artificial-intelligence-and-the-future-of-erp-012317>

data (sensor fusion) enables, for example, correlations between many different sensor values to be determined through neural networks.

Targeted prediction of disruptions or quality deviations can safeguard the manufacturing process. As a consequence, it is possible to identify unknown interdependencies in advance and to use them to stabilise the processes.

Neural networks identify unknown interdependencies

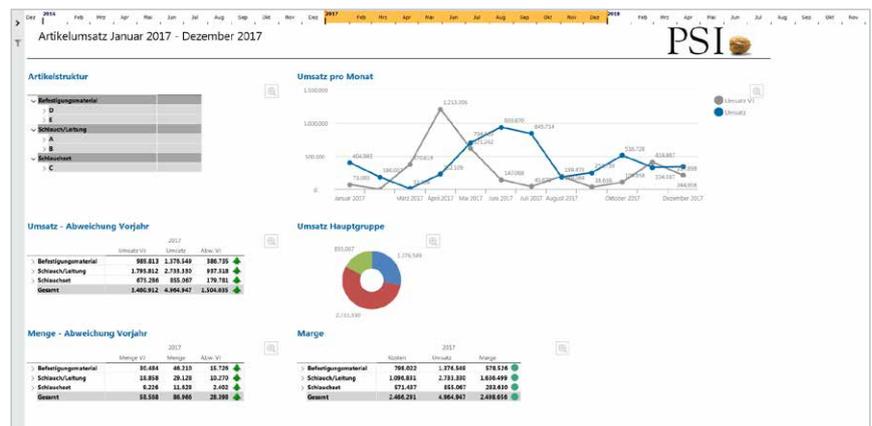
It is already possible to support predictive maintenance through fuzzy logic technologies. The use of artificial neural networks to identify unknown interdependencies is therefore the next logical step.

The growing use of MES and ERP systems in an environment shaped by dramatically increasing globalisation highlights another potential application for AI technologies. Automatic translation of text or speech using neural machine translation mechanisms at the moment the systems are used is an important aspect in the use of AI technologies. This encompasses applications that use natural language, as well as text outputs or documents.

Making the right decisions quickly

The shortening of decision-making processes and the improvement of decision-making quality in an increasingly complex, volatile and uncertain environment, particularly the manufacturing industry, are factors of eminent importance.

The complexity inherent in the globalisation of competition demands that the right decisions be made quickly. Local or regional benchmarks



BI tools such as PSI Smart Planning & Analytics are becoming more important. In this area we see AI as a future driver of innovation.

are being replaced by a kind of “world benchmark”. In this context, automated and AI-based methods are a suitable way to maintain a company’s competitive edge.

An additional aspect that supports the use of automated decision-making processes are the lead times in order processing, which are becoming ever shorter. Continuous availability of production technology can be achieved effectively through the use of fuzzy logic or artificial neural networks in system monitoring processes. Tapping into international markets faster using AI-supported localisation and translation of applications also serves to generate new business and safeguard a company’s continued existence.

Reliable data base as a key factor

The examples mentioned above are just a selection of the potential applications of AI technologies in the field of MES and ERP systems. As they become increasingly mature and widely available, they will gradually spread into the field of business software for manufacturing.

One key factor in this regard is the availability of a suitable and reliable

data base. In this way, data is becoming the “new oil” in the manufacturing industry. The PSI Group has already gained extensive experience in the use of AI technologies both in production and in the protection of critical infrastructures, such as controlling the supply of renewable energy sources into power grids or leakage detection in pipelines.

Key performance indicators

Today, there are already extensive and well-tested solutions available in production for sequencing in assembly line manufacturing and for tuning processes on the basis of key performance indicators. These KPIs are also applied to the MES components from PSI Automotive & Industry.

Establishing, operating and optimising logistics networks in a global environment is another important aspect when considered in the context of the development of value networks. This involves both

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User report: Consistent digitalization at thyssenkrupp Hohenlimburg

Complete transparency in the value chain

thyssenkrupp Hohenlimburg is aiming to achieve a fully automated value chain. The company wants the relevant IT systems to work in perfect harmony in order to support the corporate objectives. In this context, PSImetals Order Scheduler is providing assistance as a new order planning system.

thyssenkrupp Hohenlimburg GmbH operates as the Precision Steel business unit in the Steel business area at thyssenkrupp. The company is a specialist in customised solutions that can also be

high-precision hot rolling line can be supplied black, pickled, annealed and split according to the customer's requirements. Medium-wide strips manufactured in Hohenlimburg are used as a primary material in the cold roll-

where order processing tasks are operated together with the customer in an overarching solution. This gives the customer a range of options, including intervening directly in the production planning processes.

On the procurement side, the programming requirements for steel production are controlled from Hohenlimburg. The only way to respond efficiently and flexibly to customer requirements is through the integration



Thyssenkrupp is playing a leading role in the implementation of Industry 4.0 in Germany.

used to manufacture small batch sizes economically.

The Precision Steel (SE-PR) business unit has a secure supply of primary materials as the majority of its steel slab requirements are covered by the thyssenkrupp Group's own steel mills.

The medium-wide strips manufactured on the fully process-automated,

ing industry and in direct processing, predominantly in the automotive supply industry.

Industry 4.0 in practice

The company adopted digital networking of business processes with customers and suppliers at an early stage. Today, it has reached a level

of the entire supply chain in line with Industry 4.0.

The objective guides the way

It requires constant development in order to achieve a sustainable increase in customer benefit. The continuously increased production output at the more than 150-year-old site and the

associated logistical challenges place high demands on the planning and control systems.

In order to overcome these challenges, SE-PR is continuously developing the existing systems. Since early 2017, the systems have been complemented by the configuration and gradual use of the Order Scheduler from the PSImetals product family.

For people

A primary objective of this project is to establish a high level of transparency in the complex process sequences involving small batch sizes. The production planner needs to receive reliable decision-making support across all process steps.

This approach allows different planning scenarios to be run on the basis of the actual situation on a given day and a complete factory model so that optimal decisions can be made. Supported by a graphical user interface, the information must be provided in a form that gives the planner a clear overview.

Therefore, the PSImetals Order Scheduler meets all the requirements placed on it. This tool also offers a preview of the inventory development ahead of each plant and the intermediate storage areas, as well as the option to include the factory calendar, transition periods and KPIs for each plant. In a further step, campaigns and external processing operations are included.

A network of specialists

The gradual introduction and use of the new PSImetals planning tool is intended to add an important module to the existing systems. Integration into existing systems is a key require-

In demand

Friedrich Hövelmann, Head of Production Planning at thyssenkrupp Hohenlimburg GmbH

PSI: What does Industry 4.0 mean to you?

Mr Hövelmann: To me, Industry 4.0 means using digital technologies to shape mutual business processes in cooperation with customers and suppliers. thyssenkrupp Hohenlimburg has already made a lot of advances in this field. For example, the business processes developed with our cold rolling customers enable a dramatic reduction in lead times for orders. For 70 percent of customers, the planning horizon is 48–72 hours.

PSI: How do you inspire your users to adopt new tools and processes?

Mr Hövelmann: There is a long tradition of continuously developing pro-

cesses at thyssenkrupp Hohenlimburg. The important thing is to get everybody on board. The more obvious the benefit of the new tools and processes, the easier this will be.

PSI: What makes PSI a partner on your digital journey?

Mr Hövelmann: The very short planning horizons in production planning and control demand a tool that can process information in a quick and clear way so that this information can be used to develop suitable measures. We were won over by the PSI factory model in conjunction with the graphical processing and extensive analytical options. The professional project work and the results that were achieved also met our expectations.

ment in this regard. Using the snapshot method, all production-related data is transferred daily from SAP to PSImetals and is available on a consistent basis for use in further planning tasks.

In this case, the experts from PSI were able to draw on their experience of using SAP and connecting the PSI factory model. The graphical processing of the production data within the PSI tool gives the planner a quick and meaningful overview of the current planning situation.

The use of the PSImetals Order Scheduler also gives the planner a suitable tool for performing more detailed data analysis. Various algo-

rithms for plant utilisation, adapted to the respective planning scenarios, help the planner to identify and develop suitable measures for optimising process sequences.

thyssenkrupp Hohenlimburg shows that Industry 4.0 is more than a vision. Bringing it to life means defining clear objectives and reaching them step by step—with the right partners. 

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User report: Complete integration—PSIwms and PSIpenta in use at e.GO Mobile AG

Integration of ERP and WMS

Consistent material flow management is one of the core tasks of an ERP system and is the basis of optimal production processes. This is especially true in the era of Industry 4.0, when digital integration of engineering along the entire value chain is needed and increasingly high expectations of lead times must be met.

This requires all information and data processing operations to be linked to the physical processes in a company. One notable process is internal company logistics. Companies can therefore benefit from the integration of a warehouse management system (WMS) that offers sophisticated functionality. That is why the electric vehicle manufacturer e.GO Mobile AG—based in Aachen—chose to introduce an integrated system of this type.

ERP as a data-handling system

Looking at what happens in practice, it is clear why an ERP solution as a data-handling system should go hand-in-hand with a WMS: A sophisticated ERP system for use in production, like PSIpenta/ERP, is able to define storage locations via four coordinates and take account of four stock separation criteria for this purpose.

In this solution, the system processes the manually or automatically generated transport orders, e.g. from logistics personnel in the goods receipt department or based on production plans. All transport orders are logged in a pool from which the forklift drivers can take orders according to the pull principle, and then process them without reference to a production order.

Seamless integration

These functions are inadequate when it comes to complex logistical requirements, such as when many different criteria or characteristics must be taken into consideration in the receipt, storage and removal of material both within and for different storage areas, or when coordinating logisti-



The integrated PSI solution allows us to achieve strategic agility for our products and to introduce our production-related system in an agile way, since we are able to make quick and transparent changes on the product side while scaling effectively on the system side with established functionalities in an integrated and open architecture.

Dr. Rupert Deger
CIO at e.GO Mobile



cal processes like kitting and value-added services, or in the time- and resource-optimised control, assignment and planning of all goods movements through an intelligent transport management system.

They require a warehouse management system that integrates seamlessly into the production planning processes of an ERP system. This is particularly relevant to automobile manufacturers, who need to manage an extensive supply chain, but also to plant and machinery manu-

facturers who must ensure that requirements in the assembly areas are met through supply and disposal processes.

Consistent processes to increase productivity

The integration of an ERP system with a WMS is therefore needed to manage the logistics chain and coordinate the flow of goods into and out of a company. PSI integrated the two systems, which are based on the same technology and therefore do not require a conventional interface, in an

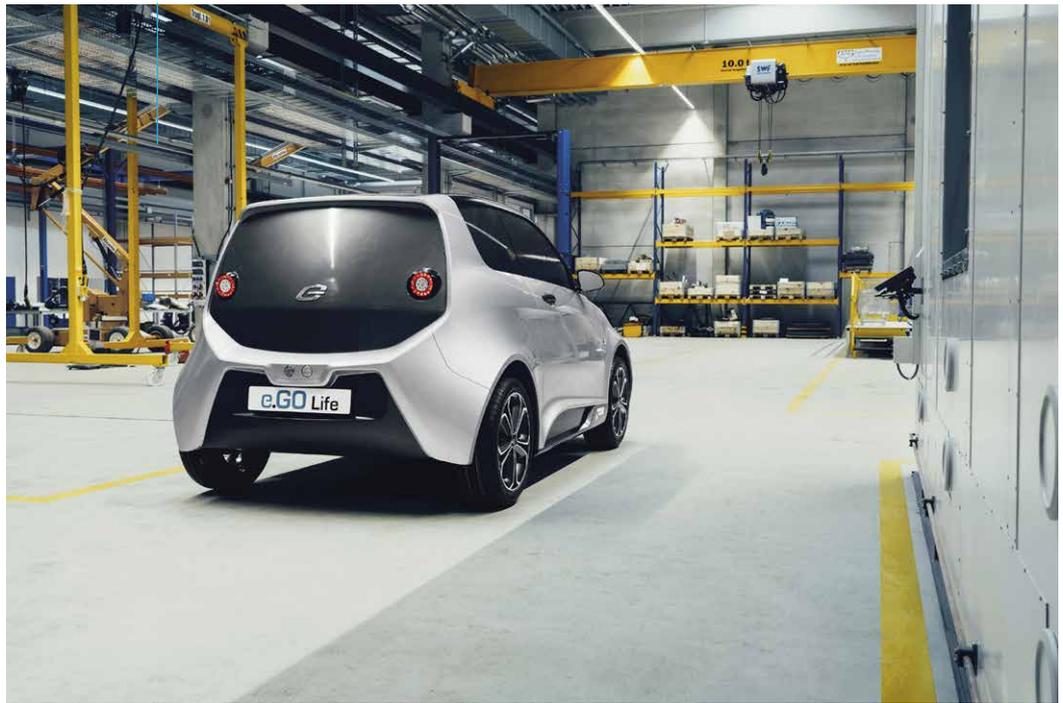
extremely straightforward way.

Optimisation of the logistics processes reduces the mean lead times together with the transport and idle times. This increases productivity markedly and reduces the error rate in the provision of materials. In turn, this plays an important role in resolving or avoiding bottlenecks.

Benefits of integration

In order to design processes that are as efficient as possible, and thus achieve profitable results, optimal production

processes are essential. A central role is played in this context by functional and integrated adjacent processes, one of the most important of which is a company's internal and external logistics. Forming a seamless and intelligent link between an ERP system and a WMS can therefore be a necessary and profitable step for many companies—not least in the context of Industry 4.0.



The newly developed electric city car e.GO Life.

e.GO Mobile:

A practical example

In the automotive industry in particular, where the primary task is to manage complex logistics chains, the consistent integration of a solution—from the order to delivery, just-in-time and just-in-sequence—plays a central role in a company's productivity and competitive edge.

In November 2017, PSI was chosen as ERP partner for the production network that manufactures the newly developed electric city car e.GO Life.

Following a rapid implementation stage that took place in agile steps corresponding to the company's own approach to product and organisational development, a key role was played by process orientation and scalability—but also flexible material control through the integration of PSIlwms. The implementation of PSIlwms allows e.GO Mobile to control materials via transport orders so that it can achieve the complete traceability required and prevent errors, includ-

ing in subsequent processes. An additional requirement placed on the material control system, i.e. PSIlwms, is consistent and flexible mapping of logistics processes. 

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PSI 

Industry 4.0 - Creating Value

From 23 to 27 April 2018, PSI will be presenting at the Hannover Messe trade fair its integrated software solutions for production, logistics, service and maintenance, with a focus on AI applications.

The integrated production and logistics process at e.Go Mobile AG will be highlighted as a practical example.

We look forward to meeting you in hall 7, stand A24.



Product report: Deep Qualicision connects the decision engine Qualicision with neural networks

Learning how to set systems

Deep Qualicision connects the decision engine Qualicision with neural networks. This solution concept efficiently learns to adjust parameters so that decisions as consistent as possible can be modelled.

In general, Deep Qualicision can be used to determine multi-criteria rankings efficiently on the basis of individual rankings, consistently taking into account the goal conflicts in business processes to be optimised. Deep Qualicision learns the priorities of the criteria so that consistent priorities are automatically recommended for any sequences of decisions.

Software-based connection between rankings and goal criteria

Deep Qualicision thus enables a deeper software-based connection to

be established between the rankings and the goal criteria. The following example of a purchase decision illustrates the principle behind Deep Qualicision:

The decisions to be modelled here are about creating a ranking of decision alternatives on car types in such a way that the ranking fulfils as many of the desired criteria as possible.

The selection of car types includes compact car, coupé, cabriolet, sedan, limousine, minivan, large capacity car, sports car and cross country. The criteria that are important in the decision example are low price, high

power, low fuel consumption, family-friendliness, high prestige and low running costs (see also Fig. 1).

Decisions by rankings

If a purchasing decision maker ranks the car types above then certain criteria are connected to the ranking as individual decision goals that are implied by the ranking of car types (consciously or unconsciously). Other goals may therefore be either indirectly negated or ignored.

For example, a ranking with the compact car and the large capacity car in the first two places tends towards low price and low fuel consumption, and probably slightly towards family-friendliness. Rankings that prioritise the sports car and the cabriolet

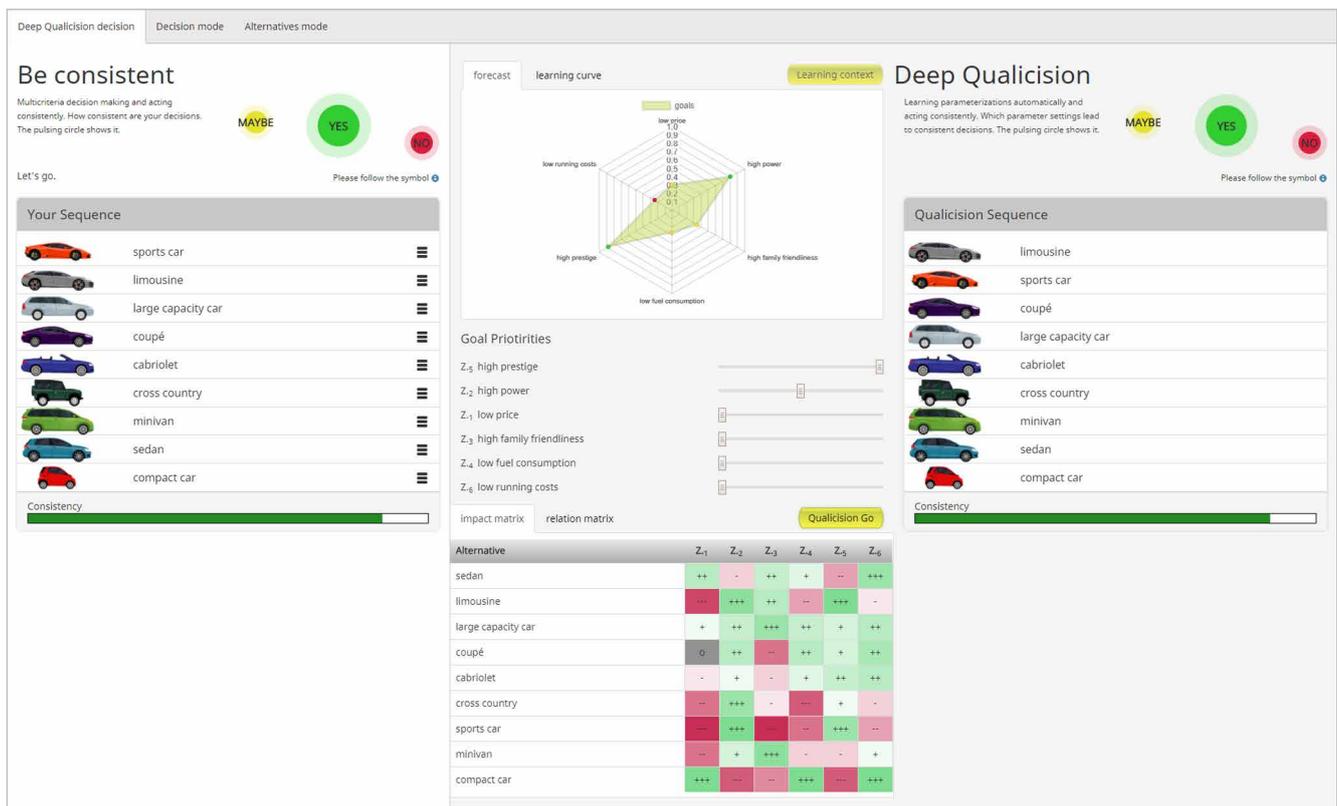


Fig. 1: Decision-making rankings with multi-criteria consistency.

let are more inclined towards high power and perhaps the desire for a little more prestige, while ignoring the low price criterion. In this case, the low price goal is even negated to a certain extent.

Purchase decision alternatives and purchaser preferences

The correlations between the car types as purchase decision alternatives and the criteria can be represented easily for each criterion when sorted (on a single-criterion basis) by purchaser preference. On the other hand the interaction of the criteria in groups is much more difficult due to the wide range of options.

For the nine decision alternatives in this example, there are already $9! = 362,880$ options available that, with six criteria, can be represented in $6! = 720$ sequences of criteria, if we assume an equally decreasing sequence of criteria.

Consistent rankings despite high degree of complexity

It immediately becomes clear that this can be even more complex if we consider that some criteria can be equally important and that the strength of the equal weighting can differ. For example, if the criteria are completely excluded in the sequences of adjustments, then there are already 1956 options.

In this scenario it is not easy for the human mind to keep track and map out consistent rankings. However, the use of Qualicision makes it possible to take the single-criterion rankings, i.e. rankings that only sort the decision alternatives by exactly one of the criteria in each case, and efficiently calculate approx. 300 rankings on a multi-criteria basis so that the goal conflicts are balanced in the most consistent way possible.

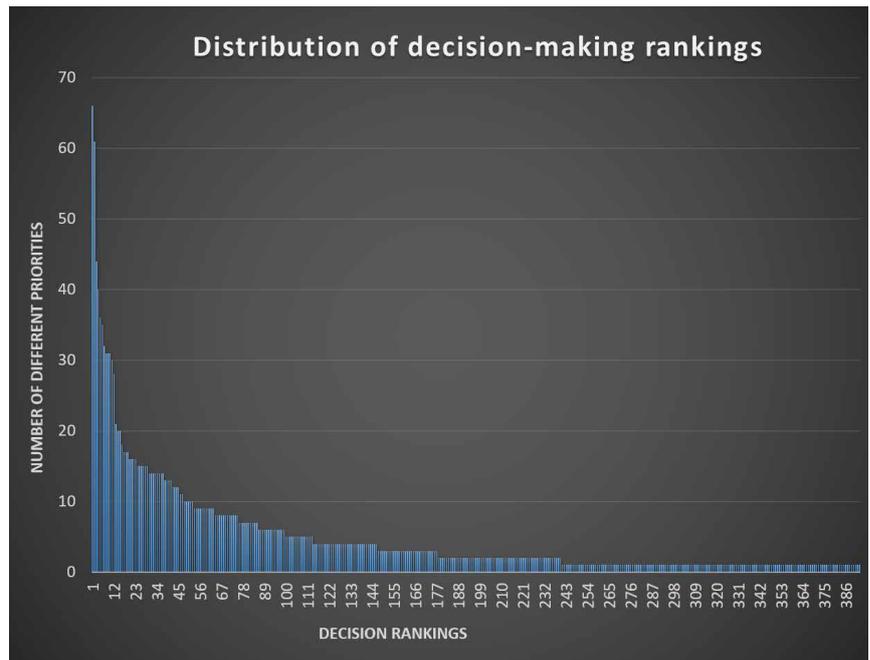


Fig. 2: Distribution of decision-making rankings.

Goal conflicts require decision-making intelligence

The fact that the goal conflicts are not equally distributed per se and thus require decision-making intelligence can be seen in the distribution of decision-making rankings in relation to the priorities of the decision-making criteria (see Fig. 2).

As a result, for individual goal priorities Deep Qualicision provides learned priority allocations that match the goal conflicts and synchronisms and are therefore consistent priority allocations for the goals in the example.

Deep Qualicision offers a broad range of applications

Deep Qualicision offers a broad range of applications: The prospect is that future optimisation solutions based on Qualicision that use Deep Qualicision will be able to learn their own parametrisation automatically. The work towards achieving this goal is well under way.

The long-term goal is for the Deep Qualicision principle to be used not

just to identify interdependencies automatically in the input data of the business processes that Qualicision already optimises but also to learn targeted Deep Qualicision adjustments of the goal priorities automatically from representative input data.

Self-adjusting optimisation processes

By the targeted method Deep Qualicision will therefore be able to handle self-adjusting optimisation processes with consistent decision-making even when configurations of process input data are widely varied. Such a solution is required for example when optimising production sequences on the basis of ever-changing order quantities and compositions. 

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News: PSI receives logistics order from shipbuilder MV WERFTEN Wismar GmbH

PSIwms coordinates warehousing processes

PSI Logistics GmbH has been awarded by MV WERFTEN Wismar GmbH, a Genting Hong Kong Group company and shipbuilder of the world's largest cruise liners, with the delivery and implementation of the Warehouse Management System PSIwms.

With three locations in Wismar, Rostock and Stralsund, MV WERFTEN develops and manufactures luxurious river cruise ships, ice-skied mega yachts and the world's largest cruise liners. From the spring of 2018, PSIwms will coordinate the warehousing processes for the supply and

management of the warehousing and production sites of MV WERFTEN, such as for the assembly lines of passenger and crew cabins in Wismar. In the 9 000-square-meter production hall, a cabin is manufactured every 20 minutes on state-of-the-art production facilities, a total of around twenty a day. By 2026, the produc-

tion is to be gradually increased to up to 7 000 cabins per year. The clocked material supply takes place from the logistics centers of the group, which will be managed by PSIwms in the future.

The investment in the Warehouse Management System from the PSI Logistics Suite is part of the forward-looking digitization strategy with which Genting Hong Kong aims to make MV WERFTEN one of the world's most modern and efficient cruise ship manufacturers. 

News: Poland's leading distributor optimizes logistics processes

Empik implements PSIwms

PSI subsidiary PSI Polska z o.o was awarded by Empik with the implementation of the Warehouse Management System PSIwms for the entire Empik Group. Empik is Poland's leading distributor of cultural and entertainment products.

Empik is steadily implementing its growth strategy by using innovative offline, online and mobile technologies. "The dynamic growth in sales and the implementation of omni-channel solutions have led us to look for a high-performance logistics solution," said

Wiesław Majewski, Logistics Director at Empik.

After extensive evaluation, Empik decided in favour of the warehouse management software PSIwms. "It fits per-



Empik operates Poland's largest distribution network for cultural, scientific and entertainment goods.

fectly within a large company with good growth prospects like ours," said Wiesław Majewski.

With integrated Smart-Move technology, PSIwms enables users to clearly

define and automate warehouse processes. The system is highly configurable and supports the processes in the three main sales channels E-Commerce, Retail and B2B.

Optimised logistics processes

The use of the system will streamline logistics processes, improve performance, shorten order lead times and improve resource planning and supply chain efficiency at Empik. The contract was signed in December 2017 and the project is to be progressively implemented in two years. 

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Product report: Innovative operating concepts for plant processes

Mobile working with PSImetals apps

PSI is supporting customers through new apps with its upcoming PSImetals release 5.16. These apps help to implement working processes in the plant with optimised operations and innovative operating concepts. Here is a brief look ahead.

PSI has long been offering software for mobile end devices for direct, on-site support for plant personnel. However, as it is written for Windows CE-based devices, this software can only be run on modern end devices to a limited extent.

Using state-of-the-art technologies

With the introduction of its own WDF2 framework, PSI now also supports newer generations of end devices such as Apple iPhone/iPad, tablets/smartphones with Google Android or special industrial handheld units. The use of state-of-the-art technologies like progressive web apps, responsive design and the JavaScript framework Angular ensures that the apps can be used on a wide range of end devices. Regardless of the device, the new PSImetals mobile apps always look good.

In addition to the KPI app, which has been available for one year, further apps that cover typical tasks in the plant will be added.

Simple, intuitive access to data

The app for Warehouse Transport Management provides simple and intuitive access to the necessary material data in the material overview, including details. Standard tasks, such as rebooking material or generating transport orders, can be completed directly on site.



Detailed material information sent directly to your mobile phone.

Special storage location views provide a quick and clear overview of the stored materials. With the new transport terminal, crane operators and forklift truck drivers can select and confirm their transport orders on the tablet itself.

Shipping app supports employees

Employees in the shipping department can also receive mobile support. The Shipping app helps employees to complete loading orders. All of

the steps can be executed via tablet or handheld unit as part of a mobile solution, from activating these orders to displaying loading lists and completing final verification.

Functions such as load documentation with photos can be provided on a customer-specific basis. The global search function makes operation easier. The process will be familiar to anyone who uses conventional search engines: When a colon introduces a list of things, do not capitalize the first word after the colon unless it is a proper noun, simply enter the material designation, load number or storage location. An easy-to-read list of results provides quick access to the data.

Additional modules planned

In the field of production, it will be possible to record material defects and immediately document them with images. The redesigned inventory module allows entire inventories to be recorded in a simple process—even in warehouses that do not have a permanent network connection. Parts of the application can be used in an offline mode for this purpose.

The focus is also on the customer-specific extension of apps. From smaller adjustments, like the selection of the data displayed, to completely new screens and functions, anything is possible. Be excited about our new release! 🌀

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Product report: PSI Automotive & Industry presents innovative solutions

A look into product development

The meeting of the PSIpenta User Group (IPA) held last November in Vienna once again focused on exchanging experiences and opinions. But this time there was also a very special highlight, as the attendees had the opportunity to take a look at the latest issues in product development.

A number of innovations were on show, including those from the areas of SDC/TA and Groovy. There was also a look ahead to the completely redeveloped modules of quality assurance (QA), service management and conformity.

At the IPA event with more than 200

explorer with filter function now offers quick access to all functions relating to a key word, such as a person.

The new sidebar also makes references and operations easier to find. Frequently used references and operations can now be added to a personal favourites list using drag and drop.

combine various business objects and will make work easier in future. For example, a list of persons can be combined with stamps, account balances, etc. If a person is highlighted in the list, then the data for this person is displayed in the other views. There is no need to repeatedly switch between different business objects.

From VBA to Groovy

Another innovation is the scripting environment developed in-house,



Satisfied customers and attendees at IPA 2017 in Vienna.

attendees, there were also workshops on topics like “EDI and myOpenFactory”, “Integrated logistics processes in Austrian SMEs” and “The control panel—Introduction, configuration and application”. The next IPA will be held on 15 and 16 November 2018 at the Sofitel Hamburg.

SDC/TA with a new look

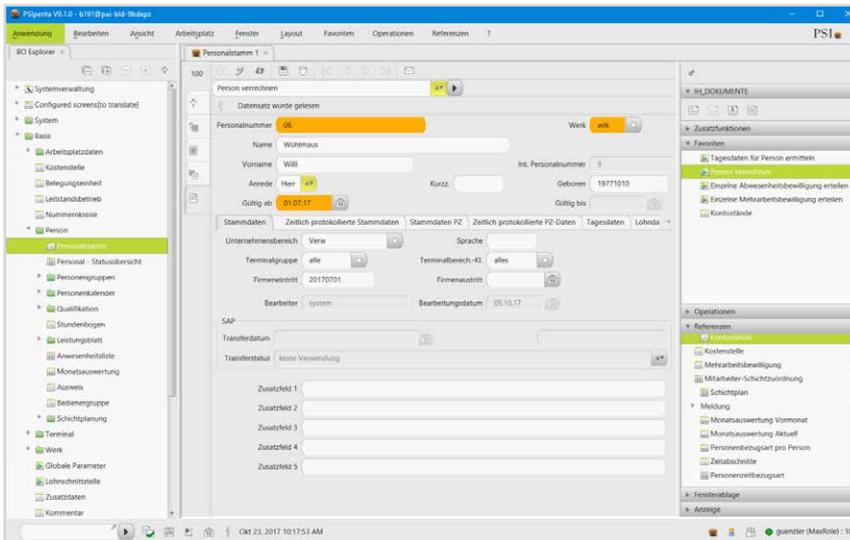
Following the release of PSIpenta V9 in spring 2017 with a redesigned interface, PSIpenta SDC/TA will also be available soon with a new look and many new features. The function ex-

In addition to the free configuration of columns and a sorting function, the overviews offer new functions like grouping of lines and aggregation of values. The user can visually highlight specific content, e.g. using colours, via configurable rules that control the appearance. The individual views can also be adjusted directly in the interface with visual support in accordance with the user’s needs.

Combined views

One special highlight is the new combined views, which can be used to

which makes it much easier for customers to make adjustments themselves. The solution is based on the open-source programming language Groovy. The advantage of this approach is that Groovy is easy to learn while also being ideal for implementing business logic, including in finance. What’s more, a script can now be generated for each business object event, instead of having one class of “Business Object” for all events like in the old VBA environment. It is also no longer necessary to configure the business object events being addressed.



The new interface of SDC/TA in use.

A further advantage of the new client is that it is a generic client, meaning it is largely independent of the server version and/or of adjustments. New quality assurance module
With the new quality assurance module, PSIpenta will support users performing testing and measuring tasks in production and purchasing. The new functional area includes the creation and administration of quality characteristics in the basic data, as well as the ability to record them and provide feedback in production and in goods receipt.

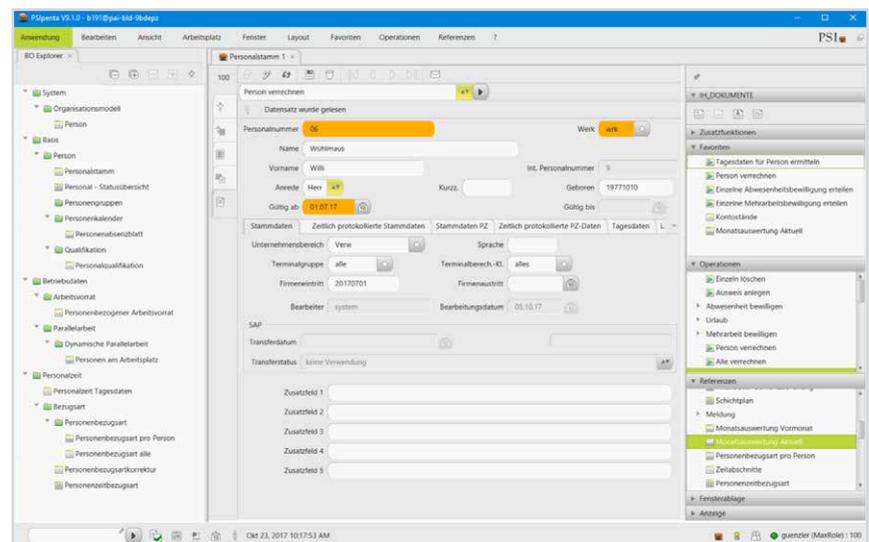
It is possible to record both qualitative (e.g. OK/NOK) and quantitative values (specific measured values). The tolerances or measuring and testing equipment that need to be considered can be assigned to individual quality characteristics.

The results of the quality control are available for analysis. If something is not OK, incidents can be created in order to document the deviation and cause.

Innovations in service management

The innovations in service management relate to the option to map

maintenance contracts directly in PSIpenta. This affects services offered by customers themselves as well



The sidebar enables quick access to many functions.

as maintenance activities provided by external companies.

All contracts and conditions are stored directly in the system and linked to the relevant master data, such as customer, location or service object, and the billing procedures are generated automatically. That means the user can easily perform post-calculations for maintenance contracts and check how cost-

effective they are. At the same time, an option has been added to generate billing procedures directly from service orders so that the customer can be invoiced for specific services or materials.

Conformity for certification of seals of quality

By contrast, the new conformity module is aimed at all producers of goods that are certified according to seals of quality. Customers have the option to map conformities and their audits in the system.

For each article order, a corresponding certificate of conformity is requested from the supplier and the certificate is stored in PSIpenta with an expiry

date. The same applies to the results of in-house audits.

This makes it easy for customers to issue a declaration of conformity for their products. 

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Interview: Dirk Noß and Elmar Jaeker, Managing Directors of PSI Mines&Roads GmbH

Synergies in mining and roads

PSI Mines&Roads GmbH has been developing software for integrated mining automation and traffic management for over 25 years. **Production manager** spoke with Elmar Jaeker and Dirk Noß, who took joint management of the company in summer 2017 following the sudden death of long-standing Managing Director Dr. Marcus Adams, about challenges, opportunities and synergies.

What has happened since?

Mr Jaeker: A lot! After an intense period of mourning and orientation, we were able to stabilise the commercial situation at PSI Mines&Roads in 2017, but also to enhance our prospects in our target markets of mining and roads.

What exactly does this mean for the mining area?

Mr Noß: In summer 2017, we were able to connect five mines for our customer Shendong in China to our PSImining/EE control system. This brings the project to a successful conclusion and the one-year warranty period is under way.

Following acceptance of the system at Shendong, we are happy to use this as a reference system so that we can show potential customers what we can do and what is possible today in the era of Industry 4.0 in mining. An additional project was also launched in China in late autumn.

Below PSImining/EE, we offer a smaller control system for use in mining that is based on the Java-based group platform PJF and JSCADA. There was a great deal of interest in this system in October 2017 at "China Coal and Mining" in Beijing, so we think we are well-equipped to face the future in this area.

What are the challenges in the roads area?

Mr Jaeker: For about three years, we have not only been working in the

agement. This approach allows traffic flows to be managed so that it is not just the individual mobility goals of road users that are taken into consideration, but also the collective goals of the responsible authorities and the residents in the region.

In the last year, we have continued to expand this concept and would now like to use it to influence traffic in cities. We believe that cities will be able to control traffic so that traf-



Dirk Noß and Elmar Jaeker took over as managers in summer 2017.

field of repair and maintenance of traffic telematics systems, but also engaging in traffic management based on the use of artificial intelligence. Together with colleagues from PSI FLS Fuzzy Logik & Neuro Systeme, we implemented a project with the motorway operators in the Netherlands and England, where we developed a multi-criteria approach to traffic man-

fic jams are avoided, local pollutant emissions are reduced and roads become safer overall.

How exactly will that work?

Mr Jaeker: In order to reach their destination, we offer road users various alternatives. These may include different routes to the destination, but

might also include options for using local public transport.

Road users can choose whether to take the direct route to their destination or make a contribution to the collective goals, which may involve accepting slightly longer journey times.

How do you intend to motivate road users to choose an option that is less attractive to them personally?

Mr Jaeker: This will be achieved through a reward system. Every road user enters their destination in a mobile app and receives suggestions for possible alternatives. They collect points every time they use an alternative travel option.

It is then possible to redeem these points, for example when they use a car park in the city. We are working with a partner who has already successfully tested this reward system in the Netherlands.

What synergies are there in the areas of mining and roads?

Mr Noß: Both of these subject areas involve process monitoring and automation. Through our activities in both markets, we have been able to acquire extensive expertise in how to connect corresponding systems at field level.

With this expertise along with our technological proximity to control systems in the field of electrical energy and our commitment to the Group-wide working groups—Mr Jaeker heads up the PSI Community for MDA/PDA/SCADA/ASM—we have become SCADA experts.

We are therefore able to offer services in this area within the Group and support our colleagues from different business units. In a way, this is our third pillar and we are already working on specific projects where we are putting this into practice.

In addition, there are approaches that are the same in both markets and that we can cover with the community components, meaning we can expand our expertise in line with the internal PSI Mines&Roads concept of “cross-selling”. One example is video streaming.

There is great demand for this both in traffic management and in underground mining. Whether the image content shows and monitors a moving flow of traffic or the flow of coal on conveyor belts makes no difference to our software.

Mr Noß and Mr Jaeker, thank you for the interview and we wish you continued success in your new roles. ☺

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Intelligent ways to smart mobility

20.21.22.23 MAR
2018 Intertraffic
AMSTERDAM

PSI Mines&Roads and PSI FLS Fuzzy Logik & Neuro Systeme presented at the Intertraffic in Amsterdam the solution PSIRoads/MDS powered by Qualicision, which won the German Mobility Prize in 2017.

A series of enhancements and the integration of the mobile solution from Dutch-German smart mobility experts V-TRON have created the basis for implementing intelligent traffic management in smart cities.

The city of the future is digital!

News: Second season of PSImetals TechTalks

Colleagues explain the world of PSImetals

After a year-long break, the next round of the PSImetals TechTalk series is getting under way. Just as in season 1, our experts were asked to explain complex issues relating to production management in a vivid and interesting way. The results speak for themselves.

While the pioneers of the first season of TechTalks were rather thrown in at the deep end from a filming perspective, the format for the new series has slightly changed. Better video quality, reduced background, no extra tools and the experts in the spotlight are the main improvements of the second season.

The concept itself has remained the same: the experts have to explain issues relating to production management in an interesting and straight-



Igor Kunin (“The Factory Model”) during a lively discussion—but with whom?

forward way. Some camera training and the cooperation with a journalist helped to get to the heart of the issues.

This time, our experts Robert Jäger (“KPI-Driven Production Planning”), Igor Kunin (“The Factory Model”), Gunther Schober (“Order Dressing”),

Luc Van Nerom (“Customizing a Standard”) and Ira Vollenberg (“Deviations in Steel Production”) are given support from some carefully targeted digital effects—but without pushing the speaker into the background.

Igor Kunin receives a special visit during his talk on the PSImetals Factory Model. But we will say no more for now. The five new TechTalks will be available online, month-by-month from March at psimetals.de—and this time, anyone can access them. Give them a watch and be surprised! 🎧

News: Vallourec awards PSI with the delivery of a new MES

PSImetals harmonizes production processes

Vallourec Germany has commissioned PSI to implement PSImetals as a production management system. The existing legacy systems at the various sites will be gradually replaced by an MES standard solution based on PSImetals. PSImetals is used in numerous Vallourec plants worldwide. Mülheim represents the first station in the European harmonization processes.

Vallourec is restructuring the production processes in all its European plants. The production IT will be reorganized in the process and the complexity of the IT structure simplified.

PSI will deliver its PSImetals Production, Quality, Logistics and Planning components within the area of Manufacturing Execution Systems (MES).

The harmonized MES model solution for Europe will first be used at the German production site at the Mülheim pilot plant.

Increased transparency of production progress

Above all, the implementation of the new production management system aims to increase the trans-

parency of production progress at Vallourec. In addition, it should be easier to establish uniform, cross-site processes and to collect key figures that consistently support cross-plant production. By standardizing the processes, it should be possible to respond more quickly to customer requirements and new technical developments. 🎧

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News: Maximum flexibility for coordinated process control in order handling

FIEGE Group counts on PSIWms

FIEGE Group (FIEGE Logistik Stiftung & Co. KG) has contracted PSI Logistics GmbH with the implementation of the warehouse management system PSIWms, and at the same time arranged a long-term cooperation.

Following an intensive selection process for a warehousing software that provides long-term investment security, the contract logistics company FIEGE decided on the current PSIWms release 4.0. The standard system convinced with its comprehensive scope of functions, integration of future-oriented technologies and consistent release capabilities.

Together with continuous development of further innovative functions on a modern IT platform, the FIEGE Group will have a warehouse management system that provides maximum flexibility for the coordinated process control in order handling. The



Enhanced Yard Management in PSIWms 4.0.

first joint project is currently being realized in a new, major distribution center that FIEGE is operating for a customer at the site in Burgwedel.

The FIEGE Group, with its headquarters in Greven, Westphalia, is one of the leading logistics companies in Europe and has specialized in efficient logistics solutions. With more than

12000 employees at 178 sites in 15 countries, FIEGE is an international player. FIEGE was founded in 1873 as a family-owned business and is currently being run by the fifth generation. 

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20.–22.03.2018	Passenger Terminal EXPO Stockholm, Sweden	PSI Logistics
20.–23.03.2018	Intertraffic 2018 Amsterdam Amsterdam, Netherlands	PSI Mines&Roads
23.–27.04.2018	Hannover Messe trade fair Hanover, Germany	PSI Group
07.–10.05.2018	AISTECH 2018 Philadelphia, Pa., USA	PSI Metals
18.–21.09.2018	InnoTrans 2018 Berlin, Germany	PSI Transcom, PSI Automotive&Industry, PSI Electrical Energy

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