Investment Security and Industrial Intelligence for an Edge Over the Competition

Added Value through Innovation

PSI

EDITORIAL

Dear readers,

The digital transformation is imposing change at an incredible pace on the world around us as we know it. According to research carried out by the digital association Bitkom, companies that are in a position to respond to these developments without difficulty are few and far between. Instead, 80 percent of respondents regarded the digital transformation as a challenge or even a risk, with only 20 percent using efficient data analysis methods, and as few as 10 percent deploying predictive maintenance software. This means that economic operators are missing out on many chances to optimize processes yet further in their field of business, to increase efficiency and to go digital with an eye to the future.

This edition of Production Manager will show you that there is a better way. By placing the customer center stage in everything it does—as evidenced by the successful launch of the new PSImetals Service Platform at the 10th METEC in late June— PSI develops market-oriented and future-proof products that support the digital transformation of the companies using them.

Two success stories (the LÄPPLE Group and the Rudolph Logistics Group) are also included as examples of how PSI software can be deployed and the benefits it brings. Articles on the new AI software Deep Qualicision and the new PSImetals Release 5.18 provide further evidence that PSI plays a leading role in integrating new technologies and developing features that are tailored to the market. A comprehensive editorial provides background information on the technological basis used by PSI when developing the majority of these innovations, many of which have since received awards.

We hope that your interest has been piqued and that you will enjoy learning more about this varied selection of topics.

Dr. Giovanni Prestifilippo and
Sascha Tepuric
Managing Directors of
PSI Logistics GmbH

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Investment Security and Industrial Intelligence for an Edge Over the Competition

Added Value through Innovation

The Java-based PSI framework is a powerful and autonomous development platform for group-wide use that promotes the development of market-oriented innovations and opens the door to a wide range of key competitive differentiators for user companies.

Modern software systems process data that has been collected and control operational materials and production and warehousing systems with the lowest possible amount of manual effort. They coordinate and optimize production and logistics processes, and therefore serve as an important pool of data for prospective analyses. This makes them digital transformation enablers. Software systems with a future-proof design are character-ized firstly by their architecture and development environment, and secondly by their designers' innovative capabilities. PSI identified these factors at an early stage in the game and created a future-proof technological basis—the PSI framework—for development work on its software systems. This prescient strategic decision makes PSI software products more capable of operating independently, since they are less affected by changes to programming languages, databases, interface technologies and the libraries used.

Individual Adjustments with PSI Click Design

The PSI technology platform also lays the necessary groundwork for the development of completely new and user-friendly design options for graphical user interfaces (GUI). The PSI Click Design system allows users to adapt the user interface of the systems to their individual requirements on a flexible and autonomous basis by clicking, dragging and dropping. With the help of an intuitive visual editor, users can follow a process-oriented procedure for combining menus, list and table dia-

logs, detail views and own filter definitions on a single screen and save them as custom profiles.

Up-to-Date with Current Development Trends

A standardized programming basis makes it possible for new and in-

Supply chain applications are becoming horizontally integrated to an ever greater extent. A parallel process is taking place in terms of the vertical integration of upstream and downstream systems. The most important foundations have already been laid for this approach, such as the PSI Logistics Suite.

and conflict-free coupling of strategic supply chain network design with operational transport management, Swiss Post has succeeded in covering the entire process sequence. The functional spectrum covers not only optimum network design and pre-scheduling through the creation of pre-combined trips, but also order acceptance, scheduling and resource planning including vehicle use, time window management and cost minimization, right through to transport execution and billing, as well as the processing and analysis of event data.

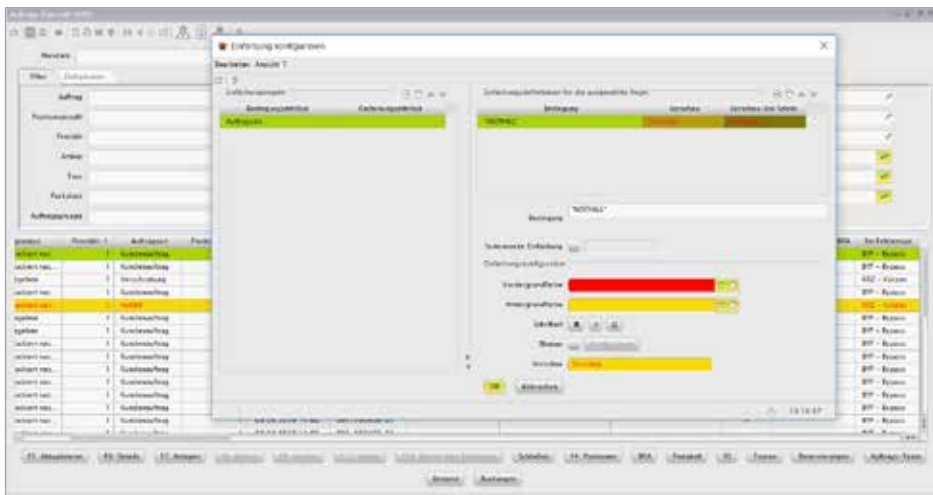*User interface configuration with PSI Click Design.*

novative features, applications and technologies to be integrated easily into products, on a group-wide and cross-system basis. For example, PSI Logistics has developed a "proof of concept" for a baggage handling application at Hamburg Airport, which also incorporates PSI's artificial intelligence (AI) methods and procedures. In this application, deep learning is combined with a neural network to coordinate process control, AutoID, documentation and tracking with surveillance camera systems (CCTV).

These options mean that the PSI framework is already up-to-date with current development trends. As far as the digital transformation is concerned, the seamless and intelligent coupling of IT systems is a make-or-break factor in this respect. Traditional system boundaries are becoming increasingly blurred in this context.

During the product development stage, PSI Logistics initially followed a consistent modular concept based on the building-block approach. What makes this approach so valuable is that individual modules or functionalities of PSIwms (warehouse management system), PSIglobal (supply chain network design software), PSItms (transport management system), or PSIairport systems can easily be integrated into any of the other systems on the basis of the shared platform, without any conflicts.

Optimized Transport Logistics

Swiss Post has optimized and future-proofed its transport logistics on the basis of a combined IT system that integrates modules from PSIglobal and PSItms. Through the coordinated interaction of modules and functionalities and the seamless, intelligent

Multi-Level Networked Systems

And that's not all—the modules and functionalities can be networked with each other at more levels than simply the horizontal system level. They can also be integrated into higher-level systems, such as the PSIpenta ERP system. At the electric vehicle manufacturer e.GO Mobile AG, for example, this integrated system concept for IT infrastructure serves as a vital basis for efficient warehousing and production processes and for the strategic positioning of the company.

e.GO hands over responsibility for the company-wide planning, management and control of business tasks, as well as the efficient use of various resources such as materials, personnel, capacities, capital and information, to PSIpenta as the data management ERP system for production. Optimally coordinated control of complex logistics processes is facilitated by the Transport Control System integrated into PSIwms. "The fact that the same technological basis is used throughout the PSI development environment means that it fits seamlessly into the ERP and MES production planning

processes without the customary interfaces," explains Sascha Tepuric, Managing Director of PSI Logistics. At the same time, thanks to its specialized functional standard that exceeds by far the core and additional functions for warehouse management systems (WMS) as defined in VDI (Association of German Engineers) Guideline 3601, it covers the requirements of intralogistics processes in a considerably more detailed and wide-ranging way than ERP systems can.

Comprehensive Networking of the ERP and WMS Levels

PSIwms boasts USPs across the board in the form of many innovative optimization functions that help it stand out in the market. These include adaptive order start, which finds the correct balance for a wide range of warehouse metrics on the basis of configurable parameters, using powerful AI features combined with process control to improve warehouse performance, or the PSI Service Broker, which virtualizes warehouses at multiple sites and automatically initiates and controls the material flows between physical locations that are required for operational purposes.

Once the functional scope of the PSIwms has been precisely customized to the user's individual requirements, the way is clear for the comprehensive networking of the ERP and WMS levels by means of a standardized IT infrastructure using PSIpenta and PSIwms—which was just what happened at Mahr GmbH, a production metrology manufacturer with an international presence. At the central production supply and distribution warehouse in Göttingen, Germany, both systems run on a shared platform, which reduces the number

Ceremonial award presentation by the "TOP 100" mentor Ranga Yogeshwar on June 28, 2019 in Frankfurt, Germany.

PSI Logistics was recently singled out for the Innovator 2019 award—the seventh time within a three-year period that its development efforts have been recognized by an independent jury. Sascha Tepuric, Managing Director of PSI Logistics, has the following explanation for this string of successes: "Innovativeness and innovations do not simply fall from the sky—they are the outcome of continuous effort at many different market-focused levels. Particularly important factors in this respect include not only hard work on the part of our employees, but also a development environment that stands out from the competition and a continuous exchange of information with the scientific community, researchers and, of course, our customers."

of interfaces and optimizes information flows and processes.

Investment security is heightened yet further by the fact that upgrades and releases will be available for the software. Against a backdrop of dynamic technological change, this provides users with the flexibility they need to integrate future functional requirements that are as yet difficult to foresee, and to digitalize and optimize constantly changing business processes and models. "As well as providing lasting stability and the right choice in terms of system design, maximum flexibility and significant efficiency gains, upgrade and release capabilities offer users the highest possible level of investment security and industrial intelligence for long-term competitiveness," sums up Dr. Prestifilippo. "In a nutshell: added value through innovation." ◉

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User Report: LÄPPLE AUTOMOTIVE Streamlines Production by Deploying a Flexible ERP System

Large-Scale Production of Luxury Car Body Parts

If you've ever driven a premium-brand vehicle, it's highly likely that you opened a door or hood manufactured by LÄPPLE AUTOMOTIVE. That's because this company (which is the largest member of the international LÄPPLE Group) supplies manufacturers such as BMW, Porsche, Audi and Mercedes. The Swabian firm is one of the foremost suppliers of aluminum body shell components, and a leading premium-segment specialist in sheet metal forming processes.

The component supplier recently received one of the largest orders in the company's history. It came from a prominent German automotive manufacturer and involved the production of six articles or assemblies (side and bottom parts as well as structural elements) with a throughput time of only a few days, over a period of several years. The parties responsible decided that the best place to start would be to put the production processes to the test and optimize them.

Lean Manufacturing in the Spotlight

When the order was initially received, the process at LÄPPLE AUTOMOTIVE looked something like this: delivery calls by OEMs were automatically combined by the ERP system into production lots with a viable size, and represented in PSIpenta in the form of a work order. These work orders served as the planning basis for the system by generating requirements (such as raw materials or human resources). Whenever a high-volume order was received, however, multiple work orders would be generated that were always the same but that needed to be checked and approved at short intervals and posted correctly by employees.

An accompanying document would also be printed for each work order as a basis for the necessary shop floor confirmations. "The new order made it clearer than ever that there was latent potential for optimization within our series production processes. This was particularly true of the manual tasks, which are of course inherently prone to a high level of frustration and error," explains Hans-Peter Rudolph, IT Project Manager at LÄPPLE AUTOMOTIVE. "We wanted to eliminate these problems by introducing efficient automation solutions wherever they made sense."

Reduction in Manual Effort Thanks to Standing Work Orders

"We developed the idea for the ERP system solution that came to be known as 'standing work orders' in collaboration with our PSI consultants," says Hans-Peter Rudolph. A standing work order serves as a kind of "paperclip" that holds together the delivery calls that belong to a parent order from a customer and the work orders generated on the basis of those

Body assembly line in use at LÄPPLE AUTOMOTIVE.

calls. It makes it possible to streamline processes while retaining the existing logic of the ERP system in use. Employees now make postings to the parent order (the standing work order). This also means that workers no longer

need to log in to the system every day or find and post to exactly the right work order. The standing work order currently covers a requirements quantity of one month, but there are plans to make it as long as six months.

At the same time, an automated control loop ensures that when a yield report is received (for example if an article has been completed), the standing work order firstly reduces the oldest work order by a corresponding quantity, and secondly generates the relevant addition to stocks. A work order is automatically deleted as soon as it reaches a lot size of zero. This ensures that the individual work orders continue to serve as a basis for the actual planning process in PSIpenta, for example when forwarding requirements messages to raw materials suppliers, but that these messages now accurately reflect the requirements for a delivery call.

A Kanban visualization board with traffic light system was also introduced for production control purposes. Production is no longer controlled on the basis of the delicate logic of the finite capacity schedule interface, but exclusively via a shop-floor display. This display only shows the shipping stock inventory.

As soon as the traffic lights change (to yellow, for example), the production foreman decides when another production run should be initiated. In order to minimize administrative effort to the greatest extent possible, the production confirmations are automatically initiated on the basis of the MES data when the component is added to stocks.

A 30 Percent Reduction in Inventory

The standing work order allows purchasing and press plant requirements to be calculated to a much higher level of accuracy. The individuals in charge believe that an inventory reduction of over 30 percent will be possible over

Quality assurance for the production process at LÄPPLE AUTOMOTIVE.

the long term. This is because smaller lot sizes make it possible to agree on more detailed plans with suppliers. By eliminating the need for order checks and approvals at the planning stage, a significant burden has also been removed from employees.

The latter now merely need to log in to the system periodically, and only need to post to the parent order (the standing work order) rather than to each individual work order generated by PSIpenta. Production inventories are reconciled on a self-regulating basis.

This means that accompanying documents are no longer required for each work order, which also massively reduces the effort involved in planning production. The project has therefore long achieved the status of a best prac-

tice to be emulated by other production areas. LÄPPLE AUTOMOTIVE is currently rolling out the system at its Teublitz site.

An ERP System for the Future

After receiving a high-volume order for the series production of components, LÄPPLE worked together with the provider of its ERP system to give it some extra "bells and whistles" with a view to optimizing production and significantly streamlining existing processes. The openness and flexibility of the ERP system used by the company have paid off once again, and LÄPPLE is now superbly placed to handle any high-volume orders it receives in future from premium OEMs. ◉

Customer report: VAMA and PSI—A Strong Team to Face Competition in the Automotive Industry

Winds of Change for Automotive Steel Producers

Chinese metal producers are currently facing a challenging time. With buzzwords like "Industry 4.0" and "Made in China 2025," both the Chinese government and Chinese companies are pushing forward the digitalization of the metals market. This rapid development of science and technology, however, requires modern companies to adapt to intelligent manufacturing. Companies that refuse to change can easily miss opportunities for further development. During this breaking period, VAMA realized that it needed to work harder when it comes to process intelligence and standardization.

Valin ArcelorMittal Automotive Steel Co (VAMA) is a joint venture between Valin Steel and the ArcelorMittal Group, which produces steel for Chinese automobile manufacturers. The company has been striving for two objectives in the Chinese market: to intensify cooperation with ArcelorMittal's main customers in China and to develop long-term cooperation with major Chinese domestic automotive manufacturers. From the very beginning of the factory construction, VAMA realized that having state-of-the-art hardware is not enough. Instead, the intelligent, future-oriented supply chain solution and a stable, transparent quality management system are the pillars of sustainable development in this area. That's why VAMA has decided to use PSImetals as its production management system for its new plant in Loudi, Hunan Province, in southern China. The project started in May 2013 and after a one-year implementation phase PSImetals went live in June 2014.

Small but Powerful

The VAMA plant is a cold rolling mill with post processing lines for pickling, batch annealing, continuous galvanizing, rewinding as well as automatic and hand packaging lines. The plant covers a large range of automotive steel products including the world-famous ultra-high-strength steel Usibor@. The annual production capacity is designed to be 1.5 million tons, half of which are cold rolled coils and the other one are aluminum coils and hot-dip galvanized coils.

Challenging Certification Processes

Since automotive manufacturers require their suppliers to provide standard certification, steel companies

The VAMA plant in Loudi, Hunan Province, China.

must ensure a stable production process and provide the information necessary for certification. Software is certainly not a substitute for reliable production processes, but it can help steel companies maintain them. Production management software not only gathers all quality-relevant data in the production process, but also helps to improve efficiency and reduce errors in the production.

An important part of the certification is the complete and transparent traceability of the product quality data, which means justifying the grounds for quality decisions by recording quality data. With PSImetals, all quality data of the finished products can be displayed with the material genealogy. The powerful archiving function provides 10 years of traceability: Whether you want to track quality data and events during production or raw material data from hot rolled coils.

Besides that, automotive companies are also demanding that steel companies provide proof of the reliability of all traceable data, especially those related to the safety. Here PSImetals is one of the most significant drivers contributing to the certification process.

Intelligent Supply Chain Integration

Planning the production and sales processes at the VAMA plant is not as easy as it seems: VAMA has to deliver precise requirements to the upstream suppliers and at the same time integrate itself into the supply chain of downstream processing.

From the perspective of the overall system architecture, all processes in automotive steel production must be integrated and transparent. The sys-
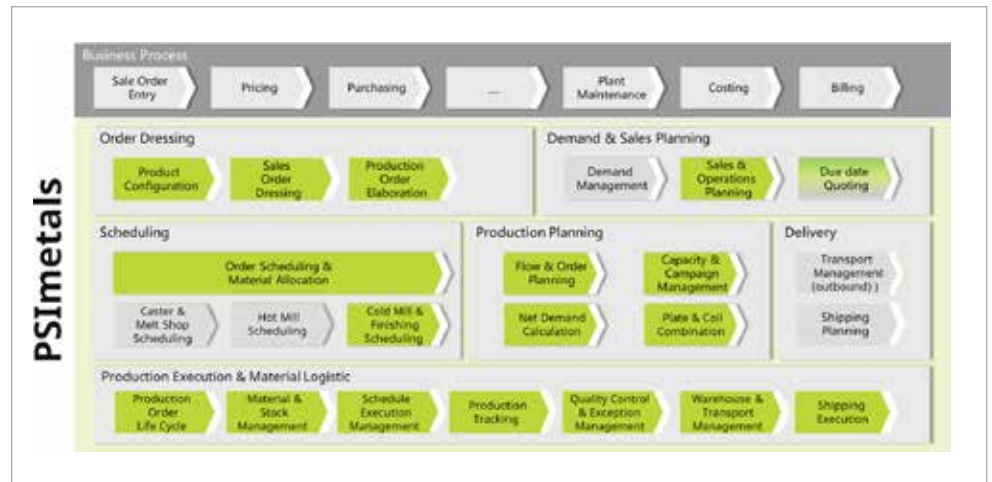
Overview of the PSImetals features implemented in VAMA.

tem design of VAMA therefore follows the concept of "thick" level 3 and "thin" level 4: all production-related operations are carried out in the PSImetals Level 3 system, from order processing via triggering of procurement requirements to the complete tracking of process quality. The ERP system (Level 4) releases the order to PSImetals, which manages the entire production in a tight cycle from planning to quality. This structure allows VAMA to create an integrated and transparent supply chain and reduce any instability that would be caused at production level by the exchange of data across multiple systems.

From a planning perspective, VAMA strived for a flexible and agile supply chain plan and an increase in Usibor@'s market share in the Chinese market. This should be done through long-term agreements with downstream automotive manufacturers to develop a stable security storage strategy and production plan and through coordination with upstream hot rolling suppliers to provide JIT (Just-in-time) deliveries. The conception and implementation of the planning system PSImetals was exactly aligned to these goals.

Nutcracker for Automotive Steel Producer

VAMA CMO Jurgen Cobbaut once said in an interview: "You may think that VAMA is relatively small, but we are very fast in developing new steel grades. Our products are of excellent quality, stable and constantly improving. That is to say, VAMA does not produce steel for vehicles, but offers Automotive Steel Plus."

PSI has set itself the task of offering a plus for automotive companies as well. This means that we focus on the specific needs of the automotive industry, offer intelligent manufacturing features and make our customers competitive in these challenging times. ◉

Further details of the project and interviews with the users can be accessed by scanning the QR codes.

Product Review: Qualitative Labeling as a Basis for the Automated Handling of Business Processes

Deep Qualicision AI Framework

Qualitative Labeling as an integral part of the Deep Qualicision AI framework involves the preparation of raw business process data for machine learning procedures. It is based on a qualitative evaluation of the data that are directly measurable in business processes using KPIs and on an analysis of relations within these data. This automated process establishes an algorithmic bridge between the raw business process data that have not yet been prepared and artificial intelligence (AI) methods. Hence, as a basis for data labeling the effort involved in the highly complex process of manual data analysis is reduced significantly.

Qualitative Labeling is a machine learning method involving the automatic detection of KPI goal conflicts and KPI goal compatibilities in business processes. This is done by evaluating corresponding data using extended fuzzy logic and special clustering methods. Thus, KPI goal conflict analysis allows business process data to be classified automatically to use the data for other AI-related purposes based on the relations identified from the raw business process data.

The automated identification of qualitative labels is vitally important for the application of AI methods to business process data, because such data is continuously evolving as the business processes themselves change. By way of contrast to applications such as image or speech recognition, in which data patterns that have been labeled once remain static, the business process data patterns that need to be labeled are dynamic and characterized by ever-changing structures; the mix of orders and process states are just some of the attributes that are likely to change on a regular basis.

Qualitative Labeling as part of the PSI Framework for Industrial Intelligence

The general validity of the procedure means that any existing PSI software that operates on the basis of processing KPIs can be used as a KPI labeling

Deep Qualicision GUI with visualized clusters of qualitative labels.

machine. This means that any existing PSI application can be supplemented with self-learning labeling capabilities that systematically lay the groundwork for the introduction of additional AI functionalities. In order

to ensure that extensions of this kind are possible in the future without any exceptions, Qualitative Labeling will form part of the PSI framework for industrial intelligence.

## An Easy Way to Get Started with the Qualitative Labeling of Business Process Data

The PSI framework ensures that getting started with the procedure is remarkably easy from the customer's perspective. If a company wants to generate qualitatively labeled data on the basis of a business process, the first step is to determine the key performance indicators (KPIs) and criteria that will be used for quality evaluation. Once this step is completed, raw business process data can be evaluated with reference to these KPIs, and appropriate qualitative labels added to the data. The business process data labeled in this way is much more readily usable in AI applications. The qualitative labels that have been calcu-
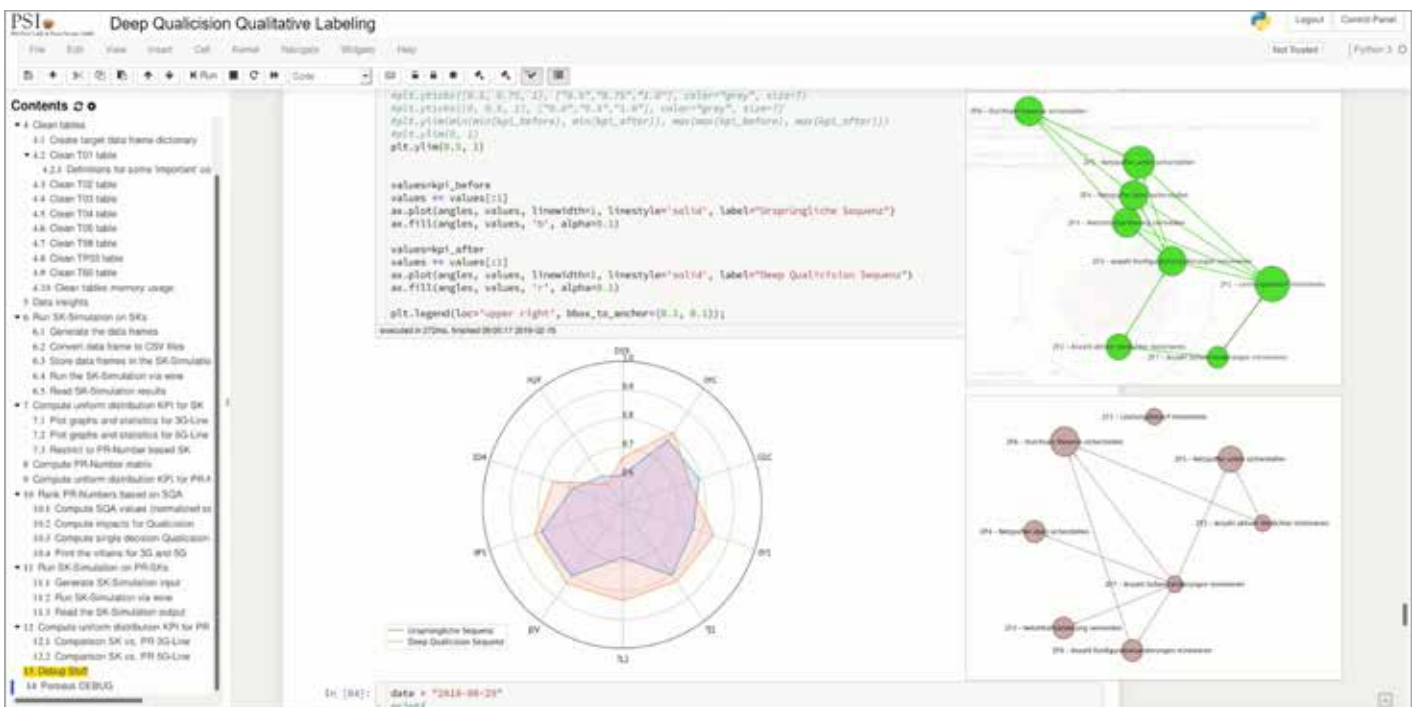
The Deep Qualicision AI framework with qualitative labels (right).

lated also make the results more transparent and easier to explain. In many cases, qualitative labels are used as a basis for triggering self-adjustment by optimization algorithms, transforming the traditional process of optimization into a learning optimization procedure.

Self-Learning Field Force Management 4.0

PSIcommand is an example of a use case, in which the procedure described above is already being used successfully. Here, Qualitative Labeling is used for self-learning identification of configuration parameters for field force optimization in connection with maintenance and troubleshooting of electricity grids. The underlying KPIs describe how teams are efficiently assigned to maintenance operations. Around 30 KPIs are used for the Qualitative Labeling of the business process data.

Over 100 000 maintenance and troubleshooting operations are distrib-

uted to hundreds of employees every year. The complexity of the business process means that identifying relevant relations by labeling the data manually would require an unrealistic amount of time and effort.

Machine Learning for all PSI Software Tools

Qualitative Labeling is used here as an extending functionality of a connectable machine learning procedure within the framework of the Qualicision-based multicriteria optimization in order to equip an already running PSIcommand application with learning self-adjustments. This means that the optimization itself can respond to relevant changes in the business process data, without requiring any effort (on the part of the user, for example). The upgrade with the Qualitative Labeling algorithms was a completely smooth process from both a technical as well as a substantive perspective, meaning that this use case will serve as a blueprint for the future in-

tegration of machine learning into a PSI software tool. Hence, the procedure can be transferred to any software application based on the associated framework.

Consequently, all the products offered by the PSI Group can be prepared for use in combination with machine learning methods through the Qualitative Labeling of business process data. Examples include the PSI products PSItraffic/BMS, PSIcommand, PSIsaso, PSIpenta/Leitstand/PSIasm, PSIwms and, of course, all the PSI FLS software products that use the Qualicision technology.

PSI is currently working on a Community Industrial Intelligence (CII) project so that Qualitative Labeling can be integrated into the PSI framework for industrial intelligence. ◉

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User Report: Rudolph Logistics Group Uses PSIglobal to Optimize Networks and Customer-Specific Tenders

Automated Tender Costing

The Rudolph Logistics Group uses a digitalized tender management system and PSIglobal (the strategic analysis and planning tool from the PSI Logistics Suite) to optimize networks and create customer-specific tenders.

The Rudolph Logistics Group offers tailor-made logistics services to its customers. The Group (which is headquartered in Gudensberg, near Kassel) manages a total of 1.4 million square meters of warehouse space. Its employees (approximately 4500, divided between 40 locations in Germany, Europe, the USA and the Arabian Peninsula) ensure that orders are processed smoothly. "All companies are unique, and so we need to develop a unique approach to their logistics tasks," explains Philipp Donth, Project Coordinator for Scheduled Cargo Traffic within the Rudolph Logistics Group. "That's why we don't use off-the-shelf modules for our customers; instead, we always develop tailor-made solutions."

Planning using PSIglobal at Rudolph Logistics.

ysis and planning tool from the PSI Logistics Suite) for the analysis, planning and optimization of logistic networks and for the creation of custom-

> *The software from the PSI Logistics Suite allows us to calculate tenders on a customer-specific basis down to the very last detail, and then check them easily against our network and our capabilities—all of which means that we can produce tenders more or less at the touch of a button.*
>
> **Philipp Donth**
> Project Coordinator for Scheduled Cargo Traffic within the Rudolph Logistics Group

The logistics service provider relies on state-of-the-art standard software in the form of a digitalized and largely automated tender management system and PSIglobal (the strategic anal-

designed tenders. "When it comes to complex tender procedures in the automotive field, simply adjusting the schedule of charges might mean that up to 600 000 data records need to be

processed," explains Donth by way of an example.

Some of the day-to-day tasks that Donth and his colleagues handle using the software systems include working out how the customer-specific relationships and quantity structures required for a tender can be handled via the company's standard network, or where new locations should ideally be set up.

Using these findings as a basis, Rudolph Logistics offers its customers the option of outsourcing not only sub-processes such as procurement and distribution logistics, but also complex projects covering the entire logistics chain. "The systems are an intelligent tool that helps us to win contracts and grow the company further," concludes Donth.

News: PSI with New PSImetals Service Platform at METEC 2019

A Basis for the Future

PSI Metals has successfully launched the PSImetals Service Platform at METEC 2019, the 10th International Metallurgical Trade Fair taking place from 25 to 28 June in Dusseldorf, Germany. The Service Platform is the new powerful software basis that combines all requirements for a future-proof production management solution for all currently available PSImetals components as well as new services that will be developed in the coming years for metal producers.

The PSImetals Service Platform is based on PSI Java Framework and forms a foundation for service-oriented software architecture which makes it highly integrative for any services used in the metals production. In addition, the platform features an integrated Service Bus (PSIbus), which is responsible for the entire data exchange between PSImetals services and third-party services/products. The proven PSImetals Factory Model, the Digital Twin, is still the heart of the new platform and will operate on all industry-proven database management systems for future services.

"We are pleased to release our new PSImetals Service Platform as it represents our first milestone in our development plan, which offers the industry a very flexible and forward-looking platform," said Thomas Quinet, Managing Director PSI Metals. "The platform is able to integrate not only currently available PSImetals components, but also all new services that will be developed in the upcoming years for steel and aluminum producers," he added.

Graphical representation of the new PSImetals Service Platform.

Thomas Quinet, Managing Director PSI Metals, Raffael Binder, Director Marketing PSI Metals, and Dr. Harald Schrimpf, CEO PSI Software AG, in front of the PSI bus at METEC 2019.

An Oldtimer as Eyecatcher

As an eye-catcher, the vintage bus stood for the development towards the digitalization of metal production. Several showcases inside the old-timer demonstrated PSI's innovations in the fields of Machine Learning, Service-Oriented Architecture, Artificial Intelligence and Virtual Reality.

Technical presentations of PSI experts during the parallel conferences European Steel Technology and Application Days (ESTAD) and European Metallurgical Conference (EMC) backed up the participation. ◉

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Interview: Why Manufacturing Companies are Relying on Process Modeling

Adaptiveness and Manufacturing Execution Systems

Dieter Deutz, Managing Director of PSI Automotive & Industry GmbH, talks about changeability and how essential it is for companies and software. He reveals how companies can adapt more rapidly to new requirements and discusses the specific benefits offered by workflow-based MES and ERP systems.

Mr. Deutz, what are the greatest challenges currently facing manufacturing companies?

The challenges are many and varied, but the conclusions to be drawn from them are surprisingly similar. Let's take the automotive industry as an example: the technology of internal combustion engines has reached a high level of sophistication, but it has recently come into disrepute as a result of scandals such as Dieselgate. And the environment is another hot-button topic, of course. These developments are bringing about large-scale changes that are all the more dramatic because they are taking place over such a short timescale. The main priority for mechanical and plant engineering companies is international competitiveness.

Keeping up with trends such as digitalization and smart production units is also important. Manufacturing companies must therefore adapt to new requirements and circumstances to an unprecedented extent, and at a much faster pace than ever before. And so they need to be more changeable. This also applies to software manufacturers—like us!

Why is adaptiveness in production currently such a hot topic in the market?

Many companies have been implementing a structured continuous improvement process (CIP) for many years. The aim of such a process is for employees to reflect on their day-to-day experiences and for the company to identify, structure and implement suggestions for improvement on this basis. In practice, however, the length of time that passes between an employee having a good idea and the idea being implemented and ultimately coming to fruition within the company is simply too long. Speed is everyone's top priority nowadays. By implication, speed means adaptiveness in this context. The tools used to operate processes (software, in other words) must have the features required to implement change as rapidly as necessary.

What do companies need to do on the IT side of things to ensure that they can stay on top of future demands?

Modeling business processes in a simple and uniform language is what we

Dieter Deutz is Managing Director of PSI Automotive & Industry.

are all about. And these models are not simply filed away with other random documents and consigned to oblivion. They form an integral part of the software. The modeled process embodies the sequence control for the business process logic.

Examining individual requests and (if necessary) responding with custom-written programs is a complex process that takes far too long. Yet standard solutions are likely to fall short when it comes to mapping every last process.

Workflow technology combines the strengths of both approaches, mak-

ing it possible to straddle the gap between standardized and custom-designed methods. Easily actionable and personalized process models are used to supplement the functional diversity of a standard solution.

What are the specific benefits that businesses and users can gain from workflow-based MES and ERP systems?

We are currently in a transitional phase, with a shift toward platforms and away from monolithic and self-contained functionalities. The workflow approach means that we are no longer constrained by the traditional MES and ERP system limits; instead, we can model on an integrated and cross-system basis. It is of no consequence whether the software has been developed by PSI or a third-party provider. This approach allows us to execute end-to-end processes deploying only a user interface. The user only needs to navigate within a single client and also benefits from an unprecedented level of transparency regarding the workflow logic of the processes. That's a huge advantage.

What exactly does that mean?

It often only becomes apparent on the shop floor whether the procedures developed within the framework of a continuous improvement process will actually work in practice. Being able to readjust processes quickly and easily instead of reprogramming them is a huge win in terms of efficiency. In future, the company that relies on modeling processes will be the company that succeeds in implementing more of the improvements that are suggested. By leveraging this poten-

tial, it will be able to tackle the aforementioned major challenges head on and gain an edge over its competitors.

How will the modeling of workflows impact on the work carried out by the different departments?

It is not unusual for the individual responsible for a particular process to struggle with the IT tools used in this connection. This is unfortunate, because after all they are the ones who know most about the process! By providing these experts with the ability to model workflows and processes, we are putting them in a position to "get their hands dirty" and make direct use of their professional expertise. They themselves have control over the procedural side of the system.

In the past, change requests would be formulated by the specialist department responsible for software modifications and a solution would then be developed by the IT department. The big question was always whether everyone was on the same page. And so the logical thing to do was to reduce communication barriers. We bring the specialist closer to the solution.

In a future where companies can adapt their interfaces and processes themselves and are no longer reliant

on software suppliers to carry out programming tasks, how will the role of software companies change?

As a general principle, projects will include a higher proportion of consultancy work. In future, software personalization will entail customizing interfaces, screens and processes. PSI has been building up experience and expertise in the manufacturing sector for 50 years, and so we're amply prepared for this development.
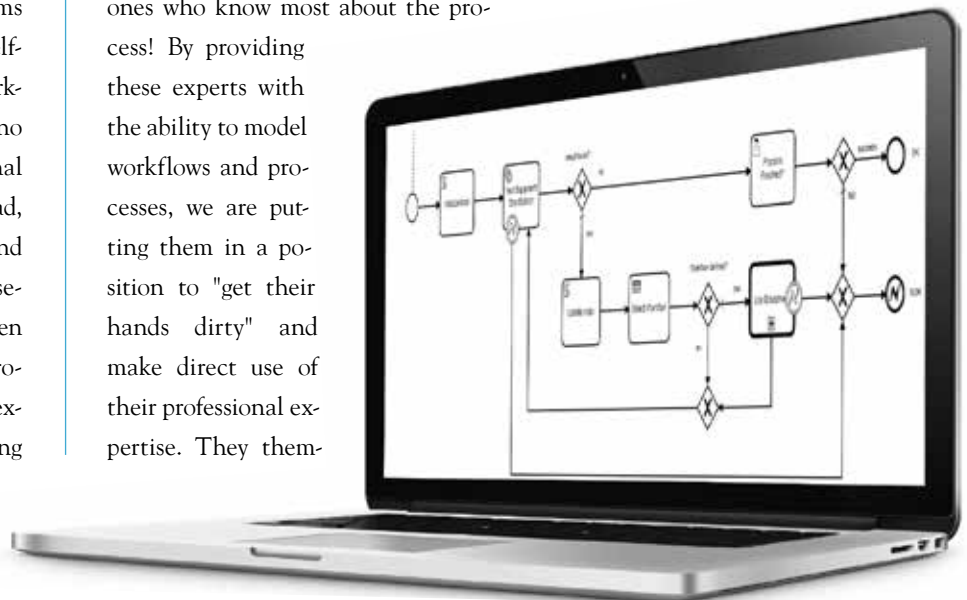
Thanks to PSIpenta/MES, the modification can be quickly modeled, tested and ready to implement.

At the same time, outsourcing is becoming more popular. SMEs in particular want to leverage the benefits of ERP or MES solutions, but would rather use a plug-and-go solution than provide support services in-house. Our vast wealth of experience means that we can offer compelling solutions that help companies to minimize the risks involved.

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Product Review: Smart City—The City of Tomorrow is Digital

AI-Based Software Makes Cities Fit for the Future

"Smart Cities" are a huge new trend that everyone is currently talking about. Yet the increasing use of private means of transport is a major headache for local authorities, which continue to face enormous hurdles in this respect. The software PSIroads/MDS (which facilitates cooperatively networked mobility) highlights optimum traffic flow optimization measures and methods that will support these local authorities as effectively as possible as they tackle this immense task.

Around two thirds of the German labor force travel to work by car. The average German car driver spends around 100 hours per year in tailbacks [1]. In the 22 largest urban areas in Germany, the additional costs (both direct and indirect) incurred on an annual basis by private households as a result of traffic congestion amount to EUR 7.5 billion, or in other words EUR 509 per household [2].

overall, CO_2 emissions rose by a staggering 21 percent between 1990 and 2010 [3] and that figure is still increasing. In Germany, for example, CO_2 emissions from internal combustion engines increased by a total of 5.4 million tonnes in 2016 [4]. The EU reports that road transport accounts for 40 percent of nitrogen oxide emissions. According to the European Commission, 400 000 people die prematurely each year in Europe

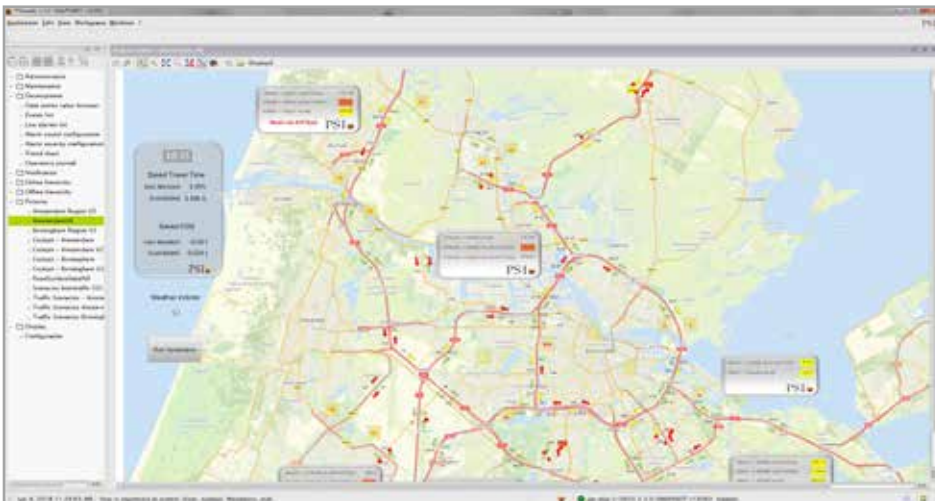## Smart City—More Reality than Vision

The greatest potential for smart technological development in this respect lies in the highest possible level of networking of different areas, on as many different levels as possible. Another key to integrated urban development is the use of new Information and Communication Technologies (ICT). As far as mobility is concerned, this means the highest possible level of cooperation, networking and visualization of telemetric data and systems in real time, with a view to efficient road infrastructure use.

Smart cities need smart mobility

Integrated planning and networking will play a vital role in future urban development and in ensuring that transport infrastructures are used in a way that is acceptable both to individuals and to society as a whole. The "Internet of Things" will play a crucial role in the harmonization of individual and co-operative mobility. The (provisional) end goal of this journey may be autonomous driving.

Relevant traffic segments and projected travel times displayed in PSIroads/MDS.

Is individual mobility a dead-end street?

The impacts of road traffic on the environment—and therefore on the human species—are devastating. Despite the fact that greenhouse gas emissions in the EU have dropped

because of high levels of air pollution, with around 70 000 deaths attributable to nitrogen oxides since 2003 [5]. The EU authorities have therefore imposed obligations on the Member States to produce clean air plans and to improve their air quality.

Smart Regulation of Traffic Flows using Artificial Intelligence

It's a situation that every car driver has surely experienced: the vehicle's navigation system suggests a route that turns out to be bumper-to-bumper with traffic. Does that need to be the case? No. The Multicriteria Decision Support (MDS) software PSIroads/MDS provides an intelligent solution to this problem, by allowing the user to make

Cities can benefit from PSIroads/MDS

- Strategic detours around heavy traffic to reduce hazards and avoid violating emissions limits

- Strategic route guidance for different road users, such as freight carriers, vehicles transporting hazardous goods, electric vehicles and/or rescue services

- Strategic measures for planned and unplanned events (football games, concerts, accidents, etc.) to avoid tailbacks and reduce CO_2 emissions by keeping the traffic flowing

- Planning of detours away from critical routes, to avoid an increase in traffic on roads that run past schools or kindergartens or through historically important urban quarters or residential areas

- Route recommendations that involve nodes, such as shopping centers and industrial and commercial areas

- Reduction in the needs for drivers to stop and start the vehicle's engine, to prevent an increase in exhaust emissions

- Reduction of peak traffic flows, e. g., imposition of speed limits if a bridge is damaged

- Customized and situation-specific adaptations to urban climate protection objectives on the basis of options involving climate-friendly means of transport, such as car sharing, public transport, or hire bikes

ollo deutscher mobilitätspreis

forward-looking decisions. It is based on PSI's AI decision support software "Qualicision", which is already being used successfully for many similar applications in various markets.

Extensively Tested and Singled Out for Awards

PSIroads/MDS was implemented in collaboration with the Dutch Rijkswaterstaat Transport Authority and the British motorway operator Highways England within the framework of an EU-funded pre-commercial procurement (PCP) project, and was awarded the German Mobility Prize in 2017.

Summary

PSIroads/MDS helps local authorities not only directly, by offering traffic management suggestions, but also indirectly, by correcting the urban planning errors that were made in the past. The traffic management system can be used on a flexible basis, helping to optimize traffic and thereby contributing to resource conservation and environmental protection. ◉

Sources:

[1] Tom-Tom Traffic Index Report/ Deutsche Handwerks Zeitung online edition, 05/31/2017

[2] Study by the Centre for Economics and Business Research (Cebr)/www. welt.de, 12/18/2013

[3] Environmental Action Germany/ www.duh.de

[4] German Environment Agency/ ZEIT online, 03/16/2017

[5] German Environment Agency/ ZEIT online, 06/16/2017

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Integration into a traffic control center operated by the Rijkswaterstaat Transport Authority in the Netherlands.

Product Review: PSImetals Release 5.18—Good News in terms of Usability and Configurability
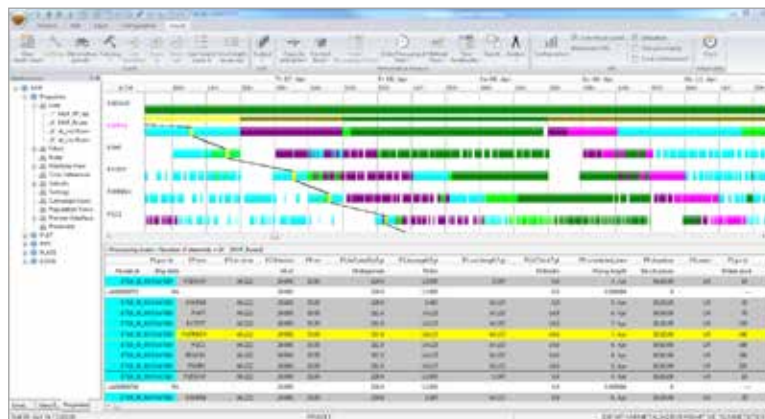
The Start of a New Era

Whichever industry you work in, digital transformation is sure to be what everyone is talking about at the moment. New technologies hold the promise of a bright future as far as production is concerned. While the trailblazers in the steel industry know that Industry 4.0 is not simply something you can pick off the shelf, other companies are still waiting for an instruction manual. The underlying problem? It's impossible to discover new continents if you're too worried to lose sight of your home country's familiar coastline.

PSI is well aware of the need to set sail for new shores and has been engaged in a continuous process of product development for many years. Our product development experts constantly draw on their vast wealth of experience and industry-specific know-how, and this process has now borne fruit in the form of the new PSImetals release. The current PSImetals Release 5.18 contains innovations that are tailored to the needs of our customers as they set out on their own voyage of discovery.

Aggregation of individual materials into virtual "volume materials" in the Order Scheduler.

Advanced Quality Management

Expanded features in Release 5.18 include the Quality Indicators (QI) and Quality Process Snapshots (QPS), both of which allow our customers to carry out enhanced quality assessments. Quality Indicators can be used to take a quality decision as soon as a production process has ended, without a time-consuming sampling process and even if the data situation is complex. By way of contrast, Quality Process Snapshots are a comprehensive source of quality-related data for a given point in time, and can be deployed for material use decisions.

PSImetals for Long Products

Over the past few releases, PSI has been refining its solution for processes involving long products. The features introduced in Release 5.18 represent significant further progress in this direction, and include role-based user perspectives with a proxy lines concept, volume planning, campaign planning and flexible tests in relation to the time and physical selection of sample specimens.

A Detailed Overview of Incoming Orders

PSImetals 5.18 closes the gaps that currently exist in terms of support for the incoming orders process. The new features shorten the workflow from technical validation through to capacity checks, and enable online monitoring of order acceptance. As soon as a request is received, the 24/7 Due Date Quoting service calculates whether the product is technically feasible and what all the potential production routes will look like, with the relevant costs/priorities. Demand Monitoring allows the user to monitor volume constantly on the basis of product and time.

Further Improvements

PSImetals Release 5.18 incorporates a number of smaller but nonetheless important enhancements to the 3D Yard Graphic, the Flow Configurator, the Plant Monitor and KPI views on mobile devices. ◉

Read more about the Release 5.18 features by scanning the QR code.

PSI

📱 Scan me

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News: Slovenian steel producer SIJ Group entrusts PSI with its digital transformation

Digital Transformation as a Strategy

PSI Metals has been commissioned by the SIJ—Slovenian Steel Group and its steel company SIJ Metal Ravne with the implementation of the PSImetals modules Production, Quality, Order Dressing and Order Scheduling and Line Scheduling. PSImetals 5.18 will replace two legacy systems in the melt shop and downstream area.

Together with PSI, SIJ Metal Ravne is starting a project is directed to the legacy manufacturing systems replacement and creating a new digital manufacturing environment. The Project scope includes sales order-based production planning, production and technological process control and quality management control as well as certification and production of stockyards management.

SIJ Group expects the new solution to improve the operational KPI's such as customer order performance, production cycle and stocks level, and to enable their second biggest steel plant SIJ Metal Ravne to enter new markets by fulfilling highest certification demands.

SIJ's Group IT team will participate in the project from the very beginning, starting with a know-how transfer by PSI experts in the nearby PSI office in Graz, Austria. This will empower the SIJ Group IT team to perform future configuration work and application maintenance. The project will start in September 2019 and is expected to go into operation within 18 months. ◉

EVENTS
www.psi.de/en/events

Date	Event	Division
01.–03.10.2019	ABM week São Paulo, Brazil	PSI Metals
08.–11.10.2019	Inter Airport Europe 2019 Munich, Germany	PSI Logistics
14.–16.10.2019	CSM Steel Congress Beijing, China	PSI Metals
15.–16.10.2019	11th Deutscher Maschinenbau-Gipfel 2019 Berlin, Germany	PSI Automotive & Industry
16.–17.10.2019	ERP Congress 2019 Frankfurt am Main, Germany	PSI Automotive & Industry
23.–25.10.2019	German Logistics Congress 2019 Berlin, Germany	PSI Logistics
07.–08.11.2019	IPA Annual Conference 2019 Erfurt, Germany	PSI Automotive & Industry, PSI Logistics, PSI FLS

PRODUCTION
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