

United Innovations



Survey of Tools for Industry

Release 1 / 2024

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GERMAN
STARTUP-
CUP

UNITED INNOVATIONS AWARDS

—
IMAGINE
EVERY
THING
—

German Startup-Cup

Categories Production 4.0
& Smart Logistics

Date: November 6th, 2024

Location: Münster, Germany



Dr. Gerd Große

It is all too clear that the unions want to use strikes to improve wages and working hours. However, one should be careful about wanting to preserve traditional views by means of industrial action. Companies that are ultimately based on rationality could seek solutions that have undesirable, irreversible consequences.

On the one hand, DAX stocks are currently skyrocketing, while on the other, Germany is stagnating and the mood is one of concern. This shows very clearly that corporations are already generating their surpluses through their international positioning. It is fitting that corporate leaders are pointing to the particularly poor profitability of local plants. In the short term, high wage increases are therefore a blessing for the workers currently employed. In the long term, it will lead to companies relocating even more work.

At the same time, large companies have a strong interest in retaining the best young talent. However, low entry barriers, good promotion and strong self-confidence tend to lead young high-flyers to take their luck into their own hands, build up a company and sell it at high prices. These sought-after personali-

ties work 50-80 hours a week and form a similarly-minded small team around them. For them, work is more like a sporting activity in which they want to become world champions. Employment with a large corporation would be tantamount to a substitution.

As an industrial location, we should strive to integrate the high-flyers in such a way that they provide work and a future for as many employees as possible.

The difficulties experienced by large companies in retaining these rare employees shows that we still have a long way to go.

Es wäre zielführender, an der Motivation, den Gestaltungsmöglichkeiten und der Beteiligung der Mitarbeitenden am Unternehmenserfolg zu arbeiten, als sie zu internen Kämpfen zu ermutigen. Lassen Sie sich von den Innovationen inspirieren und suchen Sie nach einem Arbeitsumfeld, das Ihnen die Möglichkeit bietet, Ihr volles Potenzial zu entfalten!

Dr. Gerd Große

Head of United Innovations
Chairman of the Board of GFFT e.V. &
Managing Director of GFFT Technologies GmbH



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United Innovations

United Innovations (UI) is a dynamic force reshaping Europe's innovation landscape. Our mission is to enhance efficiency in large corporations and promote the adoption of cutting-edge methods and technologies. UI focuses on increasing the success rate of new technologies in Europe, bolstering the continent's reputation as a leading innovation hub.

At UI, we emphasize collaboration through our innovation network, enhancing efficiency, quality, and reducing costs. Our partnerships expedite innovation cycles, facilitating the successful launch of new advancements.

Our innovation strategy revolves around identifying innovation needs, assessing current methods and technologies, and establishing effective innovation processes, including the development and implementation of new solutions.

United Innovations invites you to be part of this vibrant evolution in Europe's innovation sector. For more information, visit www.united-innovations.eu or follow UI on LinkedIn.



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GERMAN STARTUP-CUP

Symposium and Final of the German Startup Cup for Production 4.0 + Smart Logistics on November 6, 2024, at BASF Coatings in Münster !

The 3 innovative finalists for the final of On November 6, 2024, BASF Coatings in Münster will host a remarkable event: the Symposium and the Final of the German Startup Cup for Production 4.0 and Smart Logistics. This event offers a unique opportunity to witness groundbreaking innovations and meet the brightest minds in the industry.

The symposium is geared towards professionals and enthusiasts in the fields of production and logistics. It provides a platform for in-depth discussions, lectures, and workshops focused on the latest developments and challenges in these industries. The main themes are digitaliza-

tion, automation, and smart logistics solutions that are shaping the future of production.

The highlight of the day will be the final of the German Startup Cup, where the best startups in the country will present their innovative solutions to a high-profile jury and an expert audience. The finalists will compete for attractive prizes and the chance to develop their ideas further and establish themselves in the market.

Among the finalists are outstanding companies that have excelled in the previous rounds of the competition.



GERMAN STARTUP- CUP

UNITED INNOVATIONS AWARDS

The jury for the final will be announced soon and will consist of renowned experts and industry leaders who will evaluate the startups based on their business models and innovation potential.

In addition to the competition entries, the event will feature an exhibition where other startups and companies will showcase their pioneering technologies and solutions. This offers an ideal opportunity for networking and exchanging ideas and best practices.

Register Now

Secure your place for this exciting event and become part of an initiative driving digital transformation and innovation in the German production and logistics sector.

We look forward to welcoming you on November 6, 2024, at BASF Coatings in Münster.

Click here to register for Final-Event:

<https://www.united-innovations.eu/startup-cup/Logistics-Production>



Changing of the guard in the industry and what we should learn from it

Toyota is considered the MOL (mother of LEAN) and, with its adaptive and improvement-oriented corporate culture, outshone the competition in terms of profitability and improvement rate for decades. Three public statements by Toyota in 2023 make you stop: 1st they describe a competitor's product as a "truly piece of art" it cannot replicate, 2nd Toyota says it has become too slow in competition 3. Toyota's annual report shows that they are no longer the benchmark in terms of profitability!

What has happened?

An article by Lean Partners Projekt Gesellschaft mbH & CO. KG



Management author (The Fifth Discipline) and MIT researcher Peter Senge says "...in the long run the only sustainable competitive advantage is your organization's ability to learn faster than the competition." In other words: the rate of innovation is the only thing that matters in the long-run.

Toyota was long regarded as the benchmark for the entire industry. However, pioneers such as WikiSpeed, SpaceX and Tesla are setting new standards that are particularly popular in China and are leading to unusual competitive situations. You can read an excerpt of our findings here.

The benchmark product that Toyota openly names is Tesla's Model Y. The fastest growing au-

tomotive start-up in history also delivers the best margins in the sector.

Other pioneers include WikiSpeed, the only private team to compete against OEMs for fuel-efficient development vehicles. SpaceX is the benchmark for the cost per kilogram payload into space, making it more reliable and cheaper than any other space nation.

Here are some of the findings from our collaboration and research with the pioneers:

Innovation rate and decision-making speed are the focus of all these companies as a design guideline for the organization and all processes. How does this manifest itself?

1. **processes and products are consistently geared towards innovation and changeability**
2. **agile organizational structure and working methods**
3. **budgeting as part of corporate planning is avoided**

Item 1: Many companies treat continuous improvement as an add-on. Not so the pioneers. This is demonstrated by:

- consistent, simultaneous development of product AND process. Sequential silo struc-

- tures are a thing of the past
- Maximum modularized products, for independent process and product innovations. Teams work in parallel on innovation and value streams. This shortens the timeline and increases the rate of innovation, as changes can flow in independently without waiting times
- Interface definition on product modules. Geometry and function at the interfaces are fixed, each module can be changed at will
- Adaptation of extreme programming (radically fast software development) to hardware. First create the test environment. Based on test results, the software is iteratively improved
- Extreme manufacturing - specifications of all product modules are queried in tests. Test okay, component sold. Each innovation team can change both the process and the product at ANY TIME during production
- Goals for product and process innovation are ALWAYS derived from long-term goals. No "nice to have"

Is development, industrialization, production and improvement ONE responsibility in your organization? What is your vision? How is this translated into your organization?

Item 2: The pioneers walk the talk in regards of flat hierarchy. Decision-making speed is king - the classic reporting chain is abolished. Who do I need to implement the innovation? Talk to him directly! At SpaceX, decisions that take longer than 2 hours are considered unacceptable.

- Never alone - innovation work is teamwork here. Team members assign themselves based on the company's goals and switch as soon as they can no longer make a contribution
- Innovation teams consist of at least three people: Driver - implements changes to the product and process directly; Navigator -

guides the driver, gives instructions; Supporter - provides ideas, material and research. This parallelization drastically reduces the implementation time. The roles are changed several times a day.

How many decision-making levels do they have? How quickly are decisions made? Is daily innovation a group or individual task for you?

Item 3: Gant charts, project management and budgeting are tools of the 20th century. They manifest "waterfall thinking". We view change sequentially and plan in long cycles. Tesla dispenses with budgeting cycles and instead uses real-time profitability metrics and allows itself as much innovation as is possible under the given economic objectives.

How agile do you handle projects? Does budgeting support your innovation rate, or are findings and requirements that are not foreseen in the budget laborious and slow to be added?

There is a lot to learn. BYD, Nio, Gelly and others have announced that they no longer regard the German industry as a benchmark, but instead focus exclusively on pioneers such as Tesla & Co.

During our collaboration with the trailblazers, we often hear "If we don't fail in our changes, we are not innovative enough!" I hope that we can adopt a little more of this learning attitude.

Fail forward!



Ralph Winkler
 Founder and Director
 Lean Partners Projekt
 Gesellschaft mbH & CO.
 KG



Detailed information in the techL profile:
[COPA-DATA](#)

Innovating with Nature: The Industrial Impact of Bionics

Can bionics support an industrial company?

How can a company apply bionics?

Are there examples of the use of bionics as an innovation method?

An article by Mario Stegerer, Brose Fahrzeugteile SE & Co. Kommanditgesellschaft, Bamberg



Bionics can offer support in various areas of an industrial company. It can aid in the development of new products and technologies by innovatively applying natural principles and structures from nature. Additionally, bionics can optimize production processes and improve efficiency using biological systems as models. It also plays a role in solving technical challenges and developing sustainable solutions. Ultimately, bionics offers a tremendous range of opportunities to support industrial companies in various sectors.

Brose has been shaping the future of the automobile for over 100 years and is now one of the five-largest family-owned automotive suppliers in the world. Every third new car worldwide is equipped with at least one Brose product. We currently supply 80 car manufacturers, 50 electric bike manufacturers, and 40 automotive suppliers. Including the joint venture Brose Sitech, the company employs 32,000 people worldwide.

Despite having a large number of employees, very few have a background in biology or bionics. Therefore, as a company, we do not have the knowledge to find all suitable role models and decipher their secrets. To bridge this gap, we joined the network BIONIKON e.V. in 2016. This membership grants us access to a wide range of bionics expertise, bionics students, and professionals. In collaboration with the network, we explored possibilities for a company's bionics activities.

Our activities range from those carried out by trained personnel, such as brainstorming, research in databases, and employing working students, to activities requiring collaboration with experts or universities, including student projects, expert support, and research and development contracts.

Problem solving in a pressure cooker

Bionics is about the creative implementation of ideas from biology into technology. To this end, biologists and bionics experts work closely with engineers. Bionics hackathons are a quick and effective method for this collaboration. As an industrial partner of BIONIKON e.V., we participated in three hackathons in 2023 as part of the "Ideas Competition for the Biologization of Technology" funded by the Bundesministerium für Bildung und Forschung (BMBF). We submitted challenges like boarding assistance for people movers, door systems for people movers, and frunk systems.

Given the technical focus of our challenges, BIONIKON selected the Bionics Innovation Center at Bremen University of Applied Sciences and Rhine-Waal University of Applied Sciences in Kleve to host the hackathons. BIONIKON e.V. managed the complete organization of the three events. Thanks to this efficient organization, participants in the two-day hackathons worked in small action teams on potential role models, derived action principles, developed concepts, and built initial prototypes.

The bionics hackathon proved to be an excellent format for developing highly promising approaches in a short time, involving a broad range of skills and ideas. We followed up on the results with

two subsequent internships, resulting in two invention disclosures, one of which was registered for a patent.

Our conclusion:

Having worked on these technical challenges in our development departments for some time, we entered the bionics hackathons with low expectations. We assumed we had investigated and evaluated all technical solutions. However, we were proven wrong. The interaction between abstract bionics, young students, and experts such as university professors generated many new ideas and solutions. Participating in these hackathons was greatly beneficial.



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4 Trends for AI in Manufacturing for 2024

In the ever-evolving manufacturing landscape, manufacturers constantly seek innovative solutions to enhance operations, optimize resource utilization, and gain a competitive edge. AI has emerged as a powerful tool to address these challenges, offering a range of transformative capabilities that are revolutionizing the industry. As we step into 2024, AI is poised to play an even more prominent role in shaping the future of manufacturing, addressing pressing pain points, and unlocking new frontiers of efficiency, agility, and sustainability.

An article by Pierre Goutorbe, Dataiku

Artificial Intelligence (AI) based systems are prominently reshaping our society: technologies such as ChatGPT have wide implications on our daily lives. For medical technology companies, the ability to incorporate AI into their products will be essential, but the practicalities of doing so often appear intransparent. A large part of these uncertainties arise from a lack of regulatory guidance: the novelty of medical AI, combined with regulations such as the Medical Device Regulation (MDR) which do not mention AI, lead to a perceived large grey area. In addition, upcoming regulations such as the EU Artificial Intelligence Act add more rules, but not specifically for medical devices.

Data-Driven Supply Chains

Supply chains in 2023 continued to improve since the COVID-19 pandemic, experiencing smoother operations with less congestion and a more balanced supply/demand environment. However, global supply chains entering 2024 are roiled by disruptions at two of the world's crucial

trade corridors — the Panama Canal and the Suez Canal — even as geopolitical tensions appear set to take a more prominent role in sourcing and distribution. While AI cannot prevent supply chain disruptions, if deployed in the correct manner, it could provide predictive probabilities of future disruptions and give real-time insights into demand, inventory levels, and optimal distribution routes. Today, 37% of supply chain organizations already see the benefits of AI solutions; whether you win or lose in the market may soon depend on having the best Generative AI tools and the data quality to match them.

For instance, AI can analyze historical sales data, seasonality, store locations, and online/offline events to forecast demand fluctuations accurately. This predictive forecasting helps manufacturers adjust production schedules, optimize stock levels across locations, and improve fulfillment SLAs. Manufacturers can also leverage those data-driven approaches to answer strategic questions on coverage and competitive positioning and optimize yard management efficiency.



Image credits: Rafael Juárez - unsplash

Smart Manufacturing

Smart manufacturing is revolutionizing all aspects of the manufacturing process, from design to production to delivery, using increasingly more digital technologies such as AI and IoT. Smart factories are equipped with sensors and connected devices that collect vast amounts of data on their production lines, equipment, process parameters, and outputs.

Companies that successfully implement smart manufacturing technologies have already seen a 30% to 50% reduction in machine downtime and a 15% to 30% improvement in labor productivity. While it's still early days for Generative AI, manufacturing companies already see returns when using AI, and it is likely that best-in-class companies will go all-in on their AI investments in 2024. Indeed, a survey shows that for the manufacturing function of companies, costs decrease by 55%, and revenue increases by 66% when adopting AI.

For example, AI-powered predictive maintenance can benefit from maintenance history to detect early signs of equipment degradation, enabling proactive interventions before failures occur. This preventive approach reduces downtime, extends equipment lifespan, and minimizes costly repairs. Additionally, AI can help analyze historical production data to find the most impacting production parameters and, at the same time, enhance data-driven work by identifying trends among a large volume of sensors to understand root cause of failures.

Then, process and production engineers can assess the quality of upcoming production events by analyzing historical and real-time data, enabling them to anticipate and address production quality issues before they occur. Moreover, Generative AI can improve workers' efficiency by reducing the time spent searching for safety procedures and process guidelines, allowing them to focus on high-performance tasks.

Personalized Products and Services

According to a recent McKinsey survey, marketing and sales, product and service development, and service operations are the most commonly reported business functions using AI. It is unsurprising as AI can enable companies to offer hyper-personalized products and services to their customers, enhancing customer satisfaction and brand loyalty. In 2024, manufacturing companies will continue to expect changes in demand, market maturity, and pricing pressures; customers will gravitate toward businesses that can support them with aftermarket services, and the leading companies will use AI to detect asset problems faster and reduce downtime.

For example, product recommendation systems can push the right product to the right consumer by building a recommendation system using collaborative filtering and machine learning. Thanks to AI, manufacturers can segment customer data depending on their purchasing behavior, and they can also predict the future value of their customers to help them optimize their marketing efforts to increase revenues over time. AI-powered customer support chatbots can provide real-time assistance, answering customer queries and addressing concerns efficiently. Generative AI can also help generate new sales lead opportunities, leveraging internal and external knowledge.

AI for Sustainability

As demand for industrial products continues to rise, the manufacturing industry is facing a critical challenge related to its environmental impact. Indeed, the industry sector in 2022 was directly responsible for emitting 9.0 Gt of carbon dioxide (CO₂), accounting for a quarter of global energy system CO₂ emissions. Annual emissions slightly declined in 2020 and 2022 but did not align with the Net Zero Emissions by 2050 scenario.

As 2023 was the hottest year on record and 2024 could be even warmer, there is an urgent need to accelerate progress in energy efficiency, transition quickly to low-carbon fuels, and develop and deploy near zero-emission production processes faster. For instance, AI-powered applications could help track electricity consumption & CO₂ emissions across the company's manufacturing sites and help them minimize energy consumption.

To become a sustainable business, manufacturing companies will also need to positively affect the community, society, and economy. AI can help manufacturers improve supply chain transparency, enable them to design and produce sustainable products, and ensure that their workers get home safe.

Conclusion

AI is transforming the manufacturing industry, enabling manufacturers to optimize operations, enhance sustainability, and personalize products and services. By embracing and leveraging analytics and AI, manufacturers can gain a competitive edge and shape the future of manufacturing towards a more data-driven, sustainable, and personalized era.



Pierre Goutorbe

AI Solutions Director
Energy and Manufacturing
Dataiku

Automizing Administrative Processes with Robotic Process Automation: The RPA Handbook

The value proposition of Robotic Process Automation (RPA) is simple and seductive: a fatigue-free army of software robots works day and night through the mountain of labor-intensive data entry, error-free and cost-effectively. And it doesn't require months of IT development to integrate disparate application systems. What is RPA and what are promising use cases? What are the benefits, limitations and risks associated with RPA? And what needs to be considered during implementation? An article by Prof. Dr. Carsten Feldmann, University of Applied Sciences Münster

Processes are the source of operational value creation. If they are not optimally organised, economic success is at risk. Companies therefore need to ensure that their processes are effective and efficient, and to continuously improve them. Traditional approaches to process management, such as swim lane diagrams, are widely used in practice. But what about digitising and automating administrative business processes such as invoice posting or order processing?

Many companies have been reluctant to use process automation technologies to date - despite the high level of benefits promised by providers. In a recent study, the Institute for Process Management and Digital Transformation (IPD) at Münster University of Applied Sciences surveyed companies on the digitalisation and automation of administrative business processes. Almost half of the companies perceive the lack of personnel (49%) and problems caused by media disruptions (44%) as a problem. Many see the lack of process standardisation (39%) and low process transparency (38%) as obstacles to efficient processes. Almost half of the companies (43%) consider the costs of the solutions available on the market to

be too high. A critical gap is the lack of knowledge about digital process management tools: Newer approaches such as process mining or robotic process automation (RPA) are unknown to many respondents (15% and 20% respectively). Only 12% of companies use or test process mining, 13% RPA. This article aims to motivate companies to take a closer look at RPA by highlighting its functionality, benefits and limitations.

RPA refers to software robots (bots) that automate repetitive, rule-based tasks based on structured data in a business process. This automation of human activities on IT systems focuses on individual activities rather than an entire process. The bot mimics the input on the regular user interface of an IT system, such as the input screen. But RPA is not an Excel macro: the software robot is not limited to one application, but can be used for several IT systems at the same time without the need to build development-intensive interfaces. Typical activities include accessing IT systems and web pages to perform routine tasks such as reading, copying and pasting data, filling out input forms in multiple IT systems, performing calculations, or analysing and sending e-mails.

Types of RPA

The basic types are Attended RPA, Unattended RPA and Cognitive Process Automation. With **Attended RPA**, the bot supports an employee locally with certain tasks. An example: A supplier's invoice is received in Accounts Payable as a PDF document in an email attachment. The clerk opens the invoice and starts the RPA bot. This automatically reads the data from the digital document and records it in the ERP system. If the invoice can be clearly assigned to an order with the corresponding invoice amount in the ERP system based on its reference number, the bot automatically instructs it to make payment. However, if the bot cannot identify a corresponding order or if there is a difference in the invoice check, the bot informs the employee to initiate a manual invoice check or clarification

Unattended RPA automates a task without interaction with human employees; certain events automatically initiate the bot's activities. In the example of invoice verification (see figure 1), this is the receipt of an invoice by email. In contrast to attended RPA, the bot automatically opens the document and then reads the data from the incoming invoices in PDF format using an OCR system (optical character recognition) for further processing. A human employee is only informed in the event of escalation, e.g. if there are discrepancies in the amounts or missing information.

For unstructured tasks and decisions that require not only existing data and rules but also empirical knowledge or a certain learning ability, RPA can be enhanced by artificial intelligence (AI) processes. When bots are able to expand the rules independently and solve unstructured tasks, this is referred to as **Cognitive Process Automation (CPA)**, also known as intelligent RPA or IPA). In the example of invoice verification, if there is a difference in the amount, the bot decides independently whether the invoice should be authorised for payment by imitating the human decision-making process.

Use cases, benefits and limitations

In particular, accounting, purchasing, sales and HR are currently using RPA to automate processes. One example: In day-to-day sales, customer enquiries often take a long time to process. With standardised, data-driven processes in place, simple customer queries can be answered more quickly with the help of bots, thereby increasing customer satisfaction. For example, requested address changes are automatically read and validated from the customer's emails. If all the details are complete and correct, the customer's master data is automatically retrieved from the CRM system and the address is changed. If the address information is missing or incorrect, the bot notifies the agent and prompts him or her to process it manually.

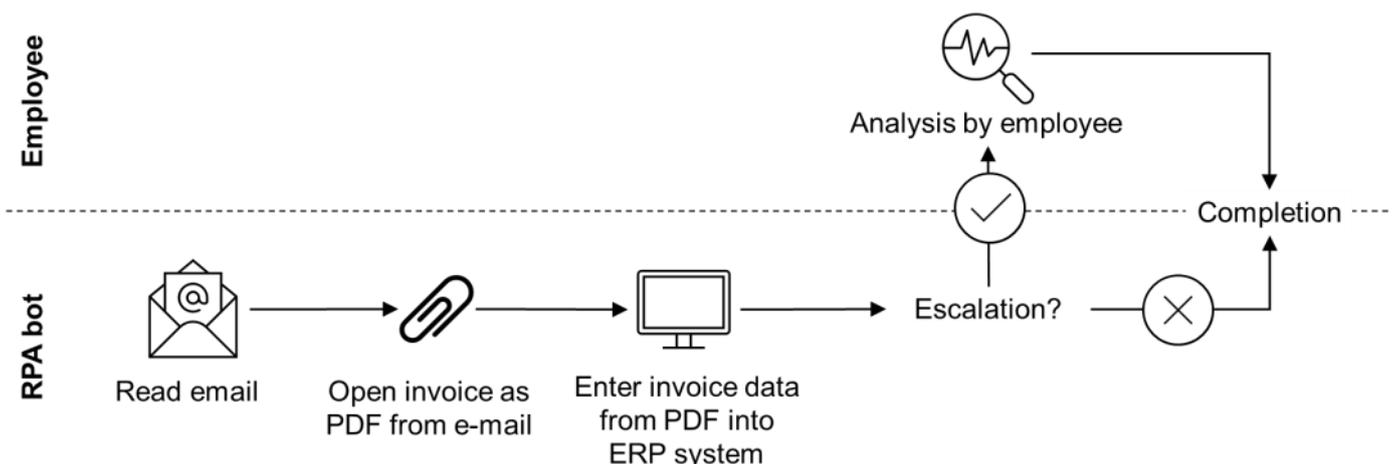


Fig.1: Unattended RPA for Invoice processing

Depending on the use case, RPA offers **benefits** in terms of cost, processing time and quality. Bots handle labour-intensive data entry 24/7 in a cost-effective and error-free manner. There is no need for time-consuming and costly IT development to integrate different application systems. When it comes to personnel costs, it is all about small improvements: many companies are confronted with complex, historically grown IT landscapes. As a result, employees have to use different IT systems in their day-to-day work and transfer data from one IT system to another due to media discontinuities.

One employee may only save a few minutes a day by eliminating the need to cut and paste data. However, significant cost savings can be achieved when scaled across all employees. Process cycle time can be reduced with RPA. RPA improves process quality by eliminating typos and other sources of human error. A valid, comprehensive digital database is available for follow-up processes, analytics and AI solutions. RPA frees employees from monotonous and tedious routine tasks. This increases employee satisfaction. It also frees up capacity for innovative strategic tasks and customer-facing activities that require human creativity and planning. By eliminating human error, RPA improves compliance, i.e. adherence to policies and legislation in terms of process conformity and consistency.

What are the **limitations** and **risks** of RPA? A key preparation for RPA is to optimise and stabilise the process beforehand: if you automate a bad process in the status quo, you end up with a bad automated process. This can lead to disappointment, especially given the current hype and exaggerated expectations, as RPA cannot digitise the entire organisation or fix dysfunctional processes across the business. On the cost side, the cost of ownership should not be underestimated. In addition to subscription models and multi-year licensing commitments, training and maintenance

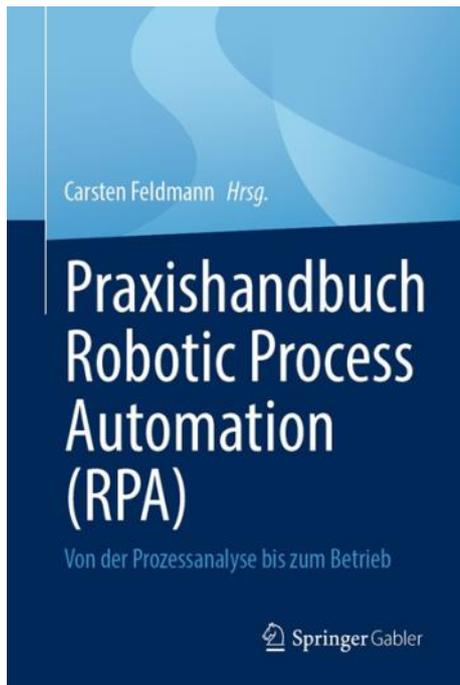
costs must also be factored in.

Conclusions and outlook

RPA is suitable for automating rule-based, routine and predictable workflows. These are based on structured, digital data and standardised, stable processes. RPA software reads data, makes rule-based decisions and transfers data to other IT systems. RPA opens up many potential business benefits, particularly in terms of increased efficiency, strict compliance, improved customer service and higher data quality. However, RPA only mimics manual human activity on IT systems. When creative thinking and action are required to solve a problem, even cognitive RPA with basic AI is of limited help. This is where machine learning and natural language processing (NLP) can complement RPA solutions in the future.

RPA differs from other process automation technologies in that it is flexible and easy to implement. This allows organisations to automate tasks and integrate IT systems where alternative approaches are too complex, costly or time-consuming. In many cases, a combination of human workers and software robots has proven beneficial for process automation: Each resource is used for the tasks it can do best.

For more in-depth information on this topic, we recommend the “Praxishandbuch RPA”. This book provides a practitioner-oriented overview of the implementation and operation of RPA solutions. The 23 authors illuminate Robotic Process Automation from different perspectives in order to comprehensively present the multi-faceted topic: From the software deployment by a consulting firm to IT legal issues to operations in an manufacturing company. In addition to procedural models for the introduction of RPA, the success factors for operation are presented using many practical examples. Fundamentals of process automation and empirical findings from practice are presented in a well-founded manner.



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Intelligent decision support systems in manufacturing

European manufacturers are under enormous pressure. Competitive disadvantages due to rising costs are manifold: inventory costs have risen due to inflation and the interest rate hikes. Many factors, inter alia the Russian war of aggression, have energy costs skyrocketing. And location factors are not in their favor, even when you ignore the American subsidies in Biden's inflation reduction act (IRA). Manufacturing in Europe – quo vadis?

An article by tulanā (Vishwakarma GmbH)

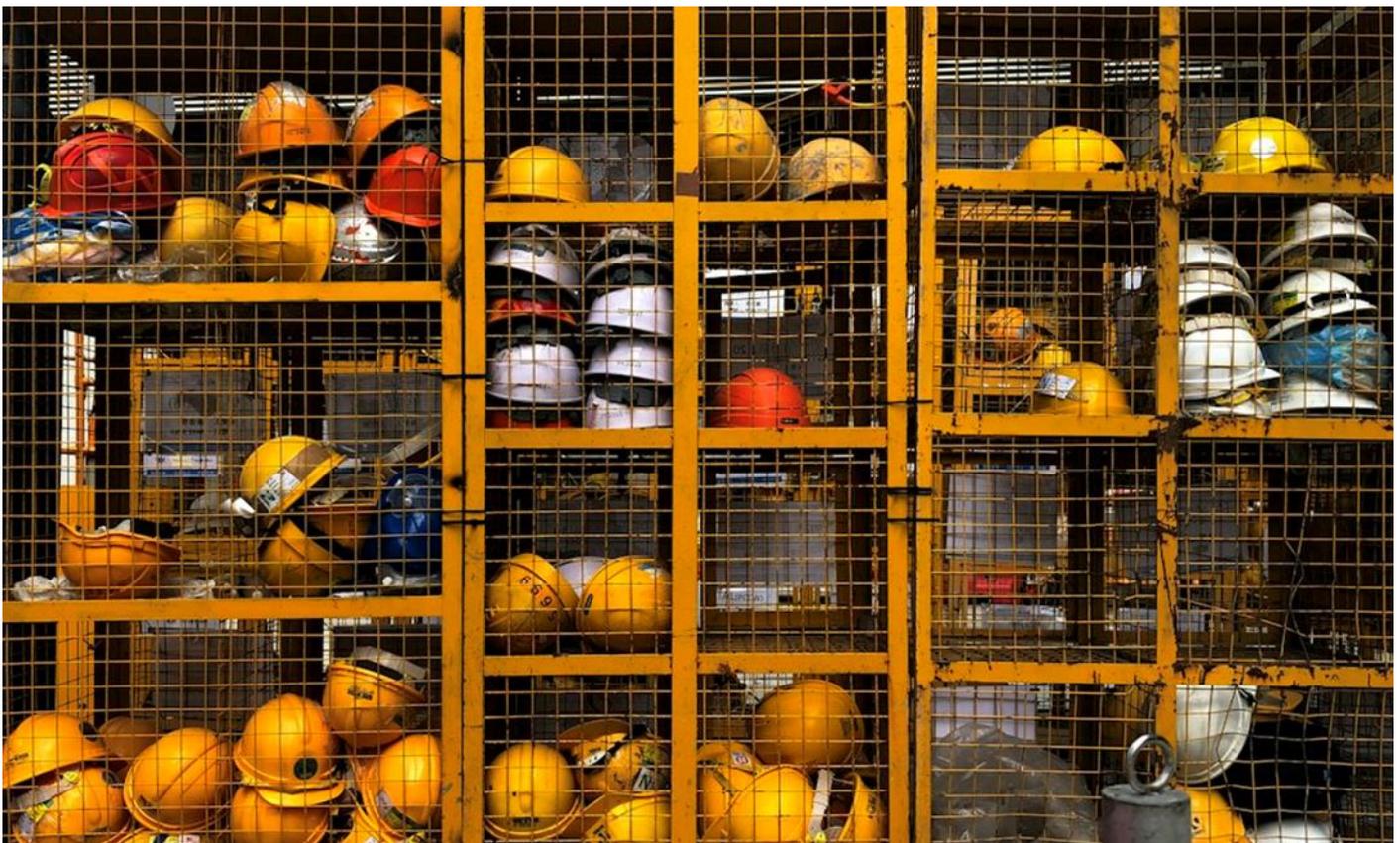


Image credits: Pop & Zebra - unsplash

Planning, for manufacturing companies, is inherently complex due to complex assemblies, limited resources, and the need to plan across planning periods on multiple levels of granularity. Often, sales, production and procurement make isolated

plans, without a coherent view of variable costs such as those related to inventory, resources, and service levels. Uncertainty due to changing demand, supply chain issues and rising costs, makes planning even more difficult.

Existing systems for integrated business planning (IBP) used by manufacturers usually come as part and parcel of ERP systems. These systems have serious shortcomings, they do not address the above challenges and, in fact, planners often do not use them and fall back on their own Excel models. These are the most pressing problems with existing systems:

- Demand forecasting is based on simple statistical models, which are not very accurate and don't quantify uncertainty.
- Even more importantly, planning functionality has serious short-comings and is often simply not used for three reasons:
 - ◇ **Short-sightedness:** Generally, it is impossible to plan inventory and production across multiple planning periods. This makes it impossible to take the future into account in once current plans.
 - ◇ **Lack of robustness:** Planning is deterministic, i.e. it fails to take into account different demand scenarios. As a result, plans are not robust to the unexpected, such as possible demand shocks.
 - ◇ **Lack of configurability:** It is impossible to model the complexities of production.
- Finally, existing systems are not user-friendly. They often require users to manually fill in large data tables, and there is very little visualization and interpretability of results.

tulanā, an intelligent decision support system, uses key technologies from artificial intelligence:

- State-of-the art transformer models and gradient boosters for forecasting.
- Multi-stage stochastic optimization for far-sighted and robust planning.

Jointly, these two techniques enable more cost-efficient and more far-sighted planning for the following reasons:

- State-of-the-art ML models for demand prediction exploit similarities and external data for better predictions and provide a measure of uncertainty to enable robust optimization in downstream optimization problems.
- Multi-stage stochastic optimization models consider thousands of demand scenarios, and 'look ahead', i.e. estimate the effect of current decisions on future plans.
- tulanā provides a user-friendly platform built on top of existing ERP solutions, which makes results easily interpretable, including visualizations, e.g. current and future recommended production targets.

Better planning results in increased predictability of operations, higher cost efficiency and fewer crunches on personnel.

In Germany alone, manufacturing accounts for one quarter of GDP. It was a guarantor for stable jobs and the economic success of this country. With the advent of modern technology such as AI, the time is now to bring European manufacturing to the 21st century.

Plan for the future. Plan for the unexpected.
Plan with tulanā.



Dr. Narendiran Sivanesan
CEO
Tulanā
Vishwakarma GmbH

 **Detailed information in the techL profile:**
[tulanā](#)

"Nebumind: Smart Factory with the digital component twin"

In a world where advanced technologies are reshaping the industrial landscape, nebumind presents itself as a trailblazer for the factory of the future. Founded by Caroline Albert and Franz Engel in 2019, the company specializes in providing production companies with an innovative data analysis software that turns the vision of a fully automated and self-regulating factory into reality

An article by nebumind GmbH



nebumind software used in 3D printing for early defect prevention

The core idea of nebumind emerged from the founders' experiences at Airbus, where they established a subsidiary in the sensor technology sector. Even then, they observed that while there was a wealth of data, it was not efficiently utilized. Armed with this insight, they founded nebumind and began focusing on the heart of modern production: the Smart Factory.

In the ongoing discourse about the Smart Factory, companies often focus on the automation of processes. However, nebumind recognizes that the crucial challenge the self-regulation of productions: Self-regulation requires intelligence to monitor the quality of manufactured components, understand influencing factors, and take corrective actions – a hurdle that has seemed largely insurmountable until now.

The central problem lies in the diverse data formats (be it protocols, images, graphs or Excel tables) and various data structures (such as different coordinate systems or time sequences) in which machines and sensors provide information today. So far, there has been no generic way to fuse these various formats effectively for a unified analysis. This is precisely where the nebumind software comes into play.

The nebumind software acts as a central data hub, collecting information from machines and sensors in various formats and fusing them as a "digital component twin". This data fusion creates unprecedented transparency in production. For every spot on the component, the software can provide precise information about what happened in the manufacturing process. This not only enables the early detection of complex defects but also their prevention through automatic counteraction.

As an example, in the 3D printing process, the nebumind software fuses data such as temperature values, images from a thermal camera, and oxygen content. It then detects deviations from a reference twin and can automatically counteract to prevent defects.

Nebumind has successfully implemented its software at renowned customers sites. As an example, in the Space manufacturing sector, MT Aerospace utilizes the software in a robot-based metal forming process for the Ariane 6 production, where it supports from process definition to serial production. A AI algorithm automatically calculates the optimal processing parameters for each step, allowing the robot to self-regulate and optimize the manufacturing process.

Another project with KSB, a manufacturer of pump systems, demonstrates the application in 3D printing. Thanks to the nebumind software,

anomalies in the printing images can be automatically detected already during the printing process, enabling significant time and cost savings.

In the research and development sector, nebumind also provides support, as seen in the case of Airbus, where the software is used in friction stir welding. Engineers can live-track how parameters and their combination affect the component and adjust them.

In addition to the software, nebumind offers a comprehensive service portfolio ranging from machine integration to data analysis and support for automation and robotics. The founders emphasize that it is not just about providing a product but also about accompanying customers on the path to digitization.

The future of production is digital and autonomous, and nebumind paves the way to this intelligent factory reality. With their groundbreaking software and dedicated service approach, the company demonstrates that the Smart Factory is not just a futuristic dream but is already becoming a reality through intelligent data analysis and machine control. Nebumind provides the basis for more automation, defect prevention and AI-based self-regulation in productions.



Caroline Albert
CEO & Co-Founder
nebumind GmbH



Detailed information in the techL profile:
[nebumind](#)

Consistently available machine data

The digitalisation of processes is considered a key success factor for sustainable business processes. Automated and sustainable provision of defined machine and process data sets across locations and company boundaries offers great potential for the optimisation of business. How can companies succeed in mastering the complexity of exchange of standardised and individual data sets?

An article by Data Coffee GmbH



Data exchange from the machine level and the production processes begins with the Data Coffee technology. The aim is to provide every group of people, from the operator to the managing director, with the best possible information, even across locations if required.

While many companies already use IT systems to control orders in the form of ERP and MES, and defined machine data is often connected for this purpose, the effort required to connect and utilise data that deviates from this definition is considerable.

The standardised and comprehensible provision of machine and process data from an established production environment in accordance with the individual requirements of the various users is crucial for the sustainable use of the information provided in this way. The questions and information requirements of the users often differ immensely, considering the general responsibilities of, for example, operators, production managers, managing directors or even roles upstream and downstream companies along the supply chain of a product.

So how can this need for multi-layered and situation-specific information be standardised and yet made possible on an individual basis without excessive use of IT systems and specialist knowledge?

This can be achieved through a solution that is based on the production processes and implemented to meet the requirements of the smallest companies, which builds a bridge between standardisation and individuality. Especially when IT resources are not or hardly available, IT applications must be designed to be intuitive to use and yet highly flexible and scalable, so that their use is worthwhile even for the smallest implementations.

The core of the software solution is to make data from a wide variety of machines available within minutes without programming and to transfer it to other software systems depending on individual rules and specifications. This is made possible by a very lean software architecture and a process that allows different proprietary or standardised protocols to be used in parallel to read process data from the machines without interfering with the control programs.

The data obtained in this way can be either un- or preprocessed according to individual or predefined rules and stored in different data sets. Where this data is sent depends on the respective application and the company's own infrastructure; this can be other software systems such as databases, dashboards, ERP, data hubs or even networked hardware such as signalling lamps.

To enable customised views within the company, different data sets can be defined with the same connection to a machine and distributed to different recipients at the same time. In turn, data from different machines can be recorded according to standardised criteria in order to achieve better comparability and transparency. Data sets can be customised at any time during the ongoing pro-

cess and can also be carried out by the customer themselves.

If desired, data sets can also be provided across company boundaries. This allows suppliers to pass on customised production and process data to their customers in a very simple and transparent yet automated manner.

Data flows and data sets are distributed by the company in a self-determined manner. Data sovereignty therefore remains with the manufacturing company itself. Process knowledge and expertise can be aggregated locally on site and digitally converted into relevant information.

This approach not only makes it possible to provide customised information in modern production facilities, but also to connect very old and inhomogeneous machinery with very specific process data requirements. This may require sensors, but these can be recorded in parallel with the machine data and integrated into the data set. In this way, the standardised exchange of data within different production lines of a company across site boundaries, up to the defined exchange of KPIs across company boundaries between supplier and customer, can be implemented individually and transparently without having to make extensive changes to existing IT systems, the working methods of the workforce or the security requirements of companies.



Dr. Aline Defranceski
CEO
Data Coffee GmbH



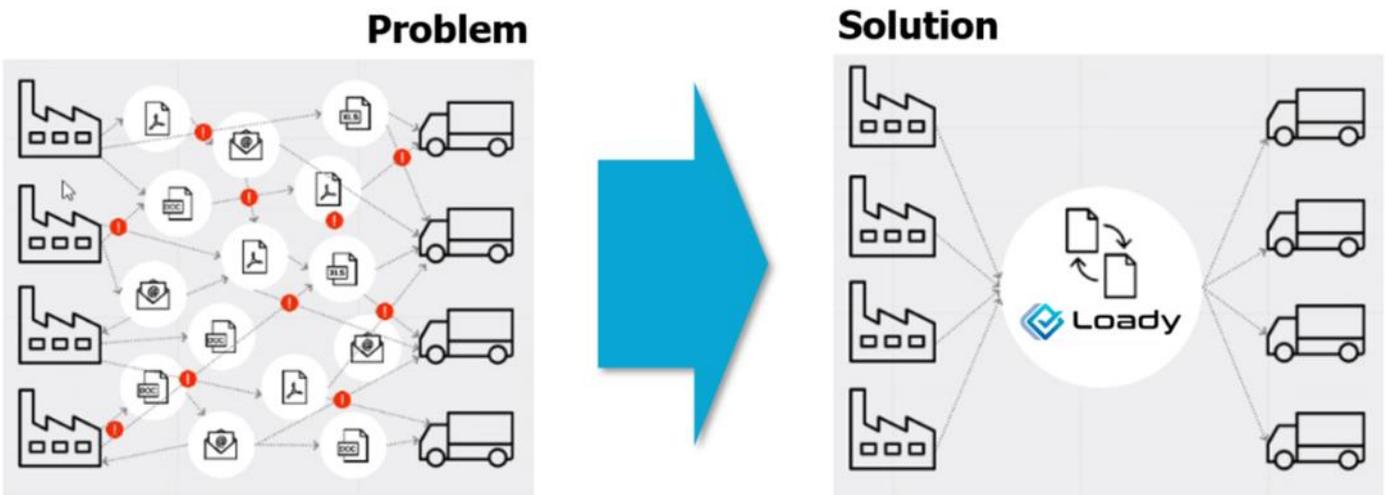
Detailed information in the techL profile:
[Data Coffee](#)

Data Quality in Logistics - The Industry takes Responsibility

What do opening hours and local procedures, driver instructions, location navigation, technical and security equipment have in common? – They make logistics complex and costly and often lead to misunderstandings, delays, troubleshooting and frustration. Now the industry is tackling the problem at its **ROOTS**. An article by Loady GmbH

In 2023, the first industrial companies, tired of the impact of the analog approach, decided to take a fundamental step and began maintaining a single source of truth for critical data elements in logistics.

Their goal? – Ensuring that their logistics service providers have the same understanding on contract- and delivery relevant specifications to enable seamless logistics operations and improve their and their customers' experiences.



Reliable data source for industrial logistics based on the standardized master data platform Loady (credit: Loady GmbH)

The digitization of logistics depends to a large extent on accurate and comprehensive master data. Today's interconnected logistics environment requires standardized master data formats and protocols to facilitate seamless interoperability and data exchange between different systems, shippers, logistics service

providers and business partners.

Today, however, master data in logistics is often handled in free texts and unstructured formats, especially when it comes to loading and unloading requirements. In practice, this means error proneness and high data management costs.

Relevance of logistics requirements

Logistics requirements relate to industrial sites and production plants, where products are to be loaded or unloaded.

Freight forwarders and drivers need to know all relevant information in order:

- Provide the right truck, equipment and documents
- Organize and plan
- Manage local regulations at gates and points of control
- Ensure product safety and quality
- Avoid delays and incidents

Industry bearing data responsibility

Due to their contractual and transport related importance, reliable logistics requirements can only be made by the industrial companies themselves.

It is them – owning the infrastructure, knowing the local conditions, deciding on procedures and being responsible for product safety and quality – who are in charge to provide the respective logistics requirements to manage their goods at their facilities.

By assuming this responsibility and providing up-to-date master data of logistics requirements, the industrial companies create the basis for ensuring data integrity and consistency across different systems and applications within the various parties involved in the logistics process.

Use cases

A large number of users throughout the entire logistics process take advantage of standardized master data for logistics requirements. This includes shippers, freight forwarders, drivers and goods recipients. The more the data is integrated

in their usual working environment and tools, the greater the benefit:

- Freight procurement
- Freight offering
- Transport management
- Customer service
- Dispatching
- Site logistics
- Truck execution
- Digital logistics



“First-hand” logistics requirements enabling operational logistics, e.g. integrated with TMS, in freight order and online driver view Loady2Go (credit: Loady GmbH)



Stefanie Kraus
CEO
Loady GmbH



Detailed information in the techL profile:
[Loady](#)

driveMybox: Digitally transforming container trucking

Today, container trucking presents numerous challenges for shippers and hauliers alike: market fragmentation, opaque pricing, driver shortages and complex operational work. But what if there was a way to streamline booking processes, enhance transparency and boost operational efficiency? Enter driveMybox, a digital solution reshaping container transport on the roads.

An article by driveMybox logistics GmbH

By connecting all players involved in pre- and on-carriage on a single, secure, cloud-based platform, driveMybox simplifies container trucking. Shippers can book trucking online, while independent drivers or haulage companies can digitally register to maximise their capacity utilisation. All in a few clicks!

Aggregating a fragmented market

Fragmentation has long plagued the container trucking industry. With many small to medium-sized players operating independently, the process of connecting shippers and hauliers traditionally involves various representatives and manual processes such as spreadsheets, emails and phone calls.

driveMybox eliminates the middleman and digitally automates these processes. Using efficient algorithms, driveMybox aggregates supply and demand, simplifying and speeding up the complex logistics involved in matching shippers with hauliers. The outcome? Lower costs for shippers and increased earnings for hauliers.

The process is simple: Shippers input their transport needs into the driveMybox platform. Utilising artificial intelligence and machine learning, the platform analyses these requirements and finds

the best-matched independent driver or haulage company. The entire booking process is managed digitally, and driveMybox acts as the contractual partner to ensure trustworthiness and reliability.

Additionally, in collaboration with its sister brand railMybox, driveMybox offers pre- or on-carriage as part of an intermodal solution. This combined service can be booked through the railMybox platform and enables users to manage the entire transport journey – from road to rail – digitally.

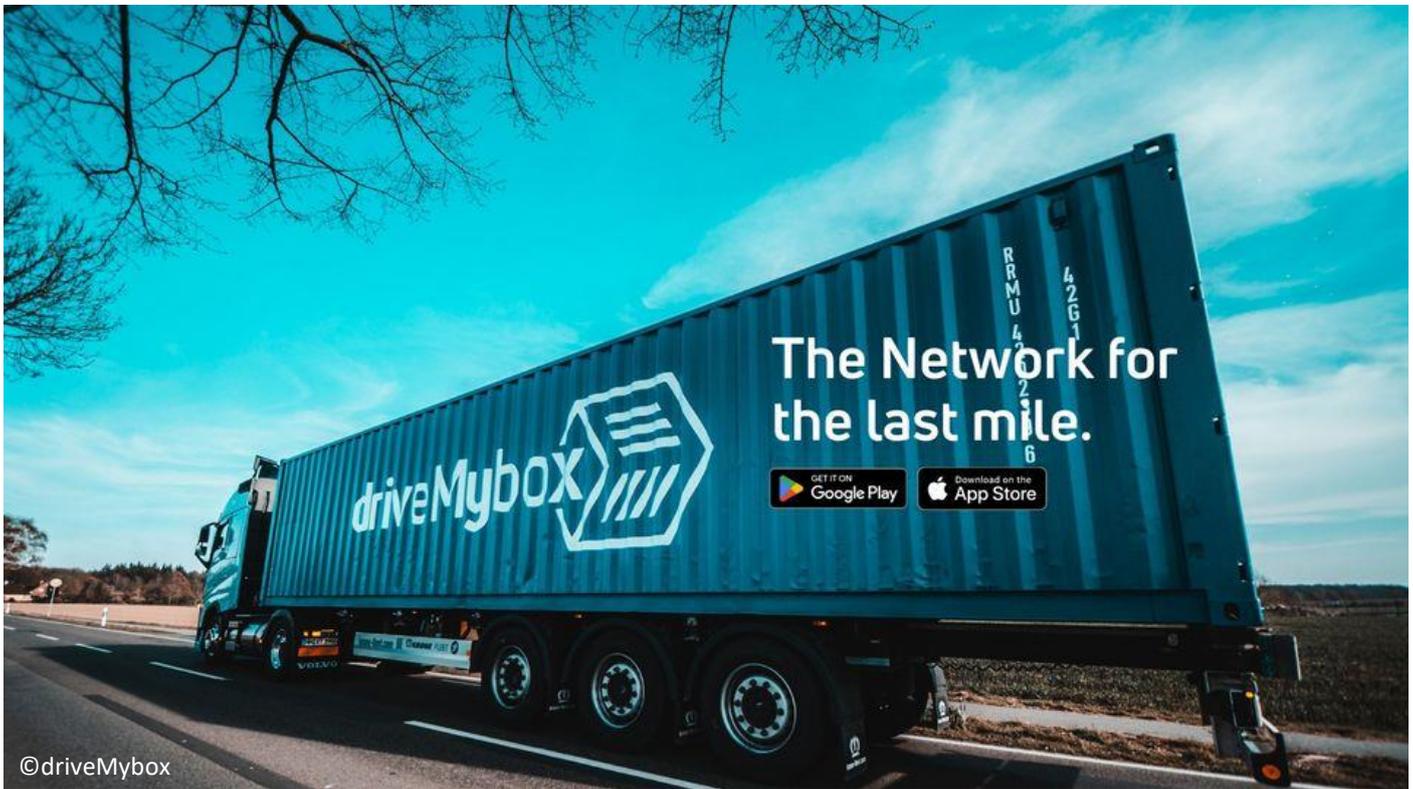
Visibility and transparency, in one place

Beyond streamlining the booking process, driveMybox enhances transparency by providing real-time pricing and live data throughout transportation.

Customers are always kept informed about their container's whereabouts, enabling them to anticipate its arrival. They can also proactively manage any potential issues that might occur during transport. This level of visibility and control allows for better planning and coordination, further elevating the user experience on driveMybox.

Maximising utilisation

Amid a growing driver shortage in the trucking industry – fuelled by rising transportation demands, strict regulations on driver hours and a



©driveMybox

decreasing number of young people entering the profession – driveMybox offers a software-driven solution to attract new drivers.

Although driveMybox cannot increase driver numbers as easily as ride-hailing services due to commercial licenses and vehicle requirements, it offers an online interface that removes many entry barriers. Drivers can use driveMybox mobile app to sign up and secure their first load in hours, without significant financial investment or social networking.

Most crucially, driveMybox reduces empty miles, boosting driver earnings. This makes it appealing to haulage companies as well, who can use the digital solution to streamline operations and maximise fleet utilisation.

Automated digital processes

driveMybox also significantly streamlines daily operational tasks for carriers and shippers, providing users with a single source for all their needs. It centralises information, from order management and booking to automated billing and digital communication.

Transforming traditional paper-based work into

digital processes results in notable time savings and cost reductions, while also minimising the risk of manual errors.

Continual development

As driveMybox continues to innovate, users can look forward to a host of new features designed to make container trucking even more seamless. The driveMybox team is constantly working on enhancements that will further automate processes, enhance personalisation and expand regional coverage.

With this commitment to innovation, driveMybox continues to redefine the future of truck transport, delivering intelligent, transparent and reliable container transport at every click.



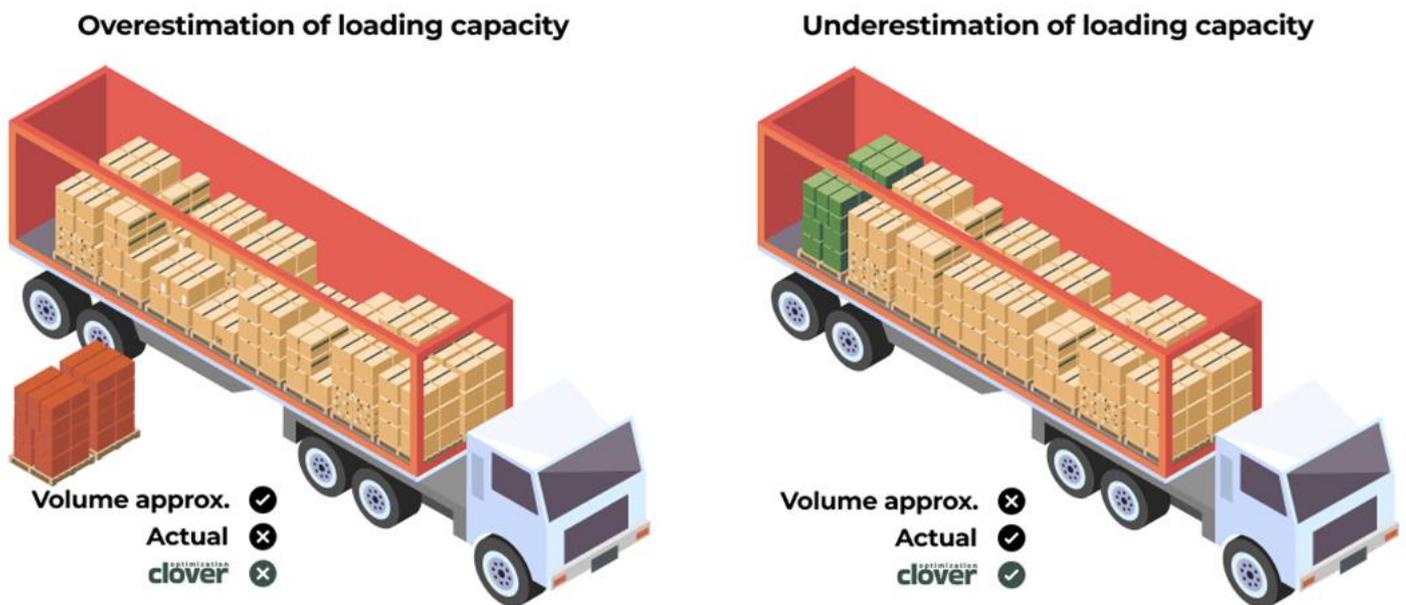
Alexander Delawari
 Manager Marketing & Sales
 driveMybox logistics GmbH

 **Detailed information in the techL profile:**
[driveMybox](#)

Beyond classic vehicle routing

The daily tasks of dispatchers revolve around vehicle routing: assignment of goods to vehicles and sequencing of stops. What planning rules need to be considered and what happens if the tour cannot be executed as planned? Answering these questions has a great impact on the operational efficiency of any transportation company.

An article by Dr. Leopold Kuttner, Clover Optimization GmbH



Through volume approximation, classical vehicle routing methods frequently over- or underestimate the actual loading capacity, leading to infeasible tours or underutilized loading space. Advanced 3D load planning provides planning security and increases loading space utilization.

The success of a transportation company highly depends on the quality and flexibility of its transportation planning. Therefore, dispatchers are a central asset and carry great monetary responsibility. They need access to the best possible planning support, allowing them to make even better decisions faster, while freeing up time for other value-adding tasks.

What makes a tour plan good?

Some planning criteria represent hard limits and others are more subjective or difficult to quantify.

For example, the vehicle capacity is a hard limit. A vehicle can only carry a limited number of goods, but how many? Some goods may be stacked onto each other, trucks may be accessed from the back or the side, there are axle-load lim-

its to consider, LIFO restrictions, and much more. Classical vehicle routing approximates the loading capacity of vehicles by weight or volume. If that approximation is wrong, plans need to be re-scheduled and goods may not be delivered as planned, leading to delays and penalties. More advanced 3D loading logic is required to efficiently use the loading space and increase planning security. The crux is that loading and routing are highly interdependent. Reassigning goods to a vehicle or changing the sequence influences the loading and vice-versa.

On the other hand, soft criteria range from somewhat quantifiable, like delivery windows where a small delay is still acceptable, to completely subjective, like the visual shape of the tour on a map. The more quantifiable the requirement, the more accurately it can be considered in algorithmic planning.

If alternative plans fulfill all the hard and soft criteria, what makes the better plan comes down to planning preferences and trade-offs, like lower costs or higher service-level.

The best result can be achieved by a two-way human-machine interaction where the dispatcher can enter the planning criteria and preferences into the algorithm and receives alternative planning suggestions to choose from.

Flexibility, speed, and decisiveness

To be flexible in planning, alternative decisions with their respective tradeoffs must be readily available, so that the best option can be chosen with confidence. To get to an initial tour plan fast, the interdependencies between planning requirements and preferences as well as assignment, sequencing and loading need to be considered. Then, if unexpected changes occur, the plan needs to be re-optimized, accounting for all the interdependencies from before, but in much less time.

User-acceptance through feature-rich vehicle routing solutions

Even if 3D loading is not relevant, or the data quality is not yet sufficient for it, there are many more features of modern vehicle routing and scheduling solutions that are central to gaining the user-acceptance of dispatchers. An important and necessary step that is key to sustained planning excellence. The algorithms need to respect as many planning restrictions and preferences as possible to gain the trust of dispatchers. Only then, dispatchers can rely on the system and focus on providing the best planning results, reaping the benefits that vehicle routing systems have promised for so long:

- cost-reductions
- time-savings
- flexibility
- planning-security
- and more

About Clover Optimization

Clover Optimization GmbH develops solutions for 3D load planning and vehicle routing. The 3D load planning helps to reliably determine the loading meters for notifications, orders, or external assignments. In addition to considering numerous dispatching rules, the highly developed vehicle module has the optional capability to perform integrated 3D load optimization—a central aspect of transportation planning. The algorithms of Clover can be integrated into any TMS, WMS or ERP system.



Dr. Leopold Kuttner
Managing Director
Clover Optimization GmbH



Detailed information in the techL profile:
[Clover Optimization GmbH](#)

The Power of Automated Product Carbon Footprint Calculation

Ever wondered how to decode your product's carbon footprint effortlessly. In the race to combat climate change, deciphering your product's carbon footprint is crucial, especially within the automotive sector. Greenable's cutting-edge tool is rewriting the rules, automating PCF analysis, and simplifying sustainability efforts. Let's delve into how our innovative approach is reshaping the landscape, empowering businesses in the automotive industry to navigate the complexities of carbon accounting with ease.

An article by greenable GmbH

Empowering Automotive Companies with Automated Product Carbon Footprint Calculation

In today's dynamic business environment, sustainability has become a critical focal point, particularly within the automotive industry. Original Equipment Manufacturers (OEMs) are exerting increasing pressure on their suppliers to provide detailed Product Carbon Footprint (PCF) data, leaving many suppliers lacking the resources and expertise to meet these demands. This heightened expectation stems from a growing consumer awareness of environmental issues, driving the need for transparent disclosure of carbon emissions associated with automotive products.

Moreover, many supplier companies grapple with a high volume of products and variants, exacerbating the challenges of manual carbon accounting tasks. Recognizing this need for automation, we at greenable, a pioneering startup in sustainable technology, have developed an innovative PCF-Tool designed to revolutionize carbon accounting. This solution not only makes the process more accessible but also injects a sense of enthusiasm into what was previously perceived as a mundane task for automotive companies.

Automating Product Carbon Footprint Calculation

Our mission at greenable is clear: we enable manufacturing companies to reveal, report, and re-

duce the carbon emissions of their products. By providing accessible and efficient tools for carbon accounting, we are driving positive change and facilitating the transition towards a more sustainable future for the automotive industry.

The automotive industry faces unique challenges when it comes to carbon accounting. With complex supply chains and diverse product portfolios, calculating the carbon footprint of automotive products can be a daunting task. Our solution simplifies this process, providing companies with the tools they need to reveal, report, and reduce their carbon footprint.

Tailored Solutions for Automotive Companies: We understand the specific needs of automotive companies and have developed a tailored solution to address their unique challenges. Whether you are an automotive manufacturer or a small supplier, our PCF-Tool can help you accurately calculate and report your product's carbon footprint.

Seamless Integration within Supply Chains: Our solution seamlessly integrates within supply chains, allowing companies to track emissions throughout their entire value chain. We provide companies with the visibility they need to identify emissions hotspots and make informed decisions. By joining the Catena-X network, we have recently made an important step in this direction.

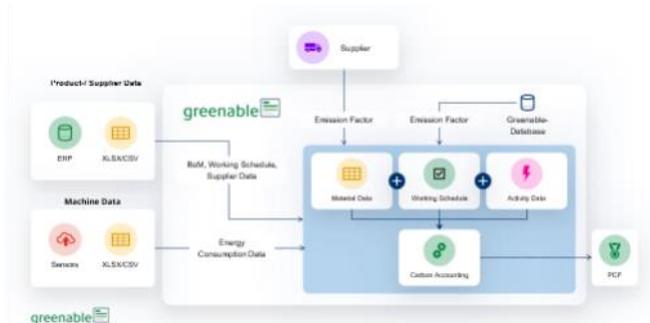
PRODUCT CARBON FOOTPRINT MONITOR



Driving Sustainability in the Automotive Industry:

By automating the PCF calculation process, we are driving sustainability in the automotive industry. With accurate carbon accounting data, automotive companies can identify areas for improvement and implement targeted reduction strategies.

What makes our tool special is its high degree of automation. By automating PCF calculation, pre-calculation, and transport estimation, our tool streamlines the entire process, saving valuable time and resources while ensuring accuracy and reliability. Handling large volumes of data effortlessly, our tool simplifies the complexities of carbon accounting, making it accessible and user-friendly for all users.



Credit: Automated PCF calculation – greenable GmbH

Our tool reduces manual tasks, saving time and money while enhancing efficiency in carbon accounting processes. With less reliance on manual intervention, resources are utilized more effectively, resulting in streamlined operations and improved productivity.

Navigating through our tool is intuitive and straightforward, guiding users step by step through the process. Helpful tips and instructional videos further enhance user experience, ensuring that users can quickly familiarize themselves with the tool and maximize its capabilities.

Our tool facilitates continuous monitoring for

goal setting in sustainability reporting and strategic decision-making. By enabling a swift start with secondary data and ongoing enhancement with primary data, companies can adapt and refine their sustainability efforts in real-time, driving continuous improvement in their environmental performance.

In summary, our solution offers automotive companies a comprehensive and efficient solution for carbon accounting, characterized by time-saving automation, a user-friendly interface, and continuous monitoring capabilities. With our tool, companies can navigate the complexities of carbon accounting with ease, driving sustainable practices and reducing their environmental footprint effectively.

Impact and Future Outlook

As the automotive industry continues to evolve in terms of sustainability, we at greenable strongly believe in the automation of PCF calculation with our innovative tool. Automotive companies can accurately calculate and reduce their product carbon footprint, driving positive change and leading the way towards a more sustainable future. Additionally, the impending introduction of the Digital Product Passport (DPP) will further revolutionize sustainability efforts within the industry, providing enhanced transparency and traceability throughout the product lifecycle.



Alexander David
Co-Founder and CPO
greenable GmbH

 [Detailed information in the techL profile: Greenable](#)

PPWR requires more reusable packaging. How Logistikbude helps companies with implementation

How emerging laws and regulations are changing the packaging industry and what added value Logistikbude can offer your company.

An article by Logistikbude GmbH



Anyone who is currently involved in the packaging industry or is responsible for packaging materials in their company will have come across THE trending topic of late and especially these days - the Packaging and Packaging Waste Regulation, or PPWR for short. The PPWR is part of the European Union's Green Deal and is a regulation that lays down rules for packaging and its disposal. It is the successor to the Packaging and Packaging Waste Directive adopted in 1994 and is intended to make the packaging sector more environmentally sustainable throughout the EU.

PPWR as a driver for B2B returnables

PPWR - these four letters have been hovering over many companies like a sword of Damocles since the first draft was published at the end of November 2022. After a lengthy back and forth

and a number of adjustments through various political decision-making and coordination processes, there is now clarity. However, there is no sign of a sigh of relief in the industry. The PPWR is coming - and with it considerable regulations for the management of packaging in companies.

The regulation was recently passed in March of this year - the last outstanding approvals are considered a formality. While the focus with regard to primary packaging (e.g. chip bags or shampoo bottles) is more on recycling-oriented design and smaller packaging, the focus in the area of packaging materials and load carriers is clearly on reusable packaging. The PPWR will result in significantly stricter requirements for companies in the future.

Specifically, this means new obligations such as

the obligation to participate in collection and recycling programs as well as the labelling obligation for the associated requirement for traceability of all packaging used. In general, a shift from single-use to reusable packaging is evident in the PPWR for the B2B sector - single-use packaging is to be increasingly replaced by reusable packaging.

For example, a minimum number of rounds or cycles that packaging must be guaranteed to complete is to be introduced. The specified reusable quotas will be particularly drastic for many B2B companies. According to the regulation, transport and sales packaging used within the EU as well as all packaging used for domestic B2B transport must meet a reusable quota of 100% from 2030.

Even if the last word does not yet seem to have been spoken here, one thing is clear: the reusable quota will come - in whatever exact form it takes! What's more, the PPWR will not come as a directive like its predecessor, but directly as a law! It will therefore apply directly in all EU member states without the need for transposition into national law. Every company will then have to take responsibility for complying with the PPWR regulations and will be responsible for detailed reporting on its business activities in this area. The text will be published in the Official Journal of the EU in September of this year. After 18 months - i.e. in mid-2026 - the regulations will then come into force. Time to act!

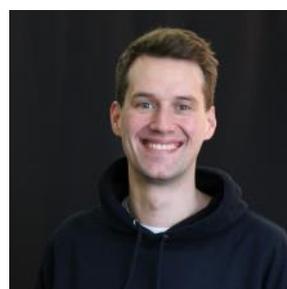
What approach do we as Logistikbude take in this context?

Clearly, we are helping companies to comply with the regulations on secondary and tertiary packaging. In light of the new legislation, it is clear that many companies will face further challenges with regard to the management of load carriers. The main trigger for these challenges is the reusable packaging requirements in the PPWR, which are focused on the B2B sector. To address the issue

of reusable packaging, it is not enough to focus solely on physical packaging.

The implementation of a corresponding reusable system including digital mapping and management of packaging is essential, taking into account the increasing need for information on packaging. Based on our experience across the industry, we can say with certainty that it is not possible to meet the requirements with the currently implemented management of load carriers and the transparency available today. This is precisely where we come in as Logistikbude and enable companies to digitally manage their reusable PPWR-compliant packaging. We offer solutions for all aspects: From the required labeling obligation, origin information or traceability of packaging used to general support in the management of collection and reusable systems through to relevant KPIs - all from a single source thanks to Logistikbude. Proof of the required circulation figures for individual packaging is already possible in our tool. This option can serve as a starting point for further KPIs that are specifically geared towards sustainability in the load carrier and packaging sector.

Much more could certainly be written about the PPWR and the other "sustainability laws" only briefly mentioned here. However, this would go too far at this point. What is undoubtedly clear is that PPWR is a topical and highly relevant issue. It is already raising companies' awareness of reusable packaging, but at the same time presents them with considerable challenges - it is high time to actively address it!



Philipp Hüning
CEO & Co-Founder
Logistikbude GmbH



Survey of technologies

We regularly consult experts on their current needs, with tool research being a frequent request. This chapter highlights key technologies we find noteworthy, providing brief product summaries and links to detailed datasheets and contacts in our techL database.



All innovations be found in the
technology database

techL

www.techl.eu

Cybus

Cybus software solutions are designed specifically for industrial manufacturing and its complex challenges. With the high-performance and scalable Factory Data Hub, Cybus brings open collaboration between manufacturing and its IT. Cybus empowers factories to gain long-term independence from manufacturers and vendors.



ConcR

At ConcR, our mission is to lead the way in advancing sustainable practices within the construction industry. We are dedicated to providing accurate and validated measurements from concrete structures. By leveraging our innovative sensor technology and advanced data analytics, we aim to mitigate the environmental impact of concrete production and contribute to global climate change mitigation efforts.



Clover Optimization GmbH

Clover Optimization GmbH develops algorithms for 3D load planning and vehicle routing. The 3D load planning helps to reliably determine the loading meters for notifications, orders, or external assignments. In addition to considering numerous dispatching rules, the highly developed vehicle routing module has the option to perform integrated 3D load optimization—a central aspect of transportation planning. This provides the dispatcher with greater planning certainty and eliminates the need to question the routes generated by the algorithm: Do the packages of the planned route actually fit on the truck? Moreover, integrated planning enables even greater savings in planning time, transportation costs, and the need for vehicles and drivers compared to conventional route planning solutions.



COPA-DATA GmbH

COPA-DATA is an independent software manufacturer that specializes in digitalization for the manufacturing industry and energy sector. Its zenon® software platform enables users worldwide to automate, manage, monitor, integrate and optimize machines, equipment, buildings and power grids. COPA-DATA combines decades of experience in automation with the potential of digital transformation. In this way, the company supports its customers to achieve their objectives more easily, faster and more efficiently. The family-owned business was founded by Thomas Punzenberger in 1987 in Salzburg, Austria. In 2022, with more than 350 employees worldwide, it generated revenue of EUR 69 million.



Data Coffee GmbH

Data Coffee provides software to make your Machine & IOT Data available in minutes to achieve transparent and objective data base for decisions in running and developing production. We create a standardized interface across all systems and enable simple and application-specific data exchange between industrial protocols, controllers and any IT systems. We convert machine data into relevant and meaningful information and visualisations and make them available for other controls, IT systems or business models, as ai driven analytics or customer used applications.



divvoice GmbH

We integrate voice assistance technology into business products and business applications to take your business to the next level. With extensive experience in hardware and cloud-based software, we offer expert advice and support to help you develop and optimize your voice-assisted solutions. Working with you, we'll create a customized success plan and ensure your product is reliable, effective, and market-leading. We help you realize the full potential of our voice assistance technology.



drag and bot GmbH

At drag and bot we work daily on making the programming of industrial robots as simple and intuitive as possible. In this way we support our customers in the flexible and cost-efficient automation of their processes.



driveMybox logistics GmbH

driveMybox is a digital service for the truck transportation of containers. We simply link transport capacities and demand online, from the price inquiry to the invoice. Real-time updates are available at any time during the transport process. We are more than just a platform - we are a contractual partner and responsible for every single order.



emocean GmbH

indigo is a distributed, networked realtime capable industrial edge and IIoT platform enabling Smart Factories and Devices as well as services like Edge AI based on the paradigms of Industry 4.0. Unlike widespread messaging platforms for IoT applications, indigo combines horizontal and vertical integration. Every node can share information and status messages with others. Mobile devices can be directly integrated for remote control and maintenance purposes. Cloud services are bidirectionally connected on demand. indigo provides true real-time communication between connected systems throughout the entire shop floor.



Energy Robotics GmbH

Our mission at Energy Robotics is to relieve humans from dangerous, repetitive and undesirable tasks through autonomous robotic inspection. Our teams of expert roboticists and passionate developers are striving to improve the Energy Robotics software platform to boost operational efficiency and workplace safety in industrial environments. Energy Robotics provides an end-to-end solution for autonomous inspections in capital-intensive industries such as oil & gas, chemical, power and utilities. Our hardware-agnostic software platform enables asset owners to easily manage a fleet of robots and drones for autonomous inspection.



greenable GmbH

Our innovative software for calculating the carbon footprint of products offers an effortless and efficient way to improve environmental performance and achieve sustainability goals. The Product Carbon Footprint Monitor is characterized by a simple structure and intuitive operation. You can easily get started and collect accurate emissions data.



i-flow GmbH

Clean data in factories. Quick & easy. Bridging the gap between factory systems and industry 4.0 technologies has never been easier. With i-flow you can model, map and prepare data from all your factory assets for use in any system.



iLARIZ GmbH

iLARIZ, based in Stuttgart, is a start-up with a Swabian-international team of innovation-oriented experts in forming technology. We focus on the process reliability of forming processes and the reduction of scrap costs in forming production. All our expertise is incorporated into our fully automated systems for digitalized monitoring through to active control of forming processes. In addition, we offer our know-how as part of our engineering services for all production areas.



Iuna AI

IUNA AI Systems GmbH is a company founded in 2020 and located in Heilbronn, Germany. We develop Deep Learning based image processing software and camera systems to automate manual inspection as well as quality assurance in industrial manufacturing. We want to take automation in industrial manufacturing to the next level in the field of visual inspection and quality assurance. In doing so, we help companies work more efficiently and sustainably increase the quality of their end products.



Loady GmbH

Loady wants one thing above all: to make B2B logistics smoother, more digital and sustainable. This is why the company launches "Loady", the first standardized platform for master data on loading and unloading requirements, in 2023. Loady's innovative idea: in order to achieve consistently high data quality, shippers and recipients manage their transport-relevant information on the platform themselves. They then share their data "first-hand" with logistics partners, digitally and in a clear, standardized structure.

Loady offers public APIs to bring current loading requirements directly to where users need them: their TMS, ERP, freight orders, e-procurement, YMS or OBUs. Additionally, Loady ensures effective communication with drivers and freight forwarders via multi-



Makula

Empowering OEMs, machine suppliers & distributors to win in the Aftermarket! Real revenue lies ahead of Machine Sales in the equipment manufacturing industry. After-sales services carry 80% of the profits. Makula manages it all.



Mimetik

The path towards highly efficient, fully connected factories goes through empowering the workers who are enabling the smooth operations at each step. While decades of work have gone into creating digital twins of factories, it's time to integrate the intelligence and agility of workers to complete the picture. Mimetik's IoT sensor digitizes manual work steps with zero infrastructure costs and without cameras, ensuring high privacy standards for easy adoption. By creating a digital twin of your best workers, you can optimize and automate the work environment, assist workers throughout the day, and improve efficiency.



nebumind GmbH

nebumind offers manufacturing companies a data analysis software for automatic quality monitoring and process optimization. The software collects data from machines and sensors during manufacturing, visualizes them as "digital twins" of the manufactured components and makes them available for automated analyses. With this concept, nebumind helps its customers to speed up the industrialization of new manufacturing processes, to detect defects early in productions and to adapt manufacturing processes more flexibly.



Peakboard GmbH

Peakboard is a low-code platform for the simple and intelligent digitization of manufacturing and logistics. Users create individual applications with the hardware and software solution to optimize their industrial processes and thus ensure more operational excellence in the company. The company of the same name, Peakboard, was founded in 2016 and is based in Stuttgart.



Peeriot AG

We are a German deep-tech start-up that combines Peer-to-Peer and IoT with the goal to simplify data exchange between devices. We help enterprises to manage the integration and the data flood of their devices easily by providing them a software for decentral IoT communication, which enables self-organized devices and knowledge networks.



Pelico

Pelico’s operations management system connects factory teams to manage unplanned bottlenecks and deliver products on time, at cost. It empowers operational teams to continuously monitor bottlenecks, anticipate issues, and act fast with AI-assisted recommendations, simulations and cross-team collaboration.

Phantasma Labs GmbH

At Phantasma, our purpose is making human work with today's AI solutions more smart and efficient. By building market-leading, industry-grade reinforcement learning-based models we enable AI-driven automation in enterprises without the need for big data. Our smart factory product line is an AI solution for manufacturing companies, that can suggest real-time optimal decisions for different areas of production planning.



PipePredict GmbH

PipePredict transforms water suppliers into smart water networks – we use machine learning algorithms to continuously localize leaks in waterpipes using data from already existing network sensors. Our predictive maintenance tool allows to monitor the pipes’ status in real time as well as predicting bursts and thus enables water plants to cut their repairing costs dramatically and optimize their repairing schedule.

scitis.io GmbH

scitis.io is a young company with a big vision. We combine the expertise and clout of several medium-sized companies and are the one-stop store for our customers when it comes to digitization. We offer a manufacturer-independent Industry 4.0 platform for industry, plant and machine tool manufacturing. Our goal is to give our customers the opportunity to offer their own IIoT solution for their plants. The focus is always on generating process knowledge and product optimization.



Synsor.ai UG

Munich-based AI Start-up, building a "predictive quality" AI for the manufacturing industry. Our main goal is to enable the real-time analysis of both image- and machine-data on a singular platform. This allows the detection of even the earliest warning signs, and through that the prediction of defects and process issues.



tulanā (Vishwakarma GmbH)

tulanā is an intelligent decision support system for planning functions in manufacturing, making it possible for leaders to navigate a world of complexity and uncertainty. As opposed to current planning tools, it enables robust and forward-looking planning while being highly configurable. Using the latest techniques in artificial intelligence and stochastic optimization, it finds the best tradeoffs between unmet demand, high inventory costs and scarce resource availability, all while considering costs, business constraints and the complexities of your manufacturing processes. Better planning results in increased predictability of operations, higher cost efficiency and fewer crunches on your personnel. Plan for the future. Plan for the unexpected. Plan with tulanā.



weeve

Weeve is a high-tech IoT startup that empowers businesses to generate value from their connected assets through data-driven services. Our platform provides an intuitive way to create and customize data pipelines and processes with a simple drag-and-drop method. We provide a library of pre-built modules for common use cases, such as predictive maintenance, pay-per-use, or machine learning. At the same time, the architecture provides the flexibility to customize and create new modules for your specific business domain. Our solution enables organizations to get ROI from their IoT projects and provides key business insights to optimize processes, reduce costs, improve your decision making and create new revenue streams.





