

White Paper Grinding Solution Forum 2026

# Artificial Intelligence in the Grinding Industry – where to start?

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## Executive Summary / Zusammenfassung

The discussion surrounding artificial intelligence has long reached industrial manufacturing. At the same time, particularly in the field of grinding technology and precision machining, many companies are still searching for concrete, realistic, and economically viable entry points.

For this reason, the co-creation workshop “AI in the Grinding Industry” was held as part of GrindingHub. The goal of the workshop was to bring together different perspectives from industry, technology, and application environments in order to jointly discuss where AI can already create real added value today, which challenges currently exist, and what first practical steps could look like.

The focus was not on long-term future visions, but rather on concrete questions from everyday industrial practice:

- Where are real benefit potentials already emerging today?
- Which prerequisites are still missing within companies?
- What currently prevents broader implementation?
- And how can a pragmatic entry into AI succeed?

The discussions and workshop results clearly show that AI in the grinding industry is primarily associated with topics such as process optimization, quality inspection, efficiency improvement, data structuring, and automation. At the same time, it became apparent that the biggest challenges are less technological in nature. Many participants identified organizational issues such as missing data structures, legacy systems, uncertainty in handling data, missing strategies, or insufficient internal communication as central barriers.

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One point became especially clear:

The industry is currently searching less for fully autonomous AI systems and more for practical solutions to concrete industrial problems.

Small pilot projects, clearly defined use cases, and the gradual improvement of data foundations and process structures were therefore identified as the most meaningful starting point.

The content of this white paper is based directly on the discussions, contributions, and results of the workshop and is intended to provide a practical overview of:

- where the industry currently stands,
- which potentials are being identified,
- which barriers currently exist,
- and what first concrete steps could look like.

### **Workshop participants on stage**

- Jens Petri (GMN)
- Michael Blickenstorfer (Rimon Technologies)
- Pavel Trojánek (NEURONSW)

### **Moderation:**

- Sven Krause

### **Key findings from the workshop**

- AI is currently associated primarily with process optimization and quality improvement.

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- Practical applications are particularly seen in the areas of quality inspection, monitoring, and automation.
- The greatest challenges currently lie less in the technology itself and more in data structures, organization, and implementation.
- Many companies are struggling with legacy systems and limited data availability.
- Small pilot projects are considered the most effective entry point into AI.
- The involvement of employees and specialist departments is seen as a decisive success factor.

# 1. Where does the industry stand today?

## 1.1 AI has arrived in the grinding industry

Artificial intelligence has now become a visible topic within the grinding industry and the broader field of precision machining. At the same time, the workshop clearly showed that many companies are currently positioned somewhere between general interest, initial practical experiments, and concrete industrial applications.

The discussions revealed that AI is now viewed less as an abstract future technology and increasingly as a possible tool for solving concrete operational challenges.

The following questions were at the center of the discussion:

- How can processes become more stable and efficient?
- How can existing knowledge be used more effectively?
- How can data be structured and analyzed in a meaningful way?
- Which applications are already realistically implementable today?

At the same time, it became clear that many companies are still in an early orientation phase. Clear strategies, defined responsibilities, and reliable practical experience from internal projects are often still missing.

## 1.2 Topics currently associated with AI

As part of the workshop, participants were asked which terms and topics they currently associate spontaneously with AI in the grinding industry.

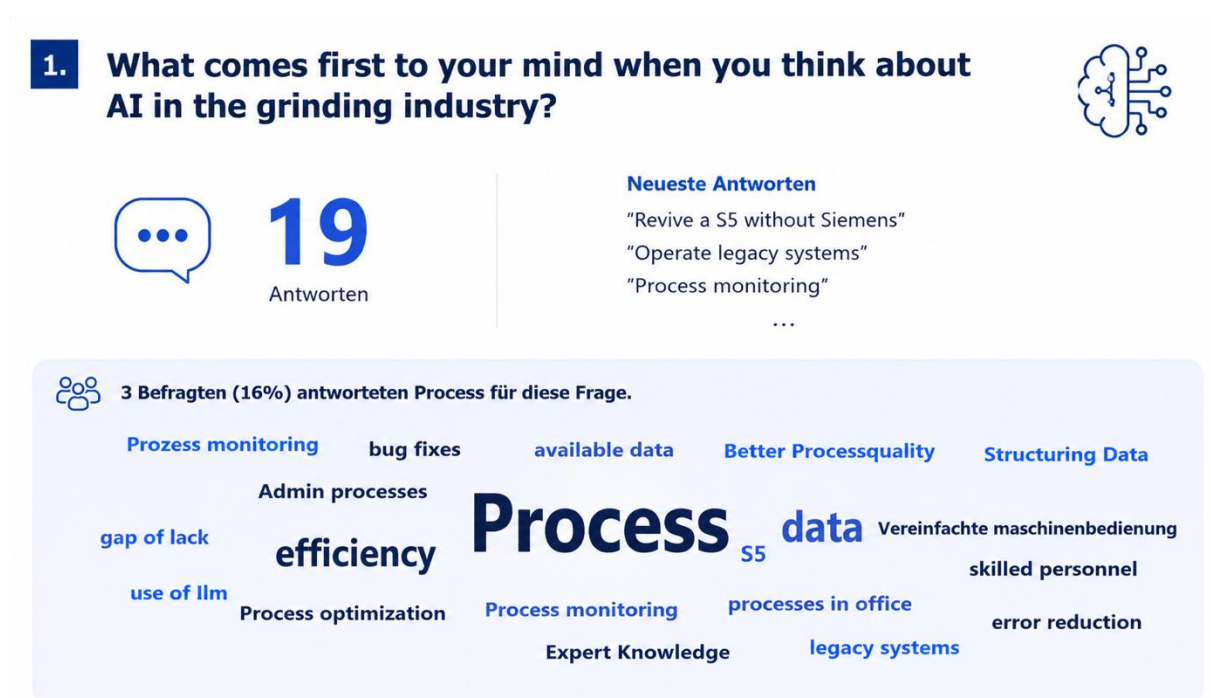


FIGURE 1: Word cloud: "Which topics do you currently associate with AI in the grinding industry?"

The most frequently mentioned topics were:

- process optimization
- efficiency improvement
- quality inspection
- data and monitoring
- planning & automation
- knowledge management
- training and employee support

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In addition, topics such as energy efficiency, error reduction, adaptive processes, and improved transparency in production workflows were discussed.

The results show that AI is currently perceived as particularly relevant wherever existing processes can be improved or available data can be utilized more effectively.

It was also noticeable that many participants associate AI less with fully autonomous systems and more with supportive applications within existing production processes.

### 1.3 First realistic fields of application

In addition to general associations, participants also discussed concrete fields of application that are already considered realistic and economically viable today.

The most frequently mentioned applications included:

- automated quality inspection
- surface inspection
- machine and process monitoring
- analysis of process data
- support for planning and automation
- knowledge retention and training

Particularly in the area of quality inspection, many companies see realistic short-term opportunities, as large amounts of process and image data are already available while at the same time there is strong economic pressure due to scrap, rework, and documentation efforts.

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Potential was also identified in the handling of expert knowledge and the support of employees, particularly against the background of the growing shortage of skilled workers.

Overall, the discussions made one thing very clear:

The industry is currently looking less for spectacular AI solutions and more for pragmatic applications with tangible benefits in everyday production environments.

## 2. Where AI can create concrete added value

### 2.1 Practical fields of application from the workshop

During the workshop, participants were specifically asked in which areas they currently see realistic and economically viable applications for AI.

The discussions focused less on long-term future scenarios and primarily on concrete applications within existing production and business processes.



FIGURE 2: Workshop results: “Where do you currently see one realistic practical application of AI?”

The participants’ contributions clearly showed that AI is currently perceived as particularly relevant where:

- repetitive tasks can be automated
- large amounts of data are available
- quality requirements are increasing
- processes are becoming more complex
- expert knowledge needs to be preserved

Applications in the following areas were discussed particularly frequently.

## 2.2 Process Optimization and Efficiency Improvement

The most frequently mentioned benefit of AI was in the area of process optimization. Many participants see the greatest short-term economic potential here, as even small improvements can have a direct impact on quality, scrap rates, machine runtimes, or energy consumption.

Examples mentioned during the workshop included:

- optimization of process parameters
- stabilization of machining processes
- reduction of scrap
- more efficient use of resources
- energy efficiency
- faster error detection
- adaptive process control

AI appears particularly relevant wherever large amounts of process data already exist but have so far only been analyzed to a limited extent.

Several participants described AI not as a replacement for existing process knowledge, but rather as a tool for supporting and accelerating the analysis of complex relationships.

## 2.3 Quality Assurance and Inspection

Another central topic area was quality assurance. Many participants already see concrete and realistic application opportunities for AI solutions in this field today.

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The following applications were specifically mentioned during the workshop:

- automated surface inspection
- image recognition
- error classification
- support for quality controls
- continuous process monitoring
- automatic analysis of inspection data

Particularly in repetitive inspection tasks, there is significant potential to relieve employees while simultaneously achieving greater process stability.

It was repeatedly discussed that technically mature solutions are already available today, especially in the field of image processing, which can also be meaningfully applied in industrial environments.

At the same time, it was emphasized that the quality of the underlying data remains decisive for achieving reliable results.

## 2.4 Planning, Automation, and Machine Support

Numerous potential application fields were also discussed in the areas of planning and automation.

These included:

- support for production planning
- optimization of workflows
- intelligent assistance systems

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- simplified machine operation
- adaptive automation
- support for machine operators
- automatic information processing

Participants particularly identified potential wherever employees are burdened in their daily work by high complexity, skilled labor shortages, or increasing documentation requirements.

AI is therefore primarily viewed as a supporting tool that can prepare decisions or make processes more transparent.

## 2.5 Knowledge, Training, and Skilled Labor Shortages

Several discussions focused on the question of how existing expert knowledge can be preserved and made more accessible over the long term.

Among the topics mentioned were:

- support for new employees
- digital knowledge systems
- training support
- faster knowledge transfer
- preservation of expert knowledge
- support for documentation and knowledge preparation

Particularly against the background of the shortage of skilled workers, many companies see the challenge of retaining long-term know-how within the company while also enabling faster onboarding of new employees.

AI-based assistance systems could help in the future by making knowledge more systematically available and by supporting employees in their daily work.

## 2.6 Data and Monitoring as the Foundation

One central topic throughout the entire workshop was the importance of data. Many participants emphasized that successful AI applications are only possible where data is sufficiently available, structured, and usable.

The following topics were particularly discussed:

- data collection
- data structuring
- monitoring
- transparency across processes
- availability of machine data
- secure data spaces

It became clear that many companies are still facing fundamental challenges in dealing with data.

The discussions also showed that many participants consider data quality and data accessibility to be significantly more important than the AI technology itself.

## 3. What Currently Prevents Implementation

### 3.1 Between Interest and Uncertainty

While the workshop discussions clearly demonstrated that many companies see concrete potential in AI applications, it also became apparent that the path toward practical implementation is often associated with considerable challenges.

Participants described fewer technological limitations and more organizational, structural, and cultural barriers.

It was repeatedly emphasized that many companies are currently interested in AI while simultaneously facing uncertainty regarding:

- data availability
- infrastructure
- responsibilities
- data protection
- economic viability
- internal acceptance

One point became especially clear:

From the perspective of many participants, the greatest challenges do not primarily lie in AI technology itself, but rather in the framework conditions within companies.

### 3.2 Key Barriers from the Workshop

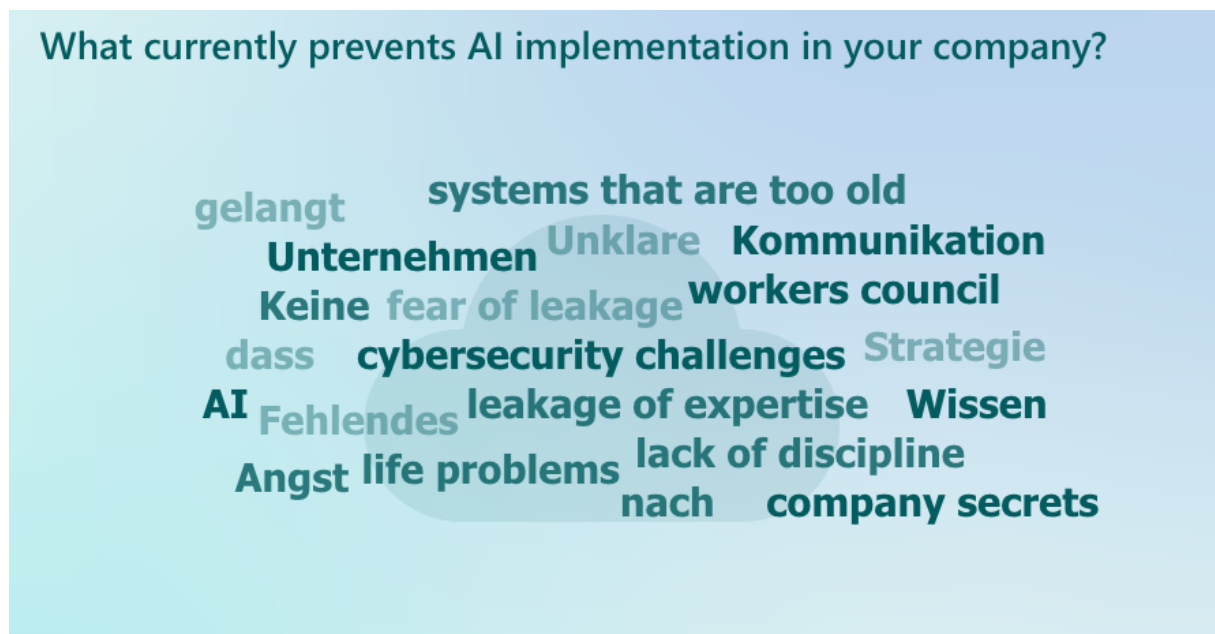


FIGURE 3: Word cloud: “What currently prevents AI implementation in your company?”

The workshop results provided a very clear picture of the current challenges. The following issues were mentioned most frequently:

- lack of know-how within the company
- legacy system landscapes
- cybersecurity challenges
- missing strategy
- unclear communication
- fear of data leakage
- protection of company knowledge

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- lack of discipline and responsibilities
- involvement of the works council
- insufficient internal expertise

It was particularly noticeable that many of the challenges mentioned are less technical in nature and relate more to organization, communication, and change management.

### 3.3 Legacy Systems and Missing Data Structures

One of the most frequently discussed topics during the workshop was existing system landscapes and data structures.

Many participants described challenges such as:

- outdated systems
- missing interfaces
- unstructured data
- insufficient data quality
- isolated data silos
- different system standards within production environments

Especially in established production environments, there is often a lack of consistent and integrated data structures required for reliable AI applications.

Several discussions made it clear that many companies first need to create fundamental transparency regarding their existing data before larger AI projects can be implemented in a meaningful way.

### 3.4 Cybersecurity and Protection of Company Knowledge

Another central topic area focused on data security and the protection of company knowledge.

Among the points discussed during the workshop were:

- fear of data leakage
- protection of company secrets
- uncertainty regarding cloud solutions
- cybersecurity challenges
- access to sensitive production data

Many participants described a general uncertainty regarding which data may actually be used and how secure AI architectures can be established in industrial environments.

Particularly in technology-intensive companies, the protection of process knowledge and manufacturing expertise plays a central role.

### 3.5 Communication, Organization, and Acceptance

In addition to technological topics, it was repeatedly emphasized that successful AI implementation is also primarily an organizational challenge.

The following topics were discussed in particular:

- missing internal strategies
- unclear communication
- undefined responsibilities

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- lack of coordination between departments
- missing prioritization
- limited involvement of employees

Several participants pointed out that AI projects often fail because of insufficient coordination between specialist departments, IT, and production.

The early involvement of employees and worker representatives was also identified as an important success factor.

### 3.6 Lack of Know-how and Skills Shortage

Many companies are additionally facing the challenge that there is still very limited experience with AI applications internally.

Among the issues mentioned were:

- lack of AI understanding
- missing internal competencies
- uncertainty when evaluating solutions
- lack of personnel resources

At the same time, it became clear that the existing shortage of skilled workers further increases the desire for supportive and relieving technologies.

Overall, the discussions made one thing very clear:

For many companies, the introduction of AI is less a pure technology issue and more a combination of data, organization, qualification, and change management.

## 4. Expert Perspectives from Industry

The workshop discussions were additionally enriched by different perspectives from industry, technology, and AI development. The following assessments reflect key thoughts from the panel participants and demonstrate how differently companies currently view the topic of AI in the grinding industry.

### 4.1 Jens Petri, GMN

Jens Petri particularly emphasized the importance of data quality and process understanding. From the perspective of the machine manufacturing environment, the current focus lies mainly on practical applications with tangible benefits within existing production processes.

“The foundation of every successful AI application in production is stable processes and reliable data.”

### 4.2 Michael Blickenstorfer, Rimon Technologies

Michael Blickenstorfer highlighted the importance of structured data and clearly defined process flows. At the same time, it became clear that successful AI projects always require organizational changes within companies.

“Many companies first need to create transparency regarding their existing data before larger AI applications can be meaningfully implemented.”

### 4.3 Pavel Trojánek, NEURONSW

Pavel Trojánek particularly emphasized the importance of pragmatic pilot projects. In his view, successful AI applications often emerge where companies first gain practical experience and gradually build competencies.

“Entering the field of AI does not have to begin with a major project. Small applications with clear benefits often create the most important foundation.”

## 5. First Practical Steps for Introducing AI

### 5.1 From Interest to Implementation

One central goal of the workshop was the question of how companies can practically get started with AI. It quickly became apparent that many participants were not looking for theoretical concepts, but rather for a realistic and implementable approach suitable for everyday industrial environments.

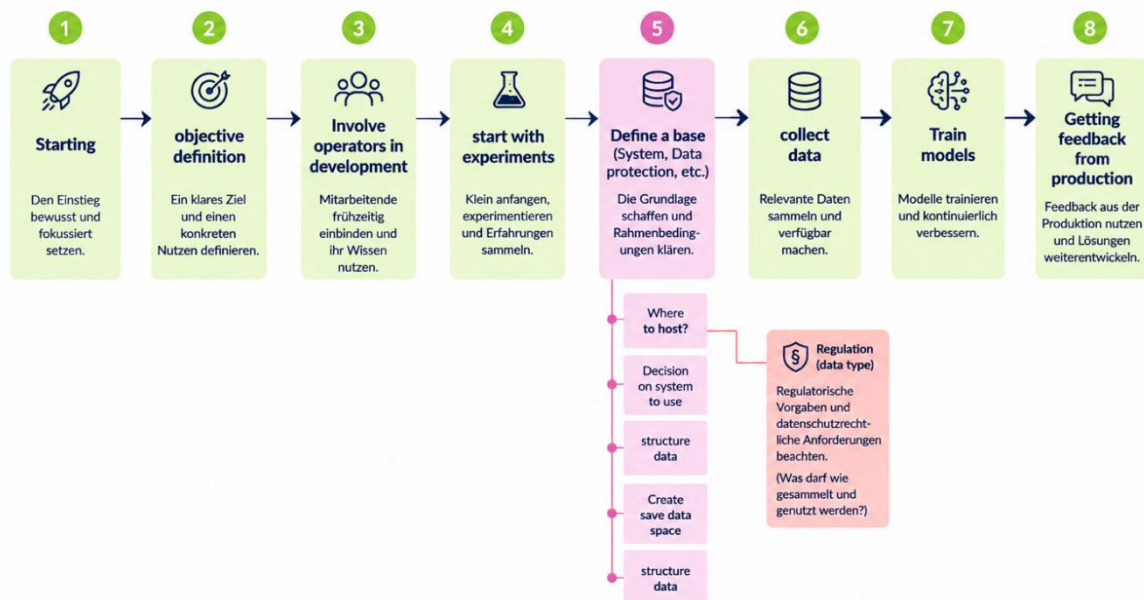
The discussions clearly showed:

Successful AI implementation does not begin with complex technologies, but with clear objectives, structured data, and small practical steps.

Many participants therefore described the introduction of AI as a gradual learning process that must be closely connected to existing production and business processes.

## 5.2 Recommendations from the Workshop

### First Practical Steps / Erste praktische Schritte



 **Zentrale Empfehlung:** Iterativ vorgehen, lernen und schrittweise skalieren – mit klarem Nutzen für die Praxis.

results: "First Practical Steps"

The workshop participants described an approach that can be structured from left to right into several consecutive and interconnected steps.

### 5.3 Step 1: Start with a Concrete Goal

It was repeatedly emphasized that companies should first define a concrete problem or objective.

Among the topics mentioned were:

- quality improvement
- reduction of scrap
- more efficient processes
- support for employees
- better utilization of existing data

The participants made it clear that successful AI projects do not begin with the technology itself, but rather with a clearly defined operational challenge.

### 5.4 Step 2: Involve Employees Early

Another important point was the early involvement of production teams and employees.

The workshop specifically mentioned:

- operators in development
- feedback from production
- early involvement of users

Several participants emphasized that acceptance and practical experience are decisive success factors for successful AI projects.

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Employees working directly in production often possess valuable process knowledge that should be considered from an early stage.

### 5.5 Step 3: Start Small and Gain Experience

Many participants explicitly recommended starting with small experiments or pilot projects.

Among the topics mentioned were:

- start with experiments
- small pilot applications
- gain initial practical experience

The discussions clearly showed that companies first need to learn how AI applications function within their own environment and which prerequisites are actually necessary.

### 5.6 Step 4: Define Foundations and Infrastructure

One central topic area of the workshop focused on the necessary framework conditions for AI applications.

The following topics were discussed in particular:

- define the system landscape
- consider data protection requirements
- clarify hosting questions
- select suitable platforms
- create secure data spaces
- consider regulations and data types

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Many participants emphasized that technical and organizational foundations must be clarified early in order to enable later scaling.

## 5.7 Step 5: Collect and Structure Data

The importance of structured data was a recurring theme throughout almost all workshop discussions.

The following topics were mentioned particularly frequently:

- collect data
- structure data
- create safe data spaces

It was repeatedly emphasized that many companies first need to establish transparency regarding their available data before larger AI applications can realistically be implemented.

The quality and availability of data were described as central prerequisites for achieving reliable results.

## 5.8 Step 6: Train Models and Continuously Improve

The final step focused on the actual development and improvement of AI models.

Among the topics mentioned were:

- train models
- continuous learning

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- integrate feedback from production
- improve models step by step

Several participants emphasized that AI applications can only be successful in the long term if they are continuously adapted to real production conditions.

## 5.9 Key Insight from the Workshop

Overall, the discussions made one point very clear:

The introduction of AI in the grinding industry is viewed less as a one-time technology project and more as a gradual development process.

The focus is on:

- concrete operational challenges
- structured data
- small pilot projects
- close collaboration between production, specialist departments, and IT
- continuous learning and adaptation

Participants largely agreed that pragmatic and realistic applications are currently far more important than comprehensive future visions.

## 6. Conclusion and Outlook

The co-creation workshop at GrindingHub clearly demonstrated that artificial intelligence in the grinding industry is no longer merely a theoretical future topic. At the same time, the industry is still at the beginning of practical implementation in many areas.

The discussions revealed that companies today are primarily searching for realistic and economically viable fields of application. The focus is less on visionary full automation concepts and more on concrete applications with tangible benefits in everyday production environments.

Potential was most frequently identified in the following areas:

- process optimization
- quality inspection
- data analysis and monitoring
- planning and automation
- knowledge management and training

At the same time, it became clear that the greatest challenges often do not lie within AI technology itself. Topics such as data structures, existing system landscapes, cybersecurity, organizational responsibility, and missing know-how currently play a much greater role.

The workshop results also show that successful AI implementation primarily succeeds where:

- concrete problems are clearly defined

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- small pilot projects are initiated
- data is made available in a structured way
- employees are involved early
- production, specialist departments, and IT collaborate closely

Overall, the discussions made one thing very clear:

The grinding industry currently needs fewer large-scale future visions and more pragmatic approaches, reliable data structures, and practical experience from real-world applications.

At the same time, this also represents a major opportunity. Many of the discussed applications are already technically feasible and economically relevant today. The decisive factor will be how quickly companies begin gathering initial experience and gradually building their own competencies.

This white paper should therefore not be understood as the conclusion of the discussion, but rather as a starting point for further collaboration, exchange of experience, and practical implementation within the industry.

Workshop participants on stage

- Jens Petri, GMN
- Michael Blickenstorfer, Rimon Technologies
- Pavel Trojáněk, NEURONSW

Moderation:

- Sven Krause

## GrindingHub

GrindingHub brings together industry, technology providers, researchers, and users while creating space for the exchange of current developments and future challenges in grinding technology and precision machining.

The co-creation workshop "AI in the Grinding Industry" was part of this exchange and was intentionally designed to bring together different perspectives in order to openly discuss practical experiences, expectations, and challenges.