

Future(s) Unfolding

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INTRODUCTION:

Increasing autonomous operations along the paper production line offers exciting prospects for business profitability, workforce empowerment and sustainability gains. Voith has the unique expertise to kick-start the process to the autonomous paper mill and support customers with best practices along the entire journey.

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Ulf Grohmann
Director Product Management Autonomous Mill, Voith Paper

Building blocks to the future

Three building blocks enable successful data-driven papermaking.

- 1. Degree of automation:** Which processes are automated? Which are manually operated?
- 2. Availability of data:** How is data collected, accessed and used? Is the data consistent?
- 3. Organizational maturity:** Are industry best practices followed? Is there a structured approach to continuous improvement? What skills do operators have and use? What is the culture in the organization?

“In many ways, the journey to the autonomous paper mill is very similar to the one up a challenging mountain,” says Ulf Grohmann, Director Product Management Autonomous Mill at Voith Paper. If your goal is to reach the top, he explains, you need to know what equipment to take, which paths to follow and what risks to expect. Most importantly, you need a guide that has the skills, stamina and survival skills to reach that goal. “You wouldn’t think twice about the need to prepare for the journey up a mountain,” adds Grohmann. The potential returns make the preparation worthwhile. The same is true in papermaking.

According to Bain & Company’s influential Global Paper & Packaging Report 2023, best-in-class mills that are technology-driven can raise EBITDA by a seven percentage-point margin or more.

Similarly, McKinsey estimates that manufacturing industries could significantly boost productivity if companies made better use of technology to share expertise across a plant and beyond. A more collaborative maintenance process, for instance, allows fast access to specialist knowledge and tried-and-tested solutions as well as better prioritization of tasks. As this approach improves plant health and minimizes downtimes, the consultancy firm notes, overall equipment efficiency could potentially enjoy a boost of 2 to 3 percentage points. “The autonomous paper mill empowers the workforce to do their best work and it drives economic growth,” says Grohmann. “What’s more, it’s a place that respects and protects our planet.”

The flexible framework

Voith has developed a flexible framework for implementing and increasing autonomous operations. The process is rooted in the principles of design thinking, which fosters collaborative, user-centric and value-enhancing problem-solving, and Kaizen, the Japanese philosophy which promotes continuous improvement through incremental change. "Our goal is to create an environment where everyone is working together on continuous improvement to impact the bottom line in a fully transparent process," says Grohmann. As each customer works in unique situations with their own priorities, this framework is designed to be flexible. What each journey has in common, however, is the first phase of the journey, or the kick-off.

Kick-off

This phase is essential for understanding the starting point, determining goals and establishing a firm base of best practices for customers. It's a time for probing questions around the three key building blocks that Voith has identified for successful data-driven production, namely the degree of automation, data availability and organizational maturity. During tailored workshops, Voith specialists in automation and process technology first explore the status of these building blocks with customers and assess how they align with high-level targets and organizational strategy. "A workshop may start with customers expressing a concrete goal, such as to increase production capacity or reduce overall energy use," explains Grohmann. "Our sessions and audit activities then drill down into the building blocks. We look at everyday tasks, processes, and procedures to first understand why those targets are not already being met. Using our knowledge and experience, we identify what action can be taken together to change that." Out of these sessions, a customized roadmap for the future is co-created.

The workshops are an opportunity for customers to explore how a more transparent, data-driven working environment supports open collaboration and teamwork, which in turn would positively impact productivity and resource efficiency.

This is true for the process manager and operators, who keep an eye on multiple complex processes, machinery and tools at the same time and react appropriately in a timely way. It's the same for the mill manager, who needs instant access to the right kind of data to support instant decision-making and task allocation to the team from any location and to see that the mill is performing well. Often, this kick-off phase underlines just how much the skills needed at the mill have changed over time – and how attractive a workplace a data-driven paper mill is becoming.

Value creation

"Next, we introduce proven technologies in phases to demonstrate the tangible value of autonomous operations," says Grohmann. This can range from closed-loop production processes to boost efficiency or solutions that allow sections of the plant to essentially run without operators. For leading papermakers, Voith is already developing systems that automatically assign tasks to people based on roles, situations, timing or even process events in a way that supports continuous improvement. The goal is to create transparency and empower people in their roles to make better, data-driven decisions and lift operations to the next level. This in return frees up capacity to develop their organization even further.

As additional processes are evaluated and the level of autonomy at the mill increases, roles and responsibilities will invariably change. "In parallel to working on the technology, we work together with our customers on transforming the workplace culture, particularly by training teams to use new machinery and develop troubleshooting skills," adds Grohmann. This is a critical success factor. By demonstrating the concrete benefits of implementing autonomous processes, operators, process managers and mill managers can get on board with the transformation early on. And as paper mills introduce more sophisticated digital and automation solutions and apply them across the whole operation, they see how the benefits increase.

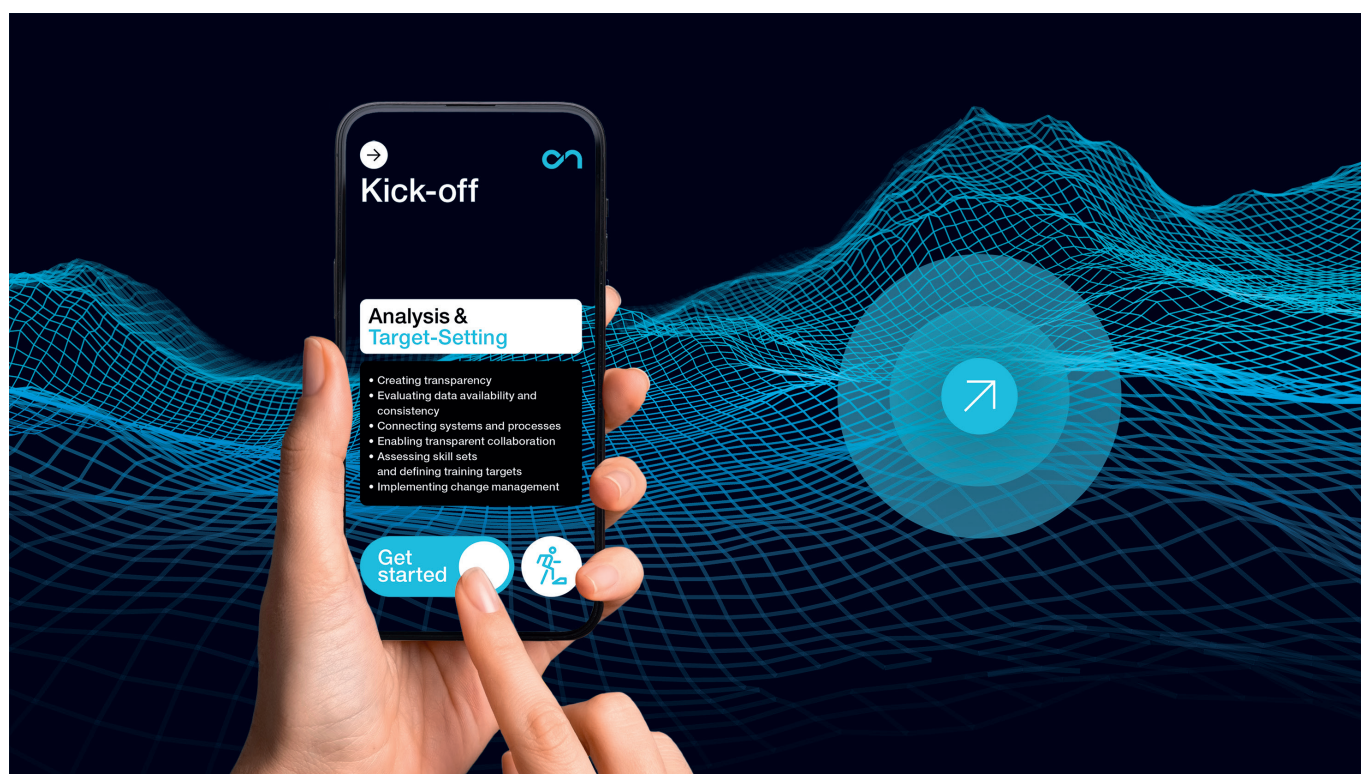


Figure 2: (Above) A framework for the future: Voith focuses on creating a culture of open and transparent collaboration and innovation.

Continuous optimization

Once customers are enjoying a more stable, robust paper production process, they move on to the next phase within Voith's framework. Essentially, this is an ongoing, never-ending process that focuses on continuous optimization and resource efficiency. "This is perhaps the most exciting of all phases," says Grohmann. "Now, we've entered a continuous loop of setting targets and defining appropriate measures. At the same time, we can search for additional value that had not been prioritized in the beginning and can now be lifted with other solutions. In a way, this is a permanent, ongoing iteration process that creates, implements and continuously optimizes new ideas and solutions."

To successfully transform a paper mill into a smart, data-driven operation, there's not just one ingredient, but many, including effective leadership, clear communication and open collaboration between teams. State-of-the-art machinery, cutting-edge sensors and advanced process control tools for the highest level of automation all have a role to play. "Whatever mountain our customers are trying to climb, we support them with the necessary value adding solutions along the entire journey," concludes Grohmann. "We ensure our customers get where they need and want to be at every step. We turn climbing a mountain into a long walk in the park. So, let's get started and see how we can bring value for you."

Kick-off

ANALYSIS & TARGET-SETTING

- Creating transparency
- Evaluating data availability and consistency
- Connecting systems and processes
- Enabling transparent collaboration
- Assessing skill sets and defining training targets
- Implementing change management

Value creation

CONSULTANCY & MANAGEMENT

- Implementing, evaluating and prioritizing solutions
- Creating stable processes
- Improving machine availability and efficiency
- Enabling data-driven decision-making

Continuous optimization

ADVANCED CONTROLS & PROCESS AUTOMATION

- Ensuring ongoing cost optimization
- Reducing energy, water and fiber consumption
- Targeting bottlenecks and using best practices, such as the golden run
- Securing operational excellence

An ecosystem for holistic, datadriven automation

With the launch of Voith's ecosystem MillOne in 2025, the market-leading full-line supplier is taking the next important step on the way to a completely autonomous paper mill. The new platform combines all relevant systems, optimizes processes in real time, and enables the intelligent connection of all production steps. All information necessary to navigate and organize production is available in real time on a dashboard and can be discussed immediately or used to initiate interventions if needed. This way, a single team of operators can control several machines. At the same time, the system keeps track of everything and draws its own conclusions intelligently. Thanks to these close links between all applications, potential sources for error can be identified early in pre-analyses and eliminated.

FutureProofing NOW!

Highly automated processes have the potential to stabilize and optimize operations, thereby freeing up operators and process managers for more value-adding tasks. Process managers will be able to keep an eye on production performance while also being proactively informed of potential areas that could be immediately improved. At the same time, autonomous operations cut out many of the more stressful elements of mill management and allow the mill manager to work remotely.

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