

AN INDUSTRY AT A TURNING POINT

AI and Digitalization in Metal Processing



DIGITAL

The metal processing industry stands at a critical turning point. Companies that fail to consistently embrace digitalization and artificial intelligence (AI) face an existential competitive disadvantage. AI plays a key role here, as it can analyze large amounts of data, take over routine tasks, and support complex decision-making. There are already several practical approaches that companies in steel and sheet metal processing can use today to increase efficiency and unlock new potential.

Skilled Labor Shortage and Rising Customer Demands

The severe shortage of skilled workers is already hitting the industry hard. Qualified employees are becoming increasingly scarce. At the same time, customer demand is rising rapidly: shorter delivery times, customized solutions, and maximum precision are becoming the new standard.

Companies that continue to rely on manual processes risk not only losing customers but also steadily eroding their competitiveness.

Without consistent digitalization and AI, inefficient processes, rising costs, and an ever-shrinking workforce will become a new reality. In the long run, this could pose an existential threat to companies in the steel and sheet metal processing industry.

Left Behind by Progress

Historically, the steel and sheet metal industry has experienced continuous technological progress. Initially, technical drawings were created entirely by hand — typically on a drafting board with pencil and ruler. This method required not only a high degree of experience and precision but was also time-consuming and prone to errors.

In the 1980s, the transition to digital methods began: Computer-Aided Design (CAD) systems made it possible for the first time to create digital drawings. At the same time, Computerized Numerical Control (CNC) machines became established, allowing digitally created drawings to be processed directly.



In the 1990s, software-based programming for the automatic generation of machine-readable NC code became established. Software such as OmniWin from MesserSoft made it possible to automatically generate cutting plans for flame-cutting machines directly from CAD data (DXF, STEP).

This led to significantly higher productivity and accuracy. In the early 2000s, additional efficiency gains were achieved through material optimization software (nesting). These systems arranged parts optimally on metal sheets to reduce material consumption and save costs.

Today, however, companies are facing new challenges: a pronounced shortage of skilled labor combined with increasing demands for speed and precision. The digital methods used so far are often no longer sufficient to remain competitive.

Consequences of Technological Stagnation

Companies that ignore technological progress or only pursue it half-heartedly risk falling far behind. It is already evident that competitors relying on digital and automated processes can produce much faster and at lower cost.

The consequences of such technological stagnation are severe: customers turn away, delivery deadlines are missed, costs skyrocket, and profit margins shrink dramatically. Ultimately, this leads to market displacement and, in the long term, insolvency.

Approaches to Using AI

Some parts of the industry are already increasingly relying on AI-based technologies. The goal is to further automate processes and make more effective use of existing data. The possibilities are diverse—especially for potential scenarios related to production.

Automated Quotation Generation

Manual, slow, and error-prone processing of customer inquiries leads to lost orders and declining customer satisfaction. With the help of Natural Language Processing (NLP), companies can automatically extract data from customer requests.

By using this AI technology strategically, quotations can be created faster, more precisely, and in a standardized way significantly reducing manual effort.

Intelligent Analysis of DXF Files

DXF files often have inconsistent structures, with differently named layers and disconnected contours. This has long made automatic processing difficult. Error-prone and time-consuming manual data handling blocks production processes and drastically increases costs.

AI systems automatically recognize the types of layers (e.g., cutting lines, drill holes, or engravings) and group geometries into logical units. This data standardization ensures smooth downstream processing in subsequent stages such as production planning.

Evaluation and Use of Production Data

Actual production times often deviate significantly from the originally calculated values and are difficult to assign precisely to individual orders. AI analyzes historical production data, enabling more accurate calculations and improved forecasts for future production processes.

Predictive Production Planning

Planning complex production processes is often complicated by short-term changes and unforeseen bottlenecks. AI-supported Advanced Planning and Scheduling (APS) systems enable dynamic planning and optimization of production capacities. Their targeted use increases planning reliability, ensures better resource utilization, and helps avoid production bottlenecks.

More Revenue Through Recognizing Customer Patterns

The analysis of customer orders for typical patterns—such as materials, thicknesses, or batch sizes—is currently rare. As a result, strategic opportunities for generating additional revenue remain untapped.

Using clustering, time-series analysis, and forecasting, AI automatically identifies recurring patterns. The result is improved inventory management, proactive quotation strategies, and data-driven decision-making at a strategic level.

An Urgent Call to Action

The steel and sheet metal processing industry no longer has time to waste. Consistent digitalization and the use of AI are no longer optional they are essential for survival. They support employees, automate time-intensive routine processes, and enable data-based, well-founded decisions.

Now it is essential to launch pilot projects, consistently digitalize processes, and comprehensively prepare and structure the data foundation.

Companies that fail to act decisively risk losing market share, customers, and ultimately their very existence. Only those who leverage technological opportunities now and make strategic investments will be able to succeed in the long term.

About the Author



The author, Christoph Richter, is a Lead Product Manager at MesserSoft.

He is an expert with many years of experience in digitalization, Industry 4.0 applications, and consulting projects for numerous clients.



Free Online Consultation

Learn more about the opportunities of digitalization in the metal processing industry, its practical applications, and key process steps in a free initial consultation.

Simply scan the QR code and register for free.

More information at www.messersoft.com