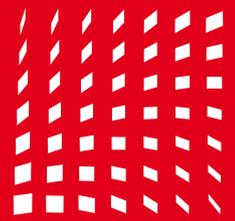# Megatrends in Printing Technologies

What influence do the megatrends of sustainability and digitalization have on processes, products, business models and the future of the industry?

drupa

no. 1 for printing technologies

Artificial intelligence

On the topics of sustainability and digitalization we offer you further white papers for **download**:

Sustainability

Resource efficiency

Recycling

Circular economy

Digitalization

From print to finishing: 4.0

Artificial intelligence

Platform economy

Connectivity

Artificial intelligence

Modern Print & Packaging technologies are equipped with tightly meshed sensor networks, inline inspection systems and digital measurement and control technology. Deep learning and artificial intelligence now provide a toolkit to reap the harvest. They extract information from the second-by-second growth of production and machine data that points to impending quality problems, imminent malfunctions*, machine wear, or hidden causes of recurring faults. Such condition monitoring, based on continuous data evaluation, makes it possible to fully exploit the service life of wear parts and operating materials, to proactively plan and synchronize repairs and maintenance and therbey to minimize machine and plant downtime. However, the potential of intelligent data evaluation methods is far from exhausted. Artificial intelligence is far better at recognizing complex relationships in large amounts of data than the human brain.

The Print & Packaging community uses this advantage to compare anonymized data from many millions of production cycles from thousands of users in order to leverage untapped productivity potential through this AI-supported benchmarking. Thanks to deep learning methods, inline inspection systems do their job reliably even when printing systems are running at full speed. In paper production, AI combines findings from continuous process data analyses with documented empirical knowledge from process engineers in order to be able to operate systems trouble-free even in borderline areas. Where precise web guiding is required in winding, slitting, and printing processes, learning systems help to overcome the limits of mechanics. To do this, they continuously analyze the smallest control deviations and calculate how these can be compensated for in the next cycle – the AI-supported precontrol, therefore, ensures that tolerable deviations do not become errors. In printing processes, intelligent algorithms ensure that the desired color saturation is achieved with minimal ink input. This is just as important for cost and resource efficiency as the use of machine learning in packaging design. Based on comparative simulations, the systems run through various designs in a very short time and determine the one that guarantees the highest output of visually appealing, stable, and fully recyclable packaging with the lowest material input.

These are the first steps in a megatrend that will change the Print & Packaging industry on many levels in the coming decades. Wherever the complexity is too high for human thinking, the data volumes too large, and the processes too fast, AI will sooner or later prevail. However, it takes time because the systems do not have intuitive intelligence. Rather, they have to be trained at great expense for their respective tasks before they can independently deepen and refine this learned knowledge in daily practice. The effort is worth it, however, because once AI is learned, it improves process quality without fatigue, without being mundane, and with steadily increasing performance. Applications range from optimized design and layout in prepress to the combination of mass customization and automation or optimized production control for a large number of different print jobs, to closed-loop control throughout the process chain or data-based predictive maintenance that minimizes unexpected production downtime**.

More information

*Application-related background on artificial intelligence in production at https://www.vdma.org/artificial-intelligence

**Advanced article series on the use of AI in the printing industry https://info.advanced-uk.com/artificial-intelligence