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?

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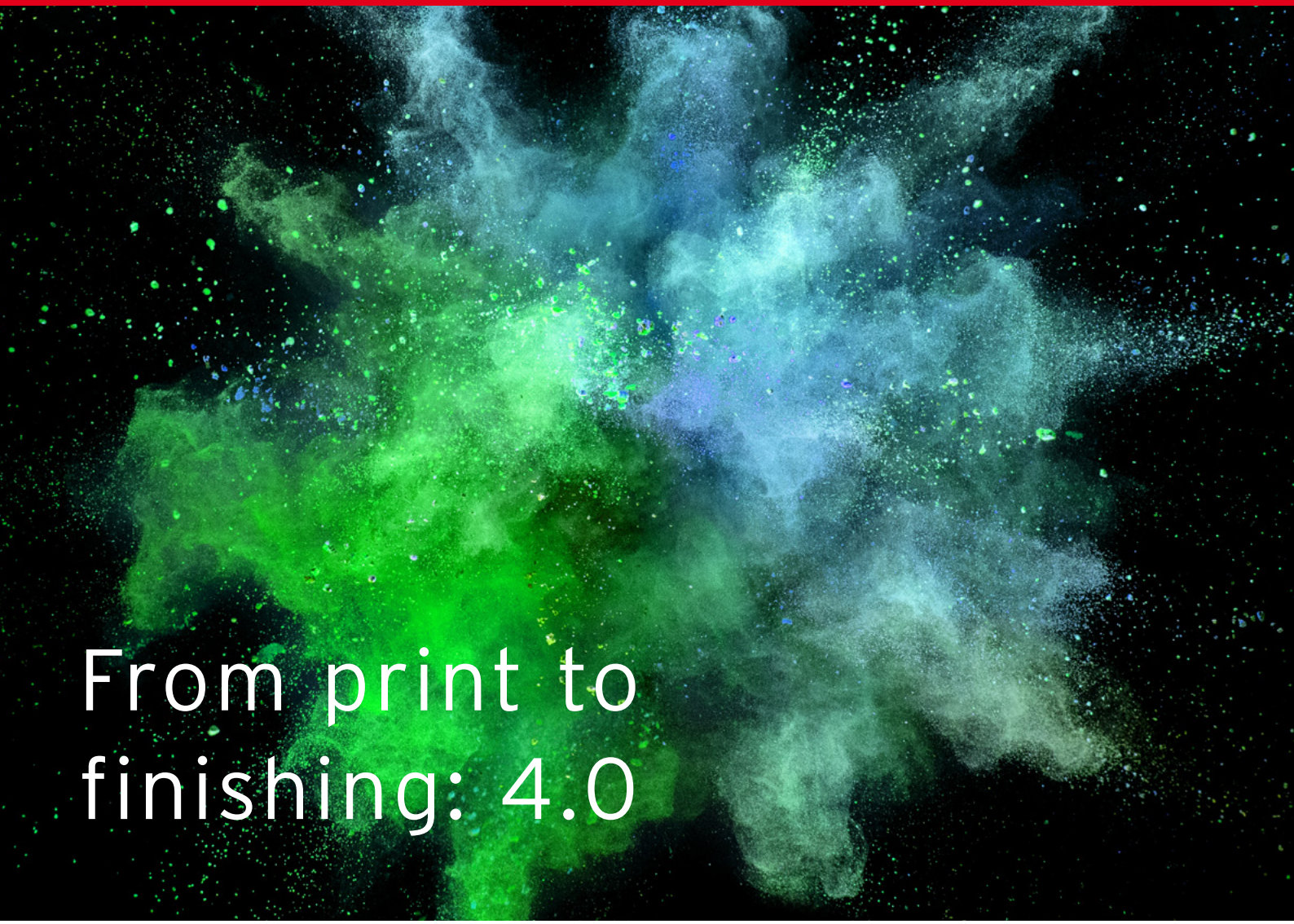
no. 1 for printing technologies



From print to finishing: 4.0

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

Sustainability

Resource efficiency
Recycling
Circular economy

Digitalization

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Artificial intelligence
Platform economy
Connectivity

From print to finishing: 4.0

Continuously networked, digitally controlled, quality-monitored, fully automated, vertically from the sensor to the cloud and horizontally integrated across company boundaries – these buzzwords summarize the most important technology trends on the road to Industry 4.0*. What is more important for users is what specific benefits they will derive from each of them. Answers are provided by a look at the economic development in the Print & Packaging sector:

- Cost pressure and increasing competition
- The trend toward globalization continues
- The quality and environmental awareness of the customers is increasing
- Run lengths are falling and large orders are called off in batches as required
- Demand for individualized/personalized print products on the rise

Print and Finishing 4.0 provides the right answers to these challenges. Automated, inline quality-monitored data and process chains simultaneously guarantee maximum efficiency and top quality. Inspection systems detect the smallest color and position deviations in printing, embossing, or finishing at every stage from the artwork to finishing and find missing dots, commas, and faulty characters in all languages. Where the human eye cannot keep up, or can only do so slowly, image processing ensures process reliability, precision, and efficiency when setting up new print jobs. Therefore, startup waste and misprints can be reduced to a minimum. This fully automatic makeready of new jobs and the seamless linking of previously separate work steps to form end-to-end process chains are the key to successful, high-quality production despite declining run lengths. The more intelligent and autonomous Print & Packaging technologies become, the less dependence there is on the experience of qualified specialists, which in many places is only available to a limited extent.

Thanks to international standardization efforts, machines and systems from different suppliers can now generally communicate smoothly with each other. The Open Platform Communications Unified Architecture (OPC UA) provides the appropriate context**, which is being recognized by more and more industries and players. Where an end-to-end data flow from prepress to postpress is guaranteed, process chaining quickly follows suit. Instead of the usual stagnation between individual process steps, the duration of which depends on the availability of personnel, a continuous production process is created. Capacity utilization increases, the need for storage space decreases and monotonous tasks such as breaking out die-cut folding boxes no longer have to be done by hand. At the same time, data-based processes increase flexibility. Finishing 4.0 solutions come with the claim to produce error-free from the very first copy – and thus to reduce to a minimum the expensive rejects of the already printed, cut, and finished intermediate products at the end of the 4.0 process chain.

However, this only covers some of the new structures. In the background, sensors along the process chain continuously collect machine and production data. Part of this data is processed decentrally and cost-efficiently with edge computers close to production in order to feed the information obtained back to the control and regulation systems in the process without any loss of time. The larger, less time-critical part of the data flows into the cloud for further use and now increasingly AI-supported analysis.

Analogous to this vertically integrated data chain, horizontal integration ensures the close organizational networking of the players along the value chain. This allows previously separate competencies and know-how to be brought together. Users, suppliers of production hardware and software, developers of a wide variety of substrates and consumables and research institutes form cooperation networks to jointly further develop Print & Packaging technologies and process chains as well as better coordinate their respective products and processes. In addition, data integration and networking create the necessary transparency for efficient recycling and longer machine running times, for proactive maintenance, refurbishing – and thereby for the transition to the circular economy. And last but not least, horizontal integration paves the

way for simplified digital order processing, accounting, costing, personnel and order planning, benchmarking, inventory management, and much more***.

A final important aspect concerns the operation and service of printing, packaging, and finishing technologies. With the constantly growing database, the effort required to integrate new human-machine interfaces (HMI) and workflow solutions is decreasing. Using a smartphone or tablet, operators, service specialists, production planners, and managers can access the current machine and production data at any time. They always carry the control station of the smart process chain with them. Whether troubleshooting, maintenance planning, repairs, an overview of spare parts, consumables and operating material availability, documentation, track-& trace functions or forwarding printed rolls and sheets to finishers and postpress – in the process world of printing, packaging, and finishing 4.0, all that is needed for the manufacturing performance is the mobile device in your pocket. This is also an effective means of combating unproductive downtime in analog, highly segmented production. The trend is now toward HMI solutions that support operators and assemblers during maintenance and repairs through augmented, mixed, or virtual reality (AR/MR,VR). Especially with a shortage of skilled workers, this use of data and digital networking also opens up the potential for a highly productive Print & packaging world of the future****.

More information

*For more detailed information on the structure of Industry 4.0, please visit https://www.plattform-i40.de/IP/Navigation/EN/Home/home.html

**The OPC Foundation provides detailed information at https://opcfoundation.org/

***Application-related information about Industry 4.0 at https://www.vdma.org/digitisation-industry-40

****Interviews with decision-makers in the print & packing community: https://www.vdma.org/drucktechnik-papiertechnik