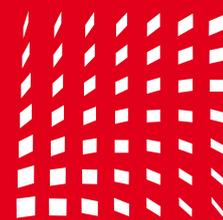


# Megatrends in Printing Technologies

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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technologies



## Circular economy

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### Sustainability

Resource efficiency  
Recycling  
Circular economy

### Digitalization

From print to finishing: 4.0  
Artificial intelligence  
Platform economy  
Connectivity

# Circular economy

Societies around the world are currently in transition from linear consumption (products and packaging are manufactured, used, and then disposed of more or less properly) to recycling, where materials are reused as much as possible. This is often accompanied by a loss of quality and use in inferior products. Product and packaging designers are countering this downcycling with ideas for upcycling - whether it's reusing classy folding boxes or tin cans to store household and food items, reusing non-toxic plastics from food packaging for toys or toothbrush handles, or giving them a second life as flower vases already built into the design of beverage bottles.

The supreme discipline of this reuse megatrend, however, is single-variety recycling processes without downcycling effects. For example, when PET bottles become PET bottles again in a closed cycle, when carrier films made of polyester are used again as carrier films after recycling - or when it is possible to reduce the indispensable fresh fiber supply in paper recycling to the limits of what is technically feasible. There is also the possibility of making machinery and equipment useful for much longer than before by using the highest-quality materials on the wear surfaces and through forward-looking maintenance. This requires new business models in which the suppliers of Print & Packaging technologies sell the machines and systems instead of using them and charge for them in pay-per-use models.

Whether closed material cycles or pay-per-use operator models for machines that run almost forever: The necessary keys to implementing the circular economy are provided by another megatrend: digitalization. Material cycles require transparency over the entire product life cycle. Material development, users, and recycling providers need precise information on how the respective product or packaging is manufactured and used, which potentially toxic substances it comes into contact with in the process chain up to disposal, and which processes take place during recycling. The example of film for sprayed cut flowers, which becomes contaminated in the process, illustrates the challenge. If it ends up in the same material stream as plastic vegetable packaging, it is difficult to

understand why the recycled film still contains traces of pesticides after recycling. A circular economy requires transparency here, just as it does in the pay-per-use of virtually trouble-free machines. Fully networked machines with close-meshed, possibly AI-supported condition monitoring are the precondition for such business models to actually become viable and worthwhile for all involved - including the long overlooked environment.



## More information

VDMA circular economy topic page:  
<https://www.vdma.org/kreislaufwirtschaft>

EU Action Plan for the Circular Economy  
[https://ec.europa.eu/environment/strategy/circular-economy-action-plan\\_de](https://ec.europa.eu/environment/strategy/circular-economy-action-plan_de)

UN Industrial Development organization (UNIDO)  
<https://www.unido.org/our-focus-cross-cutting-services/circular-economy>