

Print on Textile – The evolution towards a sustainable future

Touted as a cleaner, easier and quicker route to create and produce bespoke print, 'digital' is seen as the catch-all solution for many print applications. One area of continued interest is the textile industry. Over the last couple of decades, textile has emerged as one of the new frontiers for digital innovation. Some textile segments, however, are still relying on the traditional processes that have dominated production workflows for decades. And not without good reason.

The textile production chain has a high complexity level and a high component combination variability. Often, textile processes are not easy to replace by digital alternatives, because a minor change of one component can have a huge impact on the rest of the production process. The supply chain is also highly complex and includes process steps at various different companies, scattered across the globe.

A transfer from conventional to digital is therefore not as straightforward as many would like us to believe. Why move away from proven and reliable production structures? Why risk not being able to really replace what generations have perfected for decades? Why suffer from a learning curve just to be able to do exactly the same as before, but now with unfamiliar technology? And even if all of these uncertainties can be handled, what about cost, price and margin? Will digital tick all these boxes too?

Changing the conventional perspective

Traditional industries are built on generations of families and companies that have, for decades, been building their businesses, growing their capabilities and facilities, using huge set-ups of machinery and presses that last a long time and with little to no surprises in their workings. New technology is measured against the same metrics of the conventional and qualities are compared one on one as to serve as exact replication, rather than being considered to offer augmented possibilities that add product diversification and lead to extended portfolio opportunities. In many cases, quality properties of digital are still no match to traditional output.

One prominent driver for change in the textile industry has become the topic of sustainability and ecological footprint. A common belief is that the textile industry is among the top 5 of most polluting industries worldwide, where water and energy consumption, environmental pollution and product waste can no longer be neglected.

The fashion industry, for instance, has to cope with the growing awareness that almost 60% of what's being produced is ending up at landfills within a year after it leaves the production line. As much as up to 25% of globally produced chemical compounds are utilized in the textile-finishing industry. And just shy of 10% of global greenhouse gas emissions are said to be produced by the apparel and footwear industry. One pair of jeans requires around 7500 liters of water to get produced. One cotton shirt takes around 2700.

Impact on the print industry

It seems a daunting task to change and streamline the entire production and supply chain because of its complexity. Where to start, when considering the many factors? Obviously, the base material is the defining factor and the logical starting point. But what should be the argument? Less cotton, more polyester, with the reasoning that the natural raw material needs so much water and pesticides, whereas polyester can be recycled? Or less polyester and more natural fibers, based on the notion that polyester is a synthetic petrochemical product that has a high impact on natural resources and is non-biodegradable? Or maybe use an alternative such as manmade cellulose?

Whatever the argumentation, for the printing industry the direct impact of such questions is the choice of ink type and post-process requirements, such as fixation and washing. The combination of substrate and ink is the starting point for any development of print production systems. Printability, durability, quality; it all adds up to the definition of the parameters and specifications. In the complexity of the print process itself questions will arise as to whether a pre-treatment or coating is needed, whether inksets will deliver on color gamut or fastness properties and whether print heads allow to run at a certain speed, resolution and volume.

A matter of added value

On top of the technical production impact, another perspective on the textile segments that are directly linked to retail is the way the cost and value balance has developed over the last decades. Since the mid 90's the relative price of clothing in the EU has decreased by over one-third. At the same time, collection changes increased from seasonal to as much as 15 per year, resulting in "throw away" items that are worn less than 10 times. And while the overall price for cotton remained largely unchanged in 50 years, retail margin increased from 30% in 1970 to 70% in 2020. In other words, value has not been evenly distributed towards where products are actually being made, with lower labor and environmental standards being perpetuated.

When in Bangladesh a worker earns around €100 per month and there's evidence of forced child labor, the concept of value is not just about cost. In fact, the price vs. value perspective has pushed the industry towards mass production, low prices and large volume, all shifted from their original location to places across the globe, with raw materials being shipped in and finished products shipped back out. The consequence being that a Co2 emission can be more than 10 times the weight of the end-product itself.

The digital alternative

While digital inkjet printing may sound alluring as alternative to the conventionally produced goods to counter most of the negatives listed above, the main question is whether it should be regarded as optimization or replacement of an existing workflow with the same specifications of speed, volume, price and margin, *or* if it should be seen as an opportunity to change to local production for local markets.

If the general trend of awareness and active stance against consumerism and overproduction leads to lower production capacity needs and a change from product push to market demand, it may as well lead to 'Fashion as a Service' and 'Slow Fashion', with comparable approaches in other textile segments. This, in turn, would lead to the logical reassessment of how manufacturers and print production companies best anticipate with the development and deployment of their offerings.

It would be good for our industry to take a more holistic approach to the introduction of 'digital' in complex conventional markets. An association such as ESMA and their independent technology partners such as LMNS offer support to understand and develop new technology and application opportunities by means of conferences, consultancy and academy programs.

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