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Inkjet Textile Printing

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Introduction

The world market for printed textiles is around 30 billion square metres. By 2016 digital presses accounted for only 2.9% of this overall volume. Textile printing with digital presses represents an exciting high-growth market opportunity for print equipment and consumables suppliers.

This market is developing just as many conventional markets – such as book or newspaper print – are losing out to competition with online media.

Demand is booming and the value of this segment will nearly quadruple across the decade 2012-2021 – reaching $2.46 billion at its close. This contrasts positively with a conventional (non-textile) print market that as a whole is advancing at just 1.2% year-on-year for 2015-2020. Although within this non-textile sector, digital print performs better with a 6.0% CAGR for this period, the digital textile segment's growth is pegged at 17.5%.

This is seeing major print firms with a global presence like EFI and HP enter this market, adding smaller specialist firms to their technology portfolios.

This is building volume to the supply of digital textile presses, and having a parallel effect on supplies of consumables and post-press equipment. As this happens, bespoke technology solutions for inkjet are under development.

Textile printing with digital represents an exciting high-growth market

End-use applications

The increase in printing of textiles on digital presses is responding to demand from multiple segments:

- Clothing
- Household
- Displays
- Technical textiles

In 2016 clothing was the largest segment by volume (50.5%). Displays and signage were the second largest (35%). Household (7.9%) and technical textiles (6.4%) were relatively small in comparison.

Growth rates remain much higher than in corresponding markets for conventionally printed textiles. The greatest acceleration across the next five years will be in clothing, which has the key sub-segments of fashion at varying levels of luxury and sportswear.

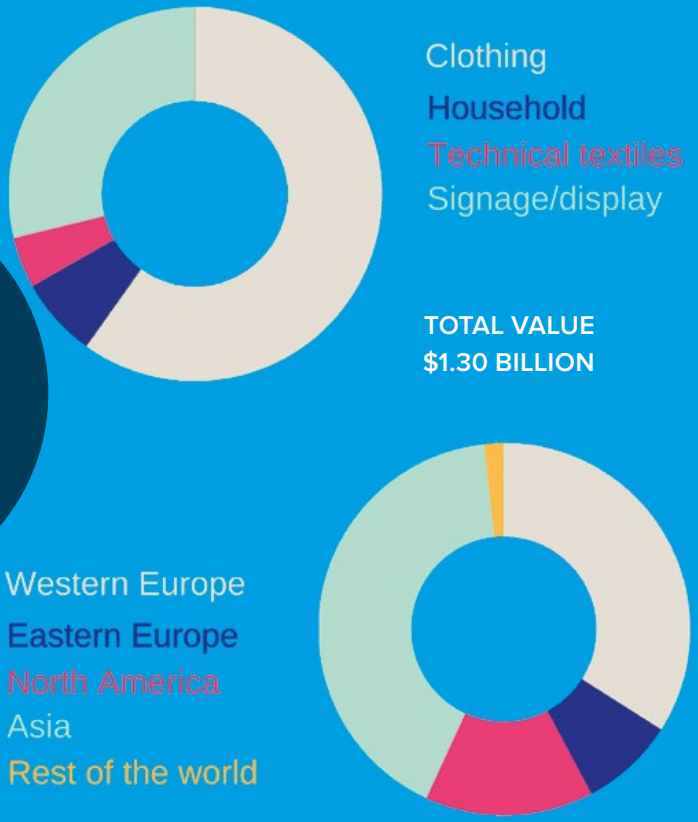
Household textiles is predicted to grow at the next fastest rate, and along with clothing, will take market share from technical and display textiles moving forward. It must be noted, however, that even the slowest growing application – displays – has a five-year growth rate of 13.9% for 2016-2021.

Machine developers are moving forward to support each of the end-use applications that are currently evolving. At last year's drupa (2016) Xaar launched its first aqueous printhead via a partnership with Ricoh.

The new Xaar 5601 includes the 3p0 printhead, which is capable of 800m^2/hour running solvent or aqueous ink at 600 dpi (in two colours) or 1,200 dpi (in single colour) with eight greyscales. The new printhead is aimed at the laminates and textile printing sectors.

Growth rates remain much higher than in corresponding markets for conventionally printed textiles

Digital textile segmentations 2016



Last year also saw Durst Imaging show their aqueous inkjet technology for textiles platform – Durst Water Technology – debuted on its Alpha series of printers.

The 180 TR offers dye sublimation printing for textile output, with production speeds of 200m^2/hour. The Alpha 180 TR features a maximum print width of 1.85m and is equipped with QuadroS printheads.

This print system is optimised for polyester and polyester-blend substrates making it especially suited to print home textiles, soft-signage and sportswear segments, as these commonly use polyester and polyester-blend substrates.

Market overview

Geographically Asia holds a 41% share of the global market by value in 2016, and will grow at the fastest rate through to 2021. Western Europe (34% in 2016) will, along with other regions, lose relative market share across the next five years.

It should be noted that the market in all regions will grow at over 13% year-on-year for this period.

Clothing

Clothing – also known as garments or apparel – is the largest segment for digitally printed textiles by volume and value. In 2016, this translated into a global market worth $770 million and 440 million square metres of substrate.

There continues to be mass-customisation through digital; but digital runs are also gradually encroaching on longer runs previously taken by conventional printing.

Clothing is the largest segment for digitally printed textiles

The trend towards more productive machines is resulting in fierce competition – and can be expected to lead to lower ink, material, and ultimately end user prices across the rest of the decade. Sportswear is the most lucrative sub-segment of the clothing market – 27.6% in 2016, or $213 million. This can be accounted for by the relative popularity of polyester-based materials in this area.

Fashion (14.5%) and haute couture (12.7%) – $112 million and €98 million in 2016 – are also significant sub-segments that include lucrative potential customers.

Investment in high-end equipment is allowing fashion cycles to accelerate, delivering photorealistic images and bespoke detailed garments.

The fast turnaround on digital presses means shorter initial runs can be ordered, allowing retailers to home-in and reorder on fast-selling stock, and cut warehousing costs. For online retailers this model can be extended even further, with garments printed in very short runs only once an order has been placed.

This is aligning with the changing nature of the fashion industry. A more competitive and interconnected world of fashion consumption means that the industry has now moved well beyond the traditional two-season (spring/summer, and autumn/winter) model. Instead each of these can now be divided into multiple mini-seasons, with new collections and launches for each.

Changing trends in the fashion industry is also the key driver behind the new machines from Kornit Digital. Its direct -to -garment machine shown at FESPA 2017 for the first time includes 16 printheads arranged in a double CMYK configuration, as part of the Israeli developer's Storm Duo range.

High-end equipment is allowing fashion cycles to accelerate

Designers like John Herrera have seized on the potential of inkjet printed designs in garments, raising their profile
Source: Epson

The machine is optimised for light clothing with a throughput of 200 prints per hour. PSPs in the garment customisation sector can leverage the machine's advanced capabilities to enhance their print offering.

It is supported by the availability and integration of a just-in-time (JIT) delivery approach for PSPs, thanks to advances in web-to-print ordering and job management software. The print industry is discovering JIT inventory has multiple benefits in terms of cash flow, investment, reductions in stock holding, minimisation of warehouse space and general operational efficiencies.

Household

With a value of $89 million globally in 2016, and 70 million square metres of fabric, household textiles is a fast developing market segment encompassing upholstery, carpets and floor coverings, bed linen and curtains – this is covered in detail in the sister FESPA white paper *New Frontiers in Interior Print*.

A good example of a machine developer paying close attention to this market sector is Mimaki. Announced last year, the Tx500P-3200DS has 3.2 m wide output and features 12 printheads that can achieve output of 130m^2/hour at 540 x 360 dpi.

The machine speaks to the trend for larger format printed fabrics that are now popular in the home. In addition, the machine is ideal for soft signage that is growing market share, because it can be transported easily, with the signage substrate and ink emitting no volatile compounds into the air, unlike traditional substrates used for signage applications.

The print industry is discovering just-in-time inventory has multiple benefits

Interior furnishings are a promising application for inkjet printing, and one that is now realising the transformative potential of ready customisation
Source: Mimaki

Technical textiles

Digitally printed fabrics used in utilitarian or industrial contexts, where decoration is not the primary motivator, are defined as technical textiles. This is the smallest and least dynamic of the digital textile print end-use segments. Worth $57 million in 2016, it will climb to $100 million in 2021, a year-on-year growth rate of 12%.

While small and slower growing than other key areas, like clothing and displays, technical textiles still has clear opportunities for both generalist and specialist PSPs, with automotive fabrics and protective clothing both expanding beyond the mean rate.

At FESPA 2017, ATPColor showed its DFP2000 machine, which the company claims is the world's only 5.3m-wide textile printer.

This type of machine aligns directly to the technical textile sector's demand for covering large expanses of wall space without sacrificing design quality.

Coupled with a product such as Squid from Lampe Textiles that offers designers and architects a self-adhesive woven fabric that can be applied to any surface, signage and decoration are about to enter a new phase of their development.

The cost dynamics of low print runs made signage one of the first segments to adopt inkjet

Signage

Displays – banners, flags and similar visual communications – are a segment where the creative freedom of digital production is evidently value-adding.

The cost dynamics of low print runs made it one of the first to adopt inkjet technology for various media and formats. This maturity is reflected in a growth rate of 13.7% for 2016-2021, pushing a market valued at $370 million to $658 million. The new opportunities this presents are explored in more detail in the sister FESPA white paper *Future Markets for Printed Signage*.

The new DX3200 from Agfa Graphics, for instance, offers large-format soft signage PSPs a new level of versatility. Showcased at ISA 2017, the new machine offers 2.3m wide print output at 1,440 x 540 dpi resolution. The dye sublimation print process in use has various quality modes with output speeds of up to 173 m^2/ hour. The 14 picolitre droplet size ensures vibrant colours can be printed with a wide colour gamut.

Epson has also been innovating in this area. The company now has several printers in the SureColor roll-fed printer range.

For soft signage PSPs, the SureColor SC 80600 is of particular interest, as it has a wider than average colour range – including a red that joins the nine-colour solvent inks (including a metallic silver) available in the Epson UltraChrome range.

New machinery

Although short-run work is attractive from a ‘per piece’ perspective, true volume growth will depend on the adoption of a new class of mass production roll-to-roll (RTR) digital textile machines.

Volume growth will depend on a new class of mass production roll-to-roll digital textile machines

Improving ink performance, including colour fastness, are giving new options for banners and other soft fabric signage
Source: Mimaki

Starting in technology hub locations – like North Italy – these are now seeing sales into traditional lower cost clusters like the Indian subcontinent.

The trend to higher productivity per printer is reflected by the fact that, while installed base will rise by 76% from 2016-2021, the total output by volume will rise by 124%. World print equipment sales for digital textile printing will double in these five years, from $811 million at its beginning to $1.63 billion at its end.

This productivity boost is attributable to larger print firms, like EFI, Epson and Mimaki entering this segment, with acquisitions of smaller dedicated textile print companies, many of which located in a historic hub for R&D work in the Como region of Italy.

Chinese producers are also active in this area helping to meet booming demand domestically and across Asia. Critically this will build scale and a global perspective to the production of high productivity textile printers.

Equally important, the enhanced profile will stimulate the development of better inks and media that will further boost the output quality and cost profile, with EFI now collaborating with DuPont to develop a range of pigment-based inks to achieve a broader strategic goal.

EFI is a good example where investments have been made in new technology for the rapidly developing industrial textile printing sector. EFI's Reggiani Renoir Flexy was launched at FESPA 2017. It offers PSPs a fast entry into textile printing.

Using EFI's new 'Dynaplast' technology the press has the capability to handle a wide range of textile substrates including stretchable materials and woven cloth up to 1.8m wide. The eight printheads have a production speed of 400m^2/hour and resolution up to 2,400 dpi.

[A] productivity boost is attributable to larger print firms entering this segment

And the gap between industrial and commercial textile printing continues to close. PSPs are constantly looking to expand their customer base without the need to continually invest in specialised printers.

Mimaki and its TX300P-1800 is a direct-to-textile printer emphasises versatility, printing onto an extensive range of natural and synthetic fabrics, offering PSPs an entry point into new textile print segments that may have previously been closed to them.

FESPA 2017 also saw the release of three new machines from DGI. The 3.2m-wide FT-3204X output can print onto papers and fabrics (simultaneously if required) on its two 1.63m media rolls. Again, this offers a bridge technology between paper and textile substrate printing that PSPs are looking for.

New fabrics

A main limitation for digital textile printing is the reliance on synthetic polyester fabrics, which are necessary for the inks from dye sublimation printers to bind to. FESPA 2017 saw the release of J-Teck3's dispersed digital and sublimation inks aimed specifically at the polyester printing sector.

A main limitation for digital textile printing is the reliance on synthetic polyester

Compatible with Kyocera (J-Tex P-E) and Epson (J-Tex P-K) printheads, the pigments are offered in nine colours with high performance when rub and washing are considered, making them ideal for the sportswear markets.

The most promising solution is to evolve pigment inks beyond technical and signage applications to open new markets in various clothing sub-segments, as well household interiors.

Increasing the range of fabrics inkjet presses can print on will help fuel the expansion of digital fabric printing into more and more areas
Source: FESPA

Pigment's key advantage is that it is flexible and can be used to print on almost all fabrics, whereas dye sublimation requires polyester, or polyester-blended materials for the dye to bind to.

Solvent pigment is a category of ink often used in mid-market wide format display printing, but it cannot be used in clothing or household décor, where the printed textile can contact human skin.

Development work remains to be done, including developing lower particular pigments that do not clog tiny inkjet nozzles, improving colour gamut and permanence, and most importantly building volume to lower the unit cost of these inks.

A major advance for pigment printing has been made by Bordeaux Digital Printink. Its Eden PG ink set for textiles has the ability to adhere to a range of textile substrates including cotton, silk, polyester and Lycra.

Available in low and medium viscosity blends, the ink has Oeko-Tex and GOTS certifications, making it safe for highly sensitive applications such as baby clothes.

New PSPs are looking to enter the textile printing sector. As they do this there is a desire for hardware and ink combinations that are efficient and cost-effective to install, and have an upgrade capacity.

To align with this Bordeaux has also taken the unusual step of entering the hardware market with its Velvet Jet PB180 printer. This has the capability of print speeds of up to 120 m^2/hour from four printheads; which can be upgraded to eight or 16 heads when needed.

Pigment's key advantage is that can be used to print on almost all fabrics

Conclusion

As machines, inks, substrates and finishing has evolved, inkjet textile printers are seeing their markets expand. This is happening in parallel to wider industry changes that are favouring digital printing – like lower print runs and a premium on customisation – and a willingness for print service providers to embrace new business models. Textiles though are also reaching outside of their traditional markets.

Fabric signage was an early adopter of digital but is still expanding at over 15% per year, with new machines coming to market that offering new throughput efficiencies and wider colour gamuts that include metallics.

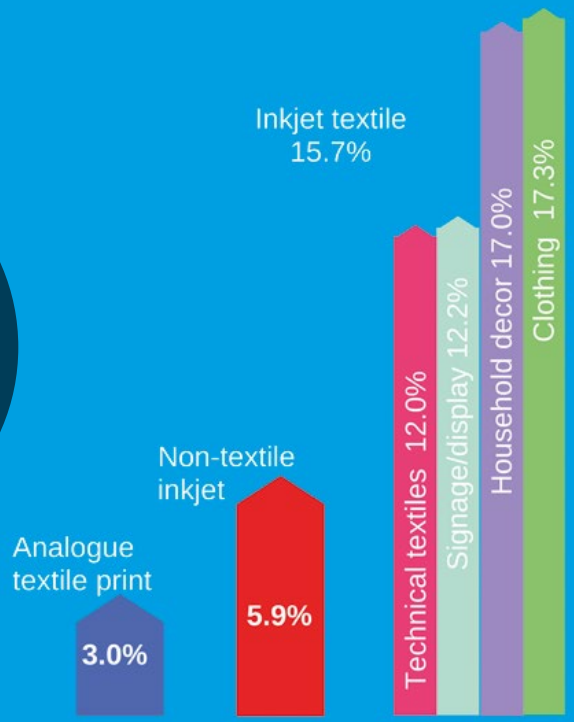
The industrial and commercial sectors are also now paying much more attention to what was previously only possible with a range of rigid substrates that have poor environmental credentials.

Digital textile printing is coming of age. Despite rapid growth, there is still great room for expansion in the fabric production industry, which is supported by consumer trends including the evolution of fast fashion and online ordering. In volume production, new, faster roll-to-roll platforms will allow inkjet to take work from screen presses at longer runs.

The other principal route that will sustain inkjet textile prints strong growth profile is the adoption of new ink and fabric combinations – like aqueous pigment formulations – that allow it to penetrate new end-use applications, especially in home décor and garments.

Digital textile printing is coming of age – there is still great room for expansion

Mean annual growth by value (2016-2021)



Digital will grow five times faster than analogue textile printing and two and a half times faster than non-fabric inkjet

Source: Smithers Pira