Digital Textile Printing Has Come of Age

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Digital textile printing has officially entered a new age. The global market for volume of printed textile is around 27 billion yards per year, growing at three percent. It is estimated that about 250 million yards is currently printed digitally. The growth curve of digitally printed yards has steepened over the past two to three years and it is expected that by 2016, the volume will be well over one billion yards.

Does digital textile printing finally make sense as a mainstream solution to serve the needs of the signage and other markets? Has the technology progressed to the point of it being viable to more than a few companies that have mastered its complexities? Is there a network of reliable vendors of the various components of the printing solutions? Is now the right time to jump into the business of printing on textiles digitally and is there money to be made at it? Let’s take a look at the evolving digital textile market.

US vs. Europe

One only needs to look at what is happening in other parts of the world to see that now is the time for companies in North America to invest resources to participate in the projected growth of digital textile printing. Some European countries, particularly Italy, Turkey and Spain, along with Brazil and India, have embraced digital textile printing to the point where they have idled some of their screen printing equipment in favor of printing textiles digitally. They are producing yardage of all types of products including apparel, home furnishing, interior decoration and signage.

The major drawbacks of printing digitally, namely speed and cost have been, and continue to be, addressed. Digital printers now in production reach speeds of 75 yards per minute. Companies are realizing running costs in the range of $0.50/yard compared to $0.35/yard for rotary screen printing. When the benefits of no screen engraving, no color kitchen and reduced manpower are factored in, the value proposition for digital printing can be justified. This, along with the flexibility in design enabled by digital printing and the favorable environmental impact has set the table for significant growth.

The US is currently a minor player in printing textiles, so when you combine the growth of the business globally and the fact that the US is behind other regions of the world in printing textiles digitally, there is the basis for a significant
Digital textile printing is a growing market and will continue to grow as a viable mainstream option in the specialty imaging community.

Opportunity to Jump into the Market Now.

Many of the designers, brand holders and large retailers are based in the US. The awareness among these groups regarding the advantages of digital printing has grown and products are showing up on store shelves that have been digitally produced.

Also showing up in more abundance in these same retailers is fabric or “soft” signage to enhance the message being delivered by the brand holder or retailer. There will be some inertia to overcome by companies looking to provide the market with textiles printed digitally in the US as customers have established vendors in Asia and India that provide their products.

The advantages of digital printing, however, are best utilized by having the production closer to the retailers. The nirvana of the retailers is to have the cash register drive the supply chain to the point that when a product is sold at the cash register, a message is sent to the manufacturers to replenish it. Digital printing is a major enabler of this goal. Additionally, the global market is changing. China’s middle class is growing significantly and more of China’s resources are required to meet their domestic needs. The resulting longer lead times and larger minimums cause retailers to carry more inventory.

Fabric Advantages & Disadvantages

Printing onto fabrics in general is significantly different than printing onto paper, vinyl and films. The characteristics of the fibers of the textile being printed and how they are woven and what treatments are present all affect the printing. Considering these characteristics, there are significant advantages in printing digitally versus analog, such as screen printing, offset or gravure.

The most obvious advantage is reduced run sizes. Being able to print short runs at a reasonable cost enables companies to produce samples efficiently and introduce a new line of printed fabrics to measure sales potential. With the advent of faster printers, now even production runs of thousands of yards can be efficiently printed. Another major advantage is the flexibility of design. No longer does an image need to be separated into a manageable number of colors for screen printing or some other analog method.

In Europe, it is common to find designers that know the design they are creating will be going through a digital workflow so they create designs with more than 50 colors. Some claim that this actually may be a disadvantage of digital printing. Some markets that have been served by screen printing have a need to replenish inventory.

Fabric Popularity

<table>
<thead>
<tr>
<th>Market</th>
<th>Polyester</th>
<th>Cotton</th>
<th>Nylon</th>
<th>Silk</th>
<th>Blends</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sign and Banner</td>
<td>A</td>
<td>B</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Flag</td>
<td>B</td>
<td>A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home Furnishing</td>
<td>B</td>
<td>A</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apparel</td>
<td>A</td>
<td>A</td>
<td>B</td>
<td>B</td>
<td>A</td>
</tr>
<tr>
<td>Technical Textile</td>
<td>A</td>
<td>B</td>
<td>A</td>
<td></td>
<td>B</td>
</tr>
</tbody>
</table>

Fabrics are listed in terms of popularity with “A” being more popular and “B” less popular.

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with more product. Often the orders for this replenishment are small in volume and lend themselves to digital. For example, in the home furnishing business, designs may stay in the market for more than 10 years, but as a design ages, the popularity declines.

Concerns also have been raised whether digital print output could match the screen printed product. It is possible to match screen printing with digital, and software is available to ensure the color matching is essentially exact. Screen printing effects, such as trap and mesh artifacts, can be rendered to the image. The other two major disadvantages that have been lodged against digital printing is speed and cost and recent developments of hardware and ink have defused these issues.

With regards to signage, digitally printed fabrics for point-of-purchase applications, trade show and event decoration, and interior decoration brings the advantage of reduced weight of the printed fabric versus a vinyl substrates drastically reducing freight costs and allows for more efficient storage. The flexibility and soft hand of fabric makes it ideal for applications where the graphics will be contoured. There is an esthetic appeal with fabric that is not possible with other substrates. This combined with the sustainable aspect of digitally printed textiles fuels the demand to the print providers.

A Growing Market
Polyester fabrics comprise more than 40 percent of all the printed textiles that are manufactured today. This market share has increased over the past two years due to the global high prices of cotton caused by recent shortages. It is not clear if cotton will recover this share as prices have dropped in some cases a few months. A convenient way to categorize machines from different vendors is to classify them in terms of speed. Class One machines will print five to 20 yards per hour. Class Two machines will print 20–80 yards per hour. Class Three machines will print 100–800 yards per hour. And Class Four machines will print as fast as 75 yards per minute.

After deciding on the market, fabric, and ink, selecting the proper printing platform is next. For printing on polyester there are two fundamental options — direct-to-fabric, or sublimation transfer. Assuming you opt for a wide color gamut, dispersed dye ink can be used for both. There are two types of dispersed dye. Low energy dispersed dye can be either printed direct or transferred. High energy disperse dye does not transfer well and is best suited to print direct. High energy dyes are typically for light fast.

Heat transfer requires a good quality coated transfer paper on which you digitally print the mirror image, and then transfer to the polyester fabric in a heat press. The polyester does not need to be pre-treated to accept the image. For direct-to-fabric, the best results are obtained by using a fabric that is pre-treated to control the dye migration.

It is also important to use a printer that has the proper fabric handling capabilities to avoid head strikes. After printing, the image needs to be “fixed” by using a heat press. The same equipment used in transferring can be used to fix direct printed fabric. Another method of fixation commonly used in Europe is steam. This is effective for applications where ink penetration is important.

Determining which solution is the best is subjective. With a fabric that is properly treated, the quality of printing is essentially the same. By direct printing you eliminate the need and cost of transfer paper but you should use pre-treated fabric for best results, which will increase the cost of the fabric. The transfer process may induce more waste due to misalignment issues, which is not the case for direct print. On the other hand, any print quality issues will cause wasted fabric when printing direct. The bottom line is each solution can be equally cost effective.

Speed & Width Considerations
After deciding whether to transfer or direct print, the speed and width of the printer should be the determining factor when choosing the optimum printer. This should be based on your expected volume, growth potential and payback. It is not unusual to expect a payback of less than one year and in some cases a few months. A convenient method to categorize machines from different vendors is to classify them in terms of speed. Class One machines will print five to 20 yards per hour. Class Two machines will print 20–80 yards per hour. Class Three machines will print 100–800 yards per hour. And Class Four machines will print as fast as 75 yards per minute.
Another convenient rule of thumb is to estimate a profit per machine hour of the printing machine. Assuming a relatively busy workload for the printer, the profit per machine hour can be calculated by estimating the sales revenue on a price per yard basis, and then estimating the cost elements of the yard of fabric or paper, ink consumed to print the yard, ink price and operator cost per hour. The average print speed is then used to make the calculation.

For example, a Class One machine running at 10 yards per hour yields a profit of $100 per machine hour assuming a selling price of $20 per yard, and a fabric, ink and labor cost of $10 per yard. By employing this rule of thumb in your business you can manage the printer assets in a way that helps you maximize its money making potential. The faster the printer (higher class), the more profit per machine hour achieved.

The Class Four printer could achieve $2,500 per machine hour or more. The printers have become more user-friendly and the RIP software has improved significantly. While it is not as simple as plug and play due to the nuances of fabric, particularly if you print on a variety of different fabric types, it does not require you to be a textile technologist to have success.

There are several resources available to help, including your printer manufacturer and/or dealer, ink supplier, fabric supplier and software RIP provider.

Digital textile printing is a growing market and will continue to grow as a viable mainstream option in the specialty imaging community. The flexibility in design, the favorable environmental impact and the increase in production speed all contribute to this market’s growth and it is only a matter of time before the North American market jump in.

Mark Sawchak is currently managing partner/owner of Expand Systems, LLC, a digital textile printing solutions provider. Sawchak and his wife Ann started the business in 2007. From 2004-2007, Sawchak worked at Fotowear, a distributor and market leader of digital transfer paper where he worked in product development and sales capacities. Prior to working at Fotowear, Sawchak worked at Kimberly-Clark Corporation for nearly 20 years, serving in various marketing and sales positions in their specialty paper division.

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