State of the Digital Textile Printing Industry: Technology and the Innovation that Drives Growth

Ron J. Gilboa, Group Director

November 2017

The Dynamics of Apparel Industry

- Evolving China
  - Migration to South East Asia
- Fast fashion
  - Readily available, somewhat controversial
- Retailers competition
  - Competing for mind share
- Direct consumer online selling
  - Change the fundamentals of supply chain
  - Purchase activated manufacturing
- Reshoring
  - Local competitive alternatives to imports
- Industry 4.0
  - The potential impact of improved automation (i.e. 3d design, digital print, labor, cut & sew)
- Environment
  - Continued focus on sustainable processes for manufacturing and recycling

Source: FLICKR USER TOFUPROD
The Textile Mill Market 5% Growth Till 2020

- $667.5 Billion worldwide
- 4.8% Growth CAGR ’15-’20
- 83% Fabrics
- 17% Yarns
- Asia Pacific 55%
- Europe 21%

Image Source: Lady Bille Magazine

10 Top Textile Exporting Countries
Emerging Economies Gain Momentum

<table>
<thead>
<tr>
<th>Country</th>
<th>Textile Exporters</th>
<th>Annual % Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>106</td>
<td>-2.9%</td>
</tr>
<tr>
<td>European Union (28)</td>
<td>65</td>
<td>1.1%</td>
</tr>
<tr>
<td>India</td>
<td>16</td>
<td>-6.5%</td>
</tr>
<tr>
<td>United States of America</td>
<td>13</td>
<td>-4.7%</td>
</tr>
<tr>
<td>Turkey</td>
<td>11</td>
<td>-0.3%</td>
</tr>
<tr>
<td>South Korea</td>
<td>10</td>
<td>-5.7%</td>
</tr>
<tr>
<td>Pakistan</td>
<td>9</td>
<td>-7.6%</td>
</tr>
<tr>
<td>Chinese Taipei</td>
<td>9</td>
<td>9.2%</td>
</tr>
<tr>
<td>Hong Kong, China</td>
<td>8</td>
<td>13.2%</td>
</tr>
<tr>
<td>Viet Nam</td>
<td>7</td>
<td>9.2%</td>
</tr>
</tbody>
</table>

Source: WTO

© 2014 InfoTrends
www.infotrends.com
The Apparel Retail market 6% Growth Till 2020

- $1.2 Trillion world wide (Retail Selling Price)
- 5.7% Growth CAGR ’15-’20
- 53% Womenswear
- 31% Menswear
- 16% Childrenswear

Source: Marketline 2016

Image Source: Shutterstock

10 Top Clothing Exporting Countries
Decline in China Spell New Opportunities

Source: WTO
Online Shopping Gaining Momentum

- **Supply chain demands**
  - Small batch manufacturing
  - Faster turn around
  - Batch consistency
  - Increased automation
  - Local manufacturing

- **Customer expectations**
  - Creativity
  - Variety
  - Customization
  - Here and now

Still a Strong Market as Per Capita Apparel Spending Continues to Grow

Source: Statista
Environmental Impact – On Going Challenge!

- 5,000 gallons of water = a T-shirt & a pair of jeans
- Textile industry is one of the top 3 water consuming industries
  › China, discharging over 2.0 billion tons of wastewater annually
- About 15% of fabric intended for clothing ends up on the cutting room floor
- Americans throws away approximately 80 pounds of used clothing per person

Image Source: EDGE

How Does Textile Recycling Stack Up

Only 0.1% of all clothing collected by charities and take-back programs is recycled into new textile fiber!

- Corrugated Packaging, 90%
- Paper packaging, 71%
- Aluminum, 35%
- Glass, 33%
- Plastic, 13%
Worldwide Textile Dye & Printed Fabrics Amount to Estimated 450Bn M²

- Total textiles ~450bnM²+
  - Of which ~5-10% are printed textiles
- Dyed fabrics estimated at 360-460bnM²
  - Total textiles less Printed Textiles
- Printed textiles ~36 bnM²
  - Of which ~2.5% are digitally printed
- Digitally printed textiles 1.2bnM²

The Case for Digital Printing

- Creativity
  - Large repeat sizes
  - Print flexibility
  - Variety of creative design choices for printing
- Supply chain
  - Short run printing advantage
  - Reduced production space requirements
  - Less printed inventory needed
  - Sampling and production done on same printer
- Environment
  - Lower water and power consumption
  - Less chemical waste
  - Low capital investment
Wholesale Value of Digital Textile Printing $33 Billion in 2021
Dominated by fabrics aimed at garment manufacturing

- Garment are the lion share of value
  - Seasonality
  - Fast fashion
  - Sports & Casuals
  - Reshoring

- Décor and technical continued growth
  - Pigment inks & VAT Dyes
  - Pretreated fabrics

Source: InfoTrends 2016-2021 Digital Textile Printing Industry Forecast
Over 60% of value is attributed to high volume systems.

Scanning & single pass direct printing above 80 M²/hr.

Most are 1.8 meter wide used for fashion fabrics, some are 3.2 meters used in décor applications.

The category is dominated by European vendors however Chinese manufacturers are aggressively entering the segment.

Digital Textile Unit Placements Exceed 11,000 by 2021

Sublimation devices dominate unit placements with systems below 80 M²/hr.

Hardware & ink revenue is valued at ~$728 million in 2016 growing at a CAGR of 15% by 2021.

Sublimation in leads placements:
- Most units, below 80 M²/hr

Pigment ramping up ad décor segment grows.

Possible future entrants:
- UV and Latex
Reactive and Sublimation Inks Dominate Textile Volume
Industry adoption will shift ink mix to sublimation and pigment inks

- About 3.5bn M² printed textile are manufactured annually
- Digital fabric printing represents 3.5% of total print volume. (excludes graphics)
- Synthetics fabrics will be outpacing natural fibers by 2021
- Growth of pigment ink uses is fueled by improvements in pretreatment improvement in integrated manufacturing processes

Source: InfoTrends 2016-2021 Digital Textile Printing Industry Forecast

2017 1.6 B/ M² Digitally Printed Fabrics Worldwide =

© 2014 InfoTrends
www.infotrends.com
Technology in Mass Customization

- **Mass customization**
  - Purchase activated manufacturing
  - It's real, hear, it's now
- **PLM**
  - Brands and retailers tool set for collaborative management of product life cycle from concept, design, development, manufacturing and end of life
  - PLM encompass all suppliers in the value chain from raw materials to finished goods
  - Reduce critical matrices such as development time, time to market and margins
Technology in Design And Planning

- Computer Aided Design
  - 3D avatar visualization
  - 2D Mark optimization
  - Print ready
- Optimized companion to digital printing

Patrizia Pepe

“By incorporating EFI Optitex digital solutions into the company design and production workflows, we expect to decrease our time to market by 30%, while better streamlining our internal processes and significantly reducing our costs,” added Lombardo. “Moreover, we expect to launch high-quality offerings more frequently in order to meet our clients’ needs.”

Sebastiano Lombardo, Patrizia Pepe’s general manager

Technology in Printing

Textile Printers

- ColorJet
- D-Gen
- EPSON
- Mimaki
- MTEX
- Roland
- Aleph
- Atexco
- DURST
- Konica Minolta
- EPSON - Robustelli
- Reggiani
- Dover - MS

Single Pass

Single Pass Hybrid
Ongoing Technology Developments

- Higher speed production printing
  - Growing Single pass offerings
  - Higher end multi-pass system at ranging speeds and capabilities
  - Direct and paper sublimation improvements
- Adoption of Industry 4.0
  - Quality control and real time maintenance?
  - Increased digital integration of workflow
  - Signs of automation of complete system- design-print-finish-sew
- More inline pretreat/fixation
- Improved color consistency in manufacturing process
  - Custom RIP profiles for specific fabrics and ink type
  - Increase in quality assurance developments
- Ink developments
  - Dual Ink Systems
  - VATdyes
  - Recirculating heads
  - Pigment ink & binders
  - Ink concentration
- In-line pretreat/fixation
- Improved color consistency in manufacturing process
  - Custom RIP profiles for specific fabrics and ink type
  - Increase in quality assurance developments
- Ink developments
  - Dual Ink Systems
  - VATdyes
  - Recirculating heads
  - Pigment ink & binders
  - Ink concentration

Single Pass Printing - Continued Growth

<table>
<thead>
<tr>
<th>2011</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dover - MS Printing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Atexco</td>
<td>Konica Minolta</td>
<td>SPG Prints</td>
<td>Miyakoshi</td>
<td>Pyung-An</td>
</tr>
<tr>
<td>Flora</td>
<td>Hope Tech</td>
<td>Teckwin</td>
<td>New King Time</td>
<td>Mouvent</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ITMA 2019</td>
</tr>
</tbody>
</table>
Scalable Manufacturing Solutions

Traditional fabric manufacturing

About $550,000 – ALL IN

Source: MTEX
The On Going Challenge...

Hangzhou China

Typical Apparel Price / Cost Structure

Fabric (printed) is about 20% of Manufacturing Cost
Cut & Sew 72% of Manufacturing Cost

Cost to sew the dress: $35
Fabric: $10
Label: $1
Fee to the person selling it to retailers (5 percent): $2.30
For wholesale price, double that total and add shipping: $105
For the price tag, retailer typically doubles again: $210

Total Production:
Wholesale price:
Retail price:

Source: Portland Garment Factory
DAVID BADDELS/THF OREGONIAN

© 2014 InfoTrends
www.infotrends.com
SoftWear Automation - T-shirt Sewing Line
Vs. Current Sewing Lines

Comparison Chart for Current vs SWA

<table>
<thead>
<tr>
<th>Current # of Operators</th>
<th>SWA # of Operators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current # of Processes</td>
<td>SWA # of Processes</td>
</tr>
<tr>
<td>Current # of Output</td>
<td>SWA # of Output</td>
</tr>
</tbody>
</table>

*Output per 8 Hour Shift.
Digital Textile Fabric Printing...The Challenge

- **Technology**
  - Reliable print heads
  - Ink and media
  - Accessories (e.g. dryer, steam, wash, inspect)
  - Quality assurance
    - Maintain color consistency
    - Defect free print
    - Support discrete digital applications

- **Supply chain**
  - Manufacturing cost
  - Managing demands
  - Market access, brands
  - Workflow automation
  - Inventory management
  - Production capacity

Digital Textile Fabric Printing...The Opportunity

- **Democratize access to market**
  - Small & Large brands
  - Design flexibility, customization, colorways and complex print designs

- **Supply chain efficiencies**
  - Integration with PLM systems
  - Transition to Mass Customization
  - Fast reaction to changes in fashion trends (local manufacturing)
  - Shorter time to market
  - Reshoring

- **Production efficiencies**
  - Integration with Industry 4.0 processes
  - Augmenting conventional printing
  - Sustainable production
  - Printing short runs
  - Prototypes to personalized
  - Simplifying print production workflow
Thank You

Ron.Gilboa@keypointintelligence.com
@gilboar