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

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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%

Source: Marketline 2016

Image Source: Lady Brille Magazine
10 Top Textile Exporting Countries
Emerging Economies Gain Momentum

Source: WTO

Textile Exporters
Annual % Change

Billions ($)

% Annual Change

China
European Union (28)
India
United States of America
Turkey
South Korea
Pakistan
Chinese Taipei
Hong Kong, China
Viet Nam

-2.9%
1.1%
-6.5%
-4.7%
-0.3%
-5.7%
9.2%
-7.6%
13.2%
7

Source: WTO
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
10 Top Clothing Exporting Countries
Decline in China Spell New Opportunities

Source: WTO

China: 161, -7.3%
European Union (28): 117, 4.2%
Bangladesh: 28, 6.1%
Vietnam: 25, 4.8%
India: 18, -1.7%
Hong Kong, China: 16, -14.8%
Turkey: 15, -0.4%
Indonesia: 7, -2.4%
Cambodia: 6, -6.5%
United States of America: 6, -6.5%

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

![Graph showing apparel, footwear, and accessories retail e-commerce revenue in the United States from 2016 to 2022](source: Statista)
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 Stacks 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%
- Plastic, 13%
- Aluminum, 35%
- Glass, 33%
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
Digital Textile Printing Landscape

Apparel
- Fashion
- Fast Fashion
- Couture
- Sportswear

Accessories:
- Scarves
- Ties
- Footwear
- Bags
- Belts

Décor
- Upholstery
- Linens
- Drapery
- Wallcoverings
- accessories

Industrial
- Transportation:
  - Automotive
  - Aerospace
  - Marine
- Military
- Medical
- Carpets

Direct-To-Garment
- T-Shirt Printing
- Cut garment
- Accessories

Graphics Communications
- Signs/Posters
- Banners
- Flags
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 d 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

Source: InfoTrends 2016-2021 Digital Textile Printing Industry Forecast
Digital Textile Unit Placements Exceed 11,000 by 2021

Sublimation devices dominate units 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

Source: InfoTrends 2016-2021 Digital Textile Printing Industry Forecast
Reactive and Sublimation Inks Dominate Textile Volume

Industry adoption will shift ink mix to sublimation and pigment inks

- About 36bn 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 6.6 B/M² Digitally Printed Fabrics Worldwide =
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

Up to 80 m²/hr

Color Jet

D-Gen

EPSON

Mimaki

MTEX

Roland

Over 80 m²/hr

Aleph

Atexco

DURST

Konica Minolta EPSON - Robustelli EFI - Reggiani

Dover - MS

Single pass

Dover - MS

Flora

Hope Tech

Konica Minolta

SPG Prints

Single Pass

Hybrid

Atexco

Teckwin
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
- 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
  - VAT dyes,
  - Recirculating heads
  - Pigment ink & binders
  - Ink concentration
- 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
# Single Pass Printing – Continued Growth

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Scalable Manufacturing Solutions

Traditional fabric manufacturing
About $550,000 – ALL IN

Source: MTEX
The On Going Challenge...
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: $48.30
Wholesale price: $105
Retail price: $210

Source: Portland Garment Factory

DAVID BADERS/THE OREGONIAN
SoftWear Automation - T-shirt Sewing Line Vs. Current Sewing Lines

Comparison Chart for Current vs SWA

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<th>Current # of Operators</th>
<th>SWA # of Operators</th>
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<th>SWA # of Output</th>
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</table>

*Output per 8 Hour Shift.

Source: SoftWear Automation
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

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