ON DEMAND TEXTILES

The Colorful Challenge of Web to Print
WEB TO PRINT

• Textiles on the web
• E-commerce experience
• Customer expectations
• Digital textile manufacturing
• Spoonflower as a case study
• Technology solutions
• Digital workflow & color management
• Challenges for development
- Customers may be B2B or B2C
- Looking for unique, custom or DIY approach
- Setting demands an easy/low touch strategy
  - Products readily found
  - Ordering process must be understandable
  - Web tools that inform & empower
CUSTOMER EXPECTATIONS

- Rapid delivery
- Product appearance
  - Color
  - Texture
  - Image layout & placement
  - Image scale
- Product performance
  - Hand/feel
  - Color fastness to care & use
WEB TO PRINT:
A DIGITAL MANUFACTURING PROCESS

- Flexible - short runs/lots of variety
- Efficient - minimal setup/rapid processing
- Automated – workflow & systems
- Digital - rather than analogue production systems
WATERLESS PRINTING

- Significant for textiles
- Minimal processing
- Environmental footprint
- Ability to turn orders quickly
- Good fit for e-commerce
@ SPOONFLOWER

• Customers upload their own designs or shop from the marketplace
• Ultra short run – average order size <5 yds
• Process 1000’s of orders/day via automated workflow
• Spoonflower + Roostery
• Offices in Durham & Berlin
CRAFT, APPAREL & HOME...
BY THE YARD & HOME TEXTILES

- Swatches & fat quarters
- Whole yards/meters
- Pillows, tea towels, blankets
- Bed and table linens
- Wallpaper & gift wrap
DIGITAL WORKFLOW BEGINS AT UPLOAD

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DIGITAL TEXTILE - SOURCE IMAGERY

- Repeating surface designs or engineered prints
- Digitally designed or rendered from hand drawn & painterly sources
- Limited palette or full color & photographic images
- Average image size (pixels) $2782 \times 2825$
AUTOMATED ORDER PROCESSING

Considers:

• Printer platform
  • Pigment vs. poly
  • Hardware solution
• Color profile
  • Color arrangement
  • Optimized for fabric & ink properties
• Image layout
  • Repeat vs. engineered
  • Print width & length
• Rapid ingestion of many small jobs
OPPORTUNITY: STANDARDIZATION

• Data requirements vary by system
  • Gray scale color separations
  • Job identification elements
• Data flow must keep pace with printer
  • Send smallest unit
  • Standard definitions for layout options
• Standard format for print instructions (i.e. JDF? XML?)
PIGMENTS

- Natural fibers
- Simplicity of processing
  - Print/cure/cut/ship
  - Quality issues caught/resolved in process
- Wovens & knits
- Slower to develop/emerging for high speed
- Challenging to maintain
- Advancing color gamut
- Development of pretreatments for gamut & color fastness
DYE SUBLIMATION

- Polyester & Poly/Spandex blends
- Wovens & knits
- Well developed technology
- Large color gamut
- Color fast to wash & crock
- Less efficient
  - Print paper/transfer/cut/ship
  - 2 steps to identify color issues
  - Reprints take longer
COLOR EXPECTATIONS

Designers:
• Replication of design intent
  • Preview
  • Printed color
• Designer tools to support process

Purchasers:
• Fidelity to web preview
• Consistency across fabrics
• Previews & samples to support purchasing
CHALLENGE: COLOR OPTIMIZATION

Color arrangement:
• CMYK
• CMYK + R,G,O,B, LK

Fabric characteristics impact color:
• Natural vs. synthetic
• Texture & appearance
• White point
• Ink load
• Pigments change hand/feel

Preparation and finishing steps:
• Pretreatment impacts color penetration, density & fabric hand
• Disperse dyes develop through finishing
TECHNOLOGY CHALLENGE: PRODUCT VISUALIZATION

- Illustrating a product that is not yet produced
- Accurate representation of color
- Communication of drape and texture (i.e. look/feel)
- Photography vs. 3D renders
- Speed/complexity of generation for 1000’s of images
Most Pics In IKEA Catalogues Aren't Photos, They're 3D Renders

3D RENDERS
FOR 1000’S OF PRODUCTS

• Rapid generation (milliseconds)
• High quality
• A high level of fidelity between the render and the delivered product
  • Print position
  • Print scale
  • Material texture and drape
  • Color
• Mobile device - view & purchase
Rendering Multiple Products