Single Pass digital printing technology for cross-industrial printing

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IC2016 Leipzig

This work will introduce key-points, trends how new digital single pass technology can improve the overall image of the printing industry at mass manufacturing companies.

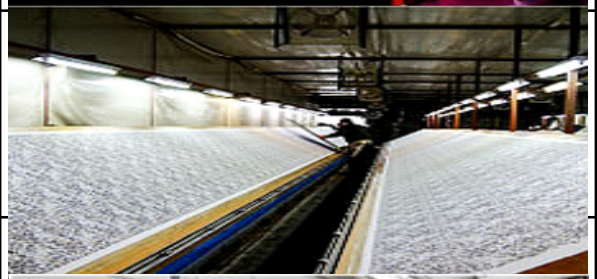
Content

- Printing Technologies and application
- Market segmentation and trend analysis
- Market sizing and forecasting
- Vertical industry analysis
- Opportunity assessment

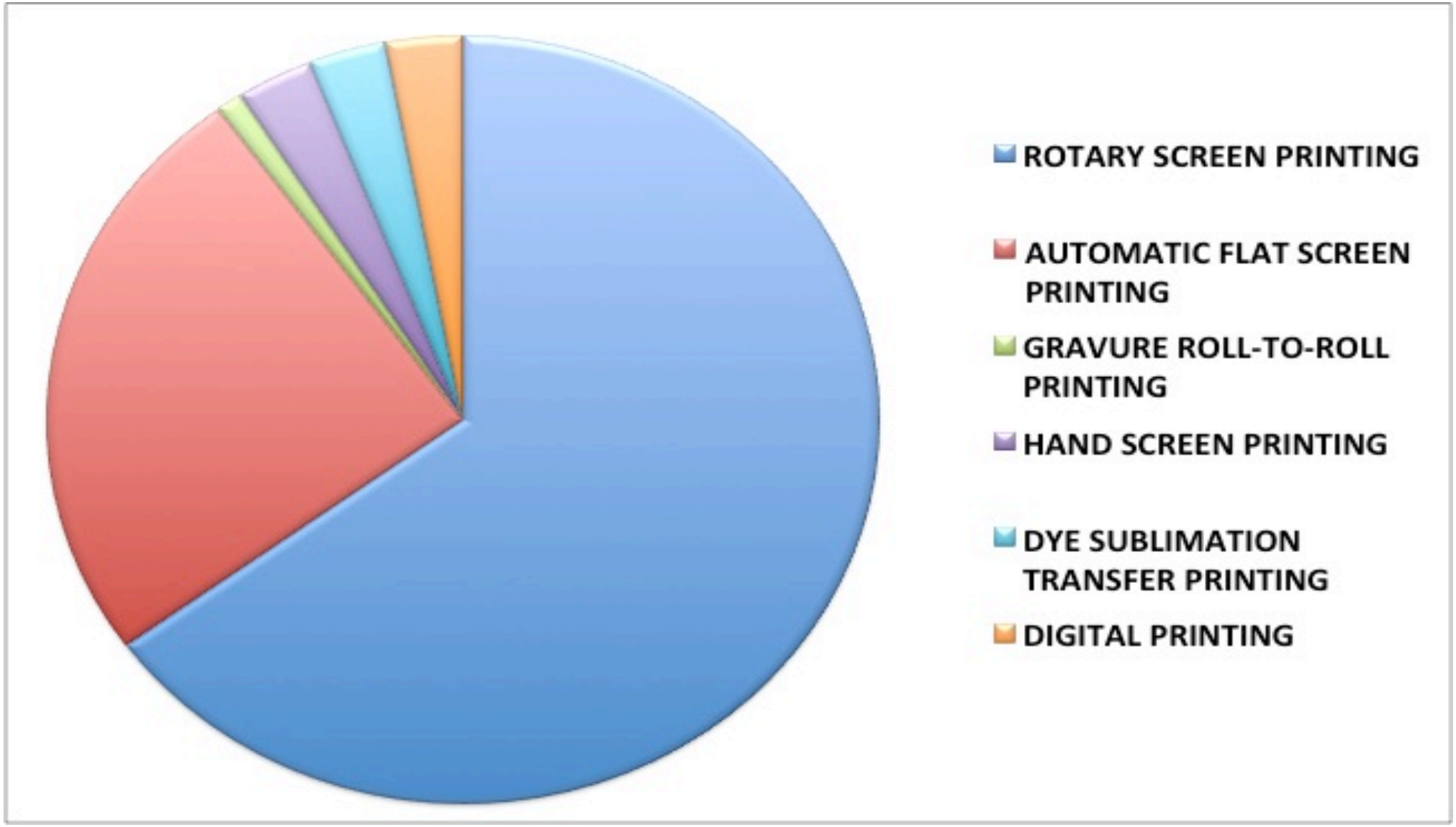
Content

- The ink requirements for the substrates to be imaged
- The typical operating environment where applications will be carried out
- Discussions

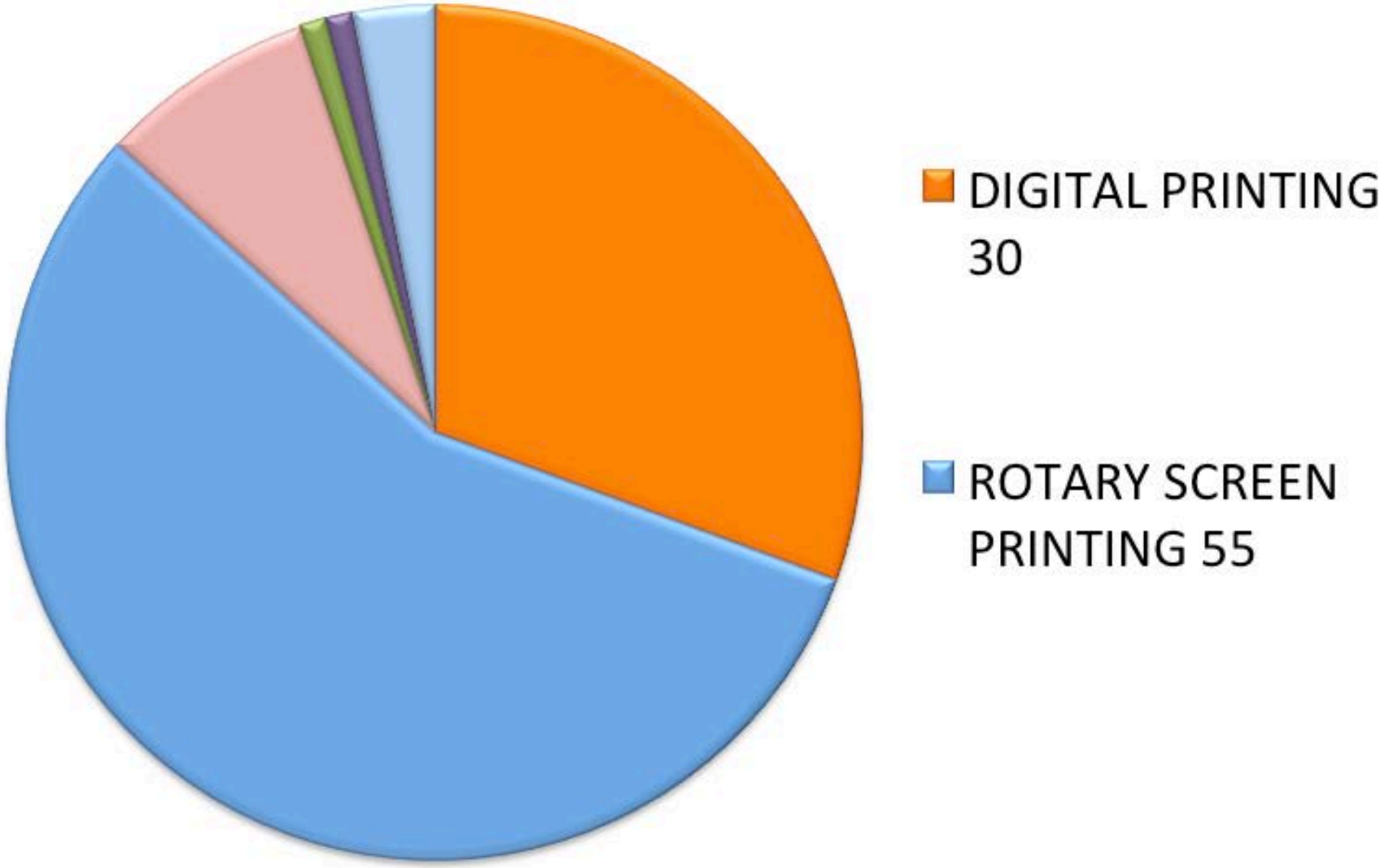
Printing Technologies and application

Printing machines and technology	Textile Imaging	Global % Share
ROTARY SCREEN PRINTING		**65**
AUTOMATIC FLAT SCREEN PRINTING		**25**
GRAVURE ROLL-TO-ROLL PRINTING		**less than 1%**
HAND SCREEN PRINTING		**3**
DYE SUBLIMATION TRANSFER PRINTING		**3**
DIGITAL PRINTING		**3**

Printing Technologies and application



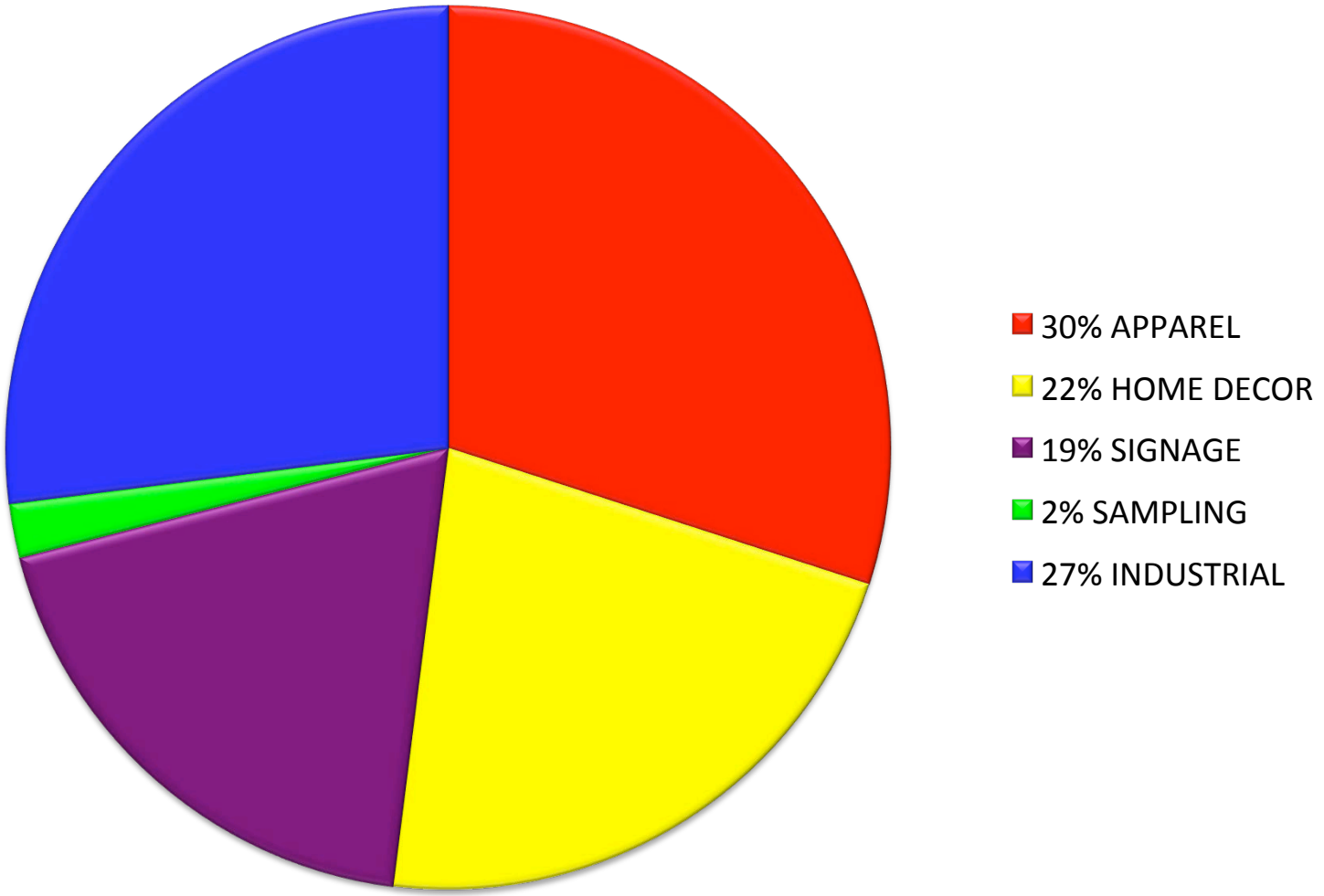
Printing Technologies and application



Printing Technologies and application

APPLICATION	ROTARY SCREEN PRINTING	AUTOMATIC FLAT SCREEN PRINTING	GRAVURE ROLL-TO-ROLL PRINTING	HAND SCREEN PRINTING	DIGITAL PRINTING	DYE SUBLIMATION TRANSFER PRINTING
CELLULOSIC						
Cotton	●	●	●	●	●	
Linnen	●	●	●	●	●	
Jute	●	●	●	●	●	
Ramie	●	●		●	●	
ANIMAL-BASE FIBERS						
Silk	●	●		●	●	
Wool	●	●		●	●	
SYNTHETIC						
Polyester	●	●	●	●	●	●
Nylon	●	●		●	●	
Rayon	●	●	●	●	●	●
Lycra (spandex)	●	●		●	●	

Market segmentation and trend analysis



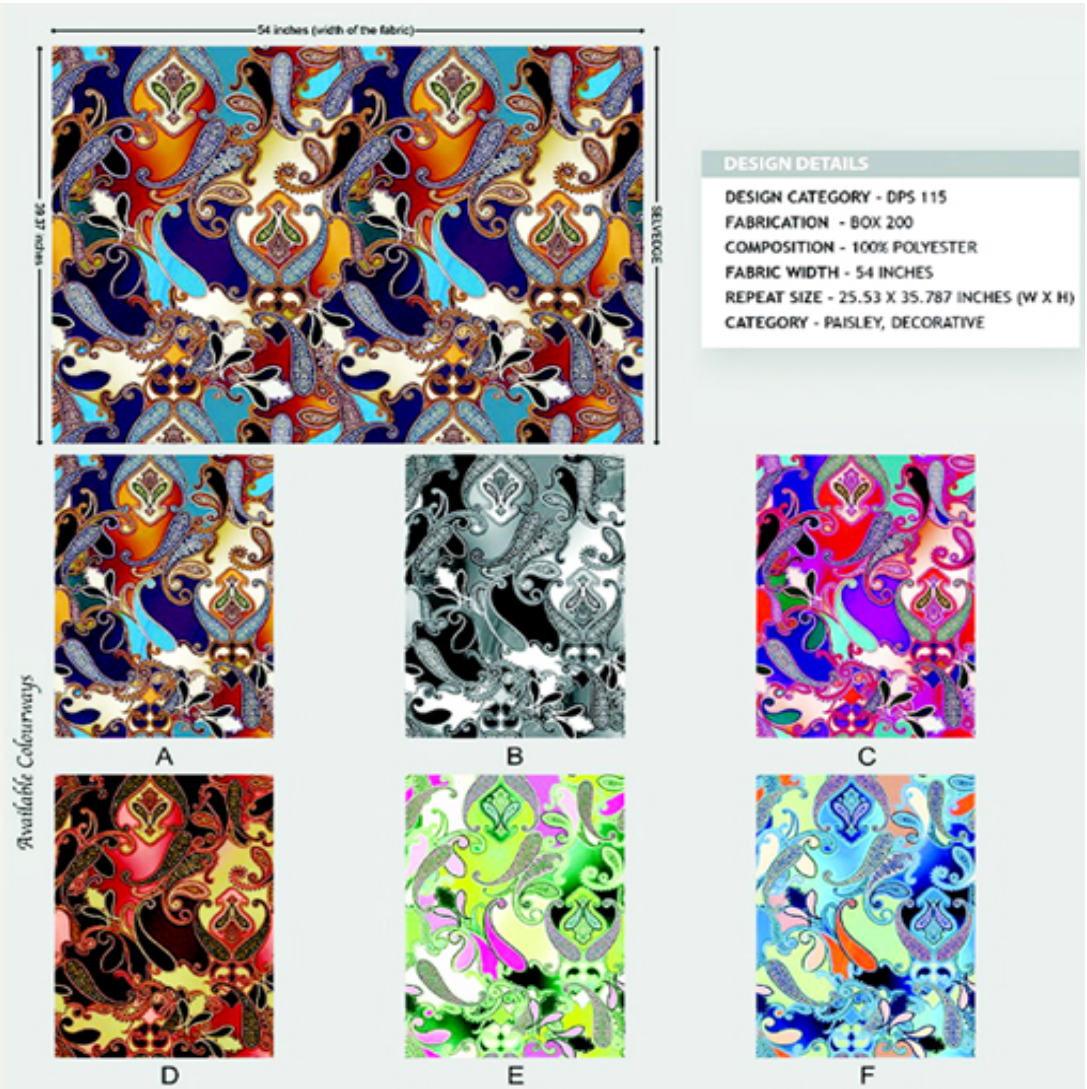
Market segmentation and trend analysis

APPAREL AND FASHION

roberto cavalli

Market segmentation and trend analysis

APPAREL
SAMPLING

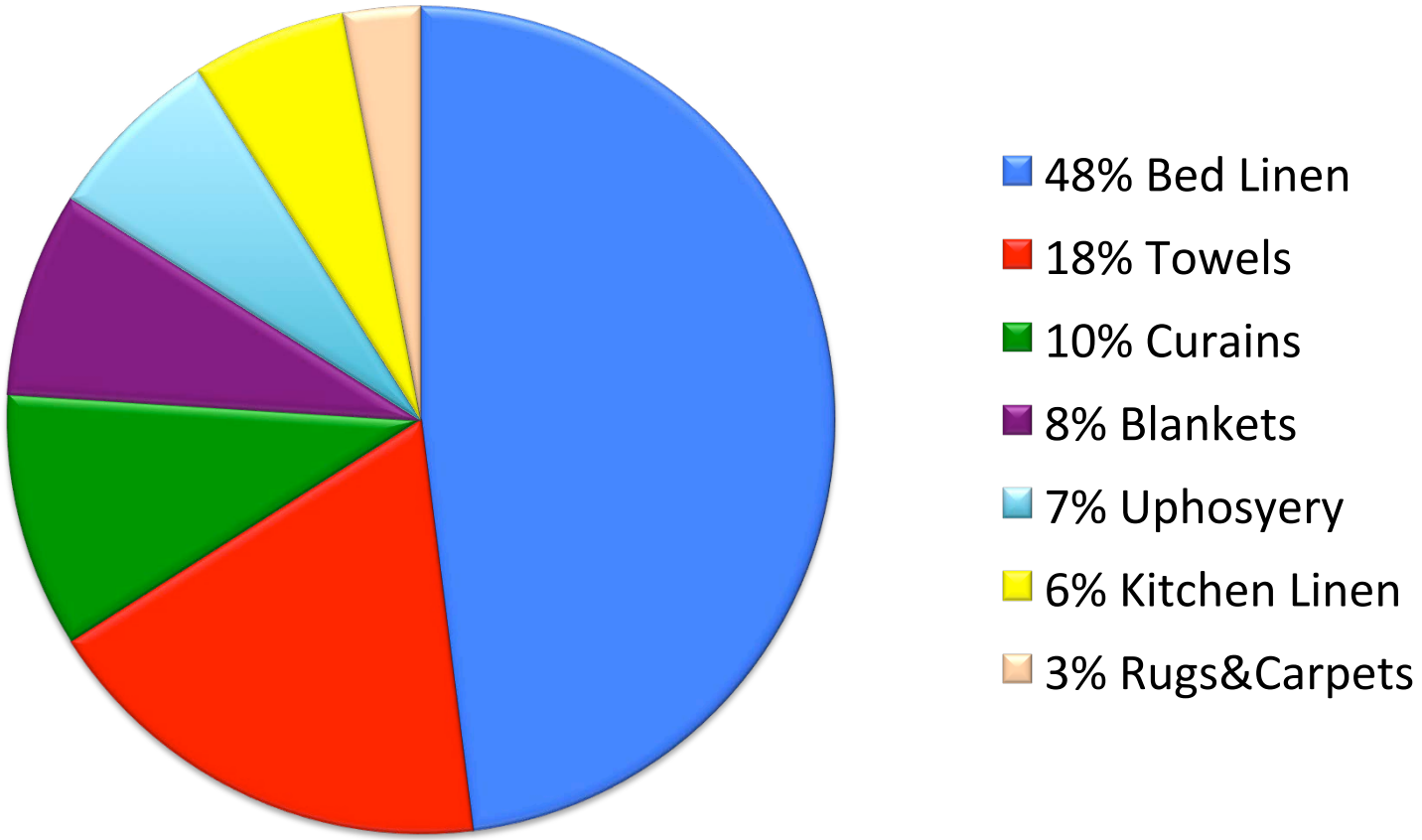


Market segmentation and trend analysis

HOME DECOR

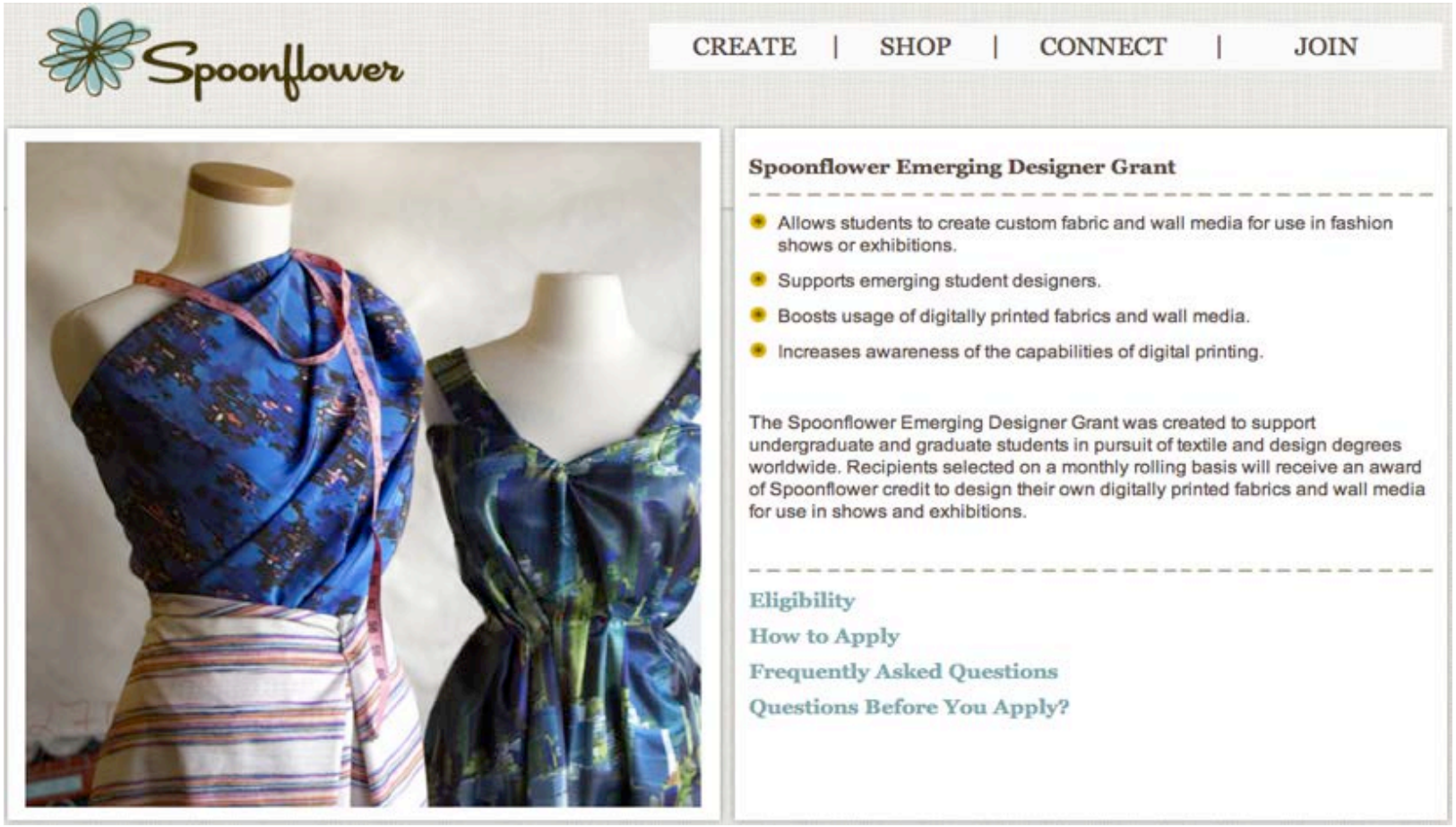
Market segmentation and trend analysis

HOME DECOR



Market segmentation and trend analysis

HOME DÉCOR new e-commerce



Market segmentation and trend analysis

INDUSTRIAL TEXTILE

Technical textile projected growth per annum is +5%, in averaged by all applications:

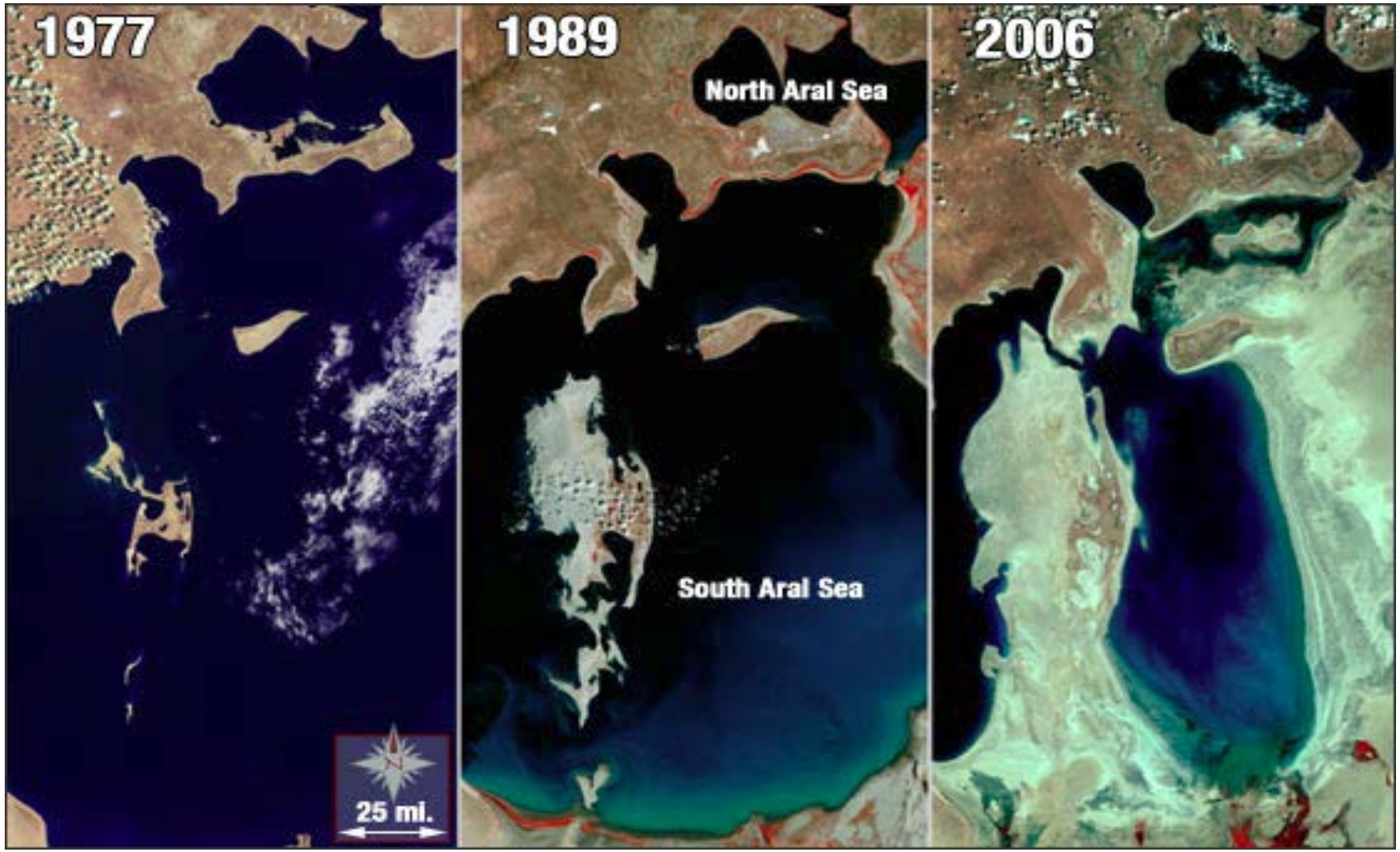
- Composites textiles (without Matrix) + 6% p.a.
- Nonwovens + 6% p.a.
- Woven, braded knitted, yam type textiles, nets, rope, carpets + 4% p.a.

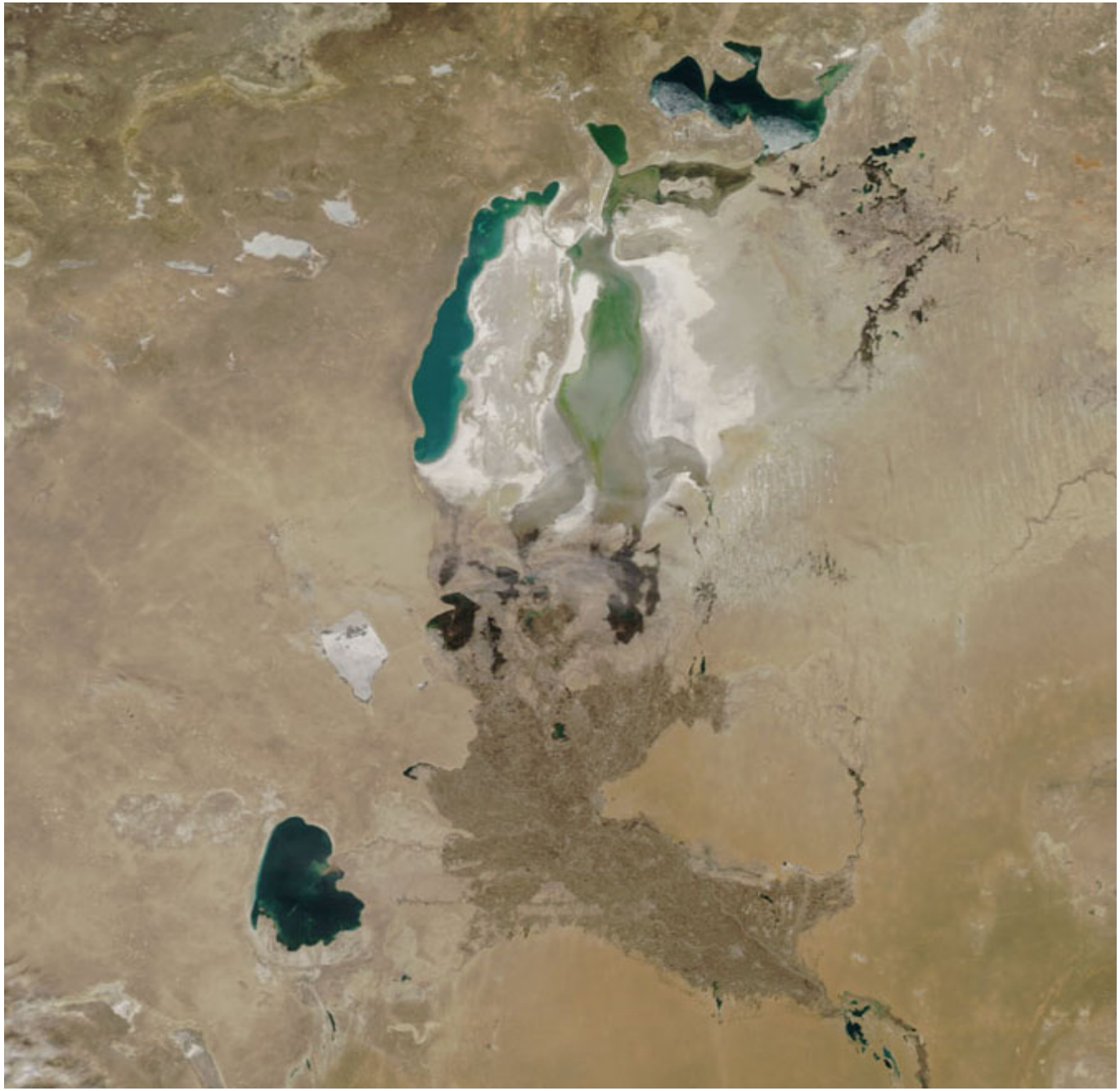
Market segmentation and trend analysis

Trends are to improve and save the Global Environment with digital textile printing technology:

- Reduction of water consumption up to 90%
- Reduction of CO2 emissions up to 25%
- Energy savings up to 37% per linear meter
- So called dry printing process
- Do not depend from the natural water sources

Market segmentation and trend analysis





Post-treatment

Washing

Post-treatment

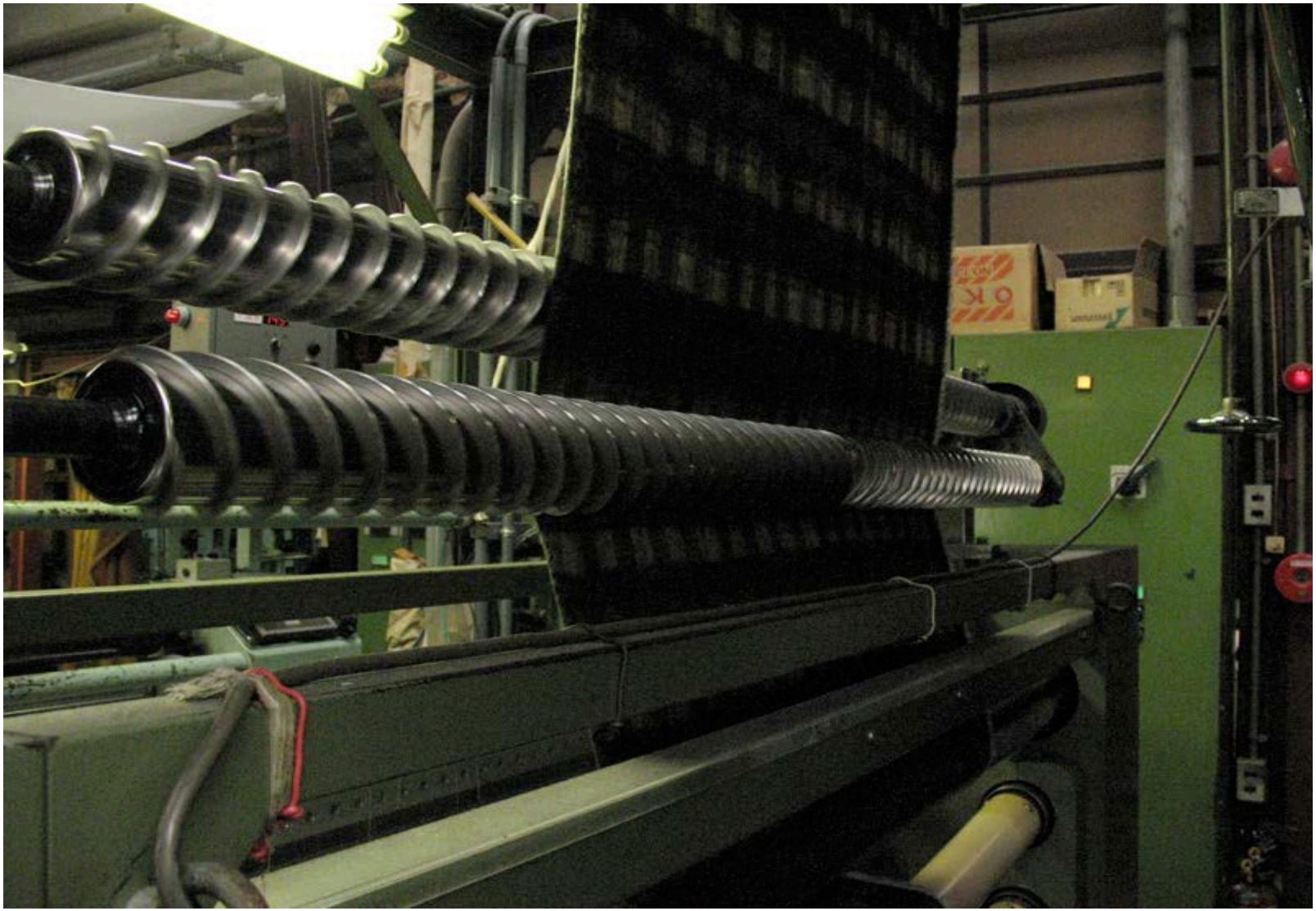
Heatset

Post-treatment

Drying

Post-treatment

Grain correction



Post-treatment

Decatizer

Post-treatment

Special tumbler

Post-treatment

Major challenge is to save water during and after the textile imaging!

Market segmentation and trend analysis

From this global scale business the digitally printed textiles be come more important people everyday life, due to be come unique and personal.

Todays total printed textile business covers about 35 bn. sqm of printed fabrics and estimates are that direct digitally printed fabrics gain up to 1 bn. sqm for the 2016

(statement of WTIN Analytics by James Rankin at ITMA2015).

Market segmentation and trend analysis

Trends:

- Time-to-market pressure of “Fast Fashion” adopt digital textile printing
- Signage printing offer favourable growth opportunity
- Custom-printed Upholstered Furniture a lucrative application for DP
- Improved print head and inks technology support Fast growth of DP

Market segmentation and trend analysis

All Major Segments will further develop the switch from analogue screen printing to digital printing, with the future potential of Single Pass digital Printing having the capability to increase digital Textile market growth even higher than the 26% predicted by WTIN Digital Textile Analytics studies in 2016.

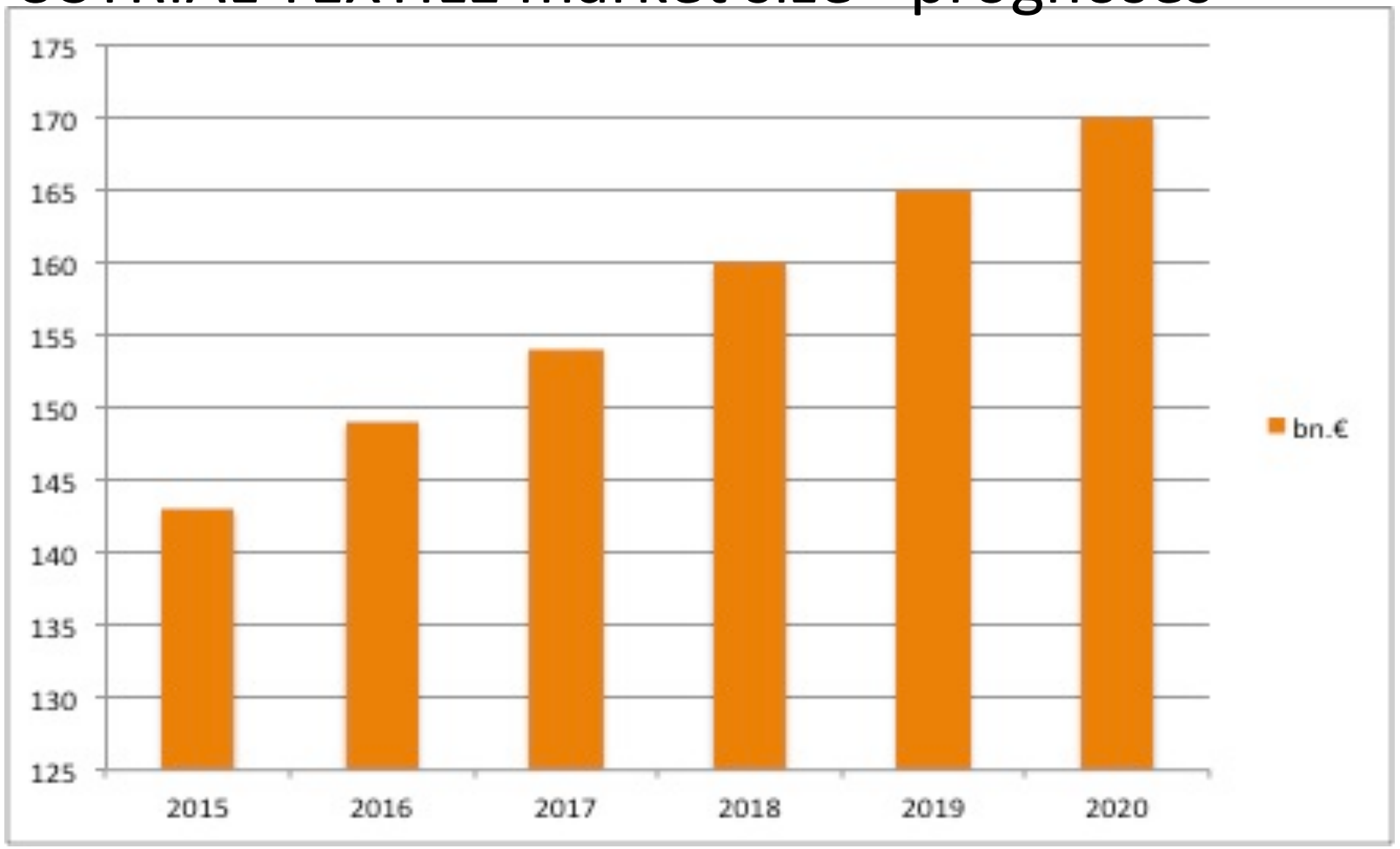
(statement by Provost Ink Jet Consulting at ITMA2015).

Market sizing and forecasting

- The textile industry is 4th largest industry of the world
- Total revenue annually is round 1 trillion euro
- More then 7 bn. customers
- Printed textile market size 35 bn. sqm (2014)
- Roll2Roll digitally imaged market size 954 M sqm (2014)

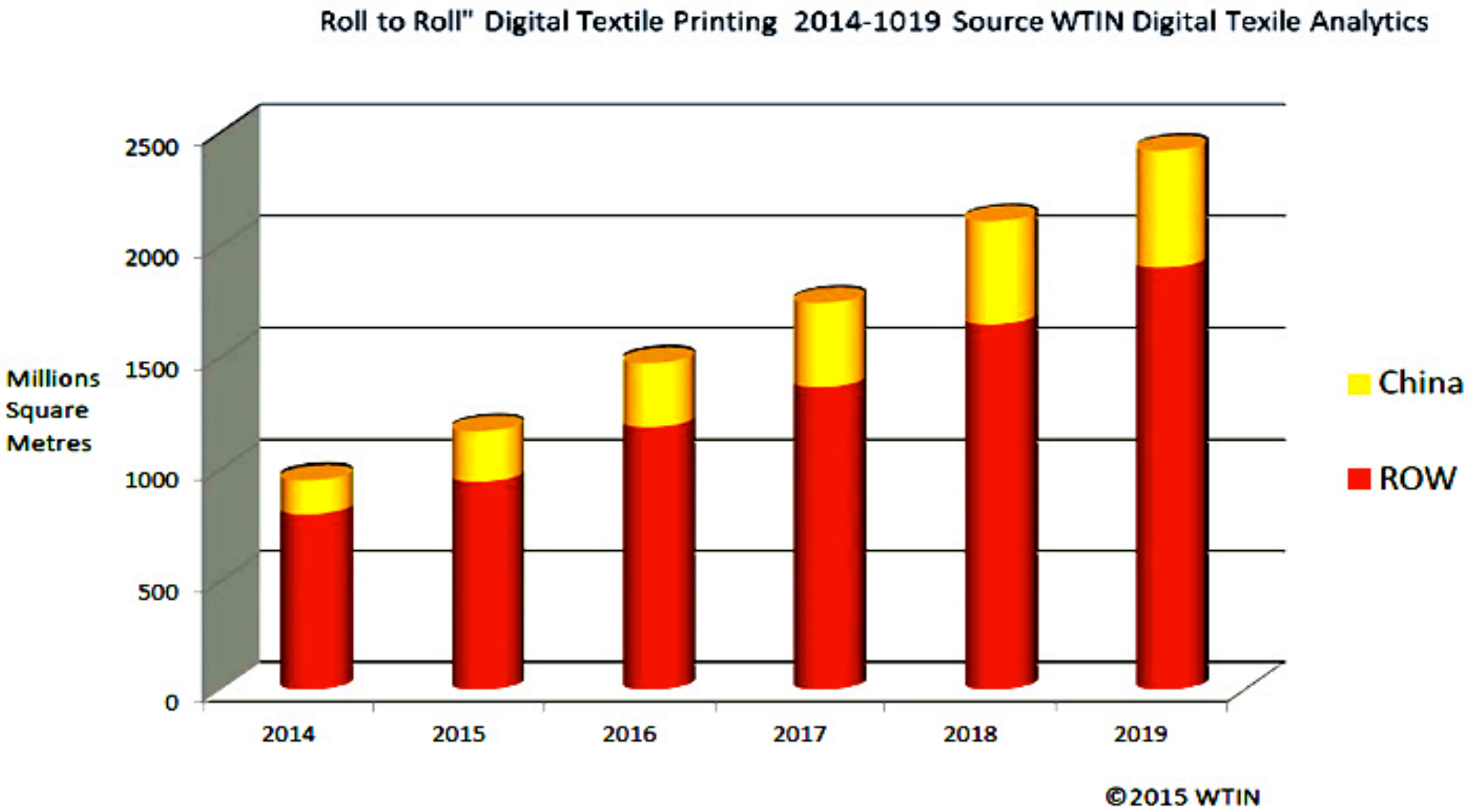
Market sizing and forecasting

INDUSTRIAL TEXTILE market size - prognoses



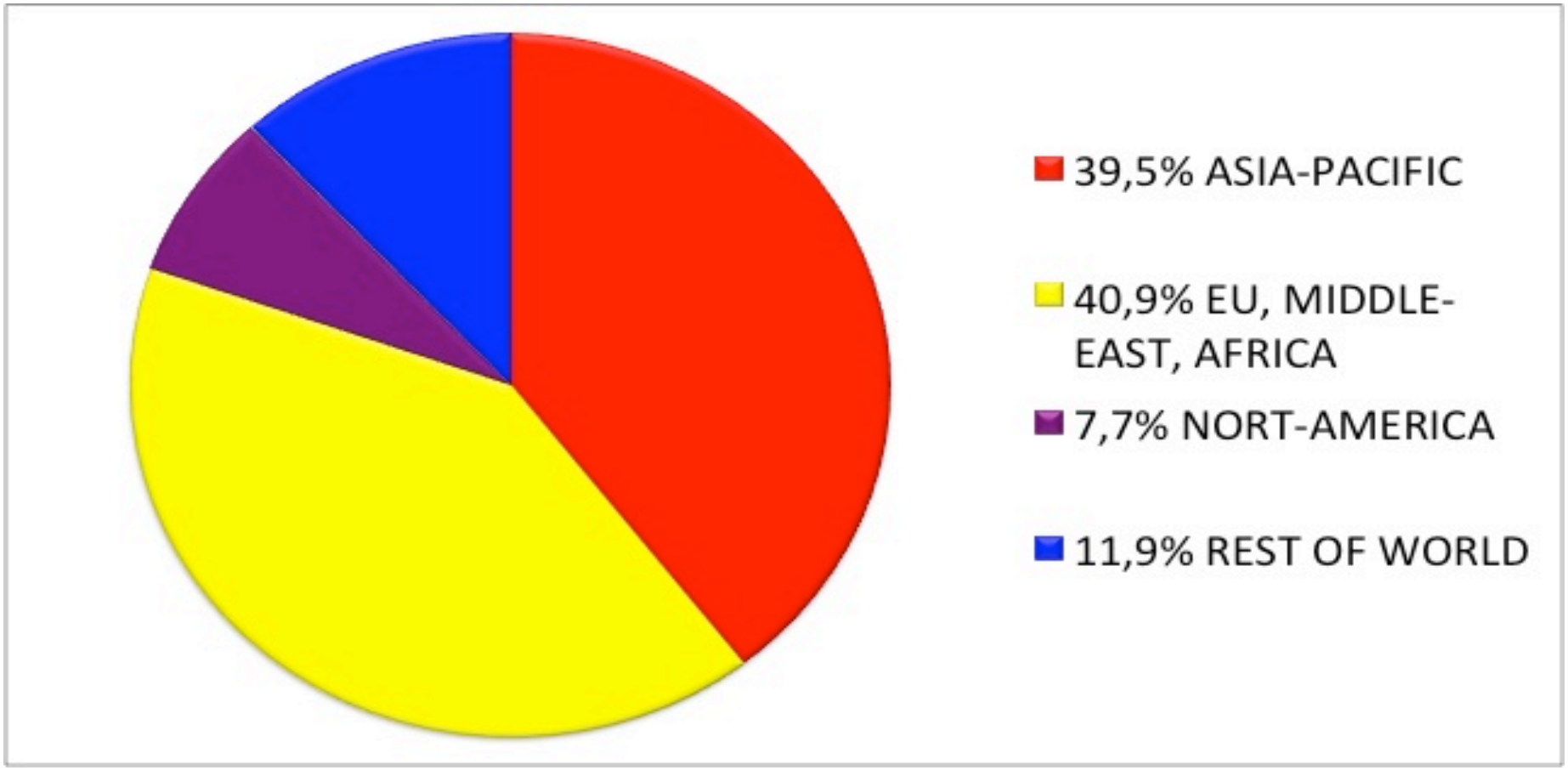
Source: IVGT, Gherzi analysis

Market sizing and forecasting



Market sizing and forecasting

Globally installed digital textile printing machines 01.2015



Market sizing and forecasting

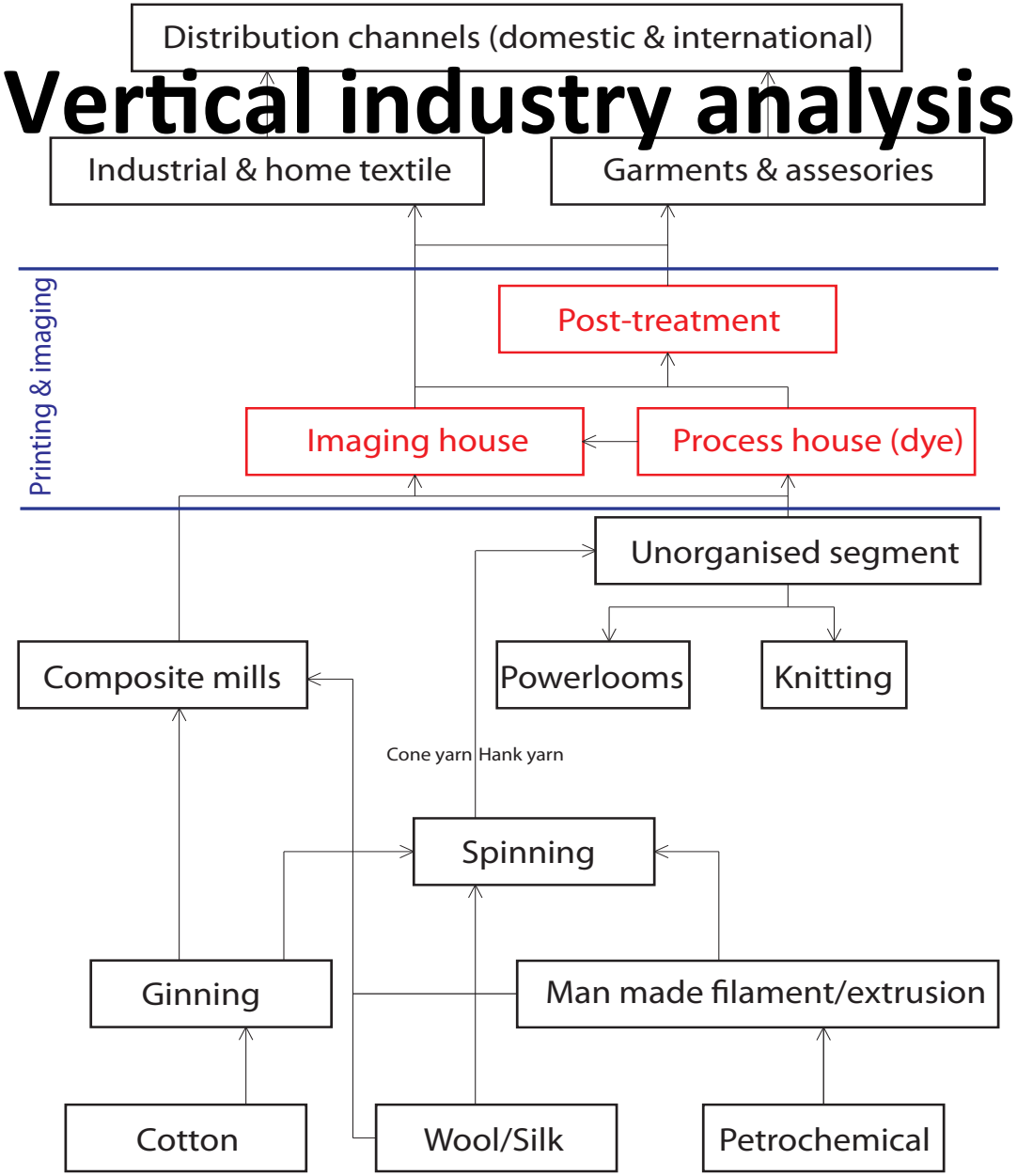
- Digital textile printing in global range is by different calculation between 2,5 to 5%

- The biggest digital printing capacity is locating in Italy with ~30% from total printed fabrics in Italy

- Gaining up with the innovative technology is Turkey with 10% from total printed fabrics in Turkey

http://www.yellowclothing.net/

Vertical industry analysis



http://www.bextex.net/

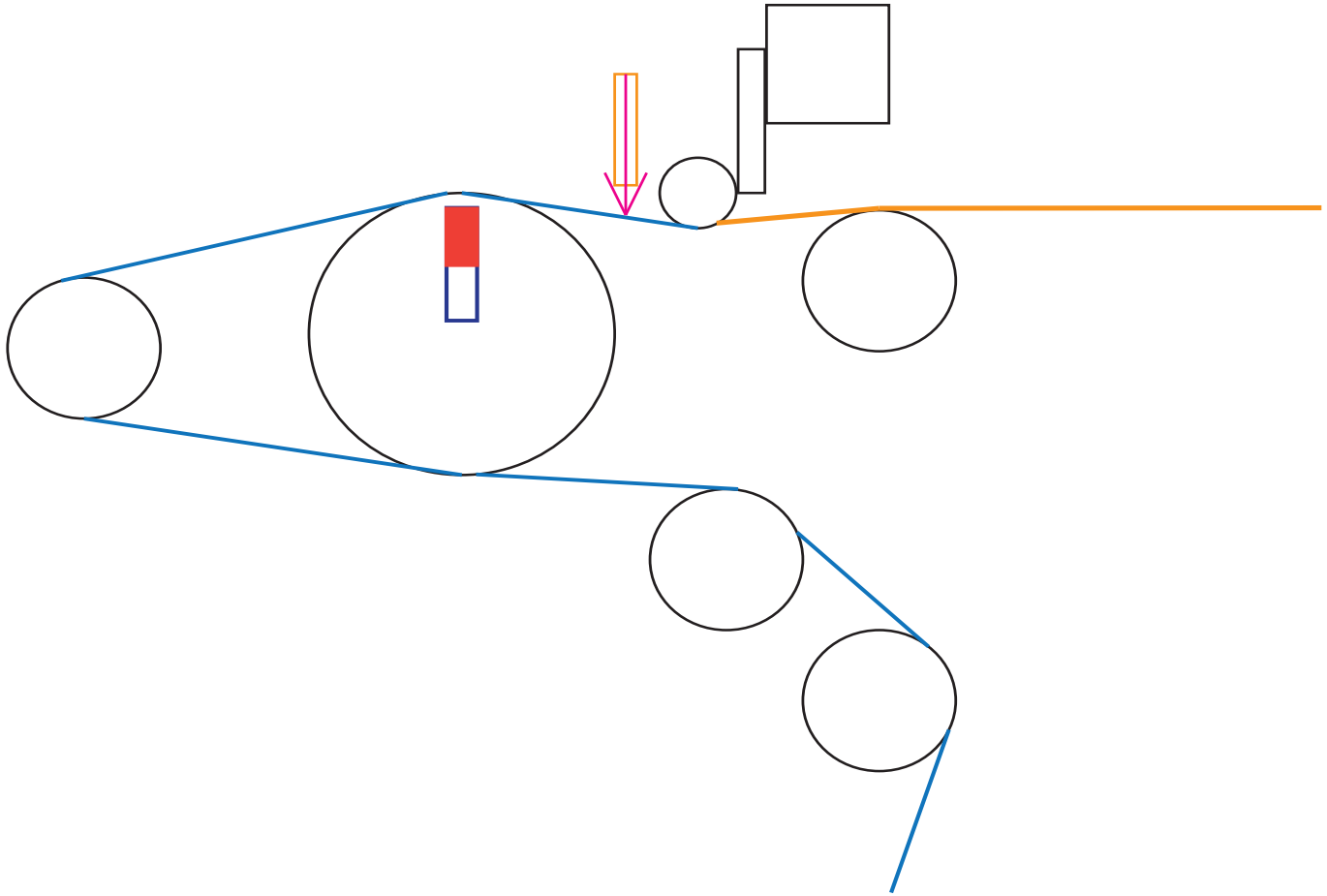
Pre-treatment

- Digital printing require the fabric pre-treatment to fix the printing inks with yarns
- Pre-treated coating has to be soluble in water
- After the printing, during the washing process coating shall assist the ink fixing with fabric yarns and give fabric good hand feeling
- For set-up the necessary chemical stenter with paddler system must considered the balance between ink and coating chemistry.

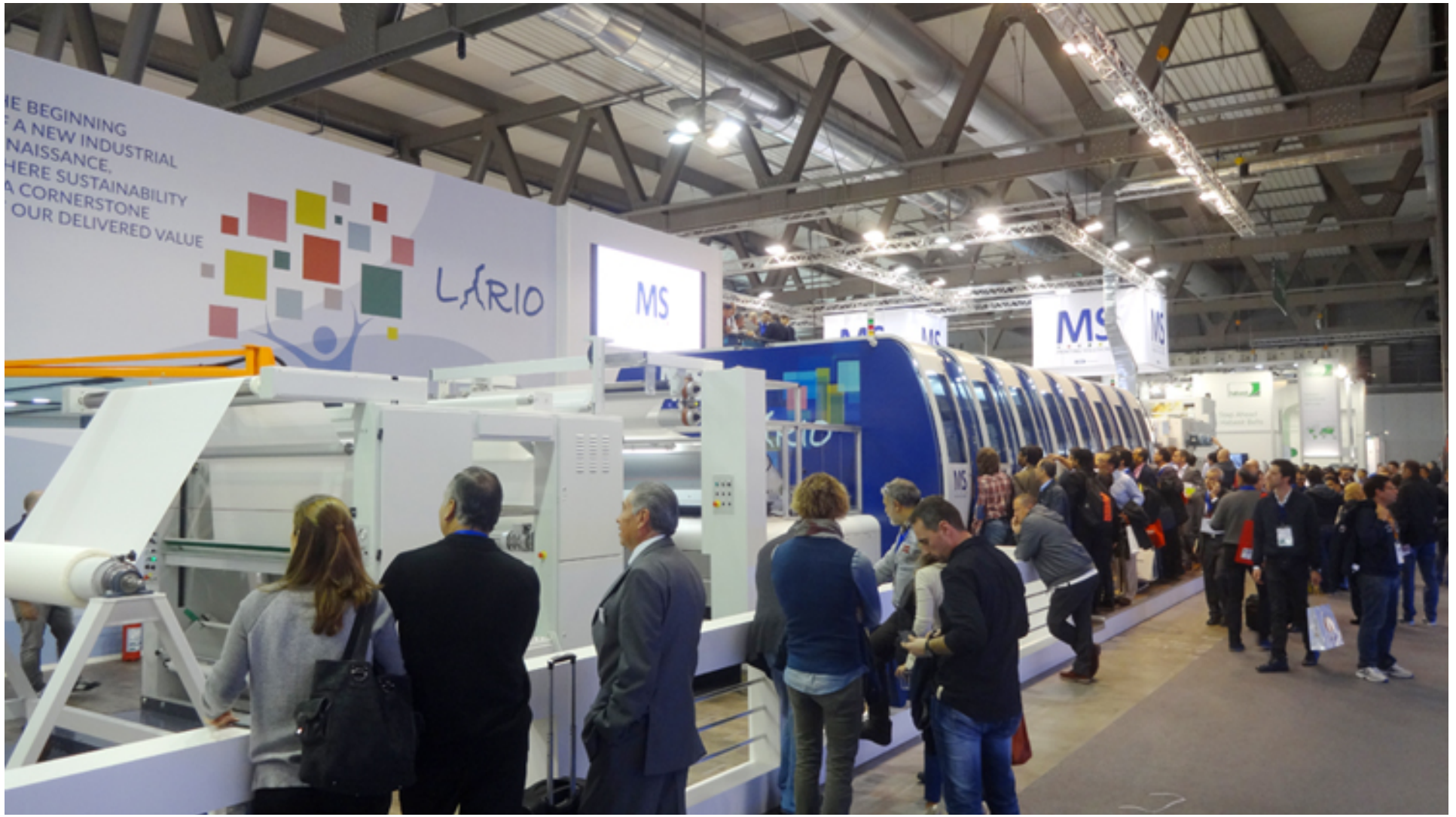
Pre-treatment process is one of the major challenges!

Pre-treatment

Magnetic roller system



Pricing program
Single Pass

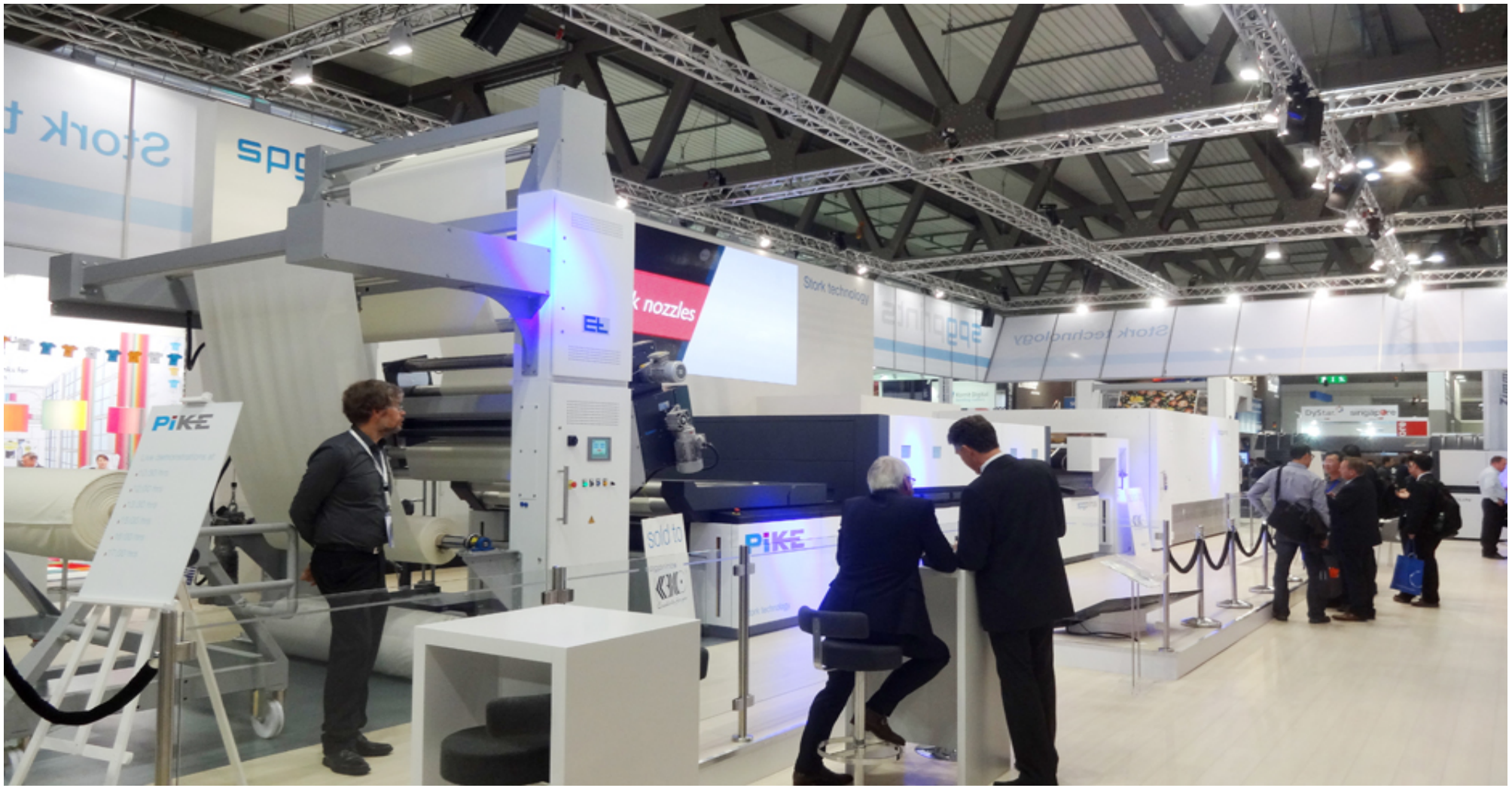


Pricing program
Single Pass

LaRio

- 6 colour line-up + 2 c
- Sequence: cyan, magenta, yellow, black, orange, blue. Open ink system.
- Printing speed is equal to screen-printing speed ~75 m/min
- Print-heads is Kyosera KJ4B technology
- Low weight fabrics 20 gr sqm is not a problem to print on the production speed.

Pricing program
Single Pass



Pricing program
Single Pass

PIKE

- 6 colour line-up + 3 c
- Sequence: cyan, magenta, yellow, black, orange, blue. Closed ink system
- Printing speed ~90 m/min, is more then screen-printing speed
- Print-heads is Fuji Dimatix Samba technology
- With printing annually 5 Msqm, average ink cost per linear meter 0.6 – 0.7 €

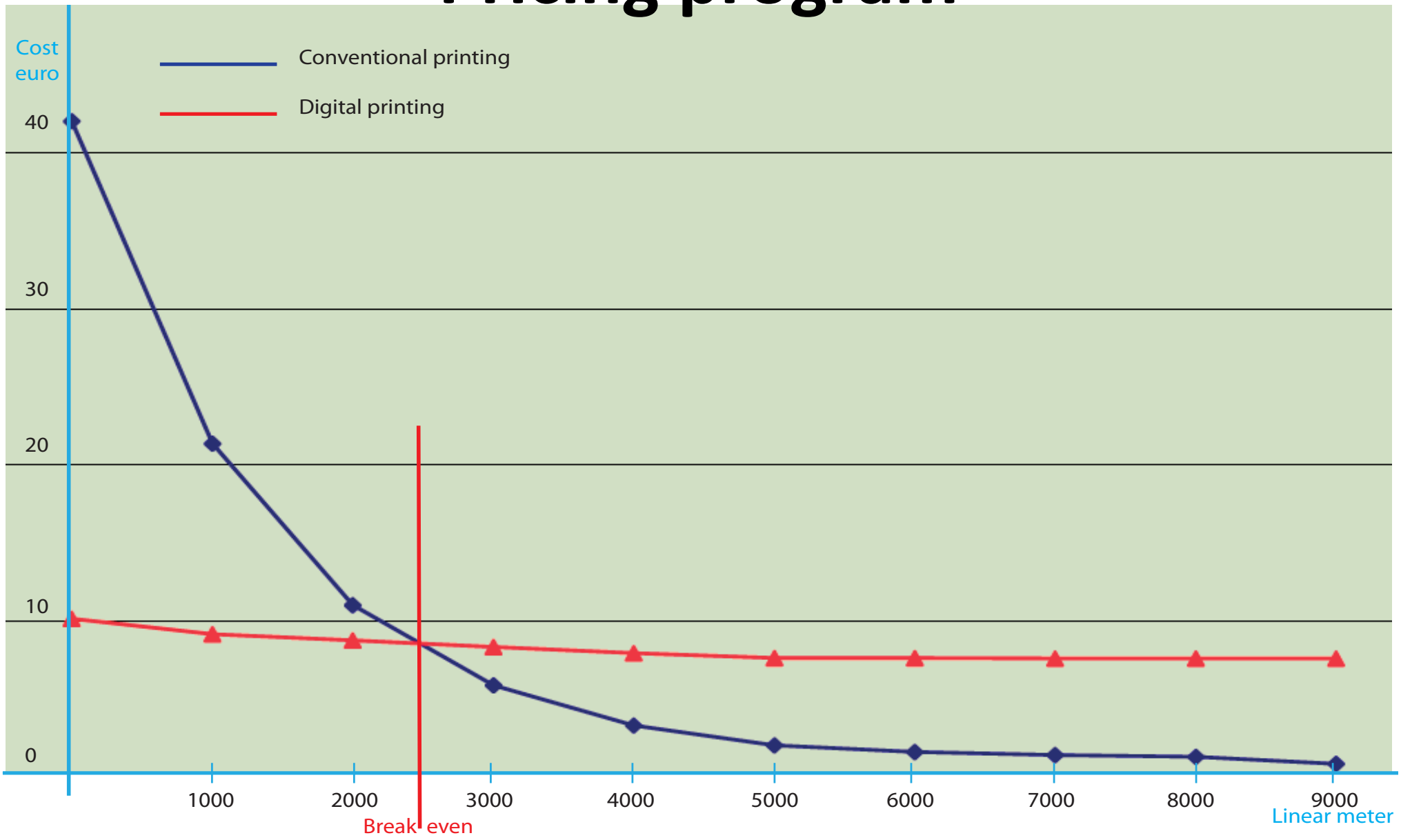
Pricing program
Single Pass

Pricing program
Single Pass

Nassanger SP1

- 6 colour line-up + 2 c
- Sequence: cyan, magenta, yellow, black, orange, blue. Closed inks system.
- Dryer 4 sections, heated up to 50-60 C.
- Ink on fabric after the printing is nearly dry.
- Dryer is more needed for the disperse pigment dye and reactive inks fixation.

Pricing program



Opportunity assessment

- Textile industry is still largely spot oriented industry.
- Opportunity assessment we visualize through spot related industry SWOT analysis at our main work.
- Textile and fabric printing industry is directly related to overall industry success.
- Textile industries are concentrated into the regions where are available total value chain of the textile and apparel industry (spinning up to garment production):

Opportunity assessment

	EDUCATION	STANDARDISATION	MARKET DEVELOPMENT
TECHNOLOGY	**Information on fabrics digital printing (DP) technology**	**Improved balance of DP components and technology**	**Improved global textile industry image and economy**
	Enhanced awareness of DP technology benefits	**Improved DP integration and move on local markets**	**Advanced technology and manufacturing of the fabrics and garments**
	Easy-to-use imaging software and pattern up-date on-demand	**Integration of the DP technology into the new textile companies and new on-demand-service providers**	**Personalized purchase via e-commerce and POD textiles and fabrics**
	Training of users by out-put device (machines) and inks technology vendors	**Standardization and production warranties for the DP garments and textiles**	**Bulk purchased from new customers at local base**
	Energy and environmental saving awareness of DP technology	**Standardization on pre-treatments and inks chemicals for the DP technology**	**New generation of the imaged garments suite the high quality printing**

Opportunity assessment

Tech Driven Business Model:

- Utilising new and innovative technologies
- Easy to connect, track and monitor
- Increased transparency across the total value chain
- Engaging the customer with sustainability

The ink requirements for the substrates to be imaged

APPLICATION	DISPERSED	REACTIVE	ACID	PIGMENT	DYE SUBLIMATION
CELLULOSIC					
Cotton		●		●	
Linnen		●		●	
Jute		●		●	
Ramie		●		●	
ANIMAL-BASE FIBERS					
Silk		●	●	●	
Wool		●	●	●	
SYNTHETIC					
Polyester	●			●	●
Nylon			●	●	
Rayon				●	●
Lycra (spandex)				●	

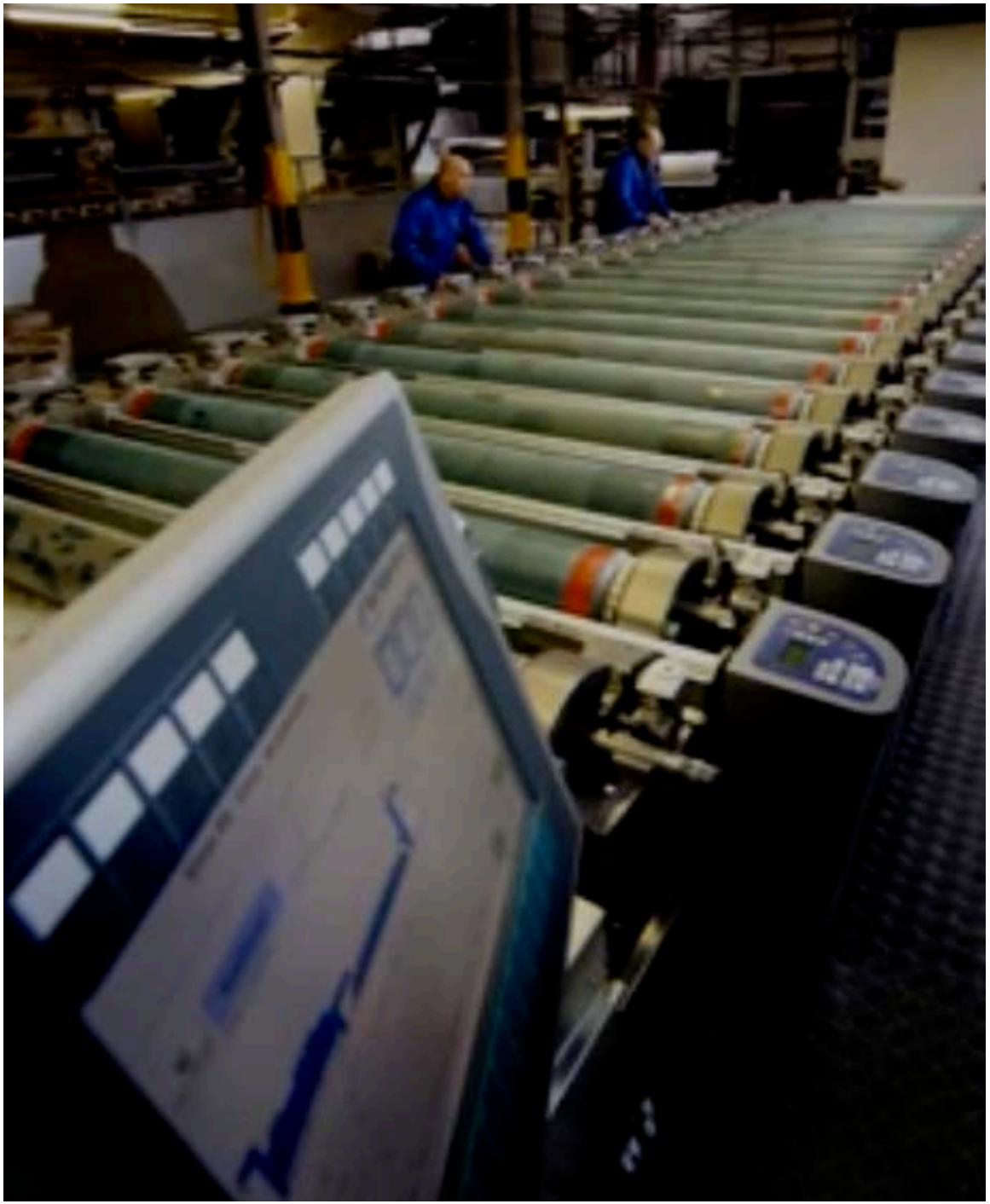
The ink requirements for the substrates to be imaged

The Key of Digitally printing textiles success is the proper inks chemistry development what allow “One ink for ALL” to image most of the fabrics types what are on the fashion, home décor and industrial textile market.

The typical operating environment where applications will be carried out

- Due the large amount water consuming by rotary screen-printing the environment is wet
- Due the large amount of heat used for water evaporation by dryers to fix the printing inks to fabric the environment is high RH %
- Due the large amount of screen frames and cylinders the storage areas are difficult to manage

The typical operating environment where applications will be carried out



New operating environment

Discussions and Conclusions

- **Discussions:**

Certification

- Oeko-Tex Standard 100
- GOTS-V3.0 (Global Organic Textile Standard)
- Restricted Substance List (RSL)

Discussions and Conclusions

- **Conclusions:**
- Our work outline the value of digital printing in textile industry resulting from global environmental aspects.
- Important is digitally pre-treatment process for fabrics with in-line printing using print heads. (Coating print heads, only Kornit new ink technology follow this unique approach).

Discussions and Conclusions

- **Conclusions:**
- Our work outline the importance to reduce usage of different types of digital printing inks (one for all), what shall suite most common fabric types.
- In addition the digital textile printing machines shall have more then CMYK ink set available, norm shall be minimum 8 colour printing technology.

Discussions and Conclusions

- **Conclusions:**
- The new generation, single pass digital printing technology requires a constant changes and development of manufacturing routines, a new employees competence are required and digital technology have already drastically changed the working environment.

Thank you for the attention!
Questions?