

# Keep Your Finger at the Pulse of Hot Trends and Upcoming Innovations in Digital Textile Printing

*Marc Van Parys  
Technical University-Gent  
Gent, Belgium*

## 1. Introduction

The European textile industry in general and the textile printers in particular, are mostly small and medium sized enterprises. The average printer is family owned, and employs less than 50 people. Globalisation, quick response, price pressure from Asia, lower demand, and ecology impose substantial demands on the different components of the printing process. During the last years we see a dramatic reduction in conventional printing activity in the different countries of the European market.

If nothing happens the European printers will mostly disappear in the next decennia. This dramatic declining of print activities forces the conventional European textile printer to focus on: shortening and flexibility of the pre-print process; printing right first time and the next time, reducing down time of the printing machine, short run production (< 100 m), and stock risks. Customers also demand personalised textiles and a wide variety of colour and unique designs. Today's ecological stringent demands ask for ecoprocesses minimising waste of raw materials and pollution on the workflow and the environment. In short, these demands have common denominators: *flexibility and versatility*.

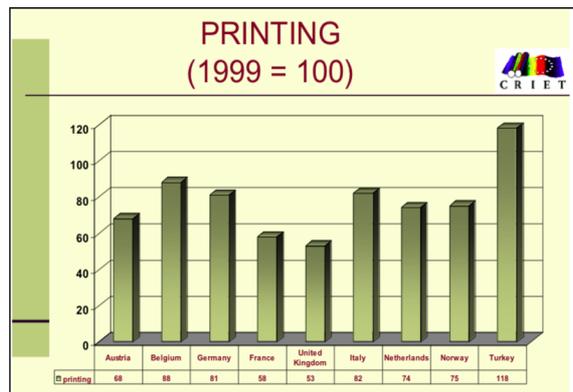


Figure 1. Evolution of printing in Europe

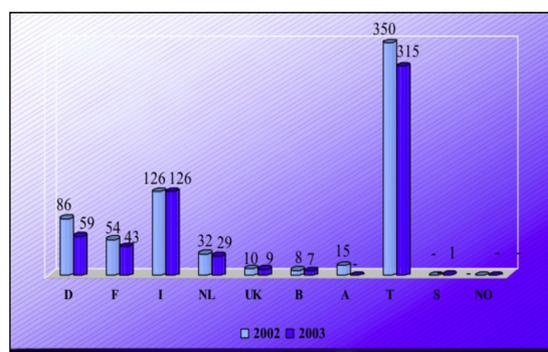


Figure 2. Evolution of printing activities in the clothing industry

## 2. Challenges and Developments

On the one side, recent prognoses forecast an explosive growth in the next years for digital printing. On the other hand conventional printing fits no longer with these demands, to survive in this dramatic evolution the only answer lies in digital printing. Despite this new digital printing technology Europe will become an *under-developed region* if no practical research will be done. Today most of the input is coming from soft- and hardware suppliers. The urgent need for creative and flexible means of DP printing at controllable costs and with predictable, consistent end results provides the impetus for new research and developments.

This lecture deals with new trends and upcoming innovations. Topics to be discussed are nanotechnology, plasma pre-treatment, UV-printing, including smart primers. Furthermore, the digital age will not stop to print only on textile supports - digital finishing and coating comes also in the picture!

### a) Nanotechnology for DP-Printing with Pigment Inks

Textile substrates for digital printing requires pre- and post-treatments to minimize problems such as ink bleeding and poor wet, light and smear fastnesses, which are mainly associated with the porous nature of textile substrates and the inks used. These specific pre-treatment must not have a negative effect on the handle and other textile properties. Digital pigment inks can be used on a lot of substrates, including fibre mixtures. However, the colour gamut, the brilliance and colour depth are often not acceptable. These

problems can be overcome using specific pre-treatment based on nanosilicates and  $\beta$ -cyclodextrines.

#### **b) UV-Printing – Smart Primers**

Although the UV technology still represents a relatively small portion of the ink market, there are interesting niches where the UV-curable inkjet technology will be the major reason for the success due to its potential advantages compared to conventional inks. Printers are looking for opportunities in new markets to augment the loss of traditional print business. This will be primarily in the shifted market segments of general commercial work and specialty printing as well as web printers seeking to avoid VOC emissions.

With the continual advancement of UV technology, improvements in inks using hyper branched polymers and coatings as well as introduction of new raw materials, combined with lower costs and productivity benefits for the printing industry, the market for UV curable inks is certain to maintain solid growth for years to come.

Smart primers will be discussed. Smart priming is a new and versatile technology to improve the adhesion of digital UV-inks on textile supports. The superior adhesion is achieved by the formation of covalent bonds between the textile surface and the UV-ink. Formation of the covalent bond is obtained by simultaneous plasma treatment and injection of special photo-initiators using a new atmospheric CoatingStar plasma technique. The durable

and homogeneous surface modification introduces a latent functionality that can be activated by UV-light during printing.

#### **c) Other Applications**

Interesting topics for the near future are printing of OLED's on textile supports and digital finishing. Digital finishing becomes possible by means of new digital printing heads. Digital finishing with nano- and microcapsules, containing different functional products is one of a research item of our lab. This smart application makes the use of relatively expensive products possible at an economic cost.

The lecture gives an overview on the general and the constraints, and exemplifies actual promising routes for the future digital printing and finishing.

### **Biography**

**Marc Van Parys** is doctor in Chemistry (1974) and head of the Textile Research and Development Centre linked to the Technical University in Gent. He is also senior consultant at Centexbel and president of UNITEX – National Association of the high Members of the Textile Industry in Belgium.

His leading a research team of 12 people dealing with new technologies such as (digital) printing, radiation technologies (plasma and laser), coating and laminating.