



## INTEGRATING INTERNET APPLICATION IN TO THE WORKFLOW FOR COSTUMISATION OF TEXTILE PRODUCTS

Dragoljub NOVAKOVIĆ<sup>1</sup>, Nemanja KAŠIKOVIĆ<sup>1</sup>, Gojko VLADIĆ<sup>1</sup>

<sup>1</sup>Faculty of Technical Sciences, Department for Graphic Engineering and Design, Novi Sad, Serbia

### Abstract:

*Market trends dictate customization of products to specific needs of consumers. In the mass customization, personalization of products is occupying significant attention. The goal of mass customization is to produce a product for an individual by means of mass production. Personalization of products dramatically increases the variety of products optimized for the individual without corresponding increase in production costs. In order to make goal of product personalization possible, easily accessible and user friendly communication interface is needed. Internet applications can deliver that kind of interface. Internet applications are very suitable for product personalization and their implementation can significantly increase customer numbers. Workflow consists of two parts collecting consumer order by implementation of internet application for personalization and the second part of the workflow in the process of personalization of textile products is using printing techniques in order to meet consumers needs regarding design. The goal of this paper is to present possibilities that can be obtained by implementation of specific Internet applications in the process of personalization of textile products. Special attention is given to selection of printing techniques that can provide better and more efficient workflow.*

**Keywords:** mass customization, personalization, Internet applications, printing techniques

### 1 INTRODUCTION

Consumer society every day sets new demands to manufacturers. The requirements are specific and manufacturers must be flexible and adaptable to fulfil them, but also it is necessary to retain the current concept of mass production. The personalization of products is used more and more in modern markets. The personalization, could not be completely defined, but some authors says that personalization is an effort to meet the needs of manufacturers specification [1], while others claim that personalization is a classic one-to-one marketing [2], where manufacturer takes information from the customer and manufacture what customer want. In any case, the mere application of personalization will give manufacturers ability to overtake the competitors and take the leadership in production. It is important that this process is not entirely new [4], because through the decade, consumers have bought adapted products (different size shirt), but today personalization can offer vast number of variations of the final products without a major increase in production costs. With personalization of products applied at the end of the production process (Figure 1) enabled the economies of mass production as a boon, and drastically increases the number of potential customers.

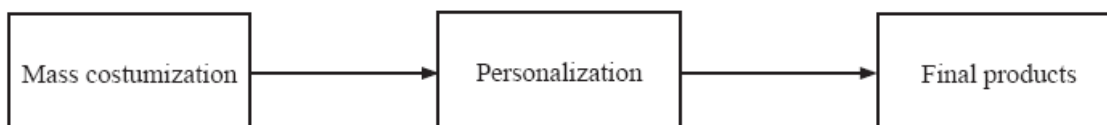


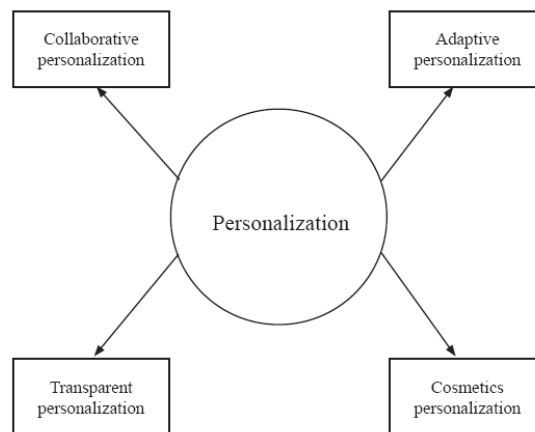
Figure 1: Personalization in mass customization



Personalization of products by means of mass customisation can provide personalised products without significantly increasing production costs in comparison with standard mass production. This can be achieved by postponing personalization process in the production process as much as possible [5]. Best results are achieved if personalization is last operation in product production process.

The concept of personalization does not mean production of individual products, they only offering a variation of standardized products. It is possible to divide the four types of personalization products of mass production [6] (Figure 2):

- A collaborative personalization involves communication between manufacturer and consumers in order to determine customers needs.
- Adaptive personalization means that companies produce standardized products keeping in mind the subsequent personalization, leaving the consumer the final stage of product personalization.
- Transparent personalization means to deliver a unique product to the consumer without special emphasis on the personalized product. This type of personalization means a very good knowledge and assessment of customer needs.
- Cosmetics personalization includes the production of standardized products and marketing them as personalized products.



*Figure 2: Types of personalization*

Since this paper is to investigate the work flow in the personalization of textile products, it is noteworthy that in the process of personalization, the most important are collaborative and adaptive type.

## 2 THE WORKFLOW FOR COSTUMISATION OF TEXTILE PRODUCTS

The process of personalization in the textile industry is very interesting, because it enables customers to actively participate in creating the final product. Workflow consists of two parts collecting consumer order by implementation of internet application for personalization and the second part of the workflow in the process of personalization of textile products is using printing techniques in order to meet consumers needs regarding design (figure 3).

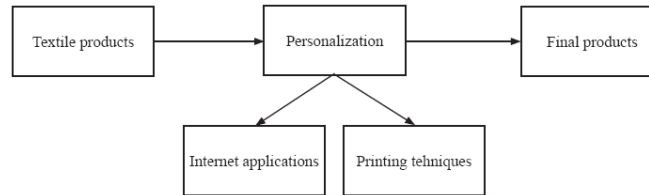


Figure 3: Workflow for customization of textile products

## 2.1 Internet applications

In order to make goal of product personalization possible, easily accessible and user friendly communication interface is needed. Internet applications can deliver that kind of interface. Internet applications are very suitable for product personalization and their implementation can significantly increase customer numbers.

An excellent example of Internet applications is a comprehensive concept of NIKEiD, by which the buyer has possibility of interactive participation in the design process with access to the final result in real time. After selecting the textile items, the buyer will use this concept and choose colour, size and design (Figure 4).

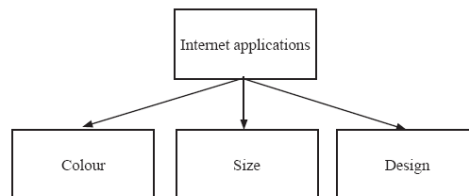


Figure 4: Personalization by Internet applications

As already pointed out, the buyer will interactively participate in the selection of a final product, and will report any deficiencies immediately able to notice and to correct them.

A good example is the personalization of sports jerseys. That personalization is presented below.

In the first step, the customer selecting the appropriate model jersey, after which they chose and the colour (Figure 5 a, b)

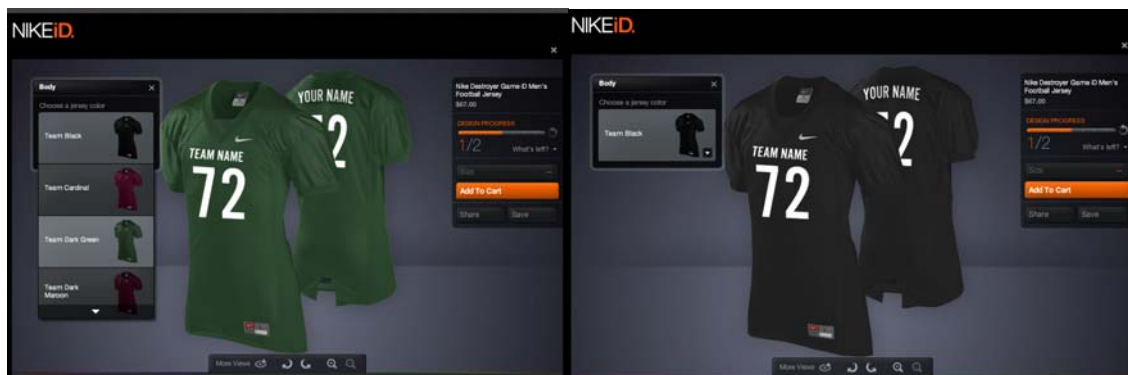


Figure 5: Selecting the colour of jersey (5a, 5b)



The process of personalization in this case will continue with entering the appropriate information for the name of the team, players and the number on the jersey (Figure 6 a, b).

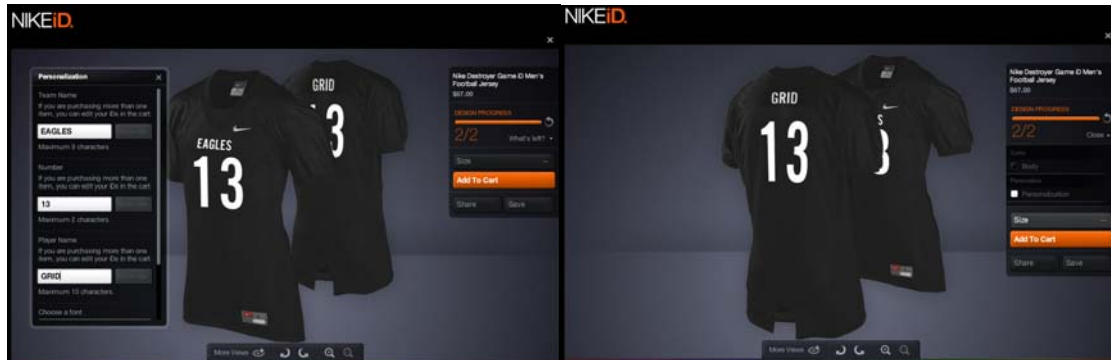


Figure 6: Selecting the information for the name of the team, players and the number on the jersey (6a, 6b)

The rest of the process is oriented to the customers choice of the size and quantity of shirt (Figure 7).



Figure 7: Selecting the size and quantity of jersey

As one of the example, it was obvious the customer was actively involved in the personalization of the desired product, and thanks to the Internet application, remove any deficiencies.

## 2.2 Printing techniques

The second part of the workflow in the process of personalization of textile products is using printing techniques in order to meet consumers needs regarding design. The printing techniques applicable for printing on textiles are digital, screen and print via the transfer [7] which is presented in Figure 8.

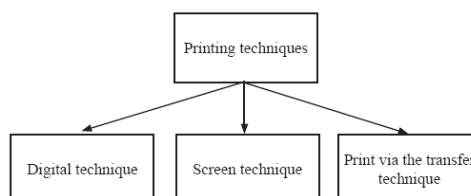


Figure 8: Printing techniques for textile products



Selecting appropriate printing technique is important, and it is necessary to know all the important parameters in order to fully satisfy the customer. One of the influential parameters is price per item, which is presented in Figure 9. In this figure, represented by the values for digital and screen printing, with a digital press using DTG Kiosk, while screen printing machine taken Schenk Variprint. These graphic systems have been installed in the printing house Krunic, Belgrade. Obtained values are expressed in Euros, with account taken the price of printing, without the cost of textile materials.

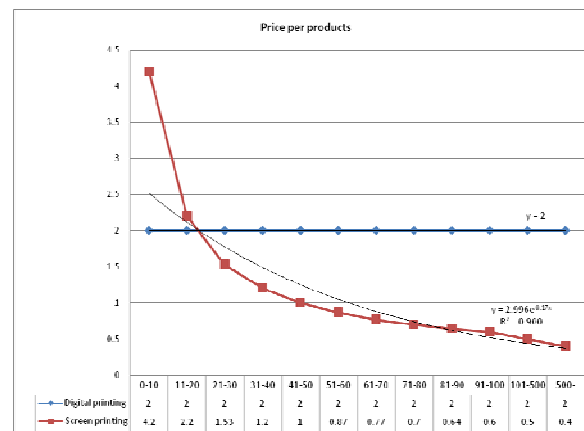


Figure 9: Price per products

Based on this graphic, it is evident that the unit cost per print using digital printing technology is constant and its curve is ideally linear function, while the price per unit piece using screen printing, behaves as a exponential trend line, with a correlation coefficient is quite high, and it can be argued that there is a correlation between the unit price and number of prints. Digital printing is definitely more cost effective for small print runs, i.e. the circulation below 20 pieces, and everything after that is more profitable to apply screen printing.

The second parameter is time, it is clear that screen machines can print significantly greater number of units per hour than digital printing machines, which is presented in Figure 10a. On the other hand, it is important to note that the preparation for four colour screen printing is one hour (Figure 10b), for example twenty prints can be produced on digital printing machine in the same time it takes to preparing screen machine for 4 colour printing process.

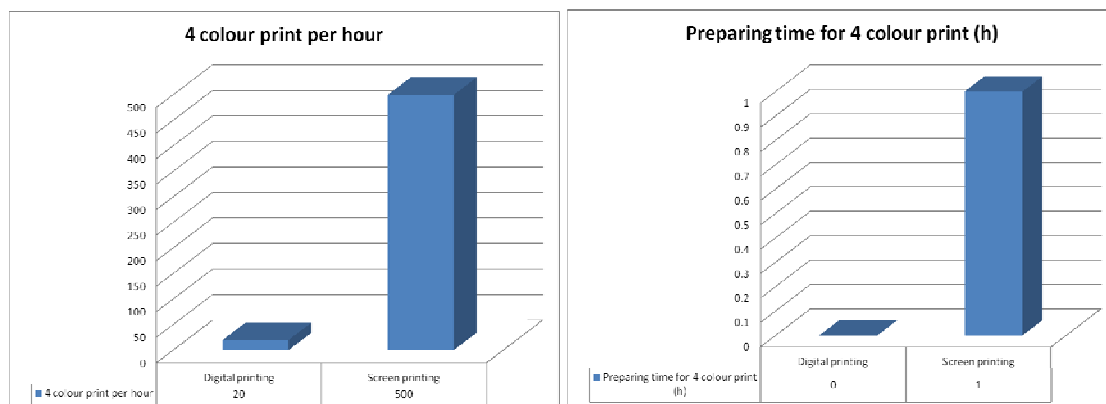


Figure 10: a) 4 colour print per hour, b) preparing time for 4 colour print (h)



### 3 DISCUSSION

This paper presents a workflow necessary for personalization of textile products. It was observed that it consists of Internet applications and printing techniques, with Internet applications giving customers the ability to actively participate in defining the design of the product. It is necessary to choose an appropriate printing technique in order to achieve the result desired by customer and conveyed thru the Internet application. Using the personalization of textile products, production costs increase slightly, especially if it comes to larger print runs.

### 4 CONCLUSIONS

Personalization of textile products will become more important in textile industry, and it is necessary that manufacturers are developing new models, as Internet applications, and application capabilities by using appropriate techniques, in order to improve the workflow of this process. It is necessary for manufacturer to pay attention to the customer, and find a model which can be charged minimally during personalization process but still result in unique product.

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### Corresponding author:

Dragoljub NOVAKOVIĆ

Department for Graphic engineering and Design, Faculty of Technical Sciences, University of Novi Sad

Trg Dositeja Obradovića 6

21000 Novi Sad, Serbia

phone: +381214852620 fax: +381214852628 e-mail: novakd@uns.ac.rs