THE IMPACT OF THE PRODUCT CONFIGURATOR USER INTERFACE ON CUSTOMER PURCHASE DECISIONS

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Abstract: *Product configurators play a key role in the concept of mass customization. Concerning the customer's perspective these tools need to support an efficient and intuitive configuration process and it is obvious that this is heavily influenced by an appropriate user interface. Research shows that de-facto standards according to the position and availability of certain web elements can be identified. Besides analyzing these necessary elements and the criteria that a B2C configurator should fulfill, we have a closer look if the arrangement of interface elements in real life cases in the apparel industry (T-Shirt configurators) not only supports the customization process but also how it is judged by users concerning their willingness to buy the offered product. The aim of this empirical study is to find out whether or not the usage of the particular de-facto standards has an influence on the customer purchase decisions.*

Key Words: *Configurator, User Interface, User Testing, Mass Customization*

1. INTRODUCTION

Tseng and Jiao [1] define mass customization as "providing goods and services that best meet individual customers needs with near mass production efficiency". To meet this individual needs, the task of designing the product and its variables is shifted from product designers and managers to the end user [2]. The key role in this context is undertaken by the configurator user interface, which provides the end user with all necessary options to customize an individual product. The development of an appropriate configurator user interface depends on several aspects, such as product type, degree of complexity, user groups etc [3]. As the customers mostly lack in technical product knowledge and moreover, typically do not know their preferences, an appropriate user interface is inevitable [4].

In existing literature, diverse guidelines of user interface design can be found [5]. As a result, users build up habits and expectations on the handling of a web-based user interface [6]. Bernard [7] states that users have expectations concerning the position of specific web elements such as help button, login button or shopping cart in an online shop. Streichsbier et al. [8] identify such web standards within configurator user interfaces in the automobile, apparel and electronic industry. Nevertheless it is essential to prove if the identified standards can be associated with user experiences and expectations. Therefore a qualitative analysis (user observational research) with 9 subjects is conducted for this paper.

2. USER INTERFACE DESIGN FOR CONFIGURATION SYSTEMS

2.1. The Importance of User Interface Design for Product Configurators

Due to the fact that the configurator is the most important touching point between customer and manufacturer, the user interface of a product configurator is a key success criterion for the customer's satisfaction. [9]. Rogoll and Piller [10] detect three criteria which a configuration system should fulfill to satisfy users:

- **Risk reduction and trust building:** A configuration system should build up a user's confidence and show competence.
- **Usability:** A configurator should be outstanding concerning operability, self explanation, orientation, individual access to information, loading time and support.
- **Visualization:** As customers don't have any chance to judge the real, physical product, it is essential to provide the customer a real feeling of the product.

Randall et al. [11] identify five basic design principles for configurator user interfaces, which help to make the configurator usable for endusers and support product managers in configurator development and maintenance:

- **Customize the customization process:** Different types of user interfaces for different target groups (experts vs. non-experts in the product domain).
- **Provide starting points:** Default values that are proposed to the user (specific parameter settings vs. whole subconfigurations).
- **Support incremental refinement:** Existing tradeoffs between different configuration alternatives (i.e. with regard to their price).
- **Exploit prototypes to avoid surprises:** Graphical development, testing and debugging of configurator environments.
- **Teach the customer:** Explanations and recommendations of different configuration alternatives.

Especially when looking at sales configurators the value perceived by a customer through the configuration process can be increased by five capabilities [12]:

- **Benefit-cost communication:** Communicating the consequences of the available choice options - comparison of what the customer gets and what the customer gives.

- **User-friendly product-space description:** Adapting the product space description to the needs and abilities of potential customers.
- **Easy comparison:** Minimizing the effort for a potential customer to compare different product configurations.
- **Flexible navigation:** Minimizing the effort for a potential customer to modify a product configuration subsequently.
- **Focused navigation:** Focusing a potential customer´s search on a product space subset that contains the product configuration that best matches his/her needs.

2.2. Definition and Advantages of Web Standards

Nielsen and Loranger [13] state that a web element which is designed in the same way on 80% or more websites, can be seen as web standard as users expect these elements to react in the same way. Staying departed from using web standards can confuse or even loose potential customers. Due to the fact that standards provide a secure feeling of having a website under control, they increase customer satisfaction. Adkisson [14] names reduced development costs and high usability as core arguments for such standards.

Higher usability, less training, acceptance of the system and higher satisfaction are advantages of implementing standards for endusers, whereas saving time and work, simplifying quality control and reducing training time are mentioned as advantages for developers of configurator systems [15].

Nevertheless, it is indicated that web standards may cause that companies lack in individuality and are not able to develop their own solutions [14]. Furthermore it is criticized that web standards are not up to date, which makes practice orientated research more important [16].

2.3. Identified Standards for web-based Configuration Systems

Streichsbier et al. [8] identify standards for web-based product configuration systems in the automobile, electronic and apparel industries. The placement of web elements within the user interface such as toolboxes and buttons has been observed. As products within the apparel industry are very diverse, the sample has been narrowed to configurators for T-shirts.

In the following, standards and guidelines which were identified for T-shirt configurators are listed (n=30) [8]:
- 100% of the analyzed configurators provide realistic product visualizations.
- 90% support customers with a visual feedback showing choices and alterations made.
- 83% represent several perspectives and viewing-points of the product image.
- 80% show and update the price during the configuration process.
- 77% of the configuration takes place on a single screen.
- The product image tends to be placed on the left side and the toolbox tends to be placed on the right side.

The following guidelines (>50%) were identified across all industries (n=126) [8]:
- The logo is placed in the top-left corner.

- Process navigation, if available, is placed horizontal along the top edge.
- Toolboxes are placed next to and/or beneath the product image.
- The back button is in the lower-left region and the forward button in the lower-right region.
- Shopping cart, order button and total price are located in the lower-right section.
- Selected product components are summarized at the end of the configuration process.
- Products available for configuration are presented as images.

These identified standards can be transformed into an exemplary structure of a T-Shirt configurator, as shown in figure 1. It includes the positioning of relevant elements in a structural frame of a configurator user interface.
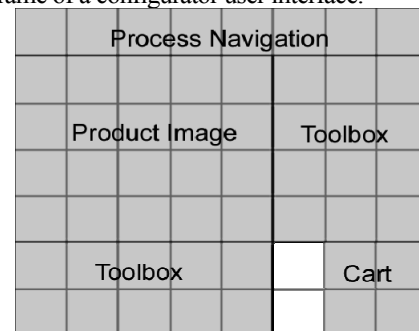

Fig. 1. *Exemplary structure of a T-shirt configurator [8]*

3. EMPIRICAL ANALYSIS

3.1. Research Aims

Streichsbier et al. [8] suggest examining the identified standards on the basis of user testing. This analysis strives on finding out whether or not particular standards concerning the structure of a configurator have any influence on the customer purchasing decision. As the identified standards vary within the industries, for the following study T-shirt configurators are considered.

3.2. Method and Setting

The following qualitative analysis is based on user observation. 9 users have been observed while handling four different T-shirt configurators. For all users the medium internet is a crucial component in their daily lives and all users have already purchased products online. In this particular kind of testing, users had to solve a given task by using the four configurators. Furthermore the users have been asked to speak out loud all thoughts that come to their mind during the process.

The following factors have been observed:
- Handling: Is the configurator easy to use?
- Orientation: Is the user capable to find everything necessary to complete the configuration process?
- Product Visualization: How influential is the product visualization towards the purchase decision?
- Design: How important is the look & feel for the purchase decision?
- Overall appearance: What factors promote trust and competence?

The users have been assigned the following task: "Create a T-shirt with a personalized print with the supplied configuration tools. Please speak out what thoughts come to your mind while designing the T-shirt."

After completing the task the users have been interrogated the following questions:

- Which configurator did you prefer in terms of visual presentation?
- Which of the configurators would you consider to be the easiest to use?
- Which of the configurators enabled you to achieve the best results?
- Which of the product (i.e. results of the configuration processes) would you most rather purchase?

3.3. Selection of the configurators used in the experiment

The selection of the configurators is based on the identified standards for product configurators (see 2.3). In order to research the impact on the user, configurators with different user interface structures were chosen.

Some research identifies correlations between sophisticated interaction elements like recommender systems or social media tools and the willingness to buy a product [17], [18]. In the presented research setting these elements were not considered.

The four T-shirt configurators picked for this analysis were taken from the world´s largest collection of product configurators, the Configurator Database [19]. The Configurator Database Report 2014 [20], a printed documentation of the database, covers 970 configurators. The highest number of configurations can be found in the apparel industry with 153 listed entries. The analysis has been conducted with the following configurators, chosen by three experts in the field of configuration:

1. www.shirtmagic.com
2. www.spreadshirt.net
3. www.youdesignit.com
4. www.ooshirts.com

4. RESULTS AND KEY FINDINGS

The users in general have been able to create their desired T-shirts with all of the given configurators. Each of the analyzed configurators displays certain strengths and weaknesses, which are described in the following.

1. www.shirtmagic.com

Shirtmagic offers a configurator with a toolbox on the right side and additional buttons above the visualization. The design of the configurator is perceived as rather neutral, as none of the subjects gives any feedback concerning the design. All subjects appreciate multiple design options, even though 4 subjects criticize that it is time consuming to handle all of them. 7 subjects think that there is too much trial and error learning and 6 subjects don't like the structure of the elements within the toolbox as it is too confusing. According to 3 subjects the product visualization is to grainy and surreal. All subjects like the image upload feature. All subjects would prefer to resize the text right onto the T-shirt.

7 subjects miss the availability of the price information during the configuration process.

Fig. 2. *Example for a configurator with a toolbox on the right side, http://www.shirtmagic.com, last request: 17.04.2014*

2. www.spreadshirt.net

Spreadshirt offers a configurator with toolboxes on the left and right side of the visualization and kind of process tabs placed horizontal along the top edge. All subjects like the design of the website and the configurator of Spreadshirt and think that the configurator is well structured. The ease of use and intuitive handling is appreciated by all subjects as well as the good quality of the product visualization. 3 subjects honor that real product images are depicted under the configurator. 5 subjects prefer starting the configuration process with a blank T-shirt instead of a predefined configuration. All subjects can handle the selection of the product model and the color easily. 8 subjects favor a wide color range towards predefined color boxes. All subjects appreciate a warning in case of a low quality uploaded image, but criticize that the system doesn't allow the purchase of a low quality image on a T-shirt. The availability of the price information during the configuration is positively mentioned by all users.

Fig. 3. *Example for a configurator with a toolbox on the left and right side as well as a process bar, http://www.spreadshirt.net, last request: 17.04.2014*

3. www.youdesignit.com

The configurator of Youdesignit has toolboxes on the left and the right side. 3 subjects give positive feedback on the design of the configurator. 6 subjects are annoyed that they are automatically forwarded after they have chosen a product color. They would prefer a forward button instead. All subjects appreciate the logical and intuitive structure of the user interface. All subjects criticize the handling of the text-tool and miss the "upload image" function.
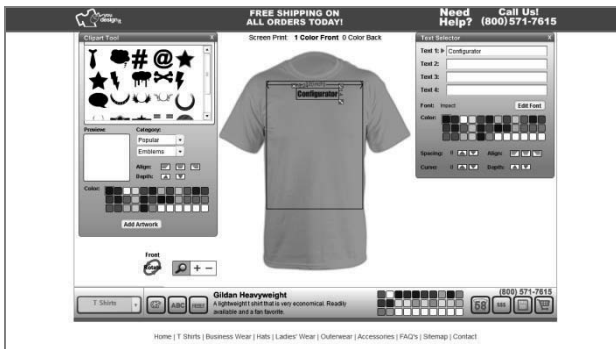
Fig. 4. *Example for a configurator with a toolbox on the right and left side, http://www.youdesignit.com, last request: 17.04.2014*

4. www.ooshirts.com

The configurator of Oohshirts offers a process navigation bar and a toolbox on the left side of the visualization. 7 subjects have a good orientation in the process within the configurator of ooshirts. All subjects like the design of the configurator and all subjects appreciate the photorealistic product visualization. 6 subjects prefer manual navigation through the process tabs. All subjects mention the preview of the font as very helpful. 5 users like the handling of the image upload, especially the editing options for the uploaded images. The availability of the price information during the configuration is honored by 7 users.
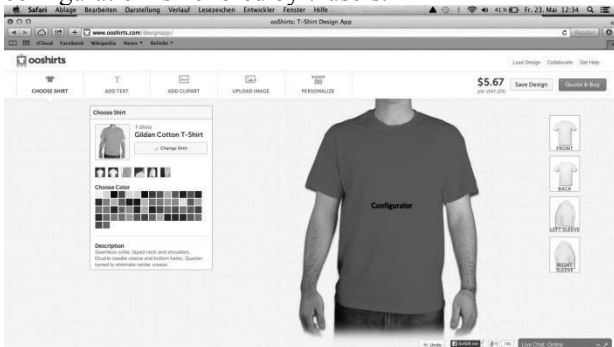

Fig. 5. *Example for a configurator with a process navigation bar, http://www.ooshirts.com, last request: 17.04.2014*

4.1. Assessment of the configurators

At the end of the observation each subject was asked to rank the configurators concerning several factors. The following results were determined:

Which configurator did you prefer in terms of visual presentation?

All subjects think that Spreadshirt is most appealing. Spreadshirt is stated as modern and well structured. In general all subjects only mentioned the design of a configurator if it is very good or bad.

Which of the configurators would you consider to be the easiest to use?

All subjects prefer the handling and usage of Spreadshirt. Also Youdesignit and Ooshirts are mentioned to make fun in creating a T-shirt.

Which of the configurators enabled you to achieve the best results?

Again all users go for Spreadshirt. One subject tends to Youdesignit, because of the product model and the chosen clipart.

Which of the product (i.e. results of the configuration processes) would you most rather purchase?

All subjects would buy their T-shirt at Spreadshirt, because the configurator is perceived as most trusted.

4.2. Overall findings

Finally the following findings were generated and can be considered as potential instructions for designing a configurator:

- The intuitive arrangement of the toolbox element is crucial for a time-saving configuration.
- The configuration options "add text", "upload image" and "add symbol" are seen as standard features for T-shirt configurators.
- A font preview is an important time saving asset for users.
- A manual forward button is preferred to an automatic forwarding.
- A realistic and good looking product visualization is crucial for purchasing.
- Different view angles of the product visualization are seen as a kind of standard.
- A live update of all configured components in the product picture is crucial.
- Availability of the price during the configuration process shifts trust.

However, the empirical aim is to find out whether or not the identified de-facto standards have a positive influence on the customers' purchase decision. The observation shows, that the position of the toolbox or other web elements seems to be irrelevant for the purchase decision. All subjects get involved with each configurator separately and without transferring special habits in terms of the handling and structure of the configuration process.

5. CONCLUSION AND OUTLOOK

To sum up, all of the subjects mentioned many different criteria that make a "good" or "bad" configurator. However, Spreadshirt was the one preferred by all of the users. During the execution of the analysis, neither the positioning of elements, nor the availability of certain elements seemed to be critical to the user's purchasing decision. The users showed no adaptation to element positioning in the usage of configurators. Foremost, a realistic visualization of the final product, and the entertainment factor of the configurator were essential. All users considered a trustworthy user interface design and simple usability to be key factors for a positive purchase decision.

The analysis shows that the users had not yet developed any expectations towards online configurators in general, or towards the usability and structure of online configurators in particular. It is yet to be evaluated, if a certain standard may emerge, or if the factors screendesign, visualization, entertainment and diversity of choices will continue to be solely crucial for the purchase decision. Further testing with additional users is necessary

- also to identify if more complex configurable products lead to different findings.

As well the influence of social media features on the purchasing decision in a web-based configuration system has to be examined. Some configurators – namely www.cowcrowd.com, www.uk.moo.com, and www.leitz-create.com – offer for example the feature to integrate pictures of social-network friends onto the designed product. Social sharing and received recommendations by friends may influence the purchase decision too.

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