Fit expectations for the mass-customized garments designed by using mobile scanning apps

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Introduction: Online mass customization is a collaborative process that provides customers an opportunity to create unique products by selecting features from a variety of options (Piller et al., 2005). However, it can potentially increase the burden on customers by increasing complexity, perceived risk, and effort (Piller et al., 2005). Simulations can aid in visualizing the fit of the garment and reduce uncertainty related to the appearance (Anderson et al., 2011). Websites with virtual prototypes can increase customer engagement and purchase intention as compared to websites that do not have such technology (Park & Kim, 2020).

Mobile scanning has been gaining traction as smartphone technologies evolve. A few companies such as unspun (unspun, 2023) require their customers to scan themselves with a smartphone for customized apparel. This technology can be used to scan consumers and present simulated garments on their bodies to set realistic expectations for garment fit. There is a gap in research exploring customer satisfaction with mass-customized garments that are developed from body scans using mobile scanning. It is important to understand customer satisfaction with the mass-customized product through this process and compare it to the products that are customized through the measurements taken manually. Therefore, the present study examined the following research questions: Will there be any differences between the women who used the mobile scanning app and the women who entered their measurements on a customization website in terms of (a) Fit satisfaction and (b) Purchase intentions before (during online mass customization) and after receiving their garment?

Methods: A dress was selected as a stimulus because previous studies indicated that it is one of the most challenging dresses for body shapes that are different from a regular hourglass shape (Baytar et al., 2021). For the online mass customization website, we selected a round neckline shift dress with a combination sleeve length (sleeveless and short), skirt shape (A-line and H-line), and dress length (mini, knee level, and long) (Baytar et al., 2021). Nine women out of 147, who responded to a screening survey agreed to use the 3DLOOK mobile app to send their avatars to the research team (Experiment group). Five participants sent their body measurements (i.e., height, weight, shoulder length, front neck-to-waist, and waist-to-floor distances bust, hip, waist, and bicep circumferences) to our research team (Control group). To ensure that all participants had the same skill and knowledge of taking body measurements, a guideline was provided in the survey. Once the study participants' avatars and manual measurements were received, combinations of 12 style details were virtually prototyped in Optitex PDS. The Control group's dresses were simulated on the default Optitex Eva parametric avatar and the Experiment group's dresses were simulated on each participant's 3D mobile-scan avatar. These images were uploaded on the research website along with a Qualtrics survey and its link was sent to each participant's email address. Participants customized their styles on the

website and answered a set of questions on a 7-point Likert-type scale (1= Extremely dissatisfied/ disagree to 7= Extremely Satisfied/ agree). The survey questions helped evaluate the participants' fit expectations and fit perceptions in certain areas including shoulder, bust, waist, abdomen, hip, and dress length, as well as purchase intentions toward the customized dress. At the end of the survey, we collected participants' mailing addresses and sent them their customized dresses for a real try-on. Fourteen garments, 5 for the control group and 9 for the experiment group, with a hard copy of instructions explaining how to take pictures of the final fit on the body, were mailed to the participants' mailing addresses. During the real try-on they took pictures and shared them with the research team. Descriptive statistics, Pearson's correlations, and Wilcoxon signed pair-ranked tests were conducted by using Statistical Package for Social Science (SPSS) 25.0.

Result and Discussions: Participants' ages ranged from 20 to 34, with an average of 25 years old (SD=5.8). Sixty-five percent of the participants were while the rest were Asian (% 35). Overall, 60% selected short sleeves, 40% selected sleeveless dresses, 60% selected A-line, and 40% chose H-line skirts, the most common dress lengths were short (40%), and long (40%) followed by knee level (20%). Satisfaction with the fit was not significantly different between the Control and Experimental groups before and after receiving the mass-customized dresses. Before trying the real dress, all participants perceived fit similarly at different parts of the dress except for the dress length. Fit perception of dress length was significantly different between the Control and Experimental group (U ($N_{control}$=4, $N_{Experimental}$=9) = 7.5, z=-1.985, p<.05). The Control group mostly perceived the dress length as "good length", whereas the Experiment group perceived it as "slightly longer". After the real try-on, there was no significant difference in fit perception in the different parts of the dress except for the waist area (U ($N_{control}$=4, $N_{Experimental}$=9) = 9, z=-2.165, p<.05). The Control group perceived fit at the waist as "slightly loose" and the Experimental group perceived its fit as a "good fit". Participants in both groups "somewhat agreed" that would purchase the dress online before trying the real dress. There was no statistically significant difference between their purchasing intentions.

Conclusions: Previous mass customization efforts in online retail were short-lived and only proved the concept of feasibility. Even though consumers' perceived benefits from mass customization options are high, the process itself contains limitations, challenges with managing the configuration complexity and manufacturers' need to balance the production cost. Mobile scanning apps can support manufacturers to be more agile and create better fitting garments as compared to the garments that could be produced based on consumers' manually taken measurements. The present study recruited a limited number of participants, especially for the control group as there was a minimum interest in taking measurements manually. Nonetheless, our findings provided valuable insights into the new realm of using mobile scanning apps for creating mass-customized apparel.

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