Augmented Reality and Motion Capture E-Shopping Usage for Apparel:
Webcam Social Shopper

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Keywords: Augmented reality, motion capture, webcam

 Significance. The Webcam Social Shopper is referred to as virtual dressing room software. It features augmented reality (i.e., an interactive method of combining live video with computer-generated data and visualizations) via a webcam and a motion capture system in which hand motions allow the users to virtually navigate backward or forward on-screen to choose clothing (Kincaid, 2009). Augmented Reality and Motion Capture (ARMC) e-shopping focuses on a virtual try-before-buying experience using a webcam (Kincaid, 2009). The computer screen becomes an augmented reality mirror where the users can see how the clothing might look in real-time and browse various garments without a keyboard and mouse (Chen, 2012). Users can adjust the size and color of the clothing item simply by using hand gestures; users can also capture image files of the screen display, including both themselves and the computer-generated image of the garment that they are "wearing," and share them with their friends on Facebook and Twitter to solicit feedback (Chen, 2012). Thus, ARMC e-shopping is a new social shopping tool that brings together the benefit of the fitting room, the convenience of e-shopping, and the potency of the social web. In recent times, innovatiave e-retailers (e.g., Tobi, JC Penney, LazyLazy, and Lookz) have begun to integrate ARMC e-shopping applications into their websites to enhance customers' online apparel shopping experiences. Although this application is in the developmental stage, it may completely change retail and revolutionize e-commerce for apparel shopping. The purpose of this study was to examine (1) whether monetary, convenience, emotional, and social values were related to utilitarian and hedonic performance expectancies (H3-6), which were related to usage intention (H1-2), and (2) whether ego involvement and cognitive effort moderated the links between performance expectancies and usage intention (H7-8). This proposed model provides insights into the development of an ARMC e-shopping application that offers distinct benefits and competitive advantages in order to maximize their profitability.

Theoretical Framework. The proposed model was based on the Value-Attitude-Behavior hierarchy consumer decision model (Homer & Kahle, 1988) and Prospect Theory (Kahneman & Tversky, 1979) explaining human decisions in uncertain situations from a value maximization perspective in order to predict behavior. Perceived values were operationalized as four exogenous constructs: (a) monetary value (e.g., "ARMC e-shopping is a good value for the money."), (b) convenience value, (c) emotional value (e.g., "Using an ARMC e-shopping service makes me feel good."), and (d) social value (e.g., "When I use an ARMC e-shopping service, it makes a good impression on other people."). Utilitarian and hedonic performance expectancies represented the attitude stage. Usage intention represented the behavior stage. Additionally, the moderating effects of ego involvement (e.g., "Clothing is an important part of me.") and cognitive effort (e.g., "It would probably be uncomplicated to use an ARMC e-shopping service.") were examined.

Method. Data were collected from U.S. online apparel shoppers ($n = 806$) using a consumer panel via an online survey. Participants watched a YouTube video explaining the concept of ARMC e-shopping and then completed a self-administered survey.

Participant Characteristics. Participants' ages ranged from 18 to 69 with 68.2% of the participants falling between 18 and 45 years of age ($m = 40.23$). Participants were women (69.7%) and men (30.3%). Median income was $50,000-$59,999.

Results. Confirmatory factor analysis was used to test the convergent and discriminant validity and composite reliability of the set of measures. A structural analysis was conducted using the maximum likelihood estimation method. The structural model exhibited a good fit with the data, $\chi^2 = 743.29$ with 253 df, $\chi^2/df = 2.93$, CFI = .98, NNFI = .97, IFI = .98, RMSEA = .049, and SRMR= .041). Regarding H1, utilitarian performance expectancy was related to usage intention ($\beta = .70$, $t = 10.02$, $p < .001$). For H3-H6a, monetary value ($\beta = .08$, $t = 2.34$, $p < .05$), convenience value ($\beta = .72$, $t = 14.63$, $p < .001$), emotional value ($\beta = .14$, $t = 3.28$, $p < .01$), and social value ($\beta = .12$, $t = 4.46$, $p < .001$) were positively related to utilitarian performance expectancy. For H4b-H6b, convenience value ($\beta = .51$, $t = 11.27$, $p < .001$) and emotional value ($\beta = .38$, $t = 7.83$, $p < .001$) were positively related to hedonic performance expectancy. For H7, ego involvement moderated the link between utilitarian performance expectancy and usage intention, $F (1, 802) = 8.33$, $p < .01$. For H8, cognitive effort moderated the link between utilitarian performance expectancy and usage intention, $F (1, 802) = 13.00$, $p < .001$.
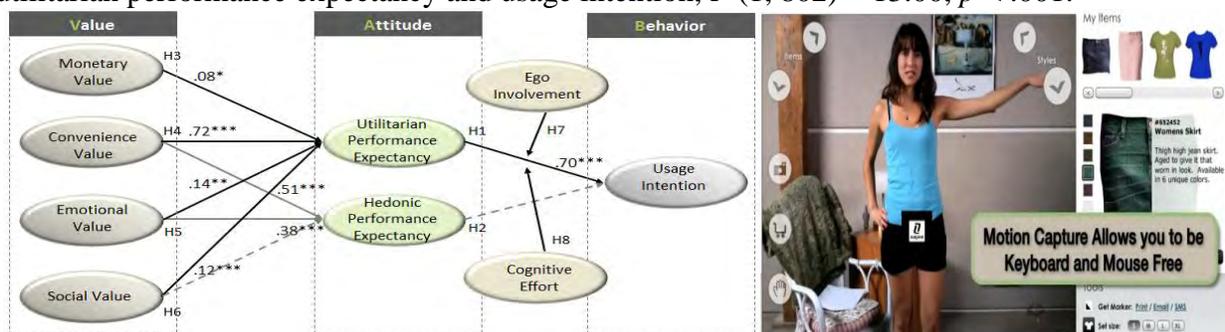

Figure 1. Final model and video screenshot of ARMC e-shopping

Conclusions and Implications. The results indicate that apparel e-shoppers who would find ARMC e-shopping enjoyable were not likely to engage in ARMC e-shopping. It may be that apparel e-shoppers would use ARMC e-shopping for utilitarian purposes. Service providers need to facilitate the usefulness of ARMC e-shopping, such as improved integration of social networking, the provision of real-time video images via customer webcams, and accurate tracking of apparel e-shoppers' movements via motion capture technology. To satisfy e-shoppers' perceived values, service providers need to further develop the benefits of the virtual dressing room, the ease of e-ordering, an improved motion capture interface, easy user manual videos, webcam social shopping communities, and diverse rewards for frequent users.

References

Homer, P. M., & Kahle, L. R. (1988). A structural equation test of the value-attitude-behavior hierarchy. *Journal of Personality and Social Psychology, 54*(4), 638–646.

Chen, Y (2012). An app utilizes the webcam to give consumers a better online shopping experience. http://www.psfk.com/2012/07/computer-augmented-reality-mirror.html

Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica, 47*(2), 263–291.

Lake, C. (2009). *10 Mindblowing augmented reality apps and videos*. Retrieved from http://econsultancy.com/us/blog/4288-10-mindblowing-augmented-reality-apps-and-videos