Influence of Social Acceptability and Product Attributes on Consumers' Attitude and Intention of Using Smart Apparel

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Introduction and Background. Smart apparel is a subcategory of wearable technology set, which integrates information technology such as sensors into fashion (Chae, 2010). The smart apparel market has tremendously grown during the last few years and significantly influenced individuals' lifestyles by shaping their decision-making patterns and purchase behavior. According to the MarketsandMarkets' (2019) report, the smart apparel market will grow from $1.6 billion in 2019 to $5.3 billion by 2024, which is 26.2% increase. Due to the co-existence of technology and fashion within smart apparel, social acceptability is one of the distinctive challenges of such products (Wasik, 2014). Smart apparel is not socially acceptable if the product is opposed to social standards and is discerned as a disruptive and annoying item causing disorders in an ordinary human interaction (Baraniuk, 2014). This will eventually lead the failure of smart apparel in the market. Thus, companies must consider social acceptability of smart apparel as a key factor when it comes to design and develop new products embedding wearable technology (Narayanaswami & Raghunath, 2002).

Although several studies addressed the key attributes of wearable technology and/or smart apparel such as functional, expressive, aesthetic, and tracking (e.g., Bakhshian & Lee, 2019; Bakhshian & Lee, 2018; Hwang et al., 2016; Koo, 2017), only a few studies addressed the importance of social acceptability of smart apparel and its relationships with product attributes (e.g., Chae, 2006, Lee, 2016; Lee & Nam, 2019). Thus, the overall purpose of this study was to investigate the role of social acceptability along with functional, expressive, aesthetic, and tracking attributes on consumers' attitude and intention of using smart apparel. This study partially employed Bakhshian and Lee's (2018) holistic framework, which consists of key potential extrinsic, intrinsic, and external determinants to predict consumers' attitude and intention of using wearables. Based on the literature review, fifteen hypotheses were proposed: functional, expressive, aesthetic, and tracking attributes have positive influences on social acceptability, attitude, and intention of using smart apparel (H1a through H4c, respectively). It was also proposed that social acceptability has positive impact on attitude (H5a) and intention (H5b). The positive effect of attitude on intention was also postulated (H6).

Methods. An online survey, using Amazon Mechanical Turk, was conducted with a nationwide convenience sample of men and women whose age was 18 years and over and live in the U.S. The survey consisted of four main sections: (a) three open-ended questions regarding whether they have experience of using any type of wearable technology or smart apparel, and whether they are interested in using them in the future; (b) a two-minute video clip of a smart apparel prototype developed by the researcher; (c) 81 close-ended questions regarding functional (F; 7 items), expressive (E; 7 items), aesthetic (A; 7 items), tracking (T; 4 items), social acceptability (SA; 49 items), attitude (4 items), and intention (3 items); and (d) five questions on demographics. Social acceptability measure of smart apparel was derived from Kelly's (2016) study and the modified extended version of the original WEAR Scale was used for this study. The F, E, and A measures were adopted from Chae (2006) and modified to be applicable for this study. The T measure was adopted from Koo and Fallon (2017). Attitude and intention measures were derived from Venkatesh and Davis (2000). All latent constructs were measured based on a 7-point Likert-type scale, ranging from "Strongly disagree (1) to "Strongly agree" (7). SPSS 26 and Mplus 8.3 were used to conduct exploratory factor analysis (EFA) for SA, confirmatory factor analysis (CFA) for all constructs, and structural equation modeling (SEM). The maximum likelihood estimation method with the Promax rotation (Corner, 2009) was used to test the model fit.

Results. The usable sample of 563 was used for data analyses. The respondents' age range was from 18 to 80 years old with the mean age of 34. Fifty-seven percent of the respondents were belonged to the generation Y (born between 1980 to 1996), followed by 19% of the baby boomer generation (born between 1946 and 1964) and 17% of the baby generation X (born between 1965 and 1979). Of the respondents, 56% were females and 44% were males. Seventy-one percent of the respondents held bachelor's degrees or higher and the rest had some college education with no degree. The majority was White/European American (71%), followed by Asian (11%) and others.

EFA was first conducted to examine whether the 49 items measure a single construct of "social acceptability" of smart apparel, or whether multiple constructs underlie it. With considering .7 as a cutoff value (Hu & Bentler, 1999), 15 items were extracted loading on three factors (3 items for aesthetic, 5 items regarding others' thoughts, reactions and norms, and 7 items for judgment, consequence, norms, and ergonomics). In this study, a single SA construct with 15 items was used when running SEM. CFA was then performed to test the measurement model fit. Due to their low standardized factor loadings (< .6), 3 items of E and 8 items of SA constructs were dropped. The fit indices of the measurement model demonstrated an acceptable fit: $\chi^2(563) = 3028.36$, $p < .001$, TLI = .87, CFI = .86, RMSEA = .08, and SRMR= .06. Next, the 15 hypothesized path model was tested and demonstrated an acceptable model fit: $\chi^2(608) = 3028$, $p < .001$, TLI = .86, CFI = .88, RMSEA = .08, and SRMR = .06. Seventy-two percent of the intention of using smart apparel was explained by the proposed constructs. Nine out of 15 hypotheses were supported. E, T, SA, and attitude significantly influenced intention of using smart apparel (H2b: $\beta = .217$, $p < .001$; H4b: $\beta = .114$, $p < .001$; H5b: $\beta = .229$, $p < .001$; H6: $\beta = .064$, $p < .001$, respectively). The positive impacts of SA and T on attitude were presented (H5a: $\beta = .730$, $p < .001$; H4a: $\beta = .167$, $p < .001$, respectively). Results also revealed SA was positively influenced by F (H1c: $\beta = .154$, $p < .05$), E (H2c: $\beta = .303$, $p < .001$), and T (H4c: $\beta = .167$, $p < .05$).

Conclusion. The findings of this study demonstrate the importance of considering social acceptability of smart apparel along with F, E, and A attributes to predict consumers' attitude and intention of using smart apparel. Among all variables, social acceptability and tracking are the most significant determinants for predicting consumers' attitude and intention of using smart apparel. This clarifies that industry professionals (e.g., designers, developers, manufacturers, marketers) must consider social acceptability of smart apparel along with other product attributes, especially tracking, during the product design and development stage. This assures that smart apparel needs to be accepted by its users and met their needs, expectations, and perceptions, which will lead to the success of smart apparel in the market. This study assists future researchers to gain a profound understanding of how social acceptability plays an important role in predicting consumers' expectations of wearable technology. This study was only limited to integrate the key set of smart apparel attributes (F, E, A, T) with social acceptability. The study sample was skewed towards the individuals who obtained a high education; thus, another model test is recommended with a wide education range. Despite the limitations, this study is unique in a way to introduce the social acceptability scale of wearables to the textiles and apparel discipline and further examine its relationship with other variables (product attributes, attitude, and intention).

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