

## The Role of Functional-Expressive-Aesthetic-Tracking Dimension on Consumers' Perception of Wearable Technology

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*Keywords:* functional-expressive-aesthetic, tracking, wearable technology, perception

Wearable technology, interchangeably used with 'wearables', has been rapidly grown recently and can potentially impact individuals' lifestyle, behavior, decision making, as well as improve their well-being in the future (MarketWatch, 2018). The wearables is defined as "electronic and computer devices that can be worn or embedded in different types of wearable products (e.g., clothing, shoes, accessories) and are often able to carry out different tasks and functions (e.g., mental and physical health tracking)" (Bakhshian & Lee, 2018, p. 1). To successfully design, develop, and manufacture a product embedding wearable technology, it is crucial to know consumers' needs and preferences of wearables, which will eventually assist industry professionals to predict target consumers' needs and perception of wearables.

Several studies exist to address the importance of functional (F), expressive (E), and aesthetic (A) attributes of wearables in the design and product development area (e.g., Chae, 2006; Koo, 2017), based on Lamb and Kallal's (1992) FEA consumers' need model. However, tracking (T) attributes, one of the distinctive characteristics of wearables, were not fully captured by this FEA framework. A number of studies have addressed the importance of T dimension (e.g., monitoring physical and mental conditions) of wearable devices (e.g., Koo, 2017), but limited studies have been found, which empirically test the significant impact of tracking attributes along with the FEA attributes on consumers' perception of wearables, especially smart apparel.

Therefore, the purpose of this study is to investigate the importance of T dimension along with FEA dimensions to predict consumers' needs and perception of wearables, using Bakhshian and Lee's (2018) holistic framework towards wearables, which includes key potential extrinsic, intrinsic, and external determinants. Based on their framework and the literature review, the following eight hypotheses are proposed in this study: FEAT dimension as a whole, perceived ease of use, perceived usefulness, and subjective norm positively influence attitudes towards wearables. It is also hypothesized that FEAT dimension, perceived ease of use, and subjective norm positively influence perceived usefulness. The positive influence of attitude on intention of using wearables is postulated as well.

An online survey, using Qualtrics, was conducted among college students whose age was 18 years old and over at a large Midwestern university. This survey consisted of three sections: (a) study section of wearables; (b) questions regarding F (7 items), E (6 items), A (5 items), T (4 items), usefulness (3 items), ease of use (3 items), subjective norm (3 items), attitude (4 items), and intention (3 items); and (c) demographics. The participants were first provided with a definition and scenario about the general characteristics of wearables. A hyperlink of different

types of wearables was also provided for the participants to be able to obtain additional information about wearables available in the market. Measures for FEA measures were derived from the existing studies (Chae, 2006; Hwang, 2014) and modified to fully reflect Lamb and Kallal's (1992) FEA dimensions. The T measures were derived from Koo and Fallon (2017). The rest of the measures were extracted from previous research (e.g., Davis, 1989; Venkatesh et al., 2003). All measures used a 7-point Likert-type scale, ranging from "Strongly disagree" (1) to "Strongly agree" (7). SPSS 25 and AMOS 25 were used for the data analyses. Maximum likelihood estimation method was applied to evaluate model fit since none of the assumptions were violated to run exploratory and confirmatory factor analyses (EFA and CFA) and structural equation modeling (SEM). Both convergent and discriminant validities have been checked. Reliability has been also checked and all constructs were reliable with Cronbach's  $\alpha > .7$ .

The 380 usable sample was used for the data analyses. The participants' ages ranged from 20 to 49 years old with the mean age of 23. Fifty-five percent of the participants were gen Z (born after 1996), followed by 43% of gen Y (born in 1981-1996), and 2% of gen X (born in the 1970s). Fifty-one percent were females and the rest were males. Seventy-eight percent of the participants were the students who were seeking a bachelor's degree, followed by 8.8% of master's degree and 13.2% of doctoral degree. The majority was Caucasian/European American (86%), followed by Asian (8%), Hispanic American/Latino (4%), and African American (2%).

EFA with Promax rotation showed that 34 out of 38 items had a standard factor loading greater than the minimum acceptable level ( $> .5, p < .001$ ) (Comery & Lee, 1992). One item of the F, two items of the E, and one item of the A were eliminated in this stage. The cross loading among items between attitude and intention was too high, which tells that these two constructs convey a similar message to the participants in this study. This led us to combine these two constructs to a single construct, called 'perception'. CFA was then performed to check the measurement model fit, resulting to the acceptable model fit (CMIN/df = 2.09; NFI = .94; TLI = .94; GFI = .84).

The hypothesized path model was examined and resulted to a good model fit with a chi-square ( $\chi^2$ ) of 668.32 ( $df = 242, p < .001$ ), TLI of .93, CFI of .94, NFI of .91, and RMSEA of .05. Six out of seven paths in the hypothesized model were statistically significant (see Figure 1). FEAT dimension ( $\beta = .45, p < .001$ ), perceived ease of use ( $\beta = .22, p < .001$ ), and perceived usefulness ( $\beta = .46, p < .001$ ) significantly and positively affected consumers' perception of wearables. In addition, perceived ease of use ( $\beta = .23, p < .001$ ),

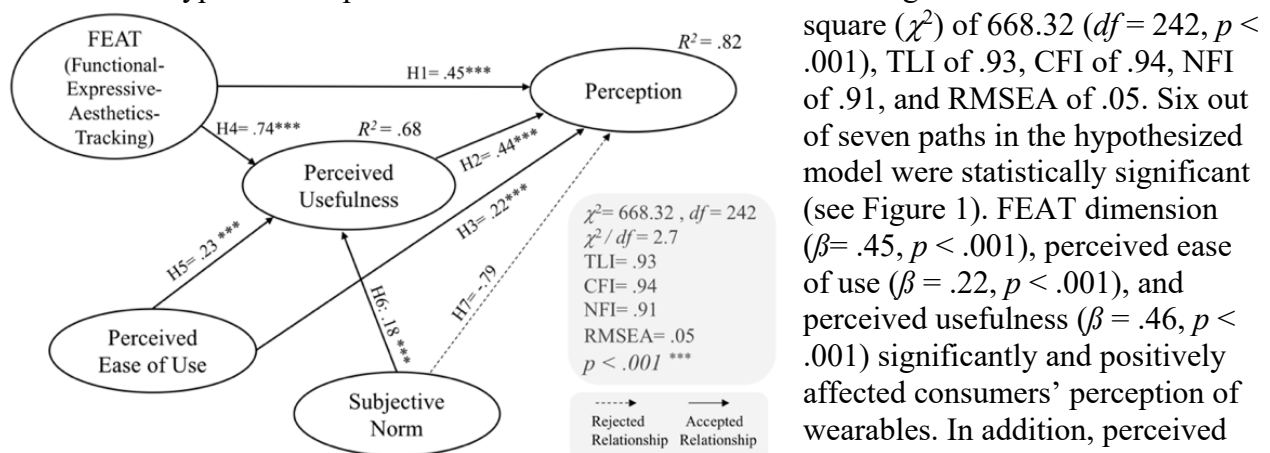


Figure 1. Final structural path model of this study.

FEAT dimensions ( $\beta = .76, p < .001$ ) and subjective norm ( $\beta = .18, p < .001$ ) positively and significantly influenced perceived usefulness. This proposed model presents an adequate model fit, by knowing that 82% of consumers' perception of wearables was explained by these variables.

The findings of this study highlight the importance of FEAT dimension in predicting consumers' perception of wearables. As we postulated, T attributes along with F-E-A attributes, all together, are key determinants of predicting consumers' needs and perception of wearables. Therefore, it is essential for industry professionals (e.g., designers and product developers, manufacturers) to fully consider the FEAT dimension as a whole to be able to fully reflect target markets' needs in products embedding wearable technology and fulfill consumers' needs of wearables in the future. The result of this study would benefit future researchers to gain a better understanding of how the FEAT dimension plays a key role in creating these high-tech embedded wearables and their sustaining value. This study was only limited to integrate a set of key product attributes, FEAT, for predicting consumers' perception of wearables. Future research needs to further consider the social acceptability of wearables in order to fully capture the viability of wearables in the market.

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