## Consumer Response to the Radio Frequency Identification (RFID) Technology-based Self-service Beauty Specialty Store: Moderating Effects of Consumer Traits

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**Introduction.** Radio Frequency Identification (RFID) refers to wireless system consisted of reader devices and tags. The reader device emits radio waves and receives signals back from the RFID tag, which is attached to the product and stores its information (Finkenzeller, 2010). RFID-based retail technologies increase an efficiency of shopping processes as well as offering novel shopping experiences to customers (Melià-Seguí et al., 2013). Several beauty retailers are experimenting with RFID technology in the context of a self-service specialty store. For example, a multinational cosmetic brand *Innisfree*, has opened the self-service stores embracing RFID-based retail technologies: An "interactive shelving display" shows product information (e.g., ingredients, color options) on the digital shelf; and a "smart table" displays video tutorials ('how to use'), recommended items to purchase together, and customer reviews on the digital screen of the table when the RFID-chipped product is brought close to or put on the screen. A RFID-based self-checkout counter enables a quick checkout by putting the items in a 'deep hole' of the counter, which reads the RFID chips of all items at once. As the brick-and-mortar retail shifts towards a more digital experience, the self-service store leveraging RFID-based retail technologies increase functionalities (i.e., usefulness, easiness) as well as entertainment (i.e., enjoyment, newness) in retail experiences during the in-store customer journey. Despite the beauty specialty retailers' increasing adoption of RFID-based retail technologies in the self-service store venue, this is an underexplored area of research.

**Literature Review and Conceptual Framework.** Researchers investigating smart in-store technologies (e.g., Kim et al., 2017) have found that consumer's beliefs on a technology (i.e., perceived ease of use, usefulness, enjoyment, and novelty) affect attitudes to the technology, which in turn influence intentions to the technology as well as to the store adopting such technology. According to Childers et al. (2001), perceived usefulness and ease of use can embody the utilitarian aspects of a technology, while enjoyment can reflect the hedonic aspect of a technology. Researchers have maintained that certain individual traits determine consumer's acceptance of retail technologies. Consumers with high levels of innovativeness (i.e., a tendency to seeking novel information) and technology self-efficacy (i.e., a judgment on one's capability to use a technology) are more likely to embrace retail technologies in the self-service store context (Adopa et al., 2020; Wang et al., 2013). On the other hand, consumers who want to avoid interactions with sales employees, having low levels of need for interaction, tend to prefer using technology-based self-services over traditional services (Meuter et al., 2000).

Building on the foregoing discussion, the purposes of this study were twofold; first, based on the Technology Acceptance Model (TAM) (Davis, 1989) as a conceptual framework, we investigated the influences of the beliefs on a technology (i.e., perceived usefulness, ease of use, enjoyment, novelty) on attitudes and intentions to the RFID-based retail technologies in the context of a self-service beauty specialty store. Second, we tested the moderating effects of consumer traits (i.e., hedonic/utilitarian shopping orientation, technology self-efficacy, consumer innovativeness, and need for interaction) in the relationships of variables delineated in our model (see the hypothesized model in Figure 1).
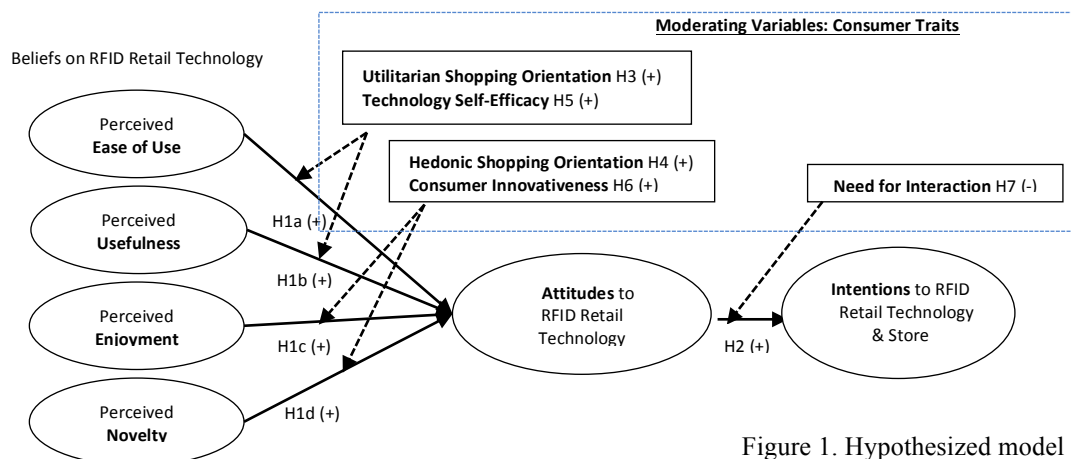


Figure 1. Hypothesized model

**Method and Procedures**. Using an online survey method, a convenience sample (*n*= 303) was collected from undergraduates enrolled at a university in the Eastern and Southeastern US. In the first part of the questionnaire, participants (Ps) were given pictures and descriptions as well as a commercial video clip depicting the RFID-based self-service beauty specialty store. Then, Ps were asked to respond to established variable measures using 7-point scales. The last section contained demographic questions. Structural equation modeling was used to test hypothesized relationships between variables.

**Participant characteristics.** Ps were women (73.2%), Caucasian (55.4%), and in their senior year (39.3%). They ranged in age from 18 to 33 years (*m*= 21.7). Ps (78.5%) indicated that they visit a specialty store for beauty product shopping 1-5 times a month. A few Ps (19.6%) have tried the retail technology at the store for beauty/fashion shopping (e.g., self-checkout).

**Results.** Confirmatory factor analysis showed that the measurements had acceptable construct validity, convergent validity, and discriminant validity. All item loadings were higher than 0.50 (*p*<.001) supporting unidimensionality of each construct. Cronbach's alpha coefficients were higher than 0.80, indicating reliabilities of all measures. The structural model exhibited a good fit with the data ($\chi2/df$=1.22, CFI=.96, NNFI=.96, IFI=.96, RMSEA=.050). The result showed that perceived usefulness (H1b, $\beta$=.63, *t*=9.47, *p*<.001) had the strongest positive effect on attitudes to the RFID-based retail technology, followed by perceived enjoyment (H1c, $\beta$=.23,

$t$=3.55, $p$<.001), and perceived ease of use (H1a, β=.12, $t$=1.95, $p$<.05). Perceived novelty had no significant impact. Attitudes to the RFID retail technology had a positive and significant impact on intentions to the technology and the store (β=.93, $t$= 42.99, $p$<.001), supporting H2. The effect of beliefs on a technology (i.e., perceived ease of use) on attitudes was not significantly different either between the high vs. low hedonic or utilitarian shopping orientation groups, rejecting H3 and H4. However, technology self-efficacy ($X^2$(1)= 7.152, $p$<.01), consumer innovativeness ($X^2$(1)= 6.653, $p$<.01), and need for interaction ($X^2$(1)= 4.121, $p$<.05) significantly moderated the relationships between variables, supporting H5, 6, and 7.

**Discussion and Implications.** College consumers perceived the RFID-based retail technologies (i.e., smart tables) as useful, enjoyable, and easy to use; and these perceptions positively affected their attitudes and intentions to the self-service beauty store adopting those technologies. Marketers can emphasize the unique technological components of their self-service store to encourage innovative as well as technology high-efficacy consumers to visit. Beauty retailers may want to increase the self-service store venue in the post pandemic, considering consumer's increasing preference on this retail format with low needs for interaction.

**References**

Adapaa, S., Fazal-e-Hasanb, S. M., Makamc, S. B., Azeema, M. M., & Mortimer, G. (2020). Examining the antecedents and consequences of perceived shopping valuethrough smart retail technology. *Journal of Retailing and Consumer Services, 52,* doi: https://doi.org/10.1016/j.jretconser.2019.101901

Childers, T. L., Carr, C. L., Peck, J., & Carson, S. (2001). Hedonic and utilitarian motivations for online retail shopping behavior. *Journal of Retailing, 77*, 511–535.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319–340.

Finkenzeller, K. (2010). *RFID Handbook: Fundamentals and Applications in Contactless Smart Cards, Radio Frequency Identification and Near-Field Communication (3rd edition)*. NJ: John Wiley & Sons.

Kim, H-Y, Lee, J.Y., Mun, J. M., & Johnson, K.K.P. (2017). Consumer adoption of smart in-store technology: Assessing the predictive value of attitude versus beliefs in the technology acceptance model. *International Journal of Fashion Design, Technology and Education, 17*(1), 26-36.

Melià-Seguí, J., Pous, R., Carreras, A., & Morenza-Cinos, M. (2013). Enhancing the shopping experience through RFID in an actual retail store. Proceedings of the *2013 ACM conference on Pervasive and ubiquitous computing adjunct publication.*

Meuter, M. L., Ostrom, A. L., Roundtree, R. I., & Bitner, M. J. (2000). Self-service technologies: Understanding customer satisfaction with technology-based service encounters. *Journal of Marketing 64*(3), 50–64.

Wang, C., Harris, J., & Patterson, P. (2013). The roles of habit, self-efficacy, and satisfaction in driving continued use of self-service technologies: A longitudinal study. *Journal of Service Research, 16*(3), 400–414.