



In-Store Automation: Consumers' Technology Adoption and Perceived Digital Exclusion

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Introduction

In-store automation has reshaped business models by allowing retailers to expand their service channels and enhance consumer experience (McKinsey & Company, 2019). Particularly, automated checkout has been introduced in various physical stores (e.g., Amazon Go, Apple Cashier-less Store, etc.), and it is expected to accommodate consumers' needs for convenient wait-less shopping in fashion stores (Arthur, 2017). Automated checkout stores adopt the IoT (Internet of Things) system based on innovative technologies (e.g., computer vision, sensor, or AI), which connect shoppers' online accounts and shopping records to a mobile app, allowing them to make purchases without waiting (Schögel & Lienhard, 2020). Previous researchers have addressed concerns about a group of consumers who feel left behind or excluded in the digitally mediated environment (e.g., online shopping) (Youn et al., 2022). This perspective needs to be further discussed in the physical-digital retail setting concerning consumers' perceived unequal digital circumstances and their relative differences in digital skills or access as retail stores adopt these emerging technologies to their physical stores (Helsper, 2017). Digitally excluded feelings or perceptions might inhibit consumers' digital technology adoption, and the role of perceived digital exclusion in the usage of in-store automation checkout remains unclear. Thus, this study integrates perceived digital exclusion into the consumer technology adoption framework in automated checkout store settings.

Literature Review and Hypotheses

Automated checkout stores have received growing attention as becoming one of the future retail store formats that integrate the digital components of online shopping into physical store shopping (e.g., phygital retail). This study combines and extends the two existing theories, a modified version of the Unified Theory of Acceptance and Use of Technology (UTAUT) (Dwivedi et al., 2019; Venkatesh et al., 2012), and the Relative Deprivation Theory (RDT) from the field of digital inequalities (Helsper, 2017; Runciman, 1966), to examine consumers' automated checkout use behavior considering their perceived relative digital exclusion. This study adopts factors explaining consumers' technology adoption and use behavior from the UTAUT— *Performance Expectancy* (PE) as an individual factor, *Social Influence* (SI), and *Facilitating Conditions* (FC) as contextual factors (Dwivedi et al., 2019). PE refers to the degree to which consumers believe that using an automated checkout would increase their shopping

performance. SI is defined as consumers' perception of the degree that important others would think they should use an automated checkout. FC refers to the degree of consumers' perception of external resources or support in using an automated checkout (Venkatesh et al., 2012). Previous studies have found the positive effects of these three factors on consumers' attitudes toward technology adoption and their subsequent behavioral intentions in various technology-driven contexts (e.g., self-checkout, mobile payment, etc.) (Dwivedi et al., 2019; Patil et al., 2020). Moreover, in order to integrate the individuals' perceived digital exclusion into the automated checkout context, this study adopts the concept of *Relative/Subjective Digital Exclusion* (RDE) under RDT from the study of digital inequalities as a negative individual factor (Anderson & Esposito, 2014; Helsper, 2017; Reisdorf & Groseelj, 2015). RDE refers to the level of consumers' subjective perception of their internal resources in terms of whether an individual feels disadvantaged compared to others concerning digital access, skills, and engagement (Helsper, 2017). Based on that, this study argues that perceived RDE would hinder consumers' automated checkout adoption behavior. Thus, this study proposes the following hypotheses.

- H1.** (a) Performance expectancy (PE), (b) social influence (SI), and (c) facilitating conditions (FC) will positively affect consumers' attitudes (ATT) to use an automated checkout, while (d) relative/subjective digital exclusion (RDE) will negatively affect consumers' attitudes (ATT) to use an automated checkout.
- H2.** Consumers' attitudes (ATT) to use the automated checkout system will positively affect their intentions (BI) to use the system.
- H3.** Two contextual factors— (b) SI and (c) FC— will positively and directly influence BI.
- H4.** (a) PE, (b) SI, and (c) FC will have a positive indirect effect on BI through ATT, while (d) RDE will have a negative indirect effect on BI through ATT.

Methods

The survey participants were consumers 18 years old or above living in the United States. The data were collected through Amazon MTurk, and a total of 294 responses were statistically analyzed. Approximately 60% were male, 76% were Caucasians. The measurement items were adapted and modified from previous literature and measured using a 7-point Likert scale (Ajzen & Fishbein, 1980; Callan et al., 2008; Helsper, 2017; Venkatesh et al., 2012). The partial least squares structural equation modeling (PLS-SEM) was conducted to test the hypotheses.

Results

The measurement model was examined. All the factor loadings were > 0.73 , and the composite reliability for all constructs was > 0.88 . Discriminant validity was checked using The Fornell-Lacker criterion, and it indicated that the AVEs of the constructs were > 0.81 , and the square root of the AVE was higher than the correlation between the constructs. According to the PLS-SEM

results, the path analysis confirmed that performance expectancy, social influence, and facilitating conditions positively influenced consumers' attitudes to use automated checkout (H1a: $\beta = 0.54, p < .001$, H1b: $\beta = 0.15, p < .05$, H1c: $\beta = 0.27, p < .001$), but perceived relative/subjective digital exclusion negatively influenced consumers' attitudes (H1d: $\beta = -0.08, p < .05$). Also, consumers' attitudes positively affected their intentions to use automated checkout (H2: $\beta = 0.70, p < .001$). Concerning direct relationships between the two contextual factors (i.e., social influence, facilitating conditions) and behavioral intention, the results indicated that both factors had a positive direct effect on behavioral intentions to adopt automated checkout (H3b: $\beta = 0.08, p < .05$; H3c: $0.14, p < .05$). Regarding the indirect relationships between the four factors and consumers' behavior intentions, perceived expectancy, social influence, and facilitating conditions had a positive indirect effect on consumers' intentions to use automated checkout through their attitudes (H4a: $\beta = 0.38, p < .001$, H4b: $\beta = 0.10, p < .05$, H4c: $\beta = 0.20, p < .001$), and there was a significant indirect negative effect of consumers' perception of relative/subjective digital exclusion on their intentions to use automated checkout through their attitudes (H4d: $\beta = -0.05, p < .05$).

Discussion and Conclusion

This study has scholarly and managerial implications. First, as consumers' perceived relative/subjective digital exclusion in technology adoption has been neglected in the discourse of retail fields, this study fills in a research gap by extending UTAUT and integrating the digital inequalities (RDT) into consumers' technology adoption (i.e., automated checkout). Second, this study offers an opportunity for fashion retailers to bring those who have been unequally represented and implicitly excluded from the physical-digital integrated shopping context to the table. Finally, retailers will obtain practical knowledge to benefit consumers who feel digitally excluded in this digitized shifting era and perceive fewer shopping options than those who are tech-savvy.

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