Privacy Fatigue: AI-powered 3D Visualization Services

Ishtehar Sharif Swazan, University of Missouri
Song-yi Youn, University of Missouri
Md. Rafiqul Islam Rana, University of South Carolina

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Introduction

The fusion of Artificial Intelligence (AI) with the fashion retail sector promises an explosive growth potential, boosting industry profits by up to $275 billion over the next five years (Khanna, 2023; Swazan & Youn, 2024). This surge is primarily driven by the ability of AI to provide unmatched personalization, especially in services demanding extensive personal data. An example of this innovation is Stitch Fix, which utilizes AI to craft personalized style profiles from 90 distinct data points derived from comprehensive customer surveys (Harreis et al., 2023). For AI-powered 3D visualization services, data points cover a spectrum of physical characteristics (i.e., heights, shapes, and images), allowing AI algorithms to suggest apparel that resonates deeply with each customer's unique preferences. However, this level of customization introduces pressing privacy concerns for consumers. Moreover, the digital shopping environment demands an excessive amount of data from consumers and, particularly, makes the provision of private information a prerequisite for using the service itself. This can lead to consumers' feelings of fatigue or cynicism regarding their privacy in the digital realm (Choi et al., 2018). Despite consumers experiencing a complex mix of privacy worries and fatigue, the way these concerns translate into feelings of exhaustion and cynicism about privacy issues remains underexplored. This would eventually influence behavioral intention to adopt AI-powered 3D visualization services (Youn & Luan, 2023).

Addressing this critical junction, we examine the extended Concerns for Information Privacy (CFIP) and how privacy concerns, intertwined with emotional exhaustion and cynicism, influence the perceived risk of sharing information. Furthermore, this study considers how consumers' digital literacy—i.e., knowledge about privacy policies and business practices (Park, 2016)—influences these dynamics as a moderator. Consequently, the study aims to explore (a) the effects of privacy concerns on consumers' feelings of exhaustion and cynicism towards AI-powered 3D visualization services in fashion retail and (b) how these feelings impact their risk and willingness to use such services. We also examine (c) the role of digital privacy literacy as a moderating factor in the associated perceived risks of information sharing.

Literature Review

The Concerns for Information Privacy (CFIP) framework captures the essence of how individuals view the collection, management, and safeguarding of their private data by companies (Smith et al., 1996). Encompassing four critical dimensions—Information Collection, Errors, Unauthorized Secondary Use, and Improper Access—CFIP paints a comprehensive picture of privacy concerns. *Information collection* scrutinizes the extent of personal data harvesting by organizations. *Errors* highlight the angst over personal data inaccuracies stemming

from weak protections. *Improper access* amplifies the alarm over unapproved entry to stored data. Lastly, *unauthorized secondary Use* raises red flags over the unconsented exploitation or dissemination of personal data (Smith et al., 1996). CFIP not only captures these multifaceted apprehensions but also highlights how they can intensify privacy fatigues—i.e., emotional exhaustion and cynicism. *Emotional exhaustion* refers to a condition where concerns over online privacy become an overwhelming burden and *cynicism* refers to a deep-rooted distrust in the mechanisms safeguarding digital privacy (Choi et al., 2018). Intriguingly, CFIP, when intertwined with feelings of emotional exhaustion and cynicism, can influence the *perceived risk* of disclosing personal information. This reflects the principles of the privacy calculus theory (PCT), which explains consumer behaviors in the context of privacy threats (Youn & Luan, 2023). This triad of emotional exhaustion, cynicism, and risk perception is crucial in determining consumer intention to embrace AI-powered personalized shopping experiences. Moreover, the degree of consumers' *digital literacy*—that refers to their knowledge of privacy policies and business practices concerning privacy—would adjust the dynamics of these relationships (Park, 2013). Hence, we propose the following hypotheses:

H1-H4. Fashion consumers' privacy concerns toward the retailer's data management—(H1) collection, (H2) error, (H3) secondary use, and (H4) improper access—will increase privacy fatigue—(a) emotional exhaustion and (b) cynicism—and (c) perceived risks regarding disclosing personal information.

H5-H6. The privacy fatigues—(H5) emotional exhaustion and (H6) cynicism—will increase (a) the perceived risk and (b) the adoption intentions to use the AI-powered 3D visualization service.

H7. The perceived risks associated with personal data disclosure will decrease the adoption intentions to use the AI-powered 3D visualization service.

H8. Consumers' digital privacy literacy will moderate the influence of privacy fatigues—(a) emotional exhaustion and (c) cynicism—on perceived risk.

H9. Consumers' digital privacy literacy will moderate the influence of perceived risk on the adoption intentions to use the AI-powered 3D visualization service.

Research Method

The survey participants were recruited through MTurk, and a screening question was used to verify that they were 18 or older. A total of 510 usable responses were collected, excluding invalid or incomplete answers. 45% of the total participants were male, 77% were Caucasians, 70% were in the age range between 25 and 44, 63% obtained a college-level degree, and 85% were living in urban cities. The survey questionnaire was constructed by adapting measurement scales from previous studies (Smith et al., 1996; Venkatesh et al., 2016; Youn et al., 2023). Participants were asked to answer questions regarding their previous experiences and perceptions toward using AI-driven 3D visualization services that required their personal information in the fashion retail store. Survey items were measured on a 5-point Likert scale.

Results & Discussion

After examining the measurement model, path analysis was conducted to test hypotheses. PLS-SEM results indicated that consumer concerns about data collection significantly increased feelings of emotional exhaustion, cynicism, and perceived risk (H1a: $\beta = 0.408$, $p < .001$; H1b: $\beta = 0.420$, $p < .001$; H1c: $\beta = 0.676$, $p < .001$). Moreover, concerns regarding error only significantly increased feelings of emotional exhaustion and cynicism (H1a: $\beta = 0.206$, $p < .001$; H1b: $\beta = 0.137$, $p < .001$). However, their concerns about the secondary use of data only significantly increased perceived risk (H3c: $\beta = 0.089$, $p < .001$). Improper access did not influence privacy fatigues and concerns. The feeling of emotional exhaustion significantly increased perceived risk (H5a: $\beta = 0.190$, $p < .001$), and cynicism did not influence any. This indicates that even though consumers perceive emotional exhaustion, they still want to use personalization services in the retail service setting. Finally, perceived risks associated with personal data disclosure significantly decreased the adoption intentions (H7: $\beta = -0.250$, $p < .001$). The moderation results show that consumers' knowledge of privacy policies had a significant negative moderation effect on the relationship between emotional exhaustion and perceived risk (H8a: $\beta = -0.125$, $p < .001$) and perceived risk and adoption intentions to use the retail service (H9: $\beta = -0.179$, $p < .001$).

Conclusion

The findings of this study hold significant implications. The extended model of CFIP, when incorporated with PCT, underscores the importance of understanding the privacy paradox, especially within the fashion retail services sector. It becomes evident that consumers' concerns regarding massive information collection and management practices are the primary factors inducing feelings of emotional exhaustion and cynicism concerning privacy issues. It is crucial for retailers to build transparent and ethical data collection systems. This can help alleviate consumer concerns and privacy fatigues.

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