

Human-in-the-Loop Aesthetic Governance: The Role of Visual Merchandisers in Mitigating AI Brand Misalignment

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Abstract

The integration of artificial intelligence (AI) into fashion retail has transformed visual merchandising by enabling automated and scalable content creation. However, AI-generated visual outputs may lack contextual awareness, cultural sensitivity, and aesthetic judgment, potentially creating inconsistencies in brand representation. This study conceptualizes this challenge as AI-driven brand misalignment and proposes a human-in-the-loop (HITL) framework in which visual merchandisers evaluate, refine, and correct AI-generated visual outputs. The study examines the relationship between AI-generated visual outputs and brand identity alignment, with visual merchandiser intervention acting as a mediator. A quantitative research design will be adopted using a structured questionnaire with a target of at least 302 valid respondents. The adequacy of this target will be assessed through an a priori statistical power analysis based on the requirements of the proposed analysis. Regression-based mediation analysis or structural equation modeling (SEM) will be used to test the proposed relationships. The study is expected to contribute to understanding the role of human aesthetic oversight in AI-driven fashion retail.

Keywords: Aesthetic governance, human-in-the-loop, artificial intelligence, visual merchandising, brand identity, brand misalignment, fashion retail, mediation model.

I. Introduction

Artificial intelligence is increasingly used in marketing and retail to enhance efficiency, personalization, and scalability (Davenport et al., 2020; Huang & Rust, 2021). In fashion retail, these capabilities provide opportunities for AI-assisted visual content and digital brand communication. Fashion branding, however, depends strongly on aesthetic and symbolic communication, including visual storytelling, cultural meaning, and emotional resonance (Holt, 2004). Although AI systems provide powerful automation and pattern-recognition capabilities, human judgment remains important when tasks require contextual understanding and interpretation (Huang & Rust, 2021; Jarrahi, 2018). Consistent brand identity supports brand recognition, differentiation, and strong consumer–brand relationships (Aaker, 1996; Keller, 2013). Inconsistencies between intended brand meaning and visual representation may also affect perceptions of authenticity (Beverland, 2005). Visual merchandisers may therefore assume an important role in AI-supported retail environments by evaluating and refining AI-generated visuals. Their expertise in organizing and communicating visual retail elements makes them particularly relevant to maintaining brand consistency (Kent, 2007). This study examines this role through a human-in-the-loop framework.

II. Literature Review Methodology

The literature review was conducted using major academic databases, including **Scopus, Web of Science Core Collection, ScienceDirect, and IEEE Xplore**, while Google Scholar was used as a supplementary search tool. The review focused on literature related to artificial intelligence, visual merchandising, human-in-the-loop systems, brand identity, and fashion retail. Keyword combinations, Boolean operators (AND, OR, NOT), citation chaining, and backward reference tracking were used to identify relevant studies. Peer-reviewed journal articles and authoritative academic sources directly related to the research topic were prioritized.

III. Theoretical Foundation

The study draws on three complementary perspectives: aesthetic governance, human-in-the-loop (HITL) human–AI collaboration, and brand identity theory.

Aesthetic Governance: Aesthetic governance is conceptualized in this study as the structured management and oversight of visual elements to maintain coherent brand representation. Visual and symbolic decisions influence how brands communicate meaning and authenticity (Schroeder, 2005; Beverland, 2005). In AI-supported environments, human evaluation may therefore be necessary to maintain aesthetic coherence.

Human-in-the-loop Perspective: The HITL perspective emphasizes combining AI capabilities with human expertise and judgment. Human involvement is particularly valuable when decisions require contextual interpretation and strategic judgment (Jarrahi, 2018). Explainable AI research similarly emphasizes human understanding and oversight of algorithmic systems (Rai, 2020). In this study, visual merchandisers represent the human component of the HITL process by evaluating, refining, and correcting AI-generated visual outputs.

Brand Identity Theory: Brand identity perspectives emphasize the development and consistent communication of distinctive brand associations (Aaker, 1996; Keller, 2013). Inconsistencies between intended identity and visual representation may weaken brand coherence and perceived authenticity (Beverland, 2005). Integrating these perspectives provides the theoretical foundation for examining visual merchandisers as human-in-the-loop agents within AI-driven aesthetic governance.

IV. Problem Statement

The increasing adoption of AI in marketing and retail is changing how brands manage personalization, customer interactions, and content-related activities (Davenport et al., 2020; Huang & Rust, 2021). However, AI systems may face limitations when tasks require contextual interpretation and nuanced human judgment (Huang & Rust, 2021; Jarrahi, 2018). These limitations are particularly important in fashion retail, where visual representation communicates aesthetic and symbolic brand meanings. Inconsistencies between intended brand identity and visual representation may weaken brand coherence and authenticity (Aaker, 1996; Beverland, 2005; Keller, 2013). Although previous research has examined AI in marketing, human–AI collaboration, and brand identity, limited attention has been given to the role of visual merchandisers in mediating the relationship between AI-generated visual outputs and brand identity alignment. This study addresses this gap by examining whether visual merchandiser intervention can mitigate AI-driven brand misalignment.

V. Research Objectives

1. To examine the relationship between AI-generated visual outputs and brand identity alignment in fashion retail.
2. To examine the mediating effect of visual merchandiser intervention on the relationship between AI-generated visual outputs and brand identity alignment.
3. To empirically test a human-in-the-loop aesthetic governance model in AI-driven fashion retail.

VI. Research Questions

1. How do AI-generated visual outputs influence brand identity alignment in fashion retail?
2. To what extent does visual merchandiser intervention mediate the relationship between AI-generated visual outputs and brand identity alignment?
3. How can a human-in-the-loop aesthetic governance framework explain brand identity alignment in AI-driven fashion retail?

VII. Proposed Research Design

The study adopts a **quantitative research approach** grounded in a positivist paradigm, allowing constructs and relationships to be statistically examined (Creswell & Creswell, 2018; Saunders et al., 2019). Data will be collected through a structured questionnaire using a **7-point Likert-type scale** to measure respondents' perceptions of the study constructs (Joshi et al., 2015; Krosnick & Fabrigar, 1997). The study will aim to obtain at least 302 valid responses. The adequacy of this target will be evaluated through an a priori power analysis using G*Power, considering the expected effect size, significance level, desired statistical power, and relevant predictors (Faul et al., 2009). Data will be analyzed using **regression-based mediation analysis or structural equation modeling (SEM)**, depending on the final measurement model and analytical requirements.

VIII. Proposed Conceptual Model

The proposed model examines the relationship between AI-generated visual outputs and brand identity alignment, with visual merchandiser intervention acting as a mediator within a human-in-the-loop framework.

The model consists of:

- **Independent Variable (IV):** AI-generated visual outputs
- **Mediator (M):** Visual merchandiser intervention (HITL role)
- **Dependent Variable (DV):** Brand identity alignment

The proposed relationship is:

AI-Generated Visual Outputs → Visual Merchandiser Intervention → Brand Identity Alignment

The model proposes that AI-generated visual outputs influence brand identity alignment both directly and indirectly through visual merchandiser intervention. The mediator represents human evaluation, refinement, and correction of AI-generated visual content. Visual merchandiser intervention is expected to support aesthetic and brand consistency by combining AI capabilities with human contextual and aesthetic judgment (Jarrahi, 2018; Kent, 2007).

IX. Expected Contribution

The study seeks to integrate research on artificial intelligence, human–AI collaboration, visual merchandising, and brand identity within the context of fashion retail. It extends existing discussions of brand identity and aesthetic management to AI-generated visual content (Aaker, 1996; Keller, 2013; Huang & Rust, 2021). It also applies the human-in-the-loop perspective to a creative retail context by positioning visual merchandisers as human agents responsible for evaluating and refining AI-generated visual outputs (Jarrahi, 2018; Rai, 2020). Practically, the findings may help fashion retailers develop hybrid AI–human approaches that combine the efficiency and scalability of AI with human contextual and aesthetic judgment to maintain brand consistency.

X. Sampling Size Justification

The study aims to obtain a minimum of 302 valid responses. This figure represents the proposed recruitment target, while its statistical adequacy will be evaluated according to the requirements of the proposed mediation and multivariate analyses. Fritz and MacKinnon (2007) demonstrated that the sample size required to detect a mediated effect varies according to the magnitude of the relationships between the independent variable, mediator, and dependent variable and the method used to test the indirect effect. An **a priori power analysis using G*Power** will therefore be conducted to evaluate the required sample based on expected effect size, significance level, statistical power, and relevant predictors (Faul et al., 2009). Sample adequacy for SEM will additionally be evaluated according to model complexity and measurement characteristics (Hair et al., 2022). The target of at least 302 valid responses will therefore be retained as the proposed recruitment goal, while its statistical suitability will be confirmed through power analysis. Additional responses may be collected to compensate for incomplete or unusable questionnaires.

XI. Population and Sampling Scope

The target population consists of individuals who are involved in or sufficiently familiar with fashion retail environments where AI-generated or AI-assisted visual content may be encountered. Participants may include professionals and practitioners with knowledge or experience in **visual merchandising, fashion branding, retail marketing, fashion business, e-commerce, digital marketing, or related fashion retail activities**. Consumers may also be included when they demonstrate sufficient familiarity with fashion retail and AI-assisted or digital visual brand content to provide informed evaluations of the study constructs. Screening questions will be incorporated into the questionnaire to determine respondent eligibility and ensure that participants have sufficient familiarity with fashion retail and visual brand communication.

XII. Conclusion

This study examines how AI-generated visual outputs influence brand identity alignment in fashion retail, with visual merchandiser intervention acting as a mediator within a human-in-the-loop framework. The proposed model positions visual merchandisers as human agents who evaluate, refine, and correct AI-generated visual content. Their intervention may help combine the efficiency and scalability of AI with the contextual and aesthetic judgment required for consistent brand representation. By empirically testing this relationship, the study aims to contribute to research on human–AI collaboration, visual

merchandising, and brand identity while providing practical insights into the governance of AI-generated visual content in fashion retail.

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