

An Exploratory Study of Fashion Brands' Diversity, Equity, and Inclusion Efforts in the Workforce Using Topic Modeling and Computer Vision

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Introduction

The fashion business, long criticized for its lack of diversity and inclusion, has recently begun prioritizing Diversity, Equity, and Inclusion (DEI) (McKinsey, 2021). For example, fashion brands have made efforts to increase the diversity of their executives and boards (Business of Fashion, 2023) and promote body size inclusion (Vogue, 2023). While businesses highlight their DEI progress, measuring DEI progress remains difficult. To address this challenge, our study aims to explore and offer a snapshot of fashion brands' DEI efforts and progress using topic modeling and computer vision. Advertising research focusing on inclusion offers critical insights to conceptualize the DEI initiatives of fashion brands (Eisend, 2022). A handful of studies have identified an inclusive workforce as racial diversity and demonstrated its impact on positive market growth and evaluation (Pandey, Shanahan, & Hansen, 2005; Richard, Stewart, McKay, & Sackett, 2017). The concepts of subjective social inclusion (Licsandru & Cui, 2018) and DEI axes (Arsel, Crockett, & Scott, 2022) further guide the way the DEI progress of fashion brands can be understood. We examine fashion brands' DEI progress by analyzing companies' DEI statements using topic modeling and visual representations of fashion workers (models) using computer vision. The research objectives are twofold: (1) to compare the topics generated from DEI statements with the dimensions of subjective social inclusion; and (2) to evaluate fashion brands' diversity through the age representation of models.

Conceptual Development

As individuals' feelings of being included in a societal context (Licsandru & Cui, 2018), social inclusion has multiple dimensions: acceptance (one's feeling of being included), belongingness (one's emotional connectedness to the group), empowerment (one's feeling of contribution to the group and being involved), equality (one's feeling of having equal opportunities), and respect (one's full recognition as a person). These dimensions of social inclusion encapsulate feelings of inclusion experienced by individuals, which offer conceptual guidance to interpret DEI statements. Age is one of the important personal characteristics in consumer research related to DEI (Arsel et al., 2022). Among fashion brands, the largest workforce ranges from 25 to 29 years old (Datausa, n.d.). Although employees with more advanced age and experiences have the potential to contribute to fashion brands, they are often undervalued in current youth culture. Using age as one of the diversity representations, we perform computer vision analyses to capture the age distribution of models in the photos of fashion brands.

Methodology and Results

Topic Modeling of DEI Statements. First, 200 fashion brands were identified from WindowsWear, a retail visual merchandising database. From these brands, 121 DEI statements were scraped from their official websites using the Beautiful Soup Python library. Natural language processing (NLP) and exploratory data analysis (EDA) were then performed to generate a word cloud (Figure 1), which highlighted keywords such as “community,” “diversity,” “women,” and “people.” Non-negative matrix factorization (NMF) was further used to perform topic modeling of DEI statements (Table 1), and the t-distributed Stochastic Neighbor Embedding (t-SNE) method was employed to visualize the topics (Figure 2). Three topics emerged from topic modeling: community, equality, and women-focused. Overall, findings of topic modeling were consistent with the dimensionality of subjective social inclusion, particularly in the aspect of equality. The topic of community generated from DEI statements broadly captures the dimensions of acceptance and belongingness of social inclusion. However, fashion brands’ DEI initiatives should focus more on practices to give employees a sense of acceptance and belongingness. The third topic, women-focused, revealed that fashion brands have paid attention to the representation of women in the workforce (Vogue Business, 2023). However, the dimensions of empowerment and respect - ways to empower women employees and develop a respectful working environment were missing in fashion brands’ DEI statements.

Computer Vision Analyses. We explored the DEI axis of age detected in the photos, as age is considered a relatively neglected identity and often invisible in research and practice (Barnhart & Penalosa, 2013). First, 47,376 images from 1,712 brands were collected from WindowsWear, capturing three visual categories: products, Facebook Ads, and Email marketing. Next, a deep learning algorithm (i.e., Faster R-CNN) for person detection was applied to remove photos that do not contain human models. By eliminating non-person and duplicate photos, 14,763 unique person images were used for further analyses. Then, Amazon’s face recognition API was used to identify demographic features. Specifically, age was detected as one facial feature for each person with the Face Recognition Algorithm. Results indicated that fashion models of the average age of 23-24 years old were captured in brands’ visual presentations across three visual categories (Figure 3), lacking the representation of advanced-age fashion workers in practice.



Fig.1

Identified Topics and Top 5 Words		
Topic 1: Community	Topic 2: Equality	Topic 3: Women-focused
Diversity, Inclusion, Employee, Community, People	Gender, Status, Protected, Equal, Disability	Woman, Collection, Fashion, Style, Design

Table 1

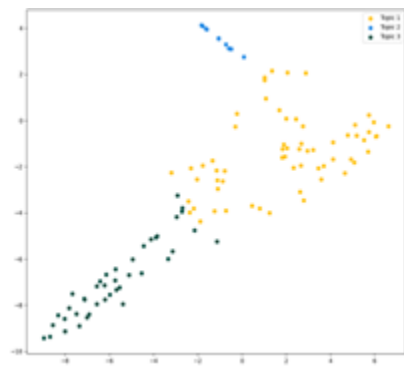


Fig.2

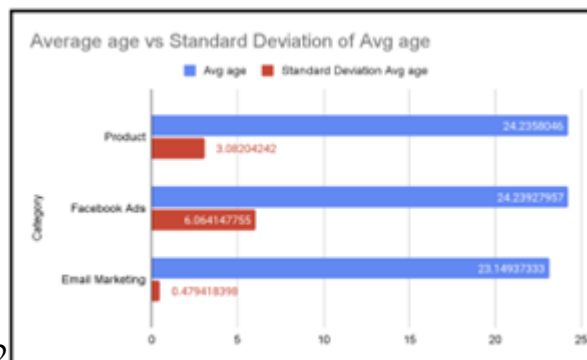


Fig.3

Conclusion

This research offers new insights into the current DEI efforts of fashion brands. Through topic modeling and computer vision, our research took a snapshot of what fashion brands focus on in their DEI initiatives as reflected in their DEI statements and how brands actually perform in a specific dimension, namely, age diversity of fashion workers (models). Results revealed that the scope of an inclusive brand defined by fashion companies through their DEI statements is limited. Fashion brands are suggested to provide detailed strategies regarding ways to enhance acceptance and belongingness, empower employees, and create respect in the workplace. Moreover, the representation of fashion workers with more advanced age should be considered in the creative process.

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