Metaverse Buzz in the Fashion Industry:
Social Network Analysis with Twitter Data Introduction

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The retail environment evolves in accordance with social changes. In response to the COVID-19 outbreak, the fashion industry experienced a dramatic shift to online shopping (Youn et al., 2021), accelerating the adoption of a virtual space called Metaverse. Metaverse refers to an immersive virtual world in which users represented as avatars can interact with one another (Lee, 2021; Shen et al., 2020). The immersive virtual world expanded from online game players to overall consumers as it offers new domains for economic, leisure, and social activities (Bourlakis et al., 2009; Papagiannidis et al., 2008).

The expected revenue from the Metaverse market in 2028 is USD 872.35 billion, and fashion is considered one of the main segments (Brand Essence, 2022). Metaverse has created new opportunities for fashion companies to expand their retail channels and provide virtual experiences to consumers. Specifically, digital-only fashion brands have emerged, and large fashion brands, such as Gucci, Nike, and Ralph Lauren, have launched their virtual collections or collaborated with Metaverse platforms (Friedman, 2022). Due to the increased significance of Metaverse in the fashion industry, the purpose of the study is to explore the state of the new trend/technology (i.e., Metaverse) diffusion in the industry. The study may help fashion retailers adapting to the Metaverse marketplace to build strategic marketing plans.

Theoretical Background. Recognizing its potential in offering an immersive shopping experience using the 3D virtual environment, research on Metaverse has gradually increased in the advertising and retailing fields. For example, the factors that are likely to influence a consumer's purchase behavior when advertising in Metaverse were identified (e.g., Shen et al., 2021). Furthermore, calls for papers focusing on Metaverse from major academic journals, such as the Journal of Interactive Advertising are expected (Kim, 2021). However, at present, there is a dearth of studies that address the influence of Metaverse on the fashion industry.

To explore the current state of Metaverse adoption in the fashion industry, this study investigated relevant conversations on Twitter using social network analysis (SNA). SNA is a research method that helps examine connections (i.e., edges) between actors or entities (i.e., nodes) in a network (Borgatti et al., 2017). It enables researchers to explore and provides an overview of the trend/technology diffusion in a network (Godart, 2015; Yu et al., 2020). Given the emergent interest in Metaverse in the fashion industry and the lack of research on this issue, we propose the following exploratory research questions that can be addressed with SNA and provide foundational knowledge for future research: **RQ1.** What are the dynamics of a network that communicates about fashion and Metaverse on Twitter?; **RQ2.** (a) What are the dominant communities contributing to the Metaverse adoption in the fashion industry, and (b) who are the central entities within the communities?

Methods. The present study examined the online communication regarding Metaverse on Twitter, a suitable social media platform for investigating real-time phenomena (Zhao & Min, 2019). The data was collected during the "Big four" fashion week FW 2022 (Feb. 11 – Mar. 8). The Big four fashion weeks are major events in the fashion industry that involve participants from different backgrounds, including celebrities, fashion brands, and media (Entwistle & Rocamora, 2006). The selected timeframe allowed us to capture a wide variety of views about the new trend in the fashion industry. The Twitter conversational data that include keywords (i.e., Metaverse and apparel/cloth/fashion/textile) were extracted using NodeXL. The network's overall metrics were calculated using SNA to investigate the dynamics of a network and identify communities within the network. Density indicates the cohesiveness of a network with the proportion of the number of edges out of all possible connections between nodes (Borgatti et al., 2017). In-degree indicates how often a particular node is mentioned or retweeted (Hansen et al., 2011). Betweenness explains the role of a node as a bridge between other nodes by calculating the number of times the node is positioned on the shortest path between two other nodes (Hansen et al., 2011).

Results & Discussion. *Dynamics of a Network (RQ1).* The final dataset yielded a network comprising 8,746 tweets with 5,385 Twitter users. The network density was .0002. Such low network density is a typical feature of a large-size network (Borgatti et al., 2017). The network's reciprocity node-pair ratio (RNPR) value was .032, indicating that only 3.2% of pairs of Twitter users within the network performed two-way communication. Twitter users within the network were clustered into communities using the Clauset-Newman-Moore algorithm, which yielded 262 communities with two or more entities. Among the communities, the biggest four accounted for over 36% of the network.

Dominant Communities (RQ2). To better understand the four dominant communities, we identified each community's central entity with in-degree and betweenness metrics. In C1 (RNPR=.006), SpaceRunnerNFT (In-degree =909), a Metaverse fashion brand, was the central entity that mainly tweeted about the financial component of the Metaverse (e.g., fundraising for fashion Metaverse). In C2 (RNPR=.002), MetaTriads (In-degree=156), another Metaverse fashion brand, was a key entity and announced the launch of the NFT fashion marketplace. C3 (RNPR=.058) consisted of Metaverse Fashion Week-related central entities; Decentraland (In-degree=74) is a Metaverse platform that hosted the first
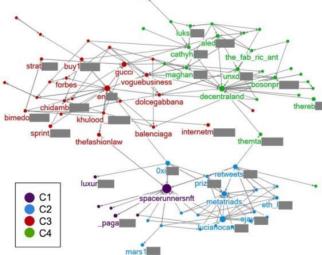

Figure 1. Communities with Central Twitter Users
Note. The node size is based on betweenness metric

Metaverse fashion week, and maghanXXX (In-degree=32) is the chair of the fashion week.

Notably, C4 (RNPR=.097) included renowned fashion brands (e.g., Gucci; In-degree=34) and fashion magazines (e.g., Vogue Business; In-degree=34). This community reciprocally discussed such fashion brands' participation in the Metaverse fashion week, and the fashion media played a crucial role in spreading the messages. Each community's RNPR value showed that C3 and C4 had relatively higher two-way communication, meaning that the Metaverse fashion week and traditional brands' digital collections received spotlights in the network.

Implications & Future Studies. Based on the Twitter interactions, we discovered the fashion marketplace expanding to the Metaverse. The results indicated that dominant communities with high reciprocal communication discussed Metaverse fashion merging into reality to a certain extent (e.g., the metaverse fashion week inviting reality brands, traditional brands launching digital collections). Additionally, the media (e.g., Forbes, Vogue Business) played a crucial role in spreading information about the new trend. Thus, it would be helpful for Metaverse fashion brands to incorporate reality components in their merchandise to attract fashion consumers who are yet to be familiar with the new virtual world (e.g., collaborate with reality traditional brands and work with the fashion magazines to advertise their virtual products). Lastly, this study looked at entities leading the initial stage of Metaverse adoption in the fashion industry. Thus, further research examining the content of consumer conversations is required to understand consumer perception of and demand on the Metaverse as a new shopping environment.

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