



Understanding the Sustainable Fashion
Discourse on Twitter: Insights into Themes,
Sentiments and User Networks

Mira Eberhardt, Marie Schmeissner and Inken Wittfoth

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Research-in-Progress Paper

Abstract

The rising significance of sustainability within the fashion industry and the increasing use of social media for discussions motivate this research. Social media platforms like Twitter enable targeted communication between different stakeholders identified within the discourse, providing valuable insights on sustainable fashion perceptions. This study examines sustainability fashion discourse on Twitter, analyzing how it is discussed and perceived. Using social media analytics on 66,587 tweets, the study employs topic modeling, sentiment analysis, and manual content analysis to identify key themes and sentiments. A network analysis explores interconnections between relevant key user accounts. The expected results might show stakeholders strategically disseminate sustainability information, leveraging signaling theory to bridge information asymmetry and enhance organizational attractiveness. Understanding these discourses within different key user accounts aims to help companies adjust strategies to meet consumer demands, enhancing the authenticity and impact of their sustainability communication in the fashion industry.

Keywords: Sustainable Fashion, Social Media Analytics, Twitter, Sentiment Analysis, Topic Modeling

1 Introduction

The rising significance of sustainability within the fashion industry (Orminski, Tandoc Jr. and Detenber, 2021), coupled with the increasing utilization of social media as a platform for discussions and opinion formation (Moe and Schweidel, 2017; Stieglitz, Basyurt and Mirbabaie, 2022a; Taxidou and Fischer, 2014), serves as the primary motivation for this research. Platforms like Twitter enable users to communicate about fashion and sustainability in a cost-effective and targeted manner. These platforms facilitate bidirectional communication between consumers and companies, resulting in vast amounts of data that can offer valuable insights into the perceptions and discussions surrounding sustainable fashion (Davis and O'Flaherty, 2013; Moe and Schweidel, 2017; Stieglitz et al., 2018). Understanding the communication about sustainable fashion can help companies adjust their strategies to meet consumer demands and expectations while achieving their sustainability goals.

The research problem is that despite the growing discourse on sustainability within the fashion industry, there remains a lack of systematic understanding how sustainability is portrayed in fashion-related

discussions on social media (Rahman, Hu and Fung, 2023) and how relevant stakeholder are interconnected (Mukendi et al., 2020). This presents a problem, as companies committed to sustainability may need to optimize their communication strategies to better address the needs and expectations of their target audience. Without a clear understanding of these discourses, it could be challenging to develop effective marketing strategies and enhance credibility and engagement in sustainable practices.

This study aims to investigate the communication about fashion, particularly sustainable fashion, on Twitter. The objective is to comprehend how sustainability is depicted in fashion-related discourse and how the stakeholders are interconnected. This analysis seeks to assist companies and other stakeholders in responding more effectively to consumer needs and expectations and adjusting their communication strategies accordingly. Guided by the following research questions, this study endeavors to gain a better understanding of how discussions and perceptions of sustainable fashion evolve on social media:

RQ1: How is sustainability portrayed in fashion-related discourse on Twitter?

RQ2: What are the interconnections between relevant accounts in the sustainable fashion discourse on Twitter?

By answering these questions, this study aims to provide insights that will help companies and other actors optimize their strategies and communication approaches to promote sustainability goals and enhance consumer awareness and engagement.

2 State of the Art

2.1 Sustainability and Social media data

While clothing originally served the basic human need to protect oneself from natural conditions such as cold or sun, the concept of fashion additionally encompasses a symbolic dimension of self-expression, group-belonging, wealth and status (ÖNDOĞAN, ÖNDOĞAN and TOPUZOĞLU, 2022; Orminski, Tandoc Jr. and Detenber, 2021). Thus, the term fashion is not only synonym to clothing, garment or apparel and hence covering the body with textiles. Especially its symbolic dimension affects the consumption behavior of fashion-items. The herein grounded costumers demand for cheap clothing and updating their wardrobe quickly has led the fashion industry to shift towards a fast fashion industry (Fang, 2023). Fast fashion refers to the rapid production model of retailers selling multiple styles of inexpensive clothing within a short period of time. Resulting falling costs, rising consumer spending and streamlined operations impacted clothing production to double between 2000 and 2014 (Remy, Speelman and Swartz, 2016). However, at the same time the lifecycle of an fashion item shortened by 50% resulting in large amounts of textile waste (Niinimäki et al., 2020).

In contrast, sustainable fashion emphasizes environmental, social, and economic sustainability (Orminski, Tandoc Jr. and Detenber, 2021). Sustainability refers to the fact that environmental resources are exhaustible and therefore today's development shall not harm future generations ability to meet their own needs (ÖNDOĞAN, ÖNDOĞAN and TOPUZOĞLU, 2022). Sustainable fashion encompasses apparel produced in adherence to environmental, social, and economic sustainability principles (Orminski, Tandoc Jr. and Detenber, 2021). Sustainable fashion production encompasses subtypes of green, eco and organic fashion which relate to environmental-friendly produced clothing following the domain of environmental sustainability. Following the economic domain of sustainability, sustainable fashion production refers to slow fashion. This means high-quality products which are timelessly designed. This enables long-term use which is independent from fast fashion trends. Furthermore, sustainable fashion refers to consumption practices characterized by reduced consumption levels. Subtypes of sustainable fashion consumption is recycled, upcycled, second-hand and circular fashion. It can also concern the subtype of collaborative consumption related to a so-called shared economy.

The turnaround towards a sustainable fashion industry relies on the collective effort of different stakeholders (Blasi, Brigato and Sedita, 2020; Niinimäki et al., 2020; ÖNDOĞAN, ÖNDOĞAN and TOPUZOĞLU, 2022). Stakeholders such as policymakers, the producing industry, retailers, media and

consumers can exert influence on the awareness for sustainable production and consumption (Blasi, Brigato and Sedita, 2020; Niinimäki et al., 2020). Against this background Orminski, Tandoc Jr. and Detenber (2021) conducted an analysis on the sustainable fashion discourse on Twitter. Typically, the fashion discourse connects to marketing campaigns. However, the analysis revealed that stakeholders in the fashion industry strategically disseminate specific information to promote the concept of sustainable fashion rather than only focusing on selling fashion products to consumers. Orminski, Tandoc Jr. and Detenber (2021) were able to identify diffusion processes such as sharing information, inspiring others and active forms of advocacy. Communication on sustainable fashion topics flows not only from the industry to consumers or from the media to the public but also within the industry and between consumers. Albeit the examined discourse revealed some cases of greenwashing the pursuit of sustainable goals often outweighed economic competition within the discourse. This is enhancing the credibility of the industry and at the same time it addresses consumer skepticism. In return costumers themselves are not passive recipients but are responsible for increasing knowledge, demanding action, questioning own habits and consuming sustainably hence influencing the market through their demands (Blasi, Brigato and Sedita, 2020). The interpersonal communication and individual experience is key to not only raise awareness but eventually change behaviour towards sustainable fashion practices (Orminski, Tandoc Jr. and Detenber, 2021) According to the diffusion of innovation theory the interpersonal communication and individual experience is key to not only raise awareness but eventually change behaviour towards sustainable fashion practices (Orminski, Tandoc Jr. and Detenber, 2021).

In the recent decade the rise and relevance of social media platforms changed information diffusion and acquisition in various fields of interest (Stieglitz, Basyurt and Mirbabaie, 2022b; Taxidou and Fischer, 2014). Carr and Hayes (2015) define social media as “Internet-based, disentrained, and persistent channels of masspersonal communication facilitating perceptions of interactions among users, deriving value primarily from user-generated content.”. Applications depicting these channels include for example blogs, wikis, forums and social networks (Stieglitz et al., 2014). As information on these platforms is interchanged within minutes it triggers equally quick reactions leading to large-scale, rapidly produced user-generated data, making it of interest to various fields (Moe and Schweidel, 2017). The quick diffusion of information for example significantly changes how marketers address targeting groups and how brand image is created (Davis and O’Flaherty, 2013). Previous marketing communications were unidirectional and consumer-directed. Institutional “gatekeepers” could control the curation and diffusion of publicly available information (Stieglitz et al., 2014). However, with social media these monologues become dialogues in which consumers play a pivotal role in co-creating storytelling and therefore actively influencing brand performance (Chu, Chen and Sung, 2016). Thus brands nowadays directly engage with their target groups (Stieglitz, Basyurt and Mirbabaie, 2022b).

Not only businesses but also a great variety of other domains such as politics, research or the entertainment industry are affected by and shaped under the influence of social media (Stieglitz et al., 2018). These beforementioned domains are reflected upon on social media and meanwhile social media shapes how topics are discussed, it forms opinions and strengthens trends in return (Taxidou and Fischer, 2014). Thus, narratives and costumers’ sentiment towards a topic can have major influence on generating awareness and interest (Coulter and Roggeveen, 2012).

As social media opens-up new opportunities of discourse participation, at the same time it enables researchers, managers and policymakers to analyze these large amounts of data created while interactive conversations are being held (Chu, Chen and Sung, 2016; Moe and Schweidel, 2017). This so called Social Media Big Data is defined as a technological, cultural and scholarly phenomenon resting on the interplay of technology, analysis and methodology (Stieglitz et al., 2014). The accessibility of this user-generated data even created a new research field of so-called social media analytics (SMA). Its goal is to develop scientific methods, technical frameworks and software tools to track, model, analyze and mine Social Media Big Data. Geissinger et al. (2023) define SMA as an interdisciplinary approach for capturing and analyzing user-generated content data which has been published on online platforms. As a concept it focuses on online discourses, communication flows and the relationship between individuals and contents. However, it can be also a method to detect early trend signals and the emergence of innovations.

A recent study indicates that Twitter is widely accepted and used as a data source within the field of SMA (Geissinger et al., 2023). With over 401 million monthly active users in 2022, Twitter was one of the most popular micro-blogging services worldwide (Iqbal, 2024). Its importance in SMA stems from the large number of users actively sharing content via tweets and the easy accessibility of this user-generated content (Stieglitz and Dang-Xuan, 2013). Despite their length limitation, tweets are valued for their fast and spontaneous communication, providing high topicality. Additionally, Tweets are publicly available and can be collected at scale using Twitter's API (Stieglitz et al., 2018).

Previously, Twitter enhanced content credibility through a proprietary verification process they deemed worthy of platformwide public-interest, but since Elon Musk's acquisition and subsequent changes in April 2023, this is no longer reliable (Haman and Školník, 2023; Paul et al., 2019).

2.2 Sustainability signaling

Organizations publish information about their sustainability initiatives to influence perceptions and bridge the information asymmetry gap between themselves and their stakeholders (Zmud et al., 2010). The signaling theory was initially developed by Spence (1973) as part of a study of information economics. Signaling theory (Spence, 1973, 2002) addresses situations where individuals or organizations possess asymmetric information. The Theory explains how these parties transfer information to reduce such asymmetries in information (Spence, 2002).

Research examines the effect of disclosing information in the context of sustainability. Ching and Gerab, 2017 show that disclosure of information can help the firm signal its sustainability commitment. Furthermore, research shows that it can reduce the informational asymmetry between the company and its stakeholders (Alon and Vidovic, 2015; Ching and Gerab, 2017; Chiu and Wang, 2015) and also gain the support of its stakeholders (Chiu and Wang, 2015).

In the context of sustainable fashion on social media, signaling theory can be applied to analyze how different stakeholders communicate their sustainability efforts. By investigating the types of signals sent (e.g., eco-friendly certifications, sustainable production practices) and the sentiments these signals might get, we can gain insights into the effectiveness of these communications. The mechanism by which sustainability messages spread and gain strength within the fashion discourse on Twitter can be examined by analyzing the network structures and interactions among relevant accounts. This approach helps to understand the current state of sustainability communication and furthermore provides a basis for developing strategies as an organization to enhance the authenticity and impact of sustainability signals in the fashion industry.

3 Methods

To systematically address our research questions, we will employ a combination of qualitative and quantitative methods, with an emphasis on social media analytics, to analyse the communication patterns and network dynamics surrounding sustainable fashion on Twitter. The Social Media Analytics Framework (see Figure 1) developed by Stieglitz and Dang-Xuan (2013) proposes, in the light of different research domains, corresponding methodologies. Based on the underlying research approach, the researcher is guided through phases of data acquisition, data preparation and subsequent data analysis.

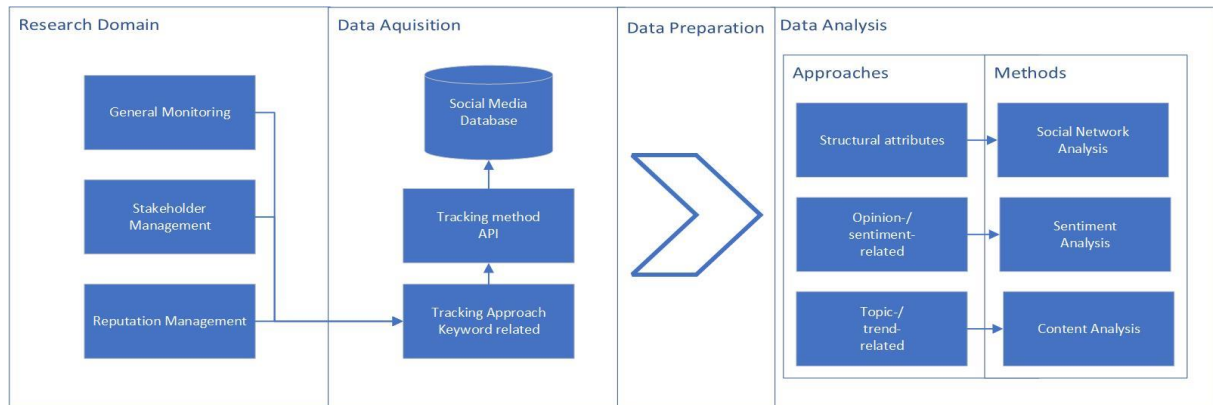


Figure 1. Social Media Analytics Framework (adapted from Stieglitz et al. (2014))

Together with the theoretical background this framework lays the foundation for the following methodological part within this paper and thus contributes to answer the research questions.

First off, cleaning and refining the available data is essential for extensively addressing the research questions. Regarding our first research question in understanding how sustainability is discussed and perceived in the fashion-related discourse on Twitter, we employ a mixed-methods approach encompassing topic modeling, sentiment analysis, and a manual content analysis. The second question, examining how the relevant key user accounts are interconnected, will be addressed using a network analysis with Gephi. We will enrich both the content analysis and network analysis by incorporating insights from a stakeholder analysis, along with an anomaly user detection based on the initial dataset.

3.1 Data collection and cleansing

Using the SMART-Portal developed by Stieglitz, Basyurt and Mirbabaie (2022b) an initial twitter dataset was acquired covering 66.587 tweets posted in June 2022 regarding the communication about fashion. From this dataset, we filtered tweets containing keywords related to fashion, thus forming a fashion dataset. Based on this fashion dataset we created a sub-dataset which contained tweets located within a sustainable fashion context, resulting in a sustainable fashion dataset.

Prior to the project and based on the original dataset, 11 distinct stakeholder groups (see Figure 2 **Fehler! Verweisquelle konnte nicht gefunden werden.**) were identified, and a manual analysis of relevant key user accounts was conducted on a representative sample of the original dataset. These relevant accounts were then assigned to the corresponding stakeholder groups. As the following methods focus on the sustainable fashion dataset, it was essential to ensure that these stakeholder groups and their associated users were not lost in the process of reducing the dataset. After refining the dataset, we confirmed that 10 stakeholder groups and 22 key users remained.

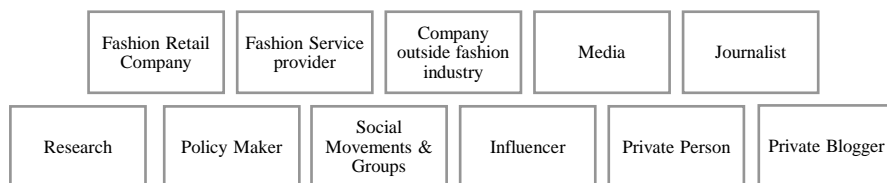


Figure 2: Distinct Stakeholder groups based on the original dataset

3.2 A mixed method approach

To address RQ1 and understand emerging signals and themes, the topic modeling approach Latent Dirichlet allocation (Blei, Ng and Jordan, 2001) will be applied to the sustainable fashion dataset. For this method, the dataset needs to be cleaned and refined to focus primarily on the core content, the actual text of the tweets. The preprocessing phase ensures the accuracy and efficient processing of the

following analyses. Next, various algorithms will be employed to determine the optimal number of topics for the Latent Dirichlet Allocation (LDA) analysis. We utilize three well-established metrics to determine the appropriate number of topics: CaoJuan2009 (Cao et al., 2009) Arun2010 (Arun et al., 2010), and Deveaud2014 (Deveaud, SanJuan and Bellot, 2014). Adding to this, the different variations of topics/topic numbers will be manually reviewed by all of the members of the research project. The results from the LDA model provide insights into the key topics surrounding sustainability in fashion.

Building upon these results and investigating RQ1 further involves understanding the opinions and emotions towards sustainability within a fashion related discourse on twitter. To achieve this, the sentiment analysis will be applied to the sustainable fashion dataset (Medhat, Hassan and Korashy, 2014). We will utilize well-established sentiment analysis models to ensure robust and accurate sentiment classification. The results from the sentiment analysis will provide insights into the overall perception of sustainability within the fashion discourse, allowing us to analyse the sentiment distribution across the dataset and across the identified topics.

To gain richer insights into the themes and sentiments presented in the sustainable fashion dataset, we will afterwards conduct a manual content analysis focusing on the different stakeholder groups. We will analyse the 182 tweets of the 22 relevant accounts regarding content, context and tone. This analysis will offer valuable insights that automated methods might overlook. Additionally, we will compare these results with findings from topic modeling and sentiment analysis. By integrating the results from topic modeling, sentiment analysis and manual content analysis, we will gain a nuanced view of the discourse surrounding sustainability in the fashion context on Twitter.

Addressing RQ2, we will perform a network analysis using Gephi to visualize and understand the interconnections between relevant accounts in the sustainable fashion discourse on twitter. This analysis provides insights into stakeholder clusters and investigates whether and where echo chambers exist among these stakeholders. Putting together the results of the two research questions will give us a general understanding about the various sustainable fashion topics stakeholder communicate about, how they feel about them, and which other stakeholder groups are potentially influenced by these topics and feelings.

4 Next steps

The next steps of this study involve conducting detailed analyses to answer the research questions. We will start with topic modeling on the sustainable fashion dataset to identify key themes within the discourse. Once key themes are identified, we will proceed with sentiment analysis to assess the overall perception and emotional tone associated with these themes and within the identified topics. To further enrich our understanding, a manual content analysis will be performed on a sample of tweets from identified key user accounts. This will provide deeper insights into the nuances of the discourse that automated methods might miss. In parallel, we will conduct a network analysis to explore the interconnections between key stakeholders within the sustainable fashion community on Twitter. This analysis will help us understand the structure of the discourse network, identify potential echo chambers, and examine the influence of different stakeholders.

Finally, integrating the results from topic modeling, sentiment analysis, manual content analysis, and network analysis will allow us to present a comprehensive view of the sustainable fashion discourse on Twitter. This multi-faceted approach will help us draw meaningful conclusions about how sustainability is communicated in the fashion industry and provide actionable insights for companies to enhance their sustainability communication strategies.

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