Analyzing Twitter and Instagram Social Networks to Trace Consumer Opinion Regarding Transparency in the Apparel Supply Chain

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The undersigned, appointed by the dean of the graduate school,

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ANALYZING TWITTER AND INSTAGRAM SOCIAL NETWORKS TO TRACE CONSUMER OPINION REGARDING TRANSPARENCY IN THE APPAREL SUPPLY CHAIN

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And hereby certify that, in their opinion, it is worthy of acceptance.

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To my family, for always believing in me.

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Abstract

The heightened demand for apparel supply-chain transparency, advent of social media, and its increased usage in sustainability campaigns has created new opportunities to understand the public's perspective toward sustainability issues. Through social network analysis, this study aims to utilize the large-scale user-generated data on social media to gain a deeper understanding of the public's views concerning apparel supply-chain transparency. Grounded in small-world theory and the strength of weak ties theory that explains structure of a social network and mechanism of information flow, this study utilizes the #whomademyclothes campaign on Twitter and Instagram as the research context. The analysis of social networks formed by the hashtags in 17,030 Instagram posts and 4,530 Twitter tweets revealed that the public associates sustainability with working condition improvements, environmental protection, community development, and transparency enhancement in the apparel supply-chain. Theses clusters were interpreted through the lens of the moral spectrum of moral responsibility framework of corporate sustainability. The findings revealed that both Twitter and Instagram users considered working condition improvement as the primary duty to fulfill. While Instagram users were more inclined towards community development, Twitter users supported environmental protection. Findings also revealed the emotion-driven Instagram community as compared to facts-driven Twitter community. This study contributes to the literature by providing a foundation for the use of social network analysis to analyze user-generated social-media data.

Key Words: Sustainability, corporate transparency, social network analysis.

Chapter I: Introduction

Chapter I contains the following sections: (a) background of the study, (b) purpose of the study, and (c) significance of the study.

Background of the Study

The apparel and textile industry employs around 60 million people (ILO, 2014) worldwide. This sector is considered not only to be among the most polluting industries in the world (Boström & Micheletti, 2016) but also among the most labor-intensive industries, making it vulnerable to labor issues (Scott, 2006). Apart from environmental pollution, the industry also experiences issues around poor and unsafe working conditions (Scott, 2006). In this light, sustainability studies in the apparel and textile industry have received great attention in recent years (Shen et al., 2014).

Currently, the apparel and textile industry is highly fragmented across national boundaries. While the garments are sold in the US, Canada or Europe, they are being produced in the factories in Asia, Eastern Europe, Latin America, or Africa (Emmelhainz & Adams, 1999). The globalization of the clothing and textile sector has, without a doubt, resulted in better utilization of resources and division of labor (Dickens, 2013). However, it has also made it extremely difficult for the firms to be completely aware of what is going on in their supplier factories in terms of sustainable business practices. This makes the brands in developed countries more reluctant to take responsibility for unfair labor conditions and unsustainable practices in their supplier factories located in developing countries (Doorey, 2011). As a result, over the years, many factories of reputed brands like Nike (1998), Walmart (2005), H&M (2012), and The Gap Inc. (2013) have been

reported to offer poor working conditions (Goswami & Ha-Brookshire, 2015). The industry has also seen some of the deadliest accidents, like the Rana Plaza collapse in Bangladesh in 2013 that killed over 1,100 and injured over 2000 garment factory workers, and the factory fires in Pakistan's Ali Enterprise factory and Bangladesh's Tazreen Fashion factory in 2012, killing over 350 garment workers. Prior to these incidents, little public information was available concerning apparel companies that were sourcing from these factories. In the aftermath of these disasters, activists rummaged through the rubble to find brand labels to identify the apparel companies involved and advocate for accountability (Stauffer, 2017).

Following the incidents, these factories and the affiliated brands were strongly criticized in the media. Also, the general public took to social media worldwide to criticize these brands and demand transparency and full accountability (North, 2013). The apparel firms thus realized that they needed to take responsibility for the working conditions in their factories (Augustine, 2012; Doorey, 2011; Goswami & Ha-Brookshire, 2015) and needed to be transparent in terms of their suppliers and their working conditions in order to gain public trust (Bhaduri & Ha-Brookshire, 2011; Goswami & Ha-Brookshire, 2015). Many researchers have argued the importance of supply chain transparency, as public disclosure of supplier names makes the corporation more accountable for the working conditions in their factories (Bhaduri & Ha-Brookshire, 2011; Doorey, 2011). In this light, many companies such as H&M, Nike, and Levi's have started to disclose the names of their suppliers through social media and their websites in order to assume responsibility for sustainable practices in their factories (Doorey, 2011). The information shared on social media not only reaches a large and

diverse audience but also enables the consumers and other users to get involved and express their true opinion and provide valuable feedback (Katal, Wazid, & Goudar, 2013; Liang & Dai, 2013). Using social media to share sustainability efforts not only creates a sense of attachment between the brand and the consumers but also leads to positive electronic word of mouth (eWOM), creating a larger number of users who know about the brand and, hence, help the brand build a positive image (Daugherty & Hoffman, 2014; Hsu et al., 2015; Huang, Lin, & Lin, 2009).

However, many companies today are still unwilling to voluntarily assume responsibility for their supply chain sustainability (Doorey, 2011; Egels-Zandén, Hulthén, & Wulff, 2015). Hence, many non-governmental organizations (NGOs), through online sustainability campaigns, are working toward mobilizing and convincing consumers to pressure the brands to improve their manufacturing practices by asking questions and by buying only sustainably produced products (Boström & Micheletti, 2016). The recent growth of social media, like Twitter and Instagram, has transformed the way people communicate and collect information. Since the users on social media platforms are connected virtually to several other users worldwide, they can engage in many-to-many interactions, allowing an exchange of valuable information and opinion, creating a virtual social network of users and information shared among them. As a result, a large amount of user-generated content is created on these online social media sites. Some of the social media platforms have become so popular and are being so widely used that they can represent a large portion of an individual's entire social world. The analysis of these social networks and user-generated data could provide new insights into their social behavior (Arnaboldi et al., 2015). However, despite the availability of this large-scale

data, current researchers have mostly utilized surveys and interviews to understand how social media can promote sustainability (Kaplan & Haenlein, 2010). As such, user-generated data remains under-utilized by the research community when it comes to studies focusing on sustainability in the apparel industry.

Purpose of the Study

In order to fill this gap in the literature, this study aims to utilize the large-scale user-generated data on online social media to gain a deeper understanding of social media users' opinions concerning apparel supply-chain sustainability. More specifically, the study, grounded in social network theories of strength of weak ties (Granovetter, 1973) and small world theory (Travers & Milgram, 2009), aims to use social network analysis to (a) investigate public opinion on social media regarding apparel supply-chain transparency, (b) identify key themes discussed by social media users, and (c) identify the major communities discussing apparel supply-chain transparency.

Significance of the Study

The increasing social media usage helps a large and diverse population on the internet to express and share their opinions and provide their feedback to other users, including organizations, corporations, and policy makers (Gokulakrishnan et al., 2012; Ordenes et al., 2014). Hence, the user-generated content on social media sites has great potential for providing meaningful insights to policy makers and corporations about sustainability-related topics such as supply-chain transparency. Therefore, mining and analyzing the user-generated content on social media regarding sustainability and supply chain transparency offers several significant implications to the apparel supply chain, businesses, and academia.

First, the study will enrich the literature of social media usage in the apparel industry, especially in terms of sustainability. The study is set to add depth to the literature by using large-scale user-generated data on social media for analysis when most of the related research so far has used traditional surveys or interviews for data collection. This study will also provide a foundation for the use of social network analysis to analyze user-generated data on social media, as this method is fairly new in textile and apparel industry-related research.

Second, identification of major communities and key themes can provide important insights to the businesses and other social organizations about public mood towards current issues in apparel industry. Having this insight can help them better target and tailor their communication in order to convey the right message, at the right time, to a larger audience in a more effective manner.

Finally, the feedback and ideas from social media users can help the businesses and policy makers identify specific actionable areas where they are lagging. The analysis of social media data can, therefore, help businesses and policy makers to understand the need of the hour and work towards it, further improving their overall performance.

Chapter II: Literature Review

Chapter II contains the following sections: (a) corporate sustainability, (b) social media and transparency, (c) theoretical framework, and (d) summary of literature gaps and research questions.

Corporate Sustainability

A corporation is defined as "a legal entity formed to carry on business or other activities with governmental approval" and is owned by shareholders (Jung & Ha-Brookshire, 2017). The term sustainability is derived from the concept of sustainable development, which has been defined by the World Commission on Environment and Development (1987, p. 8) as "development that meets the needs of the present without compromising the ability of the future generation to meet their own needs." The literature in the area of corporate sustainability emphasizes that sustainable development in a corporate setting involves seeking the triple bottom lines of corporate interests—economic, social, and environmental (Elkington, 1997). The quality of preventing harm and improving business practices to meet these goals is called sustainability (Jung & Ha-Brookshire, 2017). Using these definitions, Jung and Ha-Brookshire (2017) defined corporate sustainability as "a legal business entity's quality of enduring and pursuing its economic, social and environmental goals, while meeting the needs of the present without compromising the ability of the future generations to meet their own needs."

Researchers have paid much attention to corporate sustainability in recent years. Although most research has an overall implication on the firms' economic gains, studies with a goal of pure environmental and social improvement are gradually emerging (Ha-Brookshire & Hawley, 2014). The existing literature on corporate sustainability focuses

on the governance, and firms' performance measurement on the triple bottom line (Arzu Akyuz & Erman Erkan, 2010; Golicic & Smith, C. D, 2013; Shepherd & Günter, 2010). Some researchers have also studied corporate sustainability beyond the triple bottom line and have categorized the sustainable development into sub-categories of socio-environmental, socio-economic, and eco-environmental dimensions (Rajeev et al., 2017). Many researchers, on the other hand, have shown via case studies how leading companies such as Gap Inc. (Ansett, 2007), IKEA (Andersen & Skjoett-Larsen, 2009), Adidas, and Nike (Goswami & Ha-Brookshire, 2015) are continually working towards corporate sustainability without compromising on their economic goals.

Apparel Supply Chain and Sustainability

Currently, the apparel supply chain is highly fragmented across national boundaries where the developed countries source their apparel internationally, mostly from developing countries in Asia and Africa countries. Mentzer (2004) defined supply chain as "a set of three or more companies directly linked by one or more of the upstream and downstream flows of products, services, finances, and information from a source to a customer." The apparel supply chain is hence composed of suppliers' suppliers, core organizations, customers, and customers' customers (Ha-Brookshire & Hawley, 2014). The most common reason identified for international sourcing is to obtain lower production costs and an efficient division of labor (Emmelhainz & Adams, 1999). However, diverse business practices, cultural and language differences, and distance make it very challenging for the firms in this globally fragmented supply-chain to sustainably manage all the operations in all of their supplier locations (Doorey, 2011). According to the moral responsibility theory of corporate sustainability (MRCS) (Ha-

Brookshire, 2015), a truly sustainable supply chain can be established only if all its member corporations are committed to sustainability. However, due to the global nature of the apparel supply chain, it has become extremely challenging for the corporations to become fully sustainable, as most of the times they are not aware of what is going on in their supplier factories in terms of labor working conditions and other environmental aspects (Doorey, 2011). The industry has been repeatedly criticized for its negative environmental effects, like air, water, and soil contamination during textile and apparel manufacturing, processing, and transportation (Borghesi & Vercelli, 2003; de Brito, Carbone, & Blanquart, 2008; Hanzl-Weib, 2004; D. Myers & Stolton, 1999) and is often considered to be among the most polluting industries in the world (Shen, Li, Dong, & Perry, 2017). Additionally, this sector has also found itself surrounded by various labor-related issues, such as unsafe and poor working conditions, child labor, overtime employment, employee exploitation, low wages, and others (Scott, 2006).

Supply Chain Transparency

Advances in media and technology have made the public more aware than ever regarding both sustainable and non-sustainable practices of companies today (Goswami & Ha-Brookshire, 2015), thereby making it nearly impossible for the firms to cover up any corporate wrongdoings (Bhaduri & Ha-Brookshire, 2011; Doorey, 2011). Increased awareness of the environment, recent incidents highlighting poor social conditions, and enhanced communication technology have led to a heightened demand for transparency in the global apparel supply chain (Bhaduri & Ha-Brookshire, 2011). Transparency is defined as "visibility and accessibility of information especially concerning business practices" (Bhaduri & Ha-Brookshire, 2011). Combining this definition with the

definition of supply chain by Mentzer (2004) in the previous sub-section, we can define supply-chain transparency as the visibility and accessibility of information concerning business practices across a set of two or more companies directly linked by one or more of the upstream and downstream flows of products, services, finances, and information from a source to a customer.

Researchers have often advocated for the need for transparency in the global apparel supply chain, maintaining that the corporations would pay closer attention to the working conditions and sustainable practices in their supplier factories to gain public trust and to maintain their reputation if the identity of these suppliers were to become public (Doorey, 2011; Emmelhainz & Adams, 1999). This positive belief in the potential of supply chain transparency has attracted many researchers to study apparel supply-chain transparency. Most research on supply-chain transparency have sought to identify its characteristics such as accountability (Augustine, 2012), legitimacy (Kell, 2012), and trust (Augustine, 2012). Some other research in this regard has studied the positive effect of transparency on a firm's sustainability attempts ((Egels-Zandén et al., 2015), legitimacy (Carter & Rogers, 2008; Dubbink, 2007), and customers' willingness to purchase (Bhaduri & Ha-Brookshire, 2011). The previous literature also shows a number of studies trying to define the term "supply chain transparency" through various perspectives, such as stakeholders' perspective (Carter & Rogers, 2008), products' traceability (Doorey, 2011; Laudal, 2010), sustainability conditions at suppliers' factories (Barrientos, 2013; Cramer, 2008), and anti-corruption efforts (Schouten & Remme, 2006). In their study, Zanden et al. (2014) proposed that supply-chain transparency is composed of three dimensions: (a) disclosure of the names of the suppliers involved in

producing the firm's products, (b) disclosure of information about sustainability conditions at these suppliers' factories, and (c) disclosure of the buying firms' purchasing practices.

Many companies, such as Nike, Adidas, Levi's, Patagonia, TOMS, and others, have realized the importance of transparency in maintaining positive relations with their customers and have started releasing annual sustainability reports (Doorey, 2011; Goswami & Ha-Brookshire, 2015) on their websites and actively communicate their sustainability efforts via social media platforms like Twitter and Instagram (Reilly & Hynan, 2014). However, many companies are still unwilling to voluntarily assume responsibility for their supply-chain sustainability (Doorey, 2011; Egels-Zandén et al., 2015). In such cases, some activists and other stakeholders are using "name and shame" campaigns on social media to force these companies to make sustainable supply chain commitments (Bartley, 2007). Prior research has found that such campaigns can lead to better corporate transparency, empowering the public with information to hold companies accountable for their actions (Egels-Zandén et al., 2015). Recent growth of social media has made it even easier for the NGOs, social enterprises, and brands to run such campaigns to reach a larger, more diverse population with limited budget at hand.

Some researchers have investigated specific cases of firms who have made an attempt towards disclosing information about their suppliers and their working conditions (Doorey, 2011; Egels-Zandén et al., 2015). However, the cases of sustainability campaigns working towards encouraging firms to become more transparent have not been studied extensively.

Social Media and Transparency

Social media is defined as a "group of Internet-based applications that build on the ideological and technological foundations of Web 2.0 and that allow the creation and exchange of User Generated Content" (Kaplan & Haenlein, 2010). Social media platforms help the public to disseminate new ideas and information, explore knowledge, and express their opinions with other members of the public as well as with policy-makers and corporations. Collecting and analyzing user opinion can allow corporations to learn in a continuous manner and adapt their offerings according to customer preferences (Ordenes et al., 2014). Customers share their experiences and express their opinions more freely on social media that in person (Witell, Kristensson, Gustafsson, & Löfgren, 2011). Also, the information on social media is available in a verbatim format characterized by a higher level of detail including users' demographic information (Witell et al., 2011). Its dramatic growth in recent years has also helped shape peoples' connections with others via different social media platforms (Ngai, Tao, & Moon, 2015). Based on the characteristics, these social media platforms can be classified as content communities (e.g., Instagram, YouTube), microblogging sites (e.g., Twitter), social networking sites (e.g., Facebook), and virtual social worlds (e.g., Second Life) (Chu, 2011; Kaplan & Haenlein, 2010).

Social media is also being used increasingly by corporations to disseminate information regarding their sustainability practices. Unlike company websites, social media provides a platform to reach a much larger and diverse population through electronic Word of Mouth (eWOM) (Daugherty & Hoffman, 2014). The consumers are actively involved with the company and it not only helps to further disseminate the

information to other users but also provides valuable feedback to the firms, essential for further improvements (Gokulakrishnan et al., 2012; Ordenes et al., 2014). Hence, Most brands utilize social media to engage with customers to encourage a stronger emotional attachment with the brands (Yap & Lee, 2014). Apart from advertising their products and services, some brands have also begun to communicate their sustainability efforts through social media platforms (Reilly & Hynan, 2014). Companies and social enterprises, including Patagonia, TOMS, Adidas, Nike, Fashion Revolution, etc., are using social media platforms like Twitter, Instagram, and Facebook increasingly to involve social media users in their efforts towards social and environmental sustainability through campaigns like #wornwear, #oneforone, #voteourplanet, #onedaywithoutshoes, and #whomademyclothes. Additionally, social media has also provided a platform to the public to form groups and voice their opinions and concerns to the companies, NGOs, government, and policy makers.

Though business and research communities have paid a lot of attention to social media (Aral, Dellarocas, & Godes, 2013; Kalampokis, Tambouris, & Tarabanis, 2013), the study of social media in the field of apparel supply chain sustainability has been a little slow as compared to the research in other fields. There have been a growing number of studies focusing on the use of data and analytical capabilities for supply chain management (Chae, 2012; Hazen et al., 2014; Trkman et al., 2010), but the focus has mostly been on their use and impact on the supply chain planning and execution (Chae, 2015). Although numerous studies have investigated the impact of social media campaigns in the political context (Bennett, 2012; Huberman, Romero, & Wu, 2009;

Meraz, 2009), the research evaluating social media campaigns in the apparel supply-chain sustainability context remains limited.

In one example of such research in this direction, Roncha and Radclyffe-Thomas (2016) viewed the social media user-community as an online social network. In previous literary works, scholars have defined a social network as "a social phenomenon composed of entities connected by specific ties reflecting interaction and interdependence, such as friendship, kinship, and knowledge exchange" (Carpenter, Li, & Jiang, 2012). Many researchers have examined these social networks in a wide range of organizational contexts (Kilduff & Brass, 2010) and social behavior research (Makagon, McCowan, & Mench, 2012). The scholars have drawn on social network literature to address a wide range of research questions in social science, from studies concerning the nature of "community" (Wellman, 2001) to collective action (Scholz, Berardo, & Kile, 2008) and public participation in the redevelopment process (Holman, 2008).

In their research, Roncha and Radclyffe-Thomas (2016) argued that the recent advent of social media has led to the emergence of a completely new "online" social network (OSN) composed of the users of a specific social media platform with social links existing between them. In addition to pre-existing social relationships established by traditional face-to-face interaction, these social links can also be created and maintained only in the virtual world (Arnaboldi et al., 2015). Hence, the structure of these online social networks can be analyzed through social network analysis to identify the patterns formed by the network actors and the relationships between them. The researchers in this study thus demonstrated the power of OSNs on the social media site Instagram in building brand communities and the value of co-creation by using the

#onedaywithoutshoes campaign by TOMS as a context. The study showed that the company used Instagram to not only reach the customers but also to convert them into their brand advocates by giving them an opportunity to share their own involvement to the cause using the campaign hashtags, hence, co-creating the brand value (Roncha & Radclyffe-Thomas, 2016). The study also advocates that the success of the TOMS' campaign was a result of the community of people on social media who believed in the social cause promoted by the campaign, rather than just the idea of the campaign (Roncha & Radclyffe-Thomas, 2016). However, the study used traditional interviews as research data. Even though there has been some interesting research on the usage of social media and the concept of OSNs for sustainability campaigns in the apparel industry, the research community has not yet sufficiently utilized large-scale user-generated data for the analysis.

Theoretical Framework

This study utilizes Milgram's (1967) small world theory and Granovetter's (1973) strength of weak ties theory of the social network theory as the theoretical framework. The study also used an inductive approach to select a suitable corporate- sustainability related theory to interpret the findings.

Social Network Theory

The social network theory provides an excellent framework to analyze the user-generated data on social media as it explains the structure of a social network and how information flows within and between the networks (Borgatti & Lopez-kidwell, 2015). By definition, a social network represents a social structure that contains a set of actors and a set of dyadic ties identifying social relationships between these actors in the

considered social context (Wasserman & Faust, 1994). This social network can be realized in any social context like a workplace, a country, or a specific community. The nodes, or the actors, are the units connected by relations whose pattern can be studied. The nodes are typically people or organizations. However, any units that can be connected to other units, such as web pages, journal articles, emails, or even a given phrase within a specific discussion or conversation context, can be studied as nodes (Marin & Wellman, 2014).

In the case of a social-media campaign, when the public writes about the campaign and related topics on social media using certain key-words or specific hashtags (explained in Chapter IV), the hashtags can be studied as nodes where the relationship or the edges between different nodes are realized by the mention of the same keywords in posts containing various other keywords or hashtags. Hence, the presence of edges between different nodes in the network of a social media campaign can tell us if the distinct topics being discussed in the network are related. The strength and direction of these edges can tell us how strongly these distinct nodes or topics are related in the given context and how information flows in the given network. The study of these OSNs, can, therefore, provide interesting insights about the nature of the online community concerned with sustainability in the apparel supply chain context. This study, aimed at understanding the social media user's activity regarding apparel supply chain sustainability, is grounded in two of the most popular social network theories—the small world theory (Travers & Milgram, 1969) and the theory of strength of weak ties (Granovetter, 1973).

Small World Theory

The Small World Theory by Milgram (1967) considers the societies to be close-knit structures (Travers & Milgram, 1969), which are highly locally clustered with a short path length between the actors (Watts, 1999). As per the small world network theory, the average shortest path length between nodes in a network is around six (Travers & Milgram, 1969). This means that the messages traveling through chains of social links can reach any node in the network within an average of six hops, thus making a favorable condition for the diffusion of information. Many researchers other than Milgram (1967) have also conducted field studies to conclude that small worlds might account for how quickly ideas flow through distinct social networks in an academic community (Newman, 2001), corporate firms (Kogut & Walker, 2001; Watts & Strogatz, 1998), and the artists community (Uzzi & Spiro, 2005). Small world networks have gained attention from scholars because of its potential as the model for interaction networks of "real-world" complex systems such as computer networks, social networks, and scientific-collaboration networks (Fine, 1958).

The online social networks have been found to exhibit typical characteristics of a small world network (Adamic & Adar, 2005; Fu, Liu, & Wang, 2008; Java, Song, Finin, & Tseng, 2007), with short average distances between the users of less than six (Kwak et al., 2010; Leskovec & Horvitz, 2008; Magno et al., 2012; S. Myers et al. 2014) and a high clustering coefficient (Arnaboldi et al., 2015). This suggests that the information can travel faster through online social media as compared to any other traditional media. This implies that during a social campaign, when the organizations, brands, and users express their opinions on social media such as Twitter and Instagram, the message reaches at

least every sixth random individual using the social media platform. These individuals in turn can provide their own feedback and opinion, which will be heard and responded to by every other sixth random individual, and so on, creating a network of users and various related topics being discussed in the network. The small world network theory, therefore, provides the required framework to examine an online community and investigate its cohesiveness.

Strength of Weak Ties Theory

This study also utilizes one of the most popular social network theories—the theory of strength of weak ties—to explain the relationships and flow of novel information among various online social networks. Granovetter's (1973) theory of strength of weak ties, on the other hand, explains the relationships and flow of information among various OSNs. This theory states that the stronger the tie between two people, the more likely that their social life will overlap and have ties with the same or a similar third person having similar opinions and ideas. On the other hand, a bridging tie that links a person to people who are not connected to his/her other friends is the source of novel ideas and information, as people in one network are different from those in another and may have a different opinion or new ideas. These bridging ties are usually weak ties between the two members of different communities but hold greater strength in the sense that they are the best potential source of novel information (Borgatti & Lopez-

Kidwell, 2015). Figure 1 shows the bridging tie between two nodes in two different social networks.

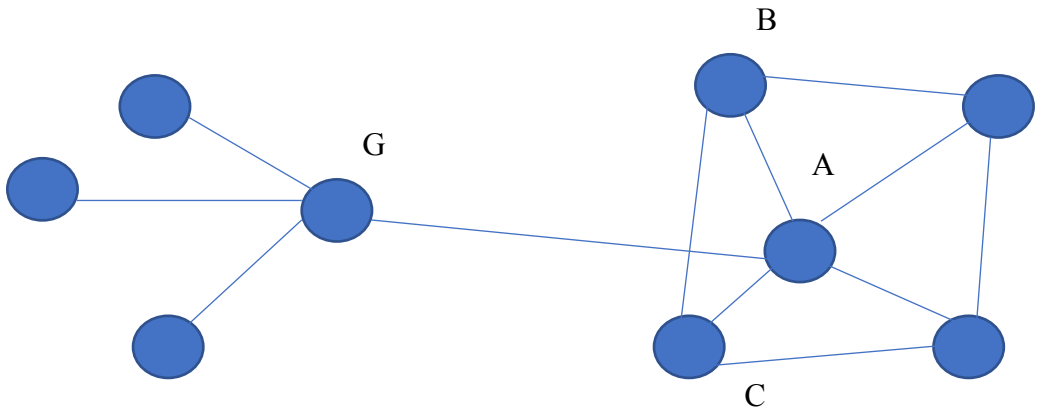

Figure 1: Bridging tie from A to G. Removing the tie breaks the network (Source: Granovetter, 1961).

This theory can explain how a single idea flows among various communities and gets enriched by public opinion and feedback in a sustainability campaign. The theory hence, provides a perfect foundation for social network analysis to examine the structure of an online social network and investigate how information flows within and between the communities in a large social network.

Social Network Analysis

Social network analysis (SNA) can be used to analyze the social networks shown in Figure 1. It is defined as the process of mapping and measuring the relationships and information flow between nodes in a social network. SNA is characterized by four defining properties: (a) it involves the assumption that links among social actors are important, (b) it analyzes the data that records social relations between actors, (c) it draws on graphic imagery to visualize the pattern of these links, and (d) it develops

mathematical and conceptual models to describe and explain these patterns (Scott & Carrington, 2016).

Researchers have used SNA in different forms and various fields to study social structures and networks including social science disciplines, physics, and biology (Scott & Carrington, 2011). With the advent of social media and increased online social interaction among users, computer programmers have developed various algorithms and programs to collect and analyze online social network data using this approach (Scott & Carrington, 2016). Prior research illustrates the contribution of network analysis in relation to social movements and how embeddedness in networks affect people's decisions to engage in social action (J. Scott & Carrington, 2016). Many researchers of social movements and collective actions are increasingly adopting social network concepts to study the individual and population effects in social and political movements (Scott & Carrington, 2016). Several researches in this direction have also illustrated how the distribution and density of ties between actors' matter. Many other recent studies have explored the mechanisms of information exchange within social networks during a social movement (Kitts, 2000), political movement (Bennett, 2012; Huberman et al., 2009; Meraz, 2009), or event crisis management (Gupta, Joshi, & Kumaraguru, 2012). However, this method has not been extensively utilized to study user-generated social media data to analyze the structure of OSNs in an apparel supply chain sustainability context.

Corporate Sustainability-Related Theories

Over the years, many researchers have proposed sustainability- related theories to explain the meaning of a truly sustainable supply-chain in apparel industry. For example,

Elkington (1994) proposed that sustainable development in a corporate setting involves seeking triple bottom lines of corporate interests- economic, social, and environmental improvements. Also, Carroll (1991) explained the pyramid of hierarchy of corporate responsibilities that all corporations may possess. While economic responsibility was shown as the most fundamental activities followed by legal compliance to be the second most important responsibility, the study showed ethical norms as the second least important activity followed by societal welfare as a voluntary responsibility of a corporation. However, a recent moral responsibility theory of corporate sustainability (Ha-Brookshire, 2015) challenges this view based on the concept of corporate personhood that considers corporation as a person and hence argues that corporations have the same moral responsibilities towards society and environment as other people. Further, The moral responsibility framework shows consumers' perception of moral duties regarding working condition support, environmental support, community support and transparency enhancement- on a moral spectrum from perfect to imperfect duties (Jung & Ha-Brookshire, 2017), where perfect duties are considered the most fundamental duties that must be fulfilled at all times and the imperfect duties are considered meritorious or voluntary duties (Kant, 1991). Many studies have successfully tested these theories using traditional survey and interview methods of data collection with a limited population. However, global perspective on these theories are still unknown.

A sustainability-related campaign on social media, where huge amount of information and public opinion from a diverse population is shared world-wide, can hence provide an opportunity to test some of these theories on global level. Social media provides a platform for the general public to respond to an event, or a piece of

information as how they perceive it and engage in meaningful discussions. Hence, structure of the social network formed by repeated key-words in these discussions can help identify the meaning of corporate sustainability as perceived by the global public. However, since, this study is exploratory in nature, an inductive approach is adopted to select the most suitable corporate sustainability-related theory in order to interpret the findings.

Summary of Research Gaps and Questions

In summary, many researchers have studied the cases of companies who fulfill their commitment towards making their supply chain more transparent by sharing their annual sustainability reports (Doorey, 2011; Goswami & Ha-Brookshire, 2015) and actively communicating their sustainability efforts via social media platforms like Twitter and Instagram (Reilly & Hynan, 2014). However, there are also many brands and social enterprises who are working towards motivating corporations to maintain a sustainable and transparent supply chain through online sustainability campaigns. Use of social media for this purpose has given new opportunities to the public and organizations to voice their opinions in this context and participate in a meaningful discussion, thus generating a trail of large-scale data of real-time public opinions and activities (Arnaboldi et al., 2015). The analysis of this dataset can help gain interesting insights regarding public mood and concerns regarding business practices of the apparel supply-chain. Though some researchers have investigated supply chain practices through social media (Chae, 2015), studies focusing on use of social media to promote apparel supply-chain sustainability and transparency is very limited. Growing awareness for sustainability and transparency in apparel supply chain, hence, calls for a need to investigate public activity

on social media in this context. In this light, the study aims to answer the following research question.

RQ_1: What is the overall public opinion of social media users regarding apparel supply-chain sustainability in terms of transparency?

Some of the previous research has studied the impact of social media on supply chain sustainability using traditional social science methods of questionnaire surveys and interviews to gain an understanding of online social networks, information transfer, communication, and community (Nam et al., 2016; Roncha & Radclyffe-Thomas, 2016; Tseng, 2017). However, these methods limit most of these studies to small or relatively smaller datasets due to difficulties in accessing the group members, participants' time and effort required for completing a social network questionnaire, and issues related to ethics, access, analysis, and interpretation of these data (Chae, 2015). On the other hand, the phenomenal growth in online interaction and the traces of huge user-generated content left behind by these interactions on social media sites provide the opportunity to access and analyze a dataset of user's real-time activity and opinions. Although many researchers are developing algorithms (Chae, 2015; Gupta et al., 2012; Scott & Carrington, 2017) to capture and analyze these data, it has not yet been extensively utilized in the context of apparel supply-chain sustainability. Additionally, the establishment of social media platforms to represent a small world network (Kwak et al., 2010; Leskovec & Horvitz, 2008; Magno et al., 2012; S. Myers et al., 2014) has attracted many disciplines to study the structure and nature of these online social networks (Kogut & Walker, 2001; Newman, 2001; Watts & Strogatz, 1998). However, the approach is fairly new in the apparel and textile research community. To bridge this gap, this study

aims to use the large-scale social media data to explore and understand the structure and characteristics of online social networks and identify the major communities and key themes related to apparel supply-chain sustainability being discussed within these communities. Hence, the study aims to answer the following research questions.

RQ_2: What major communities are present in the network discussing apparel supply-chain transparency and how do they differ from each other?

***RQ_3*:** What are the key themes discussed in these communities?

Chapter III: Methodology

Chapter III contains the following sections: (a) research context, (b) research approach, and (c) data collection and analysis.

Research Context

The aim of this study is to investigate the users' activity on social media regarding apparel supply-chain transparency through user-generated content and identify key themes and major communities discussing apparel supply chain transparency. Hence, Fashion Revolution Week—one of the biggest campaigns related to apparel supply-chain transparency on Twitter and Instagram—was selected as the research context.

The Case of Fashion Revolution Week

As mentioned in previous chapters, many brands and social enterprises are using Twitter and Instagram for sustainability-related campaigns. One such campaign towards promoting apparel supply-chain transparency, called Fashion Revolution Week, is organized by a social advocacy group called Fashion Revolution, based in the United Kingdom. Fashion Revolution Week has been held every year in the month of April since 2013 to mark the anniversary of the Rana Plaza building collapse in Bangladesh, which killed over 1,100 garment workers. The building housed several factories producing garments for many American and European retailers. At the time of the incident, little was known about the companies that were sourcing from these factories and, hence, it was difficult to hold them accountable for the lives lost. Fashion Revolution encourages millions of people to ask brands "who made my clothes" using the hashtag "#whomademyclothes" on social media platforms during the annual event in order to demand greater transparency in the fashion supply chain (Ley, 2017).

In 2016, Fashion Revolution used Twitter and Instagram to reach 129 million shoppers through 70,000 posts using #whomademyclothes. The social media impact doubled in 2017 with 533 million impressions on 2,000 brands responding to consumers with #imadeyourclothes, telling the story of their workers in their supply chains (Ley, 2017). Fashion Revolution counted 106 brands across 42 companies that disclosed the names of some of their suppliers in June 2017, compared to 29 brands out of 40 companies surveyed in 2016 (Ley, 2017). Given the rising popularity and impact of this campaign, this study focuses on the #whomademyclothes campaign as the context to understand social media user activity on Twitter and Instagram regarding apparel supply-chain transparency.

Data Sources: Twitter and Instagram

Twitter and Instagram were the most widely used platforms for the #whomademyclothes campaign. Twitter, founded in 2006, is one of the most rapidly growing social media platforms, with over 330 million monthly active users (Twitter, 2017). This microblogging site allows its users to post short messages (tweets) using up to 140 characters via the web or a mobile phone. Twitter is widely used for disseminating information by government agencies (Thelwall, Buckley, & Paltoglou, 2011) and corporations (Reilly & Hynan, 2014). It is used for event crisis management (Gupta et al., 2012), for advertising (Huberman et al., 2009), and for social and political campaigns (Segerberg & Bennett, 2011), along with use by the general public for sharing experiences, opinions, and ideas. The unique "retweet" feature allows the forwarding of a tweet by posting it again and again, thus facilitating rapid dissemination of information to a larger audience (Thelwall et al., 2011). Additionally, “reply” or the “@” symbol allow

Twitter members to address a post to another Twitter user, thus facilitating effective discussions and targeted collaborations (Gupta et al., 2012). Similarly, the "hashtag"—a metatag or character string preceded by a "#" sign that signals the meaning, topic, or intended audience of a tweet—is used to emphasize the importance of information and can be useful while searching for tweets about a specific topic (Thelwall et al., 2011). Given the noisy nature of the Twitter environment due to the large number of tweets and the speed at which they are posted, the @ sign and the hashtags are useful strategies used by the users for relating one tweet to another and to a specific topic or event. These features make coherent exchanges possible on Twitter, which is otherwise impossible in other multi-participant, public environments like chat rooms and discussion forums (Honeycutt & Herring, 2009).

Instagram, on the other hand, is a mobile photo and video capturing and sharing service that provides its users a platform to capture and share their life moments instantly with others through a series of photos or videos (Hu, Manikonda, & Kambhampati, 2014). The application launched in October 2010 and reached a milestone of 100 million users in 2013 with an average of 95 million photos and videos posted by users per day (Instagram 2017). Instagram also has the hashtag and @ features like Twitter, which make it easier to search photos related to a specific topic and to direct the post to a specific user. Thus, Instagram provides a similar level of social connectivity as Twitter, allowing users (called followers) to follow any number of other users.

Given these functions of Twitter and Instagram, they are also considered a type of social awareness stream (Naaman, Boase, & Lai, 2010). Apart from their unique features, Twitter and Instagram data, unlike other social media site data, are "open," enabling

research and business communities to access data using the companies' official Application Programming Interface (API) (Twitter 2017; Instagram 2017). This provides an opportunity to access data on an unprecedented scale and analyze them for challenging problems in diverse domains. It is also evident from prior research that Twitter and Instagram are among the most preferred social media platforms in the fashion and apparel context (Chae, 2015; Hu et al., 2014; Roncha & Radclyffe-Thomas, 2016). Hence, this study utilizes Twitter and Instagram APIs to collect data for analysis.

Research Approach

This study used data-mining-based social network analysis to investigate the pattern of discussions regarding apparel supply-chain transparency on Twitter and Instagram. There has been an increasing use of data from web sources such as Twitter and Instagram in various fields of studies in recent years (Chae, 2015; Gupta et al., 2012). Social Network Analysis (SNA) is considered an effective tool for understanding social networks based on the relationships between the actors in the network (Wasserman & Faust, 1994). Additionally, SNA enables researchers to quantify and interpret these relationships among social entities (Cronin, 2016). This approach involves visualizing the social network through nodes and edges in order to deliver and interpret the network data and the analysis results (Freeman, 1977). Network visualization provides meaningful insights into relationships among individual nodes and network structure to provide an abundant representation (Cronin, 2016) and efficiently deliver complex information. Although the approach is fairly new for apparel-industry-related research, social network analysis has been utilized by many researchers to explore the mechanisms of information exchange within social networks during a social movement (Kitts, 2000), political

movement (Bennett, 2012), and instances of event crisis management (Gupta et al., 2012). Hence, social network analysis was considered the best suited approach to analyze the social networks in this study.

A general inductive approach (Thomas, 2006) was used to find a relationship between the network structure with existing sustainability-related theory in the apparel industry. Since the vast literature on sustainability in the apparel industry has yet to study the social network structures of sustainability campaigns on fast-growing social media, this approach provides an opportunity to look at the previously researched theories of sustainability and social responsibility from a different perspective.

Data Collection and Analysis

For data analysis, Instagram posts and Twitter tweets with the hashtag #whomademyclothes were crawled separately using Python between April 24 and April 30, 2017 (the seven days of Fashion Revolution Week). Initially, 17,030 Instagram posts and 4,530 tweets were collected. The researchers prepared two separate network datasets for visualization and analysis by extracting all the hashtags representing the topic to create nodes. The edges between the nodes were created based on co-occurrences of hashtags in a tweet or Instagram post. A total of 25,010 nodes and 57,512 edges in Instagram network data, and 1,576 nodes and 2,653 edges in the Twitter network data, were identified. These network datasets were then loaded to Gephi software for visualization and analysis.

After preparing the network dataset, the study used Gephi software to analyze and visualize the Twitter and Instagram network separately. Using Gephi algorithms, the researcher conducted a three-level analysis: (a) topological analysis, (b) centrality

analysis, and (c) community analysis. The network topology refers to the layout of nodes and edges based on the information in the network dataset. Visualization of network layout uncovers the pattern of interactions among the nodes (Chae, 2015). Different network layout can be used by using graph layout algorithms for interpretation of the network graph. For this study, the researcher used the "Force Atlas 2" algorithm to visualize the Twitter network and the "Open Ord" algorithm to visualize the Instagram network. These layout algorithms were chosen based on the size of the networks and the outcome expected for network interpretation. Both the algorithms are highly accurate in detecting behavioral patterns in the network and are useful for clustering similar nodes (Cherven, 2015). The "Force Atlas 2" algorithm was chosen for the Twitter network because of its small-medium size. Similarly, the "Open-ord" algorithm was chosen to visualize the Instagram network due to its larger size. These layouts were then used to roughly categorize the nodes into different clusters where hashtags in same cluster were viewed to be related topics being discussed. Different colors were used for the nodes and edges to make the graphs readable. The average path length between the nodes were measured to gain insights into how closely these nodes were related. Additionally, the "page rank" algorithm in Gephi was used to re-size the nodes according to their rank. Page rank is a score between 0 and 1, representing the likelihood that a person randomly talking about the #whomademyclothes campaign will use any particular hashtag used as a node in the network (Ayyappan & Nalini, 2016). The nodes visible in the network for analysis and interpretation were filtered using the *K-Core* algorithm, which filters the nodes based on its centrality measure. Filtering the nodes helps in reducing the complexity of large Twitter network without affecting the underlying data structure. It

also allows the removal of unnecessary clutter and peripheral elements from the final output, permitting the researcher to focus on the nodes that are more relevant to the network (Cherven, 2015).

Further, centrality analysis was conducted to identify the influential actors in the network. At this point, the researcher measured the degree centrality, closeness centrality, and betweenness centrality as the key indicators to analyze the importance of nodes (hashtags in this case) in the network (Kitsak et al., 2010). Degree centrality is the number of ties that a node has. A higher value of degree centrality makes a node more central or important in the network (Wasserman & Faust, 1994). The closeness centrality is defined as the sum of the length of the shortest path of a node to all others. In this case, unlike the degree centrality, a lower value will make a node more central (Freeman, 1977) or it can be interpreted as more influential. The betweenness centrality of a node, on the other hand, indicates how often it appears between any two random nodes in the network. Nodes with higher betweenness centrality are considered to be more influential (Borgatti & Lopez-kidwell, 2015).

Finally, community analysis was conducted to explore the network-level characteristics such as network density and cluster coefficient. Network density represents the portion of all possible connections between nodes and measures network cohesion (Wasserman & Faust, 1994). It is the number of ties in the network expressed as a proportion of the total number of ties possible. Hence, density can be interpreted as the probability that a tie exists between any pair of randomly chosen nodes (Borgatti, 2013). Clustering coefficient, on the other hand, measures the amount of clustering in the network by measuring the extent to which the nodes in a graph tend to cluster together

(Watts & Strogatz, 1998). This measure helps determine if the network represents a close-knit small world network structure exhibited in small-world theory. Figure 2 illustrates the research method framework used for collecting and analyzing user-generated content from Twitter and Instagram in this study.

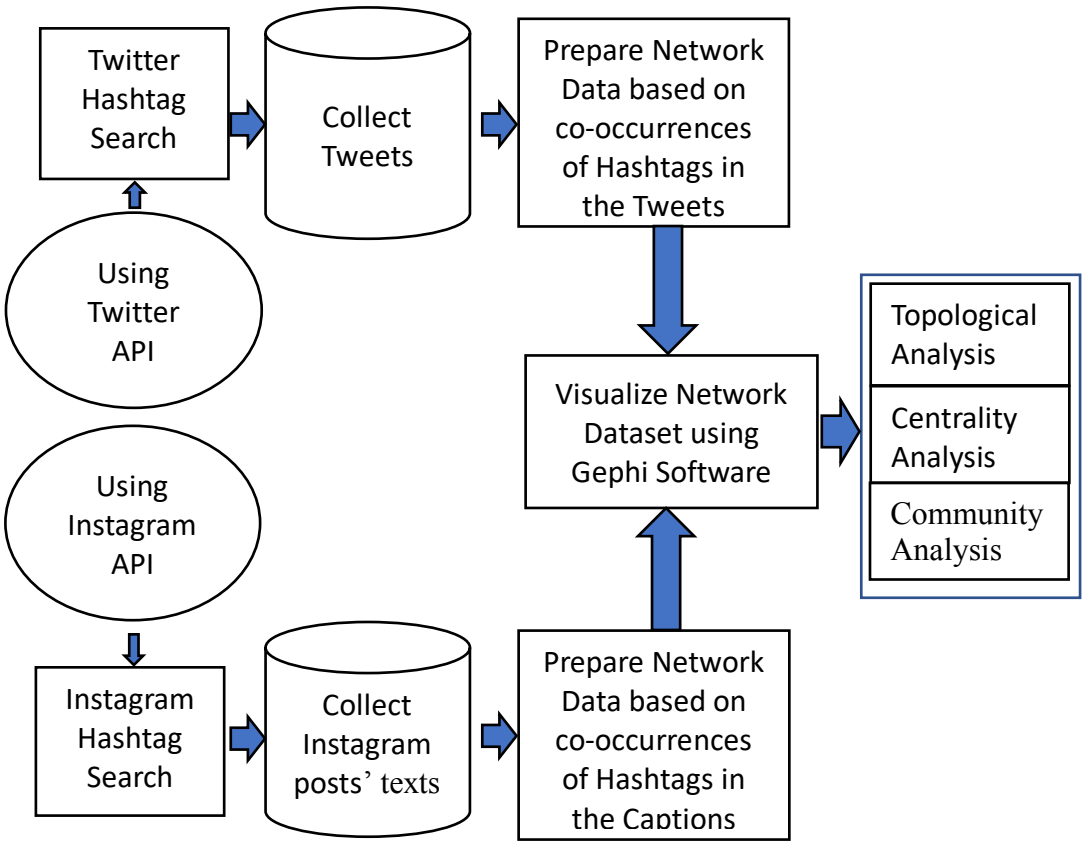

Figure 2: Research method framework.

Chapter IV: Results

This chapter contains (a) analysis results and theory induction, (b) theme interpretation, (c) community analysis results, and (d) summary of results.

Analysis Results and Theory Induction

A three-level social network analysis was conducted to analyze the network structure and clusters in the network, to measure the importance of nodes in the network, and to measure the cohesiveness of the overall network. The topological analysis of Twitter and Instagram networks using Gephi algorithms revealed four clusters in the Twitter network, namely (a) working condition improvement, (b) transparency enhancement, (c) environmental protection, and (d) community support. The analysis also revealed only three clusters in the Instagram network: (a) working condition improvement, (b) community support, and (c) environmental protection. The central hashtags in these clusters were then used to analyze the content of original Tweets and Instagram posts to interpret key themes that emerged in the network of the #whomademyclothes campaign to promote apparel supply-chain transparency.

Jung and Ha-Brookshire's (2017) moral responsibility framework of corporate sustainability (MRCS) was adopted as the theoretical framework to interpret the clusters that emerged in these networks due to their consistency with the factors of MRCS. The framework is based on the moral responsibility theory of corporate sustainability proposed by Ha-Brookshire (2015). The theory states that the extent to which a corporation is committed to sustainable development depends on how they perceive sustainability within the moral spectrum, from perfect to imperfect duties (Figure 3) (Ha-Brookshire, 2015). While perfect duties are universal and absolute duties by which all

beings must abide in all situations and circumstances, imperfect or meritorious duties, such as charity, allow an individual to choose how to fulfill them (Ha-Brookshire, 2015). Therefore, according to MRCS, if a corporation views sustainability as a perfect moral duty to fulfill, its sustainability efforts will be more meaningful. However, the MRCS framework also argues that the corporations must consider consumers' views on their sustainability activities while making any strategies. Hence, the U.S. consumers' opinion was tested and it was found that working condition support was considered to be the most important duty to fulfill, followed by environmental support and community support. Transparency was considered as the least important moral duty by the U.S. consumers (Jung & Ha-Brookshire, 2017). Since these factors on the moral spectrum were found to be consistent with the clusters that emerged in the Twitter and Instagram networks, the themes in these clusters were interpreted through the lens of the moral responsibility framework of corporate sustainability.

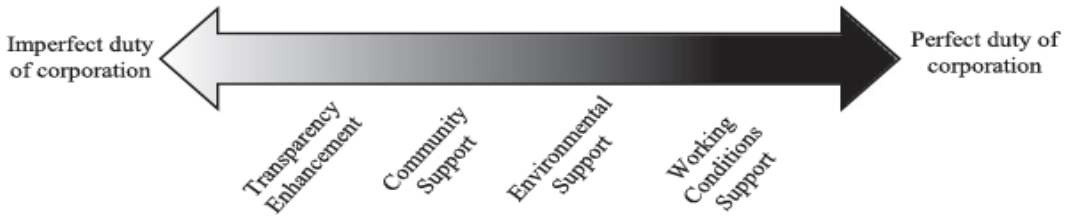

Figure 3: Moral spectrum of moral responsibility framework of corporate sustainability. (Source: Jung & Ha-Brookshire, 2017).

Theme Interpretation

As mentioned in the previous section, the topological analysis of Twitter and Instagram social networks revealed distinct clusters. Also, the centrality analysis of the nodes in these networks revealed the most important nodes in the network, which in turn helped in determining the relative importance of each cluster in the network based on

average degree of all the nodes in these clusters. The following sections discuss the results of the centrality analysis and interpretation of themes that emerged in these clusters.

Twitter Network of #whomademyclothes

The visualization of the Twitter network #whomademyclothes (Figure 4) shows the campaign "whomademyclothes" and "fashion revolution week" as the central nodes. The filter *K-core* = 5 was used to show only the most important nodes in the network layout with degree centrality > 5. The major hashtags that emerged in the network were #ecofriendly, #slowfashion, #fairfashion, #ethical, #garmentworkers, #transparency, #corporateworld, #handmade, and #vintage. Tables 1 and 2 list the top 20 nodes in the network with the highest centrality and page rank measures. Tables 3 and 4 list the top 10 nodes with the highest page rank measures and top ten edges between the nodes with their weight.

Table 1

Top 20 Nodes in Twitter Network with Highest Degree Centrality

Nodes	Degree	Nodes	Degree
whomademyclothes	1282	GoTransparent	28
fashionrevolution	491	fairfashion	25
Fashionrevolutionweek	234	transparency	24
FashRev	115	ethicalhour	24
#RanaPlaza	71	fastfashion	23
ethicalfashion	70	slowfashion	23
QuienHizoMiRopa	61	lovedclotheslast	14
imadeyourclothes	49	vintage	13
fairtrade	44	SchoneKleren	13
Vaatevallankumous	36	ecofashion	11
sustainablefashion	30	veganizedMalaga	10

Table 2

Top 20 Nodes in Twitter Network with Highest Betweenness Centrality

Nodes	Betweenness Centrality	Nodes	Betweenness Centrality
whomademyshoes	20549.676	fairfashion	2049.816
SemanaFashionRevolution	18786.54	garmentworkers	1981.482
ecofriendly	16633.546	EconomiaDelBienComun	1419.705
fashionrev	10830.296	SocEnt	1131.098
fastfashion	10747.875	transparence	1117.297
handmade	10239.14	veganizedMalaga	1111.5
#Bangladesh	5079.538	NoFastFashion	882.127
ethicalfashion	2926.909	slowfashion	882.127
sustainable	2631.101	handmade	660.818
upcycle	2378.368	ethicalhour	660.818

Table 3

Top 10 Nodes in Twitter Network with Highest Page Rank

Nodes	Page Rank	Nodes	Page Rank
whomademyclothes	0.181	fairtrade	0.025
fashionrevolution	0.108	slowfashion	0.024
ethicalfashion	0.05	ethicalhour	0.02
imadeyourclothes	0.034	GoTransparent	0.017
#RanaPlaza	0.033	transparency	0.017

Table 4

Top 10 Co-occarance of Nodes in Twitter Network

Source	Target	Weight
whomademyclothes	fashionrevolution	399
whomademyclothes	fairtrade	29
whomademyclothes	ethicalfashion	27
whomademyclothes	imadeyourclothes	21
whomademyclothes	#RanaPlaza	20
whomademyclothes	transparency	20
fastfashion	whomademyclothes	14
whomademyclothes	slowfashion	14

whomademyclothes	handmade	13
whomademyclothes	ecofriendly	11

The topological analysis revealed four clusters in the Twitter network (Figure 4) with varying clusters of working condition improvement, transparency enhancement, environmental protection, and community support. The clusters that emerged in the network were consistent with the factors of the moral responsibility framework of corporate sustainability (MRCS) (Jung & Ha-Brookshire, 2017). However, the position

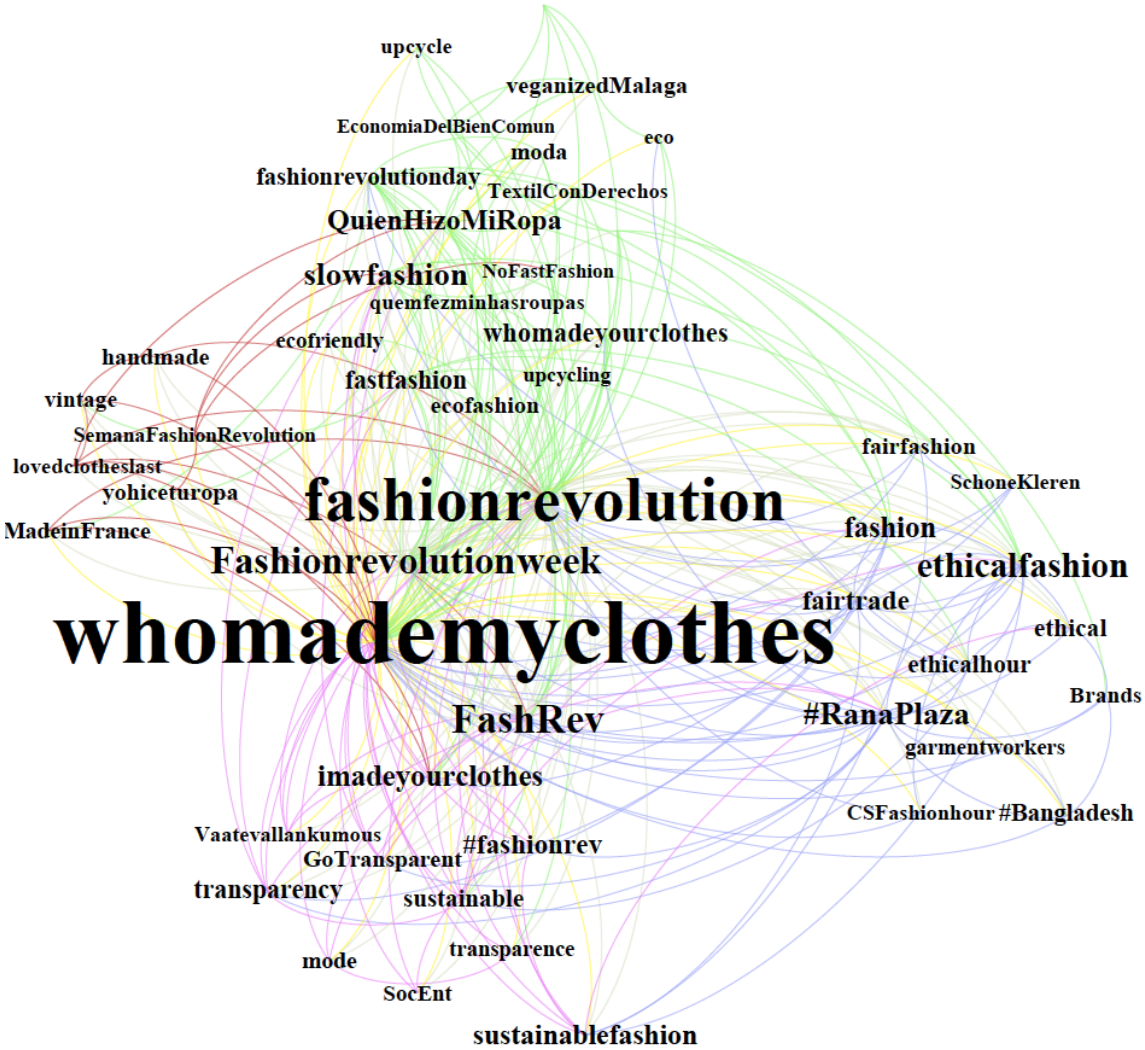

Figure 4: Twitter Network of #whomademyclothes

of these clusters on the moral spectrum were inconsistent. These clusters and themes of discussions in these clusters are discussed in the following sections.

Working Condition Improvement

The most influential of the four communities that emerged in the Twitter network was supporting the improvement of working conditions of garment workers in developing countries. This cluster with the central hashtag "ethicalfashion" had the most influential nodes in the network with the highest average degree centrality of 30.75. This means that on an average the nodes present in this cluster had the highest number of edges with other nodes in the network. In other works the hashtags in this cluster, on an average, had the highest co-occurrences in different tweets collected to form the network, making this cluster the most central theme of discussion. According to the degree centrality, betweenness centrality, and page rank statistics of each node in this cluster, "ethical fashion," "fair trade," and "fair fashion" emerged as the most discussed topics in this cluster.

As evident from the tweets from within this community, ethical sourcing, fair treatment, safe working conditions for garment workers, and fair pay were the most talked about topics. The community also voiced their concerns about the practice of child labor in the industry. Some sample tweets were "The heroes of Fashion industry who need Safety & Ethical treatment…", "My @on_running shoes bring me to work, but do they bring their maker fair pay? I'd like to know #whomademyclothes…", "Slave made goods are everywhere… How much of your stuff is made by child labourers?..." This cluster also discussed the clean clothes campaign in Portugal, which advocates for fair and safe working conditions in garment factories located in developing countries with

hashtag "SchoneKleren," which means "clean clothes" when translated to English. A sample comment was "…So, @LEVIS, I wonder #WhoMadeMyClothes? Is it made in a safe, clean and fair way? #cleanclothes #schonekleren."

Since, the entire campaign was based on the 2013 Rana Plaza building collapse, it was not surprising to find *working condition improvement* as the most influential cluster in the network. Since this cause also directly involves other human lives, it can be assumed that Twitter users could relate better to this cause. Their empathy with the workers makes them believe that improving working conditions in garment factories is the primary solution in making the apparel supply chain sustainable. This was found to be consistent with the moral spectrum of MRCS, according to which the consumers found "working condition support" as the most important duty to fulfill (Jung & Ha-Brookshire, 2017). The community asked questions to hold brands accountable for poor working conditions in garment factories and shared related articles to increase awareness among the public.

Transparency Enhancement

The second most influential cluster in the network emerged with hashtag "transparency" as the central topic. The average degree centrality of this cluster was 23.4. This cluster partially overlapped with the previous cluster, advocating for proper working conditions for garment workers in developing countries. The major theme of discussion in this cluster was the importance of transparency in making a sustainable supply chain. Through their tweets, the community strongly supported the need to improve social and environmental conditions and demanded total transparency in the apparel supply chain. Some sample tweets were "Transparency should not be an option, it should be a standard.

#fashionrevolution #whomademyclothes …", "No one should die for fashion. We demand brands put human dignity & corporate transparency above profit at all costs. #WhoMadeMyClothes."

The tweets usually shared media articles about non-transparent brands and advocated consumers' right to know the journey and story of how and where the garments were being produced and under what conditions. The community was vocal about putting social and environmental improvements before profits and costs of the garment. The emergence of *transparency enhancement* as a separate cluster was quite surprising given the overall intended theme of the campaign to promote transparency. This suggests that the demand for transparency was not the overall goal of the network despite it being the campaign's overall goal. Various communities existed in the network that were more concerned with demanding environmental protections and working condition improvements rather than demanding that corporations be transparent about it. Hence, despite having the second highest average degree, the emergence of a separate community advocating *transparency enhancement* implies that supply-chain transparency is not considered one of the most important duties by the Twitter users. Therefore, this result was partially consistent with the moral spectrum where transparency was found to be the least important duty from the consumers' perspective.

Environmental Protection

The third most infuential cluster, with an average degree centrality of 16.056, *environmental protection,* is based on the themes discussed by this community. Hashtag "QuienHizoMiRopa," Spanish for "whomademyclothes," was the central node in this cluster. The other influential nodes in the cluster were hashtags "fastfashion,"

“slowfashion,” “ecofashion,” “upcycling,” “ecofriendly,” and so on. The community showed its support toward environmentally friendly methods of production and waste reduction during the consumption process. Some of the tweets that show how this community of Twitter users utilized this campaign to raise awareness and suggest possible solutions to help the industry become more environmentally sustainable were “The wool one decomposed back into the soil. The synthetic one, not so much. Let's change this!! #FashRevDundee17 #whomademyclothes”, “Fast fashion is killing the planet. Ask #whomademyclothes & buy #secondhand or from ethical makers. Small changes make a big difference…”, “TIPS: Remember to recycle or donate your old clothes! Shop sustainably by buying vintage/second hand #fashionrevolution #whomademyclothes…”, “Ditch wasteful #fastfashion embrace individual style choose #EthicalFashion choose well, make it last #ethicalhour #whomademyclothes.”

The major topics within this cluster were focused on sustainable consumption of clothing to make it last longer by reusing, recycling, and upcycling of apparel products. The community suggested waste reduction during manufacturing and consumption of clothing, criticized fast fashion trends, and advocated the slow fashion. They also shared articles and case-studies of companies that use environmentally friendly materials to make textiles.

The network also revealed many nodes representing hashtags in Spanish and Dutch languages, suggesting a widespread reach of the community advocating environmental protection. The hashtag “EconomiaDelBienComun”—Dutch for “economy for common good”—revealed the association of this community with the Dutch campaign, advocating a more ethical economic model in which the wellbeing of

people and the environment become the ultimate goal of business (Watson, 2014). The community also talked about a store in Spain called "Veganized: NON-TOXIC Fashion," advocating the consumption of vegan, organic, and fair-trade fashion products. The overall tone of the cluster was that of raising awareness and urging the consumers to be more sustainable while consuming and disposing of their wardrobe. The emergence of this cluster in the network was surprising given the intent of the campaign as to hold brands accountable for unsustainable practices in the apparel industry; however, this cluster fits perfectly on the moral spectrum where consumers consider environmental support the second most important duty to fulfill after working condition support.

Community Support

Lastly, *community support*, the cluster with the lowest average degree of 10.167, emerged as the least influential cluster with central hashtag "lovedclotheslast." The key theme of discussion in this cluster was support towards the community of vintage sellers, handloom artisans, and women workers as evident from some of the tweets such as "Turn away from #fastfashion and support #vintage sellers on #Etsy who source by hand and with love #whomademyclothes…", and "The ladies at Carcel are artists and we want them to be treated and paid as such…"

The community urged consumers to support the community of women workers and small enterprises by shopping their products and providing them fair opportunity in today's fast-fashion market. However, the cluster was surprisingly the smallest given the intension of the campaign to promote transparency in the apparel supply chain to improve sustainability in relation to the overall social conditions in developing countries. This implies that Twitter users were more concerned about the working conditions of workers

in the factories rather than social living conditions of the community of workers in general. The result was consistent with the moral spectrum where consumers perceived community support as a lesser important duty than working condition support and environmental support.

Instagram Network of #whomademyclothes

The visualization of the Instagram network of #whomademyclothes (Figure 5) also shows the campaign "whomademyclothes" and "fashion revolution week" as the central node. The filter (*K-core* = 27) was used to show only the most important nodes in the network layout with (degree centrality > 27). The major hashtags that emerged in the network were similar to that of the Twitter network, such as #ecofashion, #ethicalfashion, #fair, #ethical, #lovedclotheslast, #transparency, #handmade, and #vintage. Unlike the four clusters in the Twitter network, the topological analysis revealed only three clusters in the Instagram network with varying themes of *working condition improvement, community support*, and *environmental protection*. Transparency enhancement did not emerge as a separate cluster. However, it was found to be the overall theme of the network. The clusters that emerged in this network were also consistent with the factors of the moral responsibility framework for corporate sustainability (MRCS) (Jung & Ha-Brookshire, 2017). However, some inconsistencies were found when these clusters were interpreted through the moral spectrum. The following sections discuss the three clusters in detail. Tables 5 and 6 list the top 20 nodes in the network with the highest centrality measures. Table 7 lists the top 10 nodes with highest page rank and Table 8 lists the top 10 edges between the nodes with their weights.

Table 5

Top 20 Nodes in Instagram Network with Highest Degree Centrality.

Nodes	Degree	Nodes	Degree
FashionRevolutionWeek	6290	ecofashion	217
whomademyclothes	4660	Zerowaste	185
Ethicalfashion	4314	transparency	179
sustainablefashion	2636	shoplocal	174
fairfashion	931	handloom	158
imadeyourclothes	825	madewithlove	149
handmade	490	fastfashion	144
slowfashion	464	ecodesign	144
sustainabledesign	352	organic	141
fairtrade	321	conciousfashion	123

Table 6

Top 20 Nodes in Instagram Network with Highest Betweenness Centrality.

Nodes	Betweenness Centrality	Nodes	Betweenness Centrality
whomademyclothes	2912.207	love	26.065
FashionRevolutionWeek	850.344	consciousfashion	23.997
fashionrevolution	664.256	upcycle	15.061
Ethicalfashion	506.644	Zerowaste	14.32
Ethical	352.574	madewithlove	14.229
sustainablefashion	430.9	transparency	14
imadeyourclothes	170.625	bethechange	13.977
ethical	113.431	reuse	11.6
handmade	55.807	fastfashion	11.461
fairtradefashion	41.383	organic	10.332

Table 7

Top 10 Nodes with Highest Page Rank in Instagram Network.

Label	Page Rank	Label	Page Rank
whomademyclothes	0.017720	ranaplaza	0.000874
fashionrevolution	0.011445	handmade	0.000812
imadeyourclothes	0.001555	transparency	0.000657

slowfashion	0.001322	fairtrade	0.000651
sustainablefashion	0.000980	ecofashion	0.000474

Table 8

Top 20 Co-occurances of Nodes in Instagram Network.

Source	Target	Weight
Ethicalfashion	whomademyclothes	1293
whomademyclothes	fashionrevolution	1196
Ethicalfashion	fashionrevolution	930
Ethicalfashion	sustainablefashion	525
Ethicalfashion	slowfashion	359
fairfashion	whomademyclothes	209
Ethicalfashion	imadeyourclothes	206
ethical	whomademyclothes	202
Ethicalfashion	fairtrade	178
Ethicalfashion	ecofashion	167

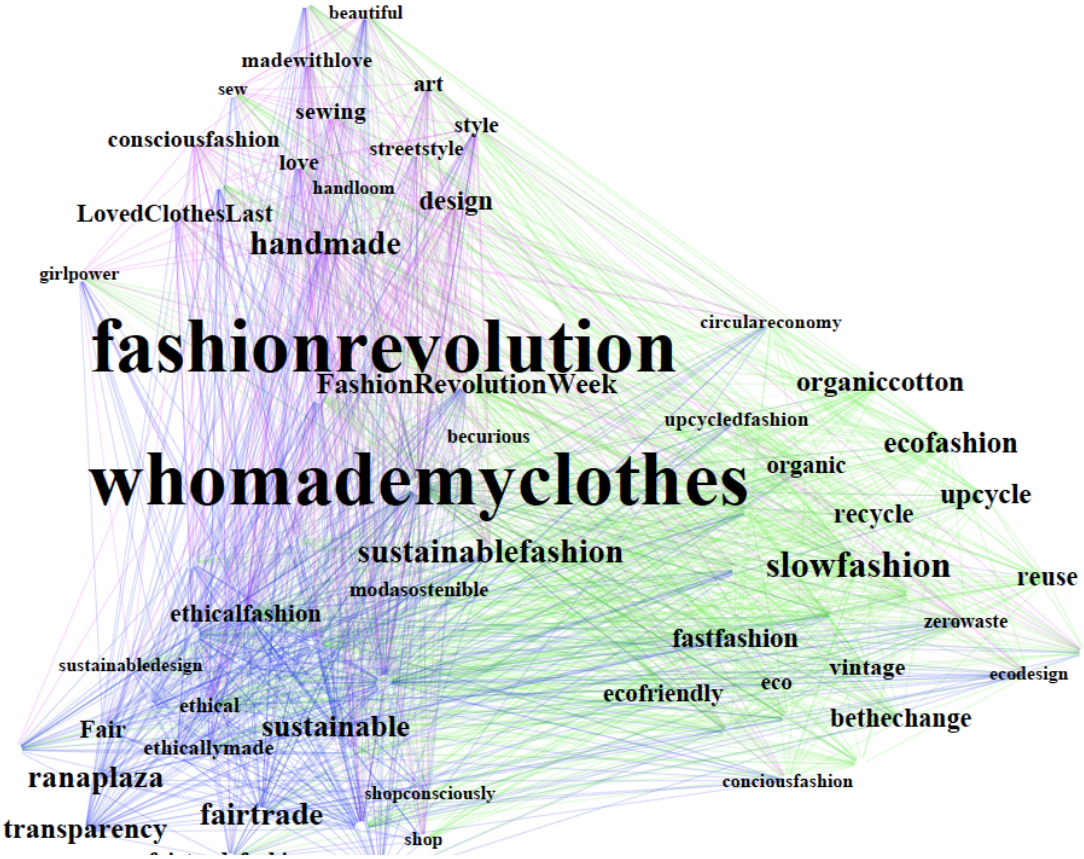

Figure 5: Instagram network of #whomademyclothes

Working Condition Improvement

The cluster with central hashtag "ethical" fashion emerged as the most influential cluster in the network with the highest average degree of 49.04. This result was consistent with the Twitter network. Major themes discussed by this community were #fairtrade, #ethicalfashion, #transparency, and #shoplocal. The text of these posts indicate that this community was mostly concerned about fair labor practices, fair wages, proper working conditions, and safe working environments in garment factories located in developing countries. Some examples of original texts associated with the nodes in this cluster are listed below:

> "On this last day of the fashion revolution week I want to ask @levis @levis_belgium: have my favorite shorts been made in favorable working conditions???..."
>
> "… I'd like to have information on the working conditions of your employees. Do your workers get a fair pay? Do they work in safe factories?"
>
> "…The tag says that it was made in Bangladesh. At least there is a country, but if I'm being honest, I doubt that it was made under fair working conditions. I urge companies to see the humanity in their workers because the question isn't what made my clothes it's #whomademyclothes…"

A small section of this community engaged in advertising their boutique shops in countries like the United States, Australia, and Canada with the hashtag "shoplocal." However, despite having a high degree centrality measure of 174, the betweenness centrality of this node (8.338) was very low, suggesting these posts had lesser influence

in the overall network outside this community. The overall theme of the cluster was demand for transparency from the brands in terms of working conditions of garment workers and promotion of fair-trade affiliated and ethical companies. The emergence of this cluster as the most important one in the network was not surprising given the major outcry among the public regarding the 2013 Rana Plaza building collapse and the intent of the campaign. This result was consistent with both the analysis result of the Twitter network and the moral responsibility framework where consumers considered improvement of factory working conditions as the most important duty (Jung & Ha-Brookshire, 2017). However, unlike the Twitter network and the MRCS, this cluster in the Instagram network also included heightened demand for transparency, reflecting the essence of the campaign in how the majority of the users responded. This might suggest the effectiveness of the Instagram platform for the campaign over Twitter where *transparency enhancement* emerged as a separate cluster all together.

Community Support

The second most influential cluster that emerged in the Instagram network was community support, with an average degree of 37.067. The community can be assumed to be more fashion forward users as they shared images with the hashtags “streetstyle,” “style,” “beautiful,” “art,” and so on. They were appreciative of the handloom industry and expressed gratitude towards the community of artisans and garment workers in developing nations like Thailand, India, Bangladesh, Bali, and Peru, using the hashtags “madewithlove,” “love,” “handloom,” and “handmade.” An example of the sample post is “This is the beautiful 'factory' where our clothes are made. Built by the Balinese,

owned by the Balinese. #ethicalfashion #handmadewithlove #whomademyclothes #community #gratitude…".

The community showed support for providing better living standards, education programs, and hygiene for the garment workers and their families in the developing countries. Consistent with the MRCS factors, many posts in this cluster were related to helping and improving the overall lives of socially disadvantaged populations such as children and women (Jung & Ha-Brookshire, 2017). Some of the sample posts from this community are listed below:

> "…You can help support beautiful children who have been born into desperate circumstances, receive food, shelter, and education…"
>
> "… I believe both people in the industry and consumers need to be consciously aware of the consequences our fast fashion choices have on people and our planet…Because no one wants their jeans to be the reason a child has lost their mother due to overworking, poor working conditions, ill hygiene criteria or fume poisoning. Because if someone demanded working women in the western world to have abortions in order to work 24/7/365 there would be hell to pay…"

Hashtag "girl power" emerged in this cluster, suggesting the focus of this community was on women empowerment in the industry. Many small firms acknowledged women as important members of their workforce and highlighted the hardships faced by them in the industry in terms of working conditions in posts like- "80 percent of the 75 million people making our clothes today are women, making far less than a living wage and unable to afford life's basic necessities. My shirt shouldn't come at the expense of people's working conditions, health, livelihood, creativity, or dignity...",

and “Meet Toon from Thailand! ...In her village, many women leave to travel to the big city to make money. They often rarely see their children and are not there to watch them grow up. Toon loves that this job has given her the ability to make a fair wage within her village and be able to stay with her children. She can now watch her children grow and take care of them as every mother deserves to do…”

The emergence of *community support* as the second most influential cluster in the Instagram network, unlike being the least influential in the Twitter network, is not surprising given that Instagram is a picture driven medium and, hence, can convey emotional and empathetic messages more effectively than Twitter.

Environmental Protection

Environmental protection emerged as the least inflential cluster in the Instagram network, with an average degree of 34.80. Although the number of influential nodes in this cluster were more than that in the *community support* cluster, the mean degree was smaller. This suggests a wider range of ideas being discussed in this cluster. The key hashtags used by this community included “slowfashion,” “fairtrade,” “ecofashion,” “organic,” “Zerowaste,” “recycle,” “ucycle,” and “circulareconomy.” The texts of the Instagram posts in this cluster revealed that, despite the intended theme of the campaign centered on transparency regarding working conditions and community support, a major portion of the network was dedicated to improving manufacturing and consumption processes in order to help protect the environment. Some of these postes are mentioned below:

> “…that's why I decided (11 years ago) to buy my clothes at #vintageshops regularly & #recycle / #upcycle my old pieces & extend lifespan of EVERY ONE

piece by giving it to my friends or charity.Yesterday, I spent the whole day by upcycling an "unwanted" stuff with my boyfriend, and we enjoyed it more than any other weekend activity you could imagine!"

"…If our clothes are cheap, chances are the planet or other humans are paying the price for it. Wearing one of my favourite sustainable, ethical brands @wearestarseeds, who make their clothes out of recycled coffee waste, biodegradable bamboo and other natural materials"

The community shared their environmentally sustainable clothing choices through images and appreciated the brands that are making eco-friendly choices while designing their products as evident from this sample post- "Take time to consider your shoes!! I'm so excited to see major brands like @adidas partnering with @parley.tv to create these beauties! Each pair =11 recovered plastic bottles! and more designs to come #whomademyclothes #showyourlabel #recycle #adidasParley"

The emergence of this cluster as the least influential in this network was quite surprising from the lens of the moral responsibility framework of corporate sustainability and the analysis result of the Twitter network where *environmental protection* was considered to be a more important duty to fulfill than *community support*. However, the lesser importance placed on *environmental protection* in the Instagram network again suggests the effectiveness of the Instagram platform for this campaign where the users paid more attention to community and working condition support as intended by the campaign. The overall theme of the posts was found to be more emotional and personal than that of the Twitter network. The Instagram users used images to convey emotion-driven messages and personal experiences directly involving human subjects.

Community Analysis Result

Community analysis of the networks shows a very low graph density (0.137) and higher average path length (1.937) of the Twitter network and a comparatively higher density (0.30) and lower average path length (1.836) of the Instagram network, indicating that the entire network of the #whomademyclothes campaign is more cohesive on Instagram as compared to Twitter. This finding was not surprising after the topological analysis revealed four distinct clusters in the Twitter network, whereas only three clusters were found in the Instagram network, with a common theme of enhancing transparency across all clusters at varying degrees of importance. These differences may also indicate that the Instagram network was more efficient in communicating the intended goal of the campaign. Table 9 summarizes the results of the community analysis.

Table 9

Community Analysis Result of Twitter and Instagram Networks.

Platform	Average path length	Network density	Clustering coefficient
Twitter	1.935	0.137	0.633
Instagram	1.836	0.3	0.424

Summary of Results

Social network analysis of the Twitter and Instagram networks of the #whomademyclothes campaign gave insights not only into the meaning of this campaign perceived by the general public, but also how they differ from each other depending on the social media platform. Both the networks demonstrated common clusters of ideas that can be summarized as *working condition improvements, environmental protection,* and *community support*. However, the order of importance of these clusters was different in each network. While Twitter users placed more importance on *environmental protection*

than *community support,* the Instagram users could relate more with *community support*. *Transparency enhancement*, the key goal of the campaign, was realized as a separate cluster in the Twitter network, while it remained the overall theme of all posts related to *working condition improvements* in the Instagram network.

The *working condition improvement* cluster with key hashtags "ethicalfashion," "fairfashion," "fairtrade," and "garmentworkers" emerged as the biggest cluster in both the networks. The results were interpreted on the moral spectrum of moral responsibility framework of corporate sustainability (MRCS) (Jung & Ha-Brookshire, 2017). Although the clusters in these networks were found to be consistent with the factors on the moral spectrum, the order of importance was found to be inconsistent. The Twitter network paid more attention to *transparency enhancement* than *environmental* and *community support,* suggesting that consumers consider Twitter to be a more effective medium to question their favorite brands directly when given an opportunity through the campaign than talking about it in a survey or interview where the concerned parties are not directly answerable. Also, transparency remained the underlying tone of conversations in all the clusters of the Instagram network, unlike a separate cluster in the Twitter network. The greater importance placed on *community support* than *environmental protection* by Instagram users can be attributed to the effectiveness of the Instagram platform in communicating the precise goal of the campaign and encouraging users to demand transparency in the apparel and textile supply chain in relation to working conditions in garment factories in order to improve the overall livelihood of the community of garment workers and their families in developing countries.

Additionally, the Twitter network was found to have a wider spread across the globe as compared to the Instagram network, evident from the hashtags in a variety of languages such as Portuguese, Dutch, and Spanish, apart from English. The tweets were also found to be more educational and fact-driven with links to blogs, news articles, and academic articles on related topics. The Instagram network was found to be driven mostly by emotions and personal experiences expressed through pictures. The Instagram network seemed more fashion-loving and showed emotions like empathy, love, gratitude and appreciation towards the community of garment workers and artisans, and sustainable and ethical brands. However, the tone of tweets remained neutral and driven by facts while demanding better sustainability and applauding those making progress toward this cause.

Chapter V: Conclusions

This chapter contains the following sections: (a) summary of the study, (b) contributions and implications, and (c) limitations and future research.

Summary of the Study

Sustainability and supply-chain transparency have recently gained interest among apparel and textile industry professionals, consumers, policy makers, and scholars (Shen et al., 2014). Social media can be used as an important tool to increase awareness and promote sustainability among the general public. This study uses one sustainability campaign on social media called #whomademyclothes as a context to examine how public opinion and reactions to supply-chain transparency in the apparel industry spread on social media. One week of user-generated content on Twitter and Instagram related to #whomademyclothes was collected and analyzed using social network analysis, which studies the structure of a social network and identifies key nodes in an online community.

Social media users on both Instagram and Twitter exhibited high interest in #ethicalfashion, #ecofashion, #fairtade, #vintage, #recycle, and #handmade. Several clusters emerged, suggesting that despite the intended theme of the campaign to promote transparency regarding working conditions in the apparel supply chain, several communities associated this campaign with a bigger picture of one's moral responsibility towards sustainability. The major clusters that emerged from the analysis of both Twitter and Instagram networks were *environmental protection, working conditions improvement,* and *community support*. These clusters were consistent with the factors in the moral responsibility spectrum proposed by Jung and Ha-Brookshire (2017) in their recent study that used survey methods to assess consumers' perceptions toward corporate

sustainability. The cluster showing support of working conditions was dominated by hashtags such as #fairfashion, #ethicalfashion, #garmentworkers, #cleanclothes, #RanaPlaza, etc., and emerged as the central cluster in this research. *Environmental protection*, dominated by themes like #ecofriendly, #slowfashion, #organic, #recycle, #upcycle, and #zerowaste, emerged as the least influential cluster in the Instagram network and third most influential cluster in the Twitter network. This was inconsistent with the moral spectrum of MRCS where *environmental support* was perceived to be the second most important duty after *working condition support* (Jung & Ha-Brookshire, 2017). Also, the cluster extending *community support* emerged as the least influential community represented by #handmade, #madewithlove, #handloom, #consciousfashion, etc., in the Twitter network. However, this was perceived to be the third most important factor on the moral spectrum (Jung & Ha-Brookshire, 2017). The inconsistency between these results can explain certain biases that participants might hold while answering survey questions. The social media data is reaction-based, revealing how the user feels when exposed to a real experience, news, or information. Hence, these data can prove to be more accurate when assessing user reactions in a given scenario as compared to the survey method, which can efficiently assess user intentions in a simulated scenario. However, the tweets and Instagram posts were found to be very emotional in nature where user seemed to use an exaggerated language to express their opinion.

Hashtags like "girl power" suggested that the Instagram users were more vocal and expressive about woman empowerment in the apparel industry. Similarly, #shoplocal in the Instagram network suggested that local clothing and textile businesses prefer Instagram as an advertising tool over Twitter. This also suggests the opportunistic

behavior of certain small businesses to use a social cause to promote their own business for profit. While the majority of this network engaged in voicing their concerns towards global supply-chain practices, some shop owners in this community talked about their products that were made within the country. Surprisingly, this sub-community identified the sustainability campaign as an opportunity to advertise their businesses instead of supporting the social cause worldwide. This re-affirms the analogy of "brands as the uninvited crashers in the web 2.0 party," put forward by Fournier and Avery (2011). The argument that the web was created to link people together in collective conversational webs and not to sell products (Fournier & Avery, 2011) holds true in this case as amid social conversations these posts seemed inauthentic and out of place. While #shoplocal was found to be central within the community, its influence was weak in the network as a whole.

The Twitter network exhibited various communities ranging from advocates of ethical and fair business practices and eco-friendly methods of production and consumption to social entrepreneurs. However, the Instagram network also exhibited a range of fashion lovers and more emotionally expressive communities who talked about empowerment of women workers and the beauty of handmade products and expressed their gratitude towards these workers in developing countries. The posts on Instagram were primarily emotion driven, while tweets, on the other hand, were mostly knowledge and experience driven. Both the networks showed their support for a sustainable and transparent apparel supply chain.

Contributions and Implications

To help the apparel brands, policy makers, and non-governmental organizations better understand what fashion consumers think about corporate transparency, this study analyzed the network of user-generated content regarding one of the biggest apparel supply-chain transparency campaigns on Twitter and Instagram. The most talked about themes or clusters that emerged as a result of the analysis were empirically tested on the moral spectrum from perfect to imperfect duties of moral responsibility theory of corporate sustainability.

The study's findings make some key contributions. First, this research is one of very few studies in the field of apparel supply chain to investigate the network of information created by user-generated content on social media to understand their opinion and behavior in the case of a sustainability-related campaign. The emergence of environmental protection as one major theme in the network of a campaign focusing on transparency regarding social and working conditions suggests the diverse nature of a social-media community and the diverse understanding and perceptions they hold regarding a certain issue. Second, while some previous research has tested the moral responsibility theory of corporate sustainability for the existence of a moral spectrum for consumers in the United States, this study looks into MRCS from a global perspective, thus attesting to the existence of the moral spectrum amongst what corporations do for sustainability, supporting MRCS at a global level. Third, the inconsistencies in the importance of communities in the network—*working condition improvement, community support,* and *environmental protection*—on the moral spectrum, as compared with results of previous studies using a survey method for data collection, indicates some differences

in opinion that people might have when answering survey questions as compared to when reacting to an incident or when exposed to some news or information in a real-life situation. Hence, the study suggests that use of social media data can provide a different and more diverse insight to a specific question.

Fourth, the findings of the Instagram network suggest corporate transparency as an umbrella under which various factors like *working condition improvement, community support,* and *environmental protection* were discussed. This raises a question about whether corporate transparency should be studied as another dimension of sustainability along with economic, social, and environmental aspects, or if would be more appropriate to study it at the same level as sustainability, giving an opportunity to the researchers studying corporate transparency and moral responsibility to test if a moral spectrum exists for corporate transparency as well. This will provide a deeper understanding to the corporations about which areas of sustainability they need to be most transparent. Fifth, the findings of this research also give an insight into the difference between the two social media platforms—Twitter and Instagram. This will help future researches focusing on social media data to select a suitable platform for data collection based on the goal of the study. While Instagram can be a good source of data for consumer-emotions-related research, Twitter might provide better insight into consumer-motivation-related research. Finally, given the extensive use of social media in the fashion and apparel industry for advertising, marketing, or to simply engage with customers for social and moral causes such as sustainability, this study contributes to the foundation of the use of social network analysis using user-generated data in apparel-industry-related research. Thus, this

research will enrich the literature in the area of corporate transparency and corporate sustainability in general.

The findings of this study also provide implications for consumer product corporations, policy makers, and social enterprises for strategizing their communications with consumers in an effective manner. This research is one of the few studies that examines the case of a sustainability-related campaign to investigate public responses and activities. The findings will help several social enterprises, apparel brands, and NGOs committed to improving environmental and social sustainability and transparency in the global apparel supply chain to understand networks and information flow on social media. This will, in turn, help them to strategize their communication to target the right audience in an effective manner to make the maximum impact. The findings show both similarities and differences in the network of the two widely used social media platforms. The organizations and brands planning for sustainability campaigns can use these differences and similarities to design their campaign for each social media platform to appeal to the conscience and emotions of a specific demography. Additionally, the findings about the feedback and ideas from social media users will help businesses and policy makers to identify specific actionable areas where they are lagging. Furthermore, the analysis of social media data will help businesses and policy makers understand the need of the hour and work towards it, hence improving their overall performance. Valuable information, new ideas, and inspiring stories are shared by users during these campaigns in various communities. Major communities identified in this study and key themes discussed by them will give insight into what today's consumers really want. The findings of the research show that a huge proportion of today's consumer base is not all

about finding the cheapest and latest trends in the market but is about finding environmentally friendly and ethically made clothing. The hint of rising interest in recycled, slow fashion, and second-hand clothing in the findings can be realized as an opportunity by socially responsible apparel businesses to bring about a new revolution in the way textiles and clothing are being produced and consumed.

Limitations and Future Research

Valuable future research could stem from the limitations of this study. Though this study targeted social media users from around the world and supported the global existence of the moral spectrum, the geographic locations of these tweets and Instagram posts were not considered while analyzing the network structure. It might be possible that communities from different countries or regions will weigh differently on the moral spectrum based on different moral values, local laws, and cultures. Hence, a cross-regional study of social-media data would be useful for organizations to customize their communications to target the audience based on their need and interest. This will also help social enterprises to target social campaigns to not only appeal to the current need of the region, but also to start a new movement based on local sentiments.

The aim of the study was to examine the social network of social media users to trace their opinion regarding corporate transparency in the apparel supply-chain. Hence, the study focused on one apparel supply-chain transparency-related campaign, which might have led to some bias when the importance of clusters was interpreted on the moral spectrum. Though the study established presence of a moral spectrum on a global level, it would be useful to re-evaluate the moral spectrum based on a more general keyword related to sustainability in the apparel industry. Furthermore, the findings of this study

suggested different levels of importance placed on the areas where the public wants these apparel brands to be transparent. Hence, future study further investigating the levels of corporate transparency would be useful.

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