



ISSN: 2288-7709 © 2021 KODISA & ICMA.
http://www.icma.or.kr
doi: http://dx.doi.org/10.20482/jemm.2021.9.1.1

A Research on Difference Between Consumer Perception of Slow Fashion and Consumption Behavior of Fast Fashion: Application of Topic Modelling with Big Data¹

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Received: December 17, 2020. Revised: December 27, 2020. Accepted: February 22, 2021.

Abstract

Purpose: The article deals with the proposition that consumers' fashion consumption behavior will still follow the consumption behavior of fast fashion, despite recognizing the importance of slow fashion. **Research design, data and methodology:** The research model to verify this proposition is topic modelling with big data including unstructured textual data. we combined 5,506 news articles posted on Naver news search platform during the 2003-2019 period about fast fashion and slow fashion, high-frequency words have been derived, and topics have been found using LDA model. Based on these, we examined consumers' perception and consumption behavior on slow fashion through the analysis of Topic Network. **Results:** Looking at the status of annual article collection, consumers' interest in slow fashion mainly began in 2005 and showed a steady increase up to 2019. Term Frequency analysis showed that the keywords for slow fashion are the lowest, with consumers' consumption patterns continuing around 'brand.' Each topic's weight in articles showed that 'social value' - which includes slow fashion - ranked sixth among the 9 topics, low linkage with other topics. Lastly, 'brand' and 'fashion trend' were key topics, and the topic 'social value' accounted for a low proportion. **Conclusion:** Slow fashion was not a considerable factor of consumption behavior. Consumption patterns in fashion sector are still dominated by general consumption patterns centered on brands and fast fashion.

Keywords: Slow Fashion, Fast Fashion, Text Mining, Topic Modelling

JEL Classification Code: C81, D12, D91, M16, M31

1. Introduction

The trend of fast fashion has brought profitability to the fashion industry, but has created a global culture that negates sustainable growth centered on eco-friendliness. As a result, the 'slow fashion' movement has emerged in recent years to encourage sustainable and ethical fashion with various concepts such as reuse and upcycling. The 'slow fashion' movement originated from the 'slow food' movement in 1986, which was created to pursue healthy meals, seasonal foods, and

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homegrown foods during the expansion of McDonald's nationwide in Italy. Slow fashion encourages consumers to pursue elaborately crafted products rather than mass-produced products, thereby adding value to labor and time spent making clothes (Kim, 2002). In Korea, movements related to eco-friendliness are also observed. On the internet, social concepts have emerged, such as 'green fashion', 'eco fashion', 'ethical fashion', and 'sustainable fashion' (Nam, 2010).

In order to examine the changes in consumers' fundamental perception of 'slow fashion' and the actual consumption behavior of fashion products through those terms, this article describes the flow of the domestic slow fashion movement with another technique rather than the traditional survey or analysis of related figures. It has been conducted using Text Mining with informal textual data through media. Due to the rapid change in the technological environment, it is not easy to explain the change in consumption behavior with some models for the existing purchase decision making process, and marketing also reflects this phenomenon and suggests the new decision making process from a new perspective. Several scholars see this phenomenon as an evolution from push-type marketing to pull-type marketing and are studying the changed pattern (Kim, Park, & Park, 2018). Through this study, this article aims to accurately diagnose perception of slow fashion in Korea and to suggest strategic directions necessary for future fashion industry companies.

In correspondence with the above purpose, this article is organized as follows. First, focusing on the issues raised in the introduction, Chapter 2 introduces research methods such as the research framework, data preprocessing, and data analysis. Chapter 3 presents the results of empirical analysis including term-frequency analysis, the weight by each topics, and Topic Network. Based on this series of reviews, Chapter 4 derives the theoretical implications and practical implications for companies. The final chapter presents future research topics not covered by this article.

2. Theoretical Background and Proposition

2.1. Theoretical Background

Fast fashion refers to the industrial ecosystem of apparel specialty stores that manufacturers take over from apparel design to manufacturing, production, distribution, and sales. Companies that choose this strategy develop supply chains in order to respond as fast as possible to consumer demands with the latest fashion trends. As a result, consumers are provided with the desired product at a fast and low price. SPA brands that employ this fast fashion strategy maximize their profits by collectively managing its products from manufacturing to distribution. In a study by Christopher, Lawson, and Peck. (2004), fast fashion brands provide 20 seasonal products each year, and consumers consume fashion products that much faster. Representative SPA brands include Zara (Spain), H&M (Sweden), Uniqlo (Japan), SPAO (Korea) and so on.

If fast speed and low price represent fast fashion, slow fashion pursues fair and correct products (Kim, 2011). Fletcher (2007) argues that slow fashion is not affected by time and is based on quality. As an alternative movement to the problems of fast fashion, it critiques the existing fashion culture (Ro, 2010). Just as slow food movement and slow life movement were proposed as solutions to the existing food industry, environmental pollution and industrial ethics of modern people, slow fashion is a practical movement that contains the values of alternatives to the problems of the modern fashion industry, such as standardization, one-off products, environmental problems, and industrial ethics. In terms of ecology, slow fashion pursues the value of slowness and slow processes in line with the slow cultural movement as a methodology of sustainable fashion. Through this, slow fashion aims to change the fashion strategies of design, production, consumption and use of the global fashion system. Therefore, slow fashion is a concept close to modern expression of sustainable fashion, and includes not only ecological characteristics but also humanistic and social characteristics.

2.2. Proposition

According to Noh (1995) and Yoon, Yang, Noh, and Jeon (2006), knowledge of the environment influences environmentally conscious consumption behavior. Laroche, Bergeron, and Barbaro-Forleo (2001) found that consumers who consider environmental issues when purchasing products said they were willing to pay more for eco-friendly products and not purchased products that caused environmental problems. However, according to Suk and Lee (2013), knowledge of environment and labor practices related to fashion is insignificant to participating boycott. Consumers' participation in ethical boycott requires empathy for the direct consequences (Lee & Joo, 2011), which can be attributed to problems such as environmental problems, child labor, and labor exploitation that arise during the production or disposal of fashion products, which are difficult for domestic consumers to empathize with. Said, Paim, Masud (2003) also stated that there was no significant relationship between knowledge and environmentally responsible behavior.

Through this, it is possible to conclude that knowledge and intent are separate from actual consumption behavior. In general, each consumer purchases goods and services according to their needs. Despite cognitive learning and awareness about environmental issues, environmental ethics are pushed out of the priority in consumption behavior. In the same context, there is an additional research that consumers prioritize brand image, quality, price, and style in product selection (Iwanow, McEachern, & Jeffrey, 2005; Joergens, 2006), which leads to the problem of duality. In addition, even if someone is familiar with ethical issues, it is difficult to find information about these issues when purchasing fashion products. In synthesis of the aforementioned discussion, this article has assumed the following proposition:

Proposition: Consumers' fashion consumption behavior will still follow the consumption behavior of fast fashion despite the recognition of the importance of slow fashion.

3. Research Method and Data

3.1. Research Framework

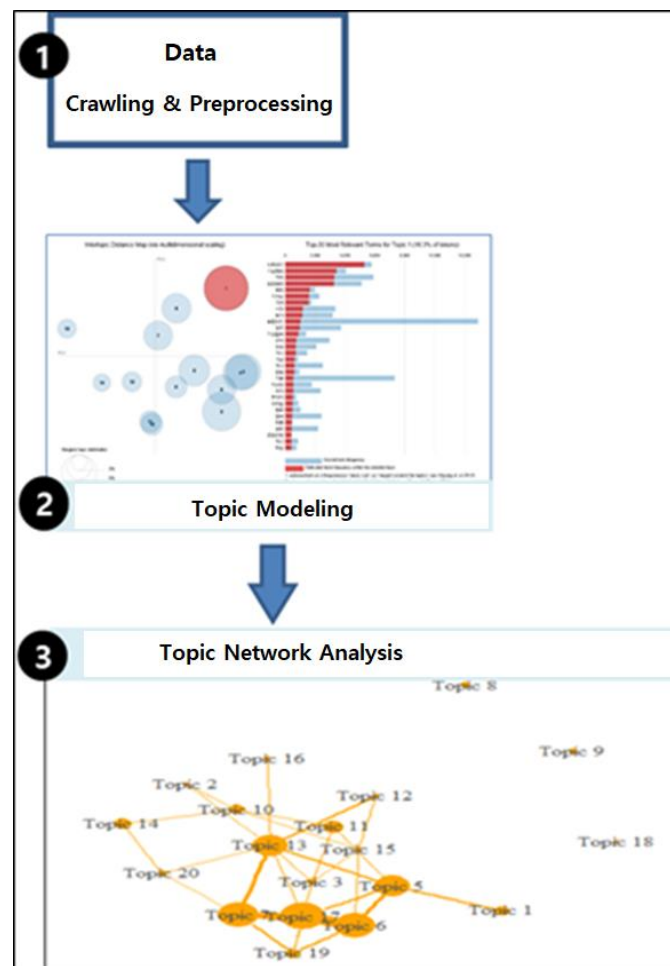


Figure 1: Research Framework

The main purpose of this study is to estimate the perception and change of perception about slow fashion in Korea. To this end, the specific procedure for conducting research is as follows. First, it begins with the process of extracting textual data from the selected platform and preprocessing it. In this process, related articles are collected from various daily newspapers from a fixed period. In the second stage, we conduct topic modelling to identify topics and then conceptualize

them. In the three steps, the distances between the topics are obtained from the results extracted with topic network analysis.

Topic modelling is one of the research methods used in text mining, and a representative technique is LDA (Latent Dirichlet Allocation). This method is a probabilistic model for finding potentially meaningful topics in several groups of words (Blei, Ng, & Jordan, 2003; Blei, 2012). LDA is a method of extracting a set of words with high probability by calculating the probability that the words will be included in a topic, assuming that a set of words in a text form a topic (Blei, Ng, & Jordan, 2003). Topic modelling creates topics by inferring posterior probabilities under the premise that words are not independent of each other. Using this analysis method, various studies have been conducted to analyze the relationship between texts (Park, Kim, Kwahk, 2016; Yang, Lee, & Kim, 2016; Lim, Lim, & Lee, 2014; Cho, Lim, & Hur, 2014). Through this, it is possible to check each topic of the texts and how much percentage of the texts they occupy as a numerical value, and what large amounts of texts mean.

Topic Network Analysis is a method of numerically grasping the structure by modelling the relationship between topics created using the topic modelling process with nodes and links (Newman, 2010). This allows us to measure how influential each topic is, in whole or in part, the association between each topic. To this end, Centrality Analysis is used, and it searches for topics with high centrality around common words between topics to find correlations between topics (Cho, Shin, & Kang, 2018). Centrality is an important measure for identifying a network, with connections to other nodes connected to one of the nodes, indicating the locations, characteristics, and influences of the topics in the overall the network structure.

3.2. Data for Analysis

For this study, we extracted the articles that are found as we search 'Slow Fashion' and 'Fast Fashion' from 2003 to 2019 in Naver News, a news aggregator of Naver. To do this, we used the 'rvest' package that helps scrap web pages in R. The package helps extract pieces out of HTML documents using XPath and CSS selectors. Since the purpose of this study is related to 'slow fashion', a total of 5,506 articles have collected by the two keywords (fast fashion and slow fashion).

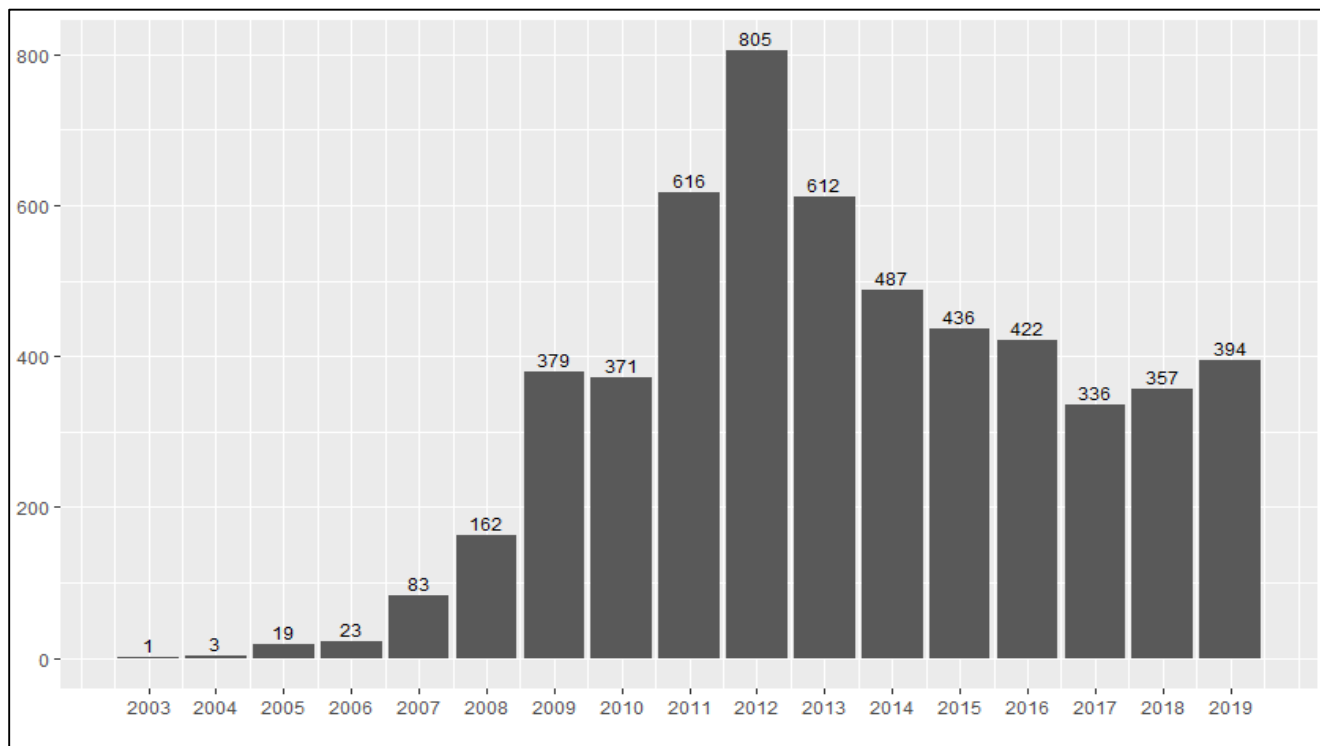


Figure 2: Status of the number of Articles by Year

Looking at the annual news figures, we can see that the topics related to slow fashion and fast fashion were hotly debated in 2012, during the 2003-2019 period. Domestic interest in these topics began to be discussed in 2003 and materialized since 2009. It also shows that there has been a significant increase in interest since the 2011-2013 period when it was intensively

discussed and then decreased. But it has been on the rise again since 2017.

3.3. Preprocess Analysis Data

Data preprocessing was carried out using R to make the words presented in the collected articles analytical. We deleted unnecessary words, special characters, topic words (slow fashion, fast fashion, fashion, etc.) for analysis, and reporters and newspaper names. Judging that the common noun would have the most important meaning for the purpose of the research, it was extracted around the common noun (NC) using the function ‘SimplePos22’ of a Hangul natural language analysis package ‘KoNLP’ of R to enhance accuracy.

4. Analysis of Research Results

4.1. Term Frequency Analysis

We analyzed the frequency of terms of the articles extracted. Among the total 94,628 words, ‘brand’ topped the list with 19,100, followed by ‘store’ with 7,621, ‘product’ with 6,833 and ‘Uniqlo’ with 3,962, a leading company in fast fashion, appearing the most among the apparel companies. The words were then used in the R visualization package ‘ggplot2’ to make the distribution chart **Figure 3** ordered by the frequency of appearances. Since fashion is a market led by each company using brand image, the word ‘brand’ has emerged overwhelmingly, and the words such as fashion company names, glossary stores, and clothing related to fashion market have appeared. This shows that brands have a strong influence on fashion market, and consumers also buy products through brands. Uniqlo, which ranked 8th, is one of the most popular fashion brands in Korea. This phenomenon conflicts with the increasing interest in slow fashion, which was previously examined in the flow of articles. Despite the gradual increase in interest in slow fashion, fast fashion brands still dominate the market, with the fewest topics and terms related to fashion.

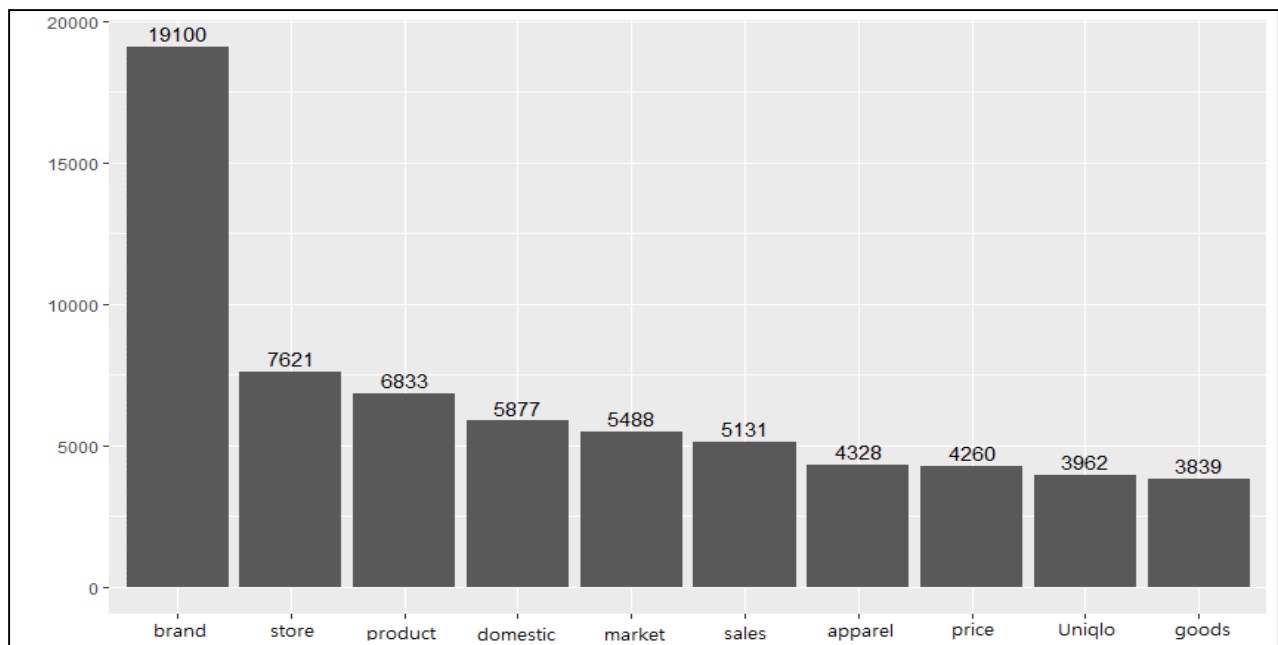


Figure 3: Top 10 Words Frequently Mentioned

Visualizing using a package ‘wordcloud’ with high frequency, we can find that ‘brand’, ‘store’, ‘price’, ‘design’, ‘market’, ‘sales’, and ‘product’. This shows that economic players such as companies, consumers and the government are not that interested in slow fashion in the fashion industry, and brands are playing a central role. This provides primary evidence of the proposition that despite the perception of slow fashion, consumers show consumption patterns centered on fast fashion.

Topic 9: Consumer Marketing	goods, brands, products, sales, customers, discounts, online, events, progress, prices, variety, events, stores, services, clothing
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Table 1 summarizes 20 high frequency terms for the previously extracted topics. It should be noted that ‘brand’ appeared frequently in all topics, and excluding the terms related to industry appeared without overlapping between topics. This shows that each topic was extracted quite independently.

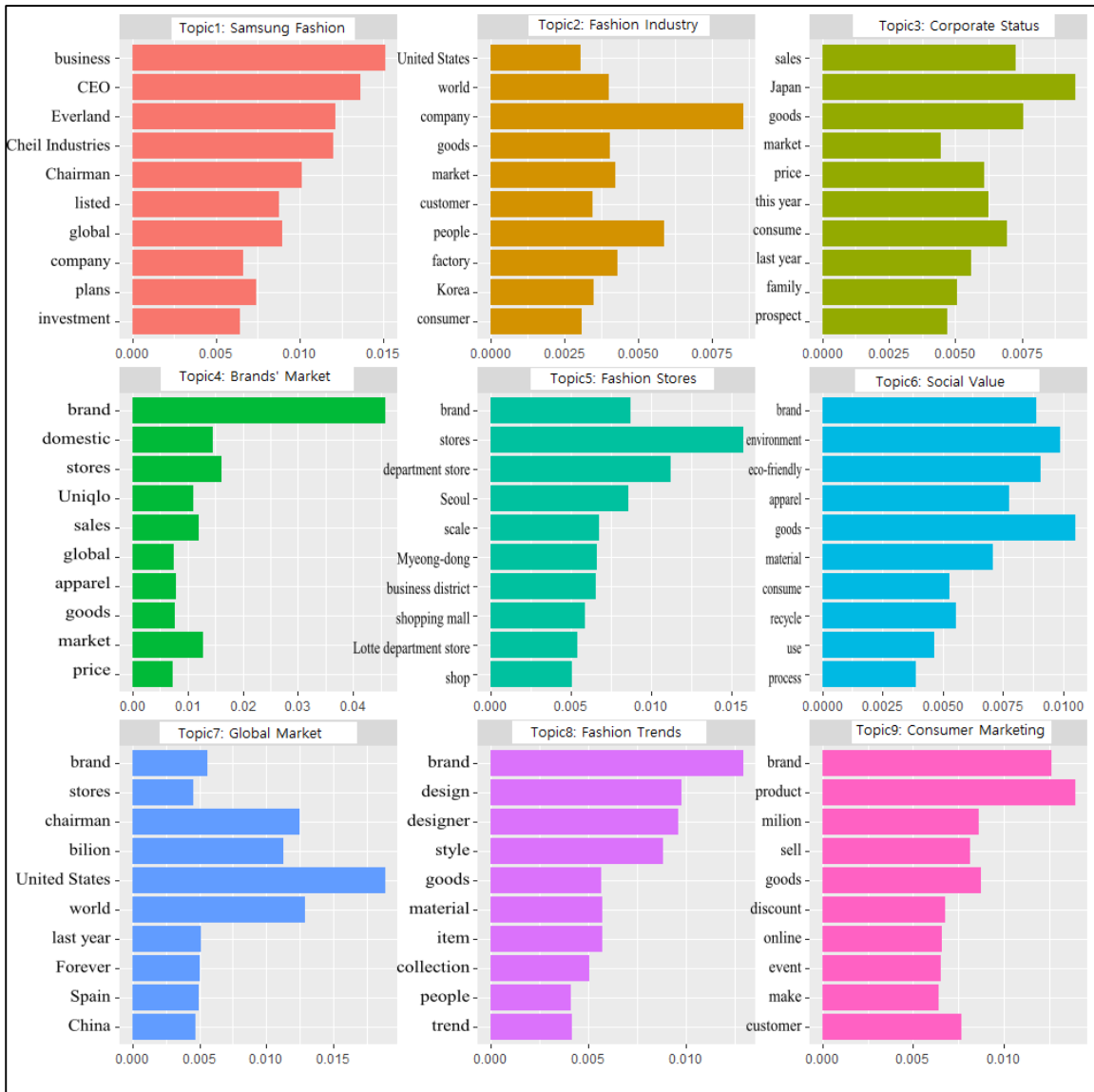


Figure 5: LDA-based Topic modelling topic classification and naming

In the next step, we have analyzed which topics were heavily treated. In **Figure 6**, Topic 4 (Brands’ Market) was the most common topic, followed by Topic 2 (Fashion industry), Topic 8 (Fashion Trend), and other topics such as Topic 6 (Social Value) and Topic 3 (Company Status) were treated less. As for topics, brand-related topics occupy the top part as well. From this point of view, we can find that most of the articles have been described around brands, which means that brands are important in the market. Slow fashion is a movement to create a sustainable fashion industry, and it is often mentioned in

topics about social value. As shown in **Figure 6**, the low share of Topic 6 suggests that it takes up a small proportion of the overall interest.

In conclusion, despite their perception of slow fashion, it presents secondary evidence of the proposition that shows consumption behavior centered on fast fashion.

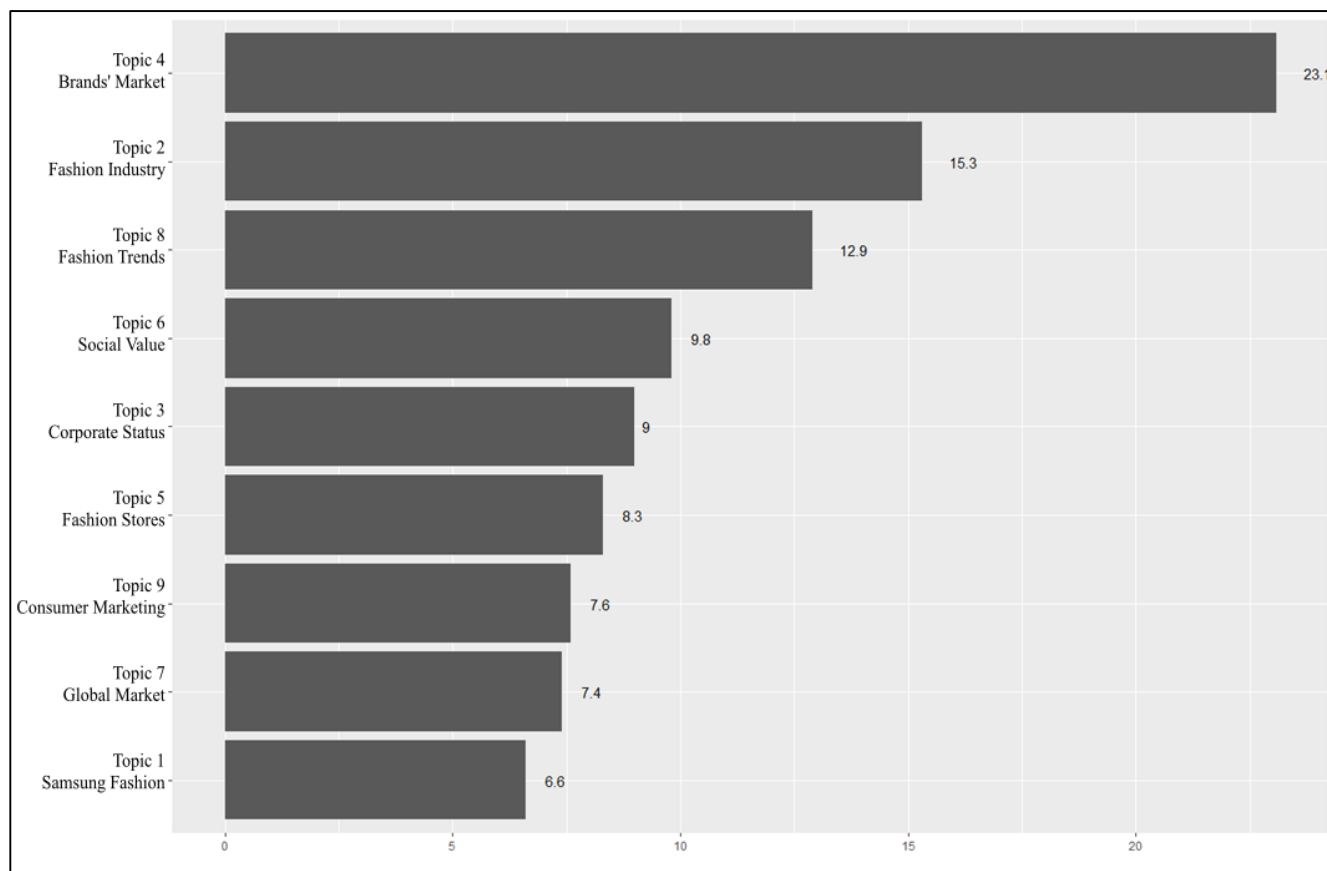


Figure 6: Proportion of Each Topic

4.3. Visualization after converting the result of topic modelling

You can visualize it after converting it to JSON using the 'LDAvis' package so that you can view the entire result on one page, and organize it as follows. The topic has a dimension of the number of words, so you need to reduce the dimension to visualize it. To this end, each topic was compressed into two dimensions through principal component analysis and visualized as shown in **Figure 8**. In **Figure 8** below, the size of the circles can be interpreted as the importance of each topic, and topics that overlap each other can be interpreted as having a similar context.

In **Figure 8**, the number in each topic circle is the same as that of **Figure 9** in the order of share by topic. Then you can see that Circle 1 (Topic 4: Brands' Market) and Circle 5 (Topic 3: Corporate Status) overlap, which shows that the two topics share contents in a similar context. Meanwhile, you can see that the circle4 (Topic 6: Social Value) is far from the center, which shows that it is not considered together in fashion industry compared to other topics. This shows that the importance of slow fashion itself is recognized by not being applied to other areas, and that it is not a significant consideration for consumers.

In conclusion, the results of the analysis of the weight of articles by subject provide tertiary evidence supporting the proposition that this article put forward, that consumers show consumption behavior centered on fast fashion despite their perception of slow fashion.

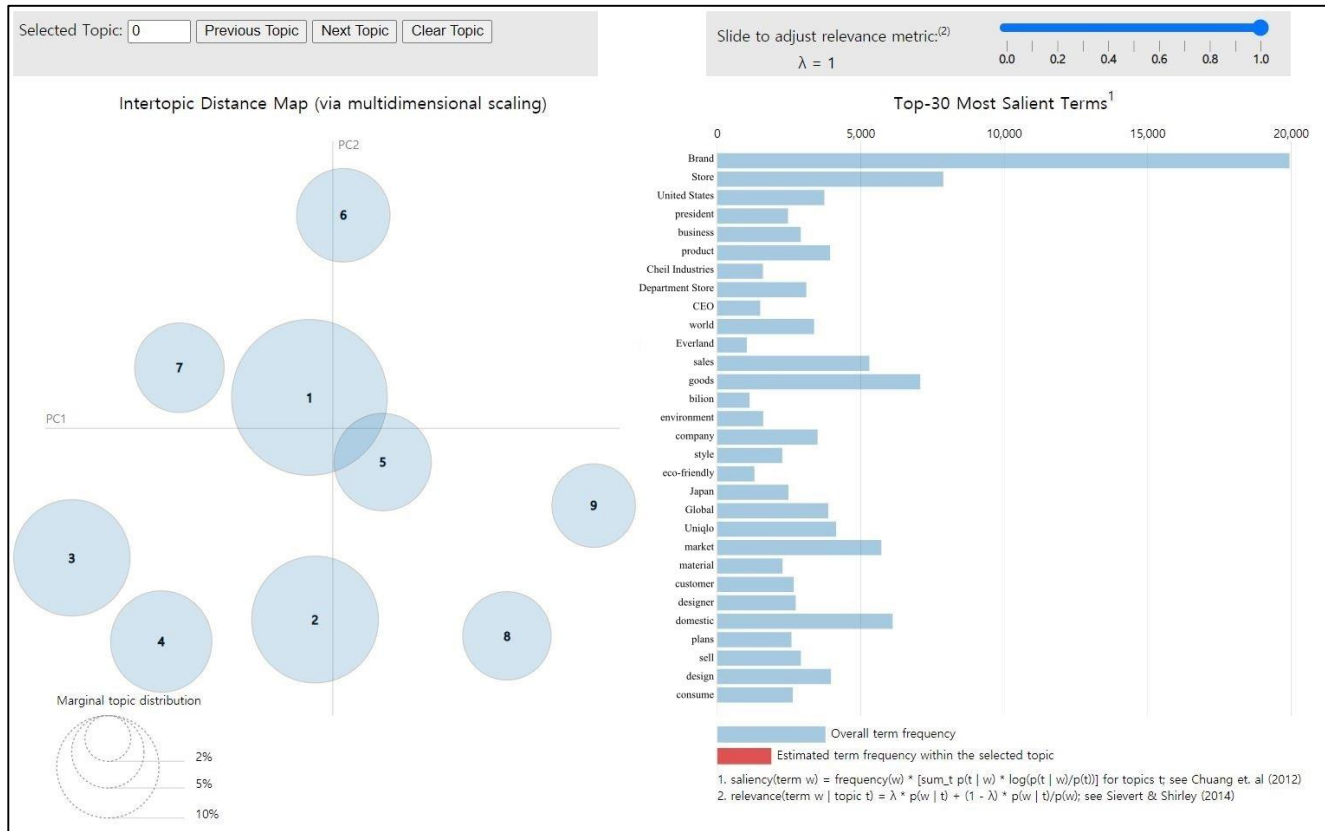


Figure 7: Topic Modelling Visualization Using the Package 'LDAvis'

4.4. Topic Network Analysis

In order to see the relationship between topics, network analysis derived through topic modelling was conducted. Through this, it shows the mutual influence of each topic. In the analysis result **Figure 7**, the size of the circle represents the contribution to the data in that topic, and the lines connected between topics indicate the degree of association (Kim & Rhee, 2016). Topic 4 (Brand Market), Topic 2 (Fashion Industry), and Topic 8 (Fashion Trend) are the influential topics of all fashion topics.

Table 2: Correlation between Topics and Centrality of Each Topic

Topic 1	Topic 2	Topic 3	Topic 4	Topic 5	Topic 6	Topic 7	Topic 8	Topic 9	Centrality	Topic
0.287	0.460	0.454	0.557	0.487	0.486	0.324	0.499	0.557	1392	4
0.277	0.382	0.391	0.499	0.369	0.460	0.299	0.486	0.458	743	8
0.266	0.324	0.382	0.487	0.245	0.451	0.277	0.458	0.404	707	2
0.221	0.315	0.345	0.454	0.242	0.404	0.250	0.314	0.391	581	9
0.164	0.314	0.250	0.451	0.224	0.345	0.224	0.245	0.369	505	5
0.160	0.302	0.242	0.315	0.211	0.224	0.198	0.240	0.302	502	3
0.150	0.287	0.240	0.299	0.198	0.211	0.190	0.189	0.190	492	6
0.101	0.224	0.221	0.266	0.164	0.160	0.189	0.101	0.150	479	7

0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	382	1
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Note: the numbers on grey color shades mean correlations to Topic 6 (Social Value)

Looking at the centrality figures that show the hub of topics, Topic 6 (Social Value) ranks seventh among the top nine topics at 492. This suggests that consumers are aware of the importance of social values such as slow fashion in the fashion consumer sector, but do not account for the largest portion of fashion consumer behavior. This suggests that consumers are aware of the importance of social values like slow fashion in the fashion consumer sector, but do not account for the largest portion of fashion consumer behavior.

On the other hand, topics about slow fashion are included in Topic 6 (Social Value), and if you look at Topic 6's status in terms of Topic linkage, you can see that despite its high ranking in linkage measure with some topics, the numbers of links with each topic generally do not rank high. This also suggests that consumption patterns in general, slow fashion has not completely transformed consumption patterns, and consumption patterns centered on needs of fast fashion are still dominant.

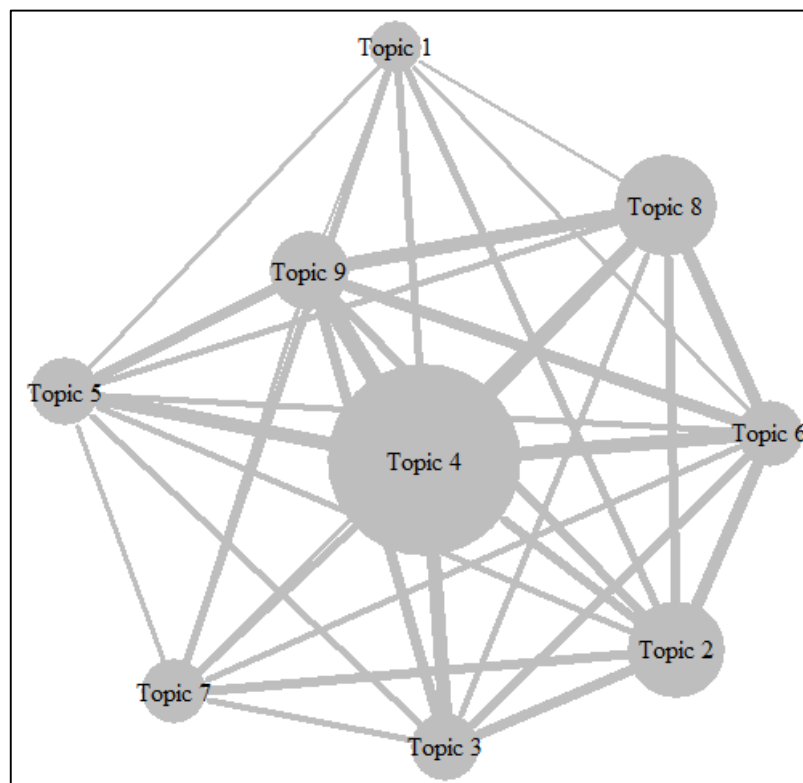


Figure 8: Topic Network between Topics

As a result, topic network analysis also provides fourth proof supporting the proposition that consumers show consumption behavior centered on fast fashion despite their perception of slow fashion. To sum up, the analysis results which were derived through four detailed review processes by applying topic modelling with unstructured textual data so far have supported the proposition presented in this article. Therefore, it can be concluded that the consumption behavior of consumers in the fashion sector controls the perception of the importance of slow fashion.

5. Discussion

5.1. Theoretical Implications

Fast fashion refers to either a fashion or fashion business that constantly reflects the latest trends in fashion, with relatively low prices and a fast product turnover. Fast fashion companies, e.g. Zara and H&M, typically release new products on a weekly basis. However, these companies are increasingly coming under fire, due to the finite and short lifespan of their clothing, which has an enormous negative impact on the environment. In fact, approximately 70 percent of disposed clothing and textiles is buried in landfill (Fletcher, 2008; Niinimäki, 2012).

In responding to this issue, the fashion industry is turning its attention to the emerging movement of “slow fashion”, which has long been little more than a buzzword. It has looked for solutions from two different angles—a design-driven approach from the supply side, aiming to extend product and material longevity (Goldsworthy, Earley, & Politowicz, 2018), and consumer-centred approach from the demand side, focusing on the customer’s emotional satisfaction, education and co-creation (Niinimäki, 2012; Pookulangaran & Shephard, 2013).

Given that slow fashion is still in its early phase (Pookulangaran & Shephard, 2013), it seems that current approaches are inadequate to achieve dramatic changes in thoughtless consumption. Therefore, in order to promote consumer appetite for slow fashion, the industry needs to undergo an entire paradigm shift to create a sustainable cycle of fashion trends.

The current approach that fashion designers are using to prolong consumers’ use of clothes is enjoying only partial success. Nevertheless, it seems difficult to satisfy the preferences of customers, with materialistic and consumerist tendencies, who seek novelty (Niinimäki, 2012; Pookulangaran & Shephard, 2013). One strategy currently taken by fashion designers and retailers is to extend not only product longevity but also material longevity (Goldsworthy, Earley, & Politowicz, 2018). Product longevity is achieved through design, by extending single-user lifetimes, enabling multiple-user lifetimes and involving production reconstruction and recycling. Meanwhile, material longevity concerns the recovery and reuse of materials (Goldsworthy, Earley, & Politowicz, 2018). These approaches have already been adopted by a large number of companies across Europe, such as Filippa K (Sweden), Tom Cridland (UK), Vigga (Denmark) and Recover (Spain) (Goldsworthy, Earley, & Politowicz, 2018).

Critics argue, however, that the impact of these design-driven approaches is limited due to their failure to offer sustainable satisfaction to customers who seek emotional satisfaction through a variety of sources, such as the functional value, empirical value and symbolic value of an item of clothing (Niinimäki, 2012). On this basis, Niinimäki (2012) suggested that the most effective approach to extend the lifetime of a product is to proactively design fashion with sustainable consumption in mind, offering customer’s emotional satisfaction in a sustainable way by design.

Although the proactive fashion design approach is a plausible alternative, the criteria value of consumer satisfaction is varied and constantly changing. In addition, the majority of consumers prioritise materialistic values, e.g. novelty, possession, social status and brand, over the environmental impact of a product (Wang & Wallendorf, 2006). Given this contradictory evidence, it is possible to predict that an approach based on product longevity and consumer satisfaction will only be effective in the short term.

Another strategy that fashion designers and retailers employ also has limited efficacy by itself. Companies are inducing shifts in consumers’ active roles in production, as well as consumption by educating consumers about the production process and informing them about the supply chain (Niinimäki, 2012; Pookulangaran & Shephard, 2013; Siegel, Burnside, Kester, Howes, & Robertson, 2012). This can reduce the information gap, resulting in greater transparency (Siegel, Burnside, Kester, Howes, & Robertson, 2012) and consumer awareness (Bhaduri & Ha-Brookshire, 2011). It is believed to amplify the symbolic value of the clothing, encouraging consumers to consider environmental and ethical concerns beyond simply instrumental or experienced value (Niinimäki, 2012).

Meanwhile, co-creation—the involving of consumers in the design or realisation process (Goldsworthy, Earley, & Politowicz, 2018)—is another option. For example, NOMO Jeans offers services that is available to choose color, details, cut of jeans (Niinimäki, 2012). Its aim is to create an emotional attachment between product and person through the sense of achievement (Niinimäki, 2012). However, it is noteworthy that Joergens (2006) and Pookulangaran and Shephard (2013) argues that price, quality and style have a greater bearing on purchase decisions even for consumers with a high level of awareness of ethical issues.

In the same vein, the reality is that consumers tend to care little about the environmental impact of their choices in contrast with the relatively greater attention given to the workers’ rights, e.g. the working conditions in the factories where their clothes are made (Perry, 2012). Thus, current strategies go some way to encourage consumers to change their consumption behaviour but they alone will not induce sufficient change to tackle the wider problems of the fast fashion trend.

5.2. Managerial Implications

The implications for fashion industry managers derived based on the results of this study are as follows. First, given the

failures of the current design-driven and the consumer-centred approaches in encouraging consumers to engage with fashion more sustainably, an entire paradigm shift is needed within the fashion industry. The viability of achieving sustainable consumption through current approaches is already stretched thin. Instead, changes must begin from within the system that creates fashion trends.

The first challenge is to extend the cycle of “color” trends. For instance, since 2000 the Pantone Color Institute has announced a “color of the year” each year. This creates color trends in clothing, accessories and shoes that are short-lived, since a new color is announced only one year later. There is a need to extend the length of the cycle over which Pantone declares its preferred color to avoid exacerbating the fast fashion trend. The second challenge is to extend the cycle of fashion collections. Fashion collections are designed and refreshed on a seasonal basis, which stimulates unnecessary consumption of clothes for consumers seeking novelty. Lengthening the duration of fashion collection cycles would decrease consumption and reduce the premature disposal of products (Niinimäki, 2012) and inventories.

If the two changes above were made within the industry, one would expect not only consequences within the fashion industry, such as a slowing down of the changes in trends and a lower sensitivity of consumers to fashion novelty, but also broader effects such as a reduction in the harm done to the environment, e.g. a decrease in CO₂ emissions (Goldsworthy, Earley, & Politowicz, 2018). In conclusion, to solve the problems caused by fast fashion, concerted action from both a design-driven perspective and a consumer-centred approach should be taken. However, it alone is not sufficient. Instead, the fashion industry needs to invest in a complete paradigm shift to moderate the length of the cycle of fashion trends, making trends themselves slow. Although these suggestions are radical and may not be a panacea for all problems arising from fast fashion, they may help us make some progress towards a solution, making the fashion industry more sustainable for all.

Second, despite consumers' perception of slow fashion, the fashion market still shows the movement of each brand through topic modelling. Both words and topics showed maximum frequency and centrality in the keyword and topic of 'brand'. This indicates that the brand strategy is a key factor in determining the competition in the fashion market, and it can also be easily integrated with other factors. In addition, although the level of connection with the current core topics is low, 'Social Value' is expected to have a greater relevance in the future with topics such as 'Fashion Trends' and 'Marketing'. Therefore, at the strategic level, companies should keep in mind that they need a sufficient understanding of brands, trends, and marketing, and can be used as an element that can lead new fashion trends in order to incorporate the social value of slow fashion into the fashion industry. As fashion companies such as Filippa K (Sweden), Tom Cridland (UK), Vigga (Denmark) and Recover (Spain) apply the social value of slow fashion to their brand strategy, there is a growing market for consumers to prefer eco-friendly products. While utilizing the fast fashion market for short-term survival, it is necessary to simultaneously pursue an exploration strategy to prepare for the slow fashion market, considering that consumer preferences in the fashion market can be strengthened toward slow fashion in the long term (March, 1991). In other words, in the future, when social values including slow fashion and ethics are combined, it is expected that consumers will have shown greater preference for the product. Therefore, when developing products or establishing future marketing strategies, companies need to focus on the general consumption pattern of fast fashion preferences in the short term, but to maintain consumer values such as slow fashion in the long term (Birkinshaw & Gibson, 2004; Tushman & O'Reilly, 1996).

6. Conclusion

In this study, fashion-related articles were extracted from Naver News and analyzed using topic modelling to see the perception of domestic slow fashion and actual consumption behavior. And we presented the suggestions based on the analysis results. As a result of the analysis, the word 'brand' appeared the most, and the topics derived were nine, including 'brands' market,' 'fashion industry,' 'fashion trend' and 'social value.' Among them, 'brand' and 'fashion industry' were two of the biggest topics. The topic of 'social value' was found to be in discourse, but less relevant to topics that showed great centrality despite their small connection to other topics. This shows that consumers' consumption behavior tends to meet their needs by taking into account brands, even though social values are of interest to consumers.

Despite the results of the above valuable research, this study has limitations that need to be supplemented in the future. First, web articles used as analysis data for this study were from newspapers affiliated with Naver, which mainly dealt with major newspapers and failed to crawl data extensively. In addition, the analysis includes unstructured text that reflects the ideological tendencies of particular newspapers, which fails to rule out the issue of bias. Second, the extracted textual data has some limitations in generalization because it had not completely eliminated the advertising data appearing simultaneously at the bottom of the article, even though it had performed a systematic preprocessing process. Therefore, it will be necessary to completely refine unnecessary data in future studies, resulting in more reliable analysis results. Third, on a methodological

level, this article shows the limitations of data collection due to not utilizing more professional data in terms of fully utilizing domestic newspaper articles on slow fashion. Comparing recognition levels between countries by using data from other countries for future research also extends the horizons of this study. Finally, although the period of the global financial crisis was included in the research period, the timing of slow fashion's intensive emergence as a major issue may be different. Thus, it fails to sample text around that time period, showing fundamental limitations. Methodically, further research needs to be carried out via the Dirichlet Multinomial Registration (DMR), which is being used to solve this problem.

These set of limitations are future research topics that need to be supplemented in the future. The understanding of the gap between consumers' perception of slow fashion and actual consumption behavior can only be complete if these alternative and complementary research topics are fully addressed. We hope that this study drive a series of future studies.

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