



Discovering fashion industry trends in the online news by applying text mining and time series regression analysis[☆]

Hyojung Kim, Minjung Park^{*}

Department of Fashion Industry, Ewha Womans University, 52, Ewhayeodae-gil, Seodaemun-gu, Seoul 03760, South Korea

ARTICLE INFO

Keywords:

Agenda-setting theory
Fashion industry news
Latent dirichlet allocation
Topic modeling
Time series regression analysis

ABSTRACT

The growth of digital media usage has accelerated the development of big data technology. According to the agenda-setting theory, news media inform the public regarding major agendas and business cycles. This study investigated 168,786 news documents from 2016 to 2020 related the South Korea fashion business using Python. A total of 19 topics were extracted through latent Dirichlet allocation and then transformed into structured data using a time series approach to analyze significant changes in trends. The results indicate that major fashion industry topics include business management strategies to increase sales, diversification of the retail structure, influence of CEOs, and merchandise marketing activities. Thereafter, statistically significant hot and cold topics were derived to identify the shifts in topic themes. This study expands the fashion business contexts with agenda-setting theory through big data time series analyses and can be referenced for the government agencies to support fashion industry policies.

1. Introduction

The emergence of digital networks and the growth of Internet media have led to a proliferation of online data. Moreover, big data analysis technology has become a major growth engine in the era of the Fourth Industrial Revolution. Many finance, business management, telecommunications, and medicine companies utilize big data technology to gain a competitive edge. The global big data market has grown from \$49 billion in 2019 to \$56 billion in 2020, an increase of 14.3% [1]. The Korean market is forecast to grow at an average annual rate of 11.2% and reach approximately KRW 2.56 trillion in 2023 [2]. According to an IBM report, unstructured data such as text, images, and videos comprised 93% of all data in 2020, with 1.7 MB of data generated every second [3]. Although the quantity of big data generated on the web is continuously growing, attempts to analyze it are limited due to the ambiguity in the language used online and the challenges of natural language processing.

Text mining is a big data analysis technique that involves discovering valuable information from vast quantities of data contained in natural language and analyzing it in digital form [4]. For example, unstructured text data comprising characters are collected when performing a natural language analysis of news articles, web posts, and e-mails through mathematical analysis and statistical algorithms. For instance, previous studies using text mining techniques in clothing science have analyzed online reviews of service experiences of companies that rent out fashion products [5], tracked changes in fashion designs based on the fashion-trend forecasting

[☆] This research is based on a doctoral dissertation of the first author. This work was supported by the Ministry of Education of the Republic of Korea and the National Research Foundation of Korea (NRF-2021S1A5A2A03071538).

^{*} Corresponding author.

E-mail addresses: maketrends@gmail.com (H. Kim), minjungpark@ewha.ac.kr (M. Park).

<https://doi.org/10.1016/j.heliyon.2023.e18048>

Received 30 November 2022; Received in revised form 30 June 2023; Accepted 5 July 2023

Available online 13 July 2023

2405-8440/© 2023 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

news information over 10 years [6], and used text mining to classify topics on sustainable fashion based on magazine articles [7].

Fashion journalism plays a pivotal role in providing the public with information on the most recent fashion industry issues. According to the agenda-setting theory, which explains the empowerment of the media, news reports make information recipients aware of the significant messages [8–10]. The news media emphasizes main issues, making readers aware of the industry trends in that field [11]. In Korea, fashion companies' information began to be reported in the mid-1990s; since then, agencies have specialized in fashion trend information after companies and consumers have recognized the importance of fashion business information [12]. Recently, the development of Internet technology has led to the spread of fashion industry news, and major news coverage displays its social significance to the public [13]. Despite the importance of news as an indicator to detect the current business trends, no prior studies have systematically identified fashion industry-related news agendas and trend changes. Previous studies on fashion-related news have mainly focused on fashion journalism, analyzing a few select news articles. Kim and Han [14] discussed the role of professional fashion media, while Lee et al. [15] researched the opinions on Korean fashion in overseas fashion daily newspapers. Concerning studies about fashion magazines, Bailey and Seock [16] discovered the positive relationship between the article contents and consumer loyalty, and Yang and Kim [17] discussed the competition between the fashion media platforms. Thus, it is necessary to conduct a large-scale text analysis focusing on the recent fashion industry news using big data techniques.

To fill this research gap, we explored the major agendas and changes in yearly trends of the domestic fashion industry news articles from the economic and business management media coverage. Specifically, this study performed a latent Dirichlet allocation (LDA) topic modeling and time series regression analysis on the news data, which was obtained by searching for the keyword “fashion” on an online portal over the past five years (2016–2020). The findings of this study may provide a theoretical basis for the media effect in fashion business literature in respect of agenda-setting theory [18,19]. Additionally, they can serve as a reference for relevant government agencies to formulate fashion industry policies by examining the current fashion business trends.

2. Literature review

2.1. Fashion industry news

The fashion industry refers to the diverse aspects of businesses and people involved in the industrial systems for producing, distributing, retailing, and consuming products [20]. It encompasses a wide spectrum related to beauty and accessories, as many fashion brands' products contain fashion merchandise and lifestyle products. According to the Korea Federation of Textile Industries [21], the domestic fashion industry continues to grow significantly and currently accounts for one-tenth of all domestic industries. In the digital era, the fashion industry has transformed from its previous structure, and the roles of the textile, clothing manufacturing, distribution, and consumption industries have become organically interconnected [22]. Consequently, fashion industry news enables corporations and people to exchange useful information and create a collaborative system across multiple levels of the industry. It is also useful for companies to understand social changes and policies based on the national economy and establish management strategies suited for future international circumstances. Yun [23] indicated that domestic and international conditions widely influence the fashion industry because they involve consumer goods sensitive to changes in the social structure and economic conditions. For instance, the domestic fashion industry in Korea recorded exports worth USD 11.2 billion in 2021, down by 13.3% from the previous year, due to the influence of the coronavirus disease (COVID-19) pandemic [24], while approximately 7,000 Korean fashion distribution stores went out of business during the global financial crisis of 2008 [25]. To help overcome these challenges, companies have devised management strategies such as creating small-scale production systems or diversifying their distribution channels based on news about rapidly changing domestic and foreign situations.

Coverage of fashion industry news in South Korea began to diversify and expand in the mid-1990s with the publication of overseas fashion magazines, such as WWD (www.wwd.com), Harper's Bazaar (www.harpersbazaar.com), and Vogue (www.vogue.com), under license agreements with the parent companies in the US (Kim & Kim, 2010). Mass media news concerning the fashion industry affects the reviewer's perception of the company's reputation and creates important agendas in fashion business management [10]. Some scholars have noted that the content of media reports is a major antecedent variable in economic agents' decisions [26–28] and that the perspective on issues reported in the news creates the public agenda, reflecting the media's influence [29]. Therefore, fashion industry news releases may cause changes in industry trends by shaping the psychological orientation of the readers through media reports [30].

Several studies have attempted to examine fashion industry news, mainly focusing on fashion magazine content and journalism values. Titton [31] investigated the cultural relationship between the fashion industry and fashion media from the 19th century to the present, while Lee and Chun [32] analyzed online fashion media news and classified the values of fashion news based on the key factors of expertise, social importance, timeliness, conflict, and negativity. In the fashion trends context, Jang and Kim [6] discovered that the fashion material term “functional” was the main trend in fashion textiles between 2010 and 2019. Roozen and Raedts [33] demonstrated that news articles about environmental issues negatively impacted fast fashion consumers' attitudes. However, few studies have systematically identified the latest fashion industry news through the text mining technique. Using this technique, this study derived the major agendas and closely examined changes in yearly trends, using fashion industry news reported in economic and business management media over the past five years (2016–2020).

2.2. Agenda-setting theory

Agenda-setting theory assumes that issues reported in the media are transferred to information recipients and contribute to setting

the public agenda [18,19]. Lippmann [34] explained that mass media served as a medium between the images in the public's minds and the outside world. Cohen [35] claimed that the media provided consumers with the topics they should recognize. Additionally, many scholars [11,36,37] developed the theoretical structure of the agenda-setting theory to emphasize the empowerment of the news media on the issues of the public agenda. Consequently, the readers become interested in topics emphasized by the professional media and their attributes, which are highlighted in the public agenda again [38]. Although the news may be a public issue, certain attributes of the keywords forming the news may be predominated or discussed in relation to other topics. Hence, the content of news reported by the media becomes a factor that shapes public opinion and judgment on which cases to concentrate on [39]. Additionally, the usage of portable devices such as smartphones, tablet computers, and laptops has become extremely common in recent years. Hence, traditional news media mainly distribute daily reports through online portals. As Internet portal sites use networks open to the public, they are easily accessible and help information spread rapidly. As a result, the online news from Internet portal sites occupies a large scale of news consumption in the market. Consumers have become accustomed to obtaining information from online portal articles, making the influence of online news even stronger [40].

Previous scholars [41,42] found that the issues reported by the media were transferred to the awareness of news recipients and forged the public's perspectives on which cases to focus on, creating trends in certain industries. Boukes et al. [18] reviewed consumers' confidence based on the tone of economic news articles and recognized that media effects related to the social attributes of news impacted consumer confidence. Jin and Yoo [43] analyzed the causal relationship between news reports about companies and consumer behavioral intentions. They reported that negative news regarding a company's product deception lowered consumers' product attitudes and purchase intentions. Conversely, Luo et al. [44] explained that economic agents such as business managers and consumers primarily relied on media reports because it was hard for them to identify the industry-specific situation through direct experience. Many findings [26, 45, 46] have demonstrated that a negative tone in the media on corporate crises adversely impacts the perception and attitude of news recipients.

Based on the above discussions about the agenda-setting theory and media influence [18,47,48], it would be meaningful to explore the socially formed agendas and changes in the trends of the fashion industry through the online news reported by professional media outlets. Accordingly, this study sought to investigate the keywords and topics of the domestic fashion industry using the LDA topic modeling technique.

2.3. Text mining analysis and LDA topic modeling

Text mining analyzes large quantities of unstructured text data to extract useful information for a specific purpose [49]. Specifically, text data are collected based on natural language processing, which analyzes human language through computer programs, and useful information is, in turn, derived using a variety of mathematical analyses and statistical algorithms. This enables researchers to uncover information such as unknown correlations, customer preferences, and market trends that help businesses make decisions. Additionally, text mining analysis helps supplement the limitations of statistical data obtained from structured questionnaires by eliminating researchers' prejudices [5]. According to Ref. [50], the text mining market is forecast to grow continuously and reach USD 16.85 billion by 2027. The most recent text mining techniques integrate methods from the diverse academic fields of linguistics, computer science, and statistics.

Topic modeling is an unsupervised learning algorithm that gathers keywords and documents with similar topics based on words in large text data, if the major topics have a probabilistic distribution [51]. LDA topic modeling uses a probabilistic algorithm suitable for analyzing large quantities of digital data in science research [52]. Specifically, assuming a Dirichlet distribution in which a topic hierarchy exists between words appearing in a document, the distribution of words in each document is probabilistically calculated to create a model. This technique is primarily used to derive key topics from within the text of the mined information, such as media news and research trends [53], social network posts [5], and policy-related issue analysis [54]. Jang and Kim [53] used an LDA algorithm to uncover major research subjects in domestic fashion design journals, while Kim [55] identified trends in athleisure fashion through topic modeling of news articles over 2018–2020 by identifying searches involving anorak fashion keywords. Choi and Lee [56] examined the current state of research on ethical consumption in fashion journals and derived the issues of animal protection, distribution, and convergence with science and technology. Furthermore, several studies [5, 52, 55, 57, 58] have demonstrated media empowerment through news report analysis using an LDA algorithm to extract key topics.

Based on Gow et al. [59], unsupervised learning was found to be useful in identifying potential information without relying on existing models. Given the limited research on text mining fashion industry news, accurate topic classification information was essential. We assumed that LDA topic modeling was a suitable approach for processing extensive documentation of news data and classifying similar words within the corpus. Moreover, we adopted the time series regression method to achieve statistically significant topic trend changes. Accordingly, this study proposed the following research questions:

RQ 1. What are the major topics in fashion industry news over the last 5 years (2016–2020)?

RQ 2. How do the trends in each topic change, and what are the statistically significant hot (upward) topics and cold (downward) topics?

3. Methods

3.1. Data collection

We collected the news data from Naver (<http://news.naver.com>), which has the greatest influence on online news distribution in South Korea, accounting for 41.6% of domestic portal news usage [60]. The Python library BeautifulSoup was utilized to scrap and parse content data from the website. To minimize the likelihood of missing or returned articles, we divided each year into 3-month intervals during the web crawling process. Therefore, we collected a total of 969,059 articles from 470 media outlets.

The scope of data collection included news containing the keyword “fashion” and published between January 1, 2016, and December 31, 2020, through web crawling. We referred to the five-year unit to select the data period because it is used in prior studies on domestic and overseas industrial trends and social science surveys [61,62]. The search term “fashion” was chosen for the news articles as it included the comprehensive clothing industry sector; clothes, makeup, hairstyles, and accessories [63]. Moreover, major fashion companies, such as Handsome, LF Corp., and F&F Co., Ltd. Provide a wide range of products under “fashion” categories.

3.2. Refining and cleansing data

In this study, it was necessary to exclude news content on design and style unrelated to the fashion industry from the analysis. Consequently, we selected 53 media outlets specializing in economics and business from among the Naver finance affiliates (<https://finance.naver.com/news/>), leaving 169,879 news documents. Additionally, articles with only photos and a title but no main text, promotional content, and duplicate articles were removed because they did not meet the purpose of the analysis. Consequently, 168,768 news documents were left for the final analysis. Subsequently, we extracted nouns using a morpheme analysis package KoNLPy (Korean Natural Language Processing in Python) to preprocess the data and cleanse it, to remove unnecessary content for analysis. We extracted only nouns from the data because topics are represented effectively through nouns [64], whereas adjectives [65], verbs [66], and adverbs [67] are more associated with sentimental analysis, rather than topic modeling [170, 171, 172]. Finally, words appearing in at least 80% of the documents and words derived from less than five documents were excluded from the analysis because they would not significantly influence the identification of topics [63].

3.3. Measurement and research process

According to Ref. [68], a term frequency (TF) implies the total number of times a word appears in the documents, while a TF-inverse document frequency (TF-IDF) reflects a word’s importance in a corpus. Equation (1) states, “TF” represents the occurrence frequency of a specific term (i) in a document (j) among the total number of documents (N), “DF (document frequency)” indicates in how many documents (j) a term (i) appears, and “IDF (inverse document frequency)” is obtained by dividing the total number of documents (N) by the document frequency (DF) of a specific term (i) and then taking the log [68]. The more frequently a specific word appears in all documents, the smaller the IDF (Equation (1)). A large “DF” value may indicate that the word appears multiple times in other documents, lowering its importance; therefore, the importance of terms appearing in all documents should be determined using both TF and TF-IDF [69]:

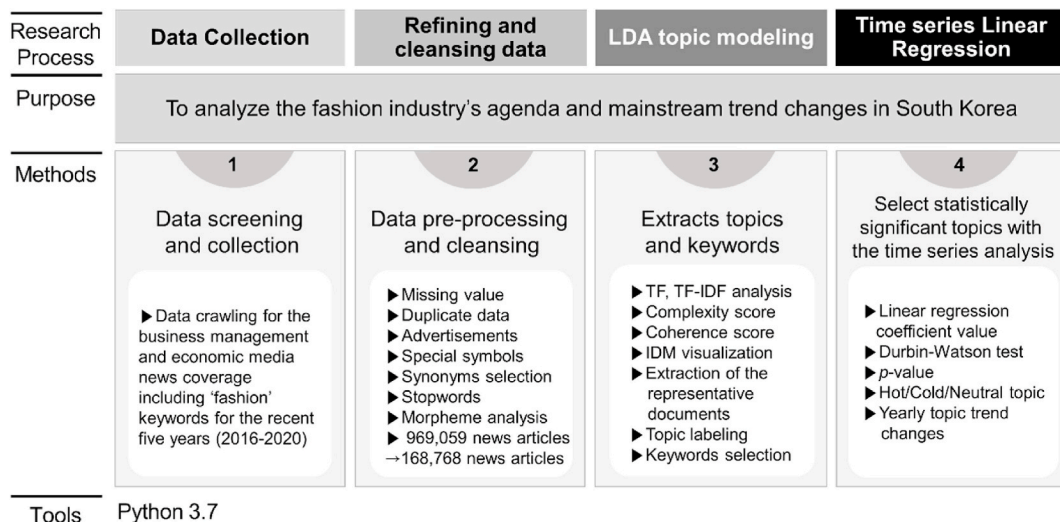


Fig. 1. The research data processing flowchart.

$$TF - IDF_{i,j} = TF_{i,j} \times \log \left(\frac{N}{df_i} \right) \tag{1}$$

High-frequency words were classified through TF and TF-IDF analysis to select the substantial keywords in the text documents. The perplexity and coherence scores [70] were classified as quantitative information indicators for the optimized number of topics. Using an inter-topic distance map [71], the relationships between topics were visualized and examined. Later, five experts from the fashion business management field verified the subjects and keywords of each topic, based on the ratio and weight of the topics derived through the LDA algorithm. Finally, hot topics and cold topics were derived based on the statistical indicators of the regression coefficient value, Durbin–Watson value, and significance probability to identify trends in the fashion industry by year [72]. The programming language Python 3.7 (<http://www.python.org>) was used for data collection and analysis. Fig. 1 shows the detailed data analysis process of this study.

4. Results

4.1. TF and TF-IDF analysis results

According to the TF frequency analysis, 837 keywords appeared at least 10 times, and “brand” appeared the most frequently. This was followed by “brand,” “Seoul,” “beauty,” “business,” “enterprise,” “event,” “South Korea,” “Lotte Department Store,” “product,” and “release.” This indicates that the news reports were mainly focused on product launches and retailing distribution of the fashion as well as cosmetic products. Regarding the TF-IDF analysis results, the term “brand” appeared most frequently, followed by “Seoul,” “beauty,” “Lotte Department Store,” “business,” “South Korea,” “event,” “enterprise,” “Seoul Fashion Week,” and “product.” This indicates that news articles on the business aspects of domestic fashion and cosmetics companies had high importance among all the documents. Table 1 shows the detailed TF and TF-IDF analysis results.

4.2. Selecting the optimized number of topics

In big data research and LDA topic modeling analysis, selecting the optimized number of topics is important to maintain objectivity and secure numerical validity in probabilistic modeling. The number of topics was selected based on the perplexity score [73] and coherence score [70] as the quantitative information indicators to exclude the subjective judgment of the researcher. In general, topic modeling becomes more stable, and each topic consistently constitutes a clear subject when the perplexity score decreases [74], whereas the coherence score increases [75,76]. The number of topic options was narrowed down to 16, 17, 18, and 19 based on their low perplexity and high coherence scores (Fig. 2). Each topic option was separately analyzed using relevant keywords and tested for its occurrence in all the web-crawled documents. Consequently, 19 optimized topics were selected, which fulfilled the specific objectives of this study through the inclusion of a concrete selection of pertinent keywords.

We applied the Gensim Python library, which is useful in fast indexing of documentation for large-scale unsupervised topic modeling to discover the LDA implementation. In addition, the interactive visualization pyLDAvis package through an inter-topic distance map (IDM) was used to confirm and examine whether the topics are mutually correlated. According to Ref. [71], IDM ranks topics according to the relevance and importance of topics and words; it is possible to identify the relationship between topics

Table 1
Results of the term frequency and term frequency - inverse document frequency (N = 837).

Rank	Word	TF	Word	TF-IDF	Rank	Word	TF	Word	TF-IDF
1	Brand	55,470	brand	80008.171	16	shopping	10,958	retail	32620.576
2	Seoul	29,861	Seoul	69771.920	17	store	10,309	Handsome	32413.689
3	beauty	18,297	beauty	46127.215	18	Shinsegae	10,198	the United states	32358.227
4	business	14,810	Lotte Department Store	44562.069	19	cosmetics	9,787	market	32340.820
5	enterprise	14,071	business	41849.120	20	China	9,702	sales	30672.016
6	event	14,025	South Korea	38273.993	21	beauty	9,598	platform	30503.818
7	South Korea	13,877	event	38152.397	22	luxury	9,438	investment	30284.268
8	Lotte Department Store	13,795	enterprise	38126.418	23	Hyundai Department Store	9,184	launching	29687.435
9	product	13,130	Seoul Fashion Week	37885.174	24	Dongdaemun	8,949	E-Land Group	29278.913
10	release	12,380	product	35859.060	25	duty free shop	8,881	Samsung Electronics Co., Ltd.	29094.929
11	economy	12,098	release	35175.941	26	home shopping	8,699	entrepreneur	28296.524
12	online	11,571	economy	34398.045	27	Asia	8,329	performance	26059.576
13	Seoul Fashion Week	11,559	online	33948.906	28	shopping center	7,973	take over	25664.303
14	global	11,276	Samsung C&T	33826.327	29	collaboration	7,591	profit	25067.714
15	fashion show	11,182	fashion show	33488.146	30	CEO	7,317	entrepreneur	23057.120

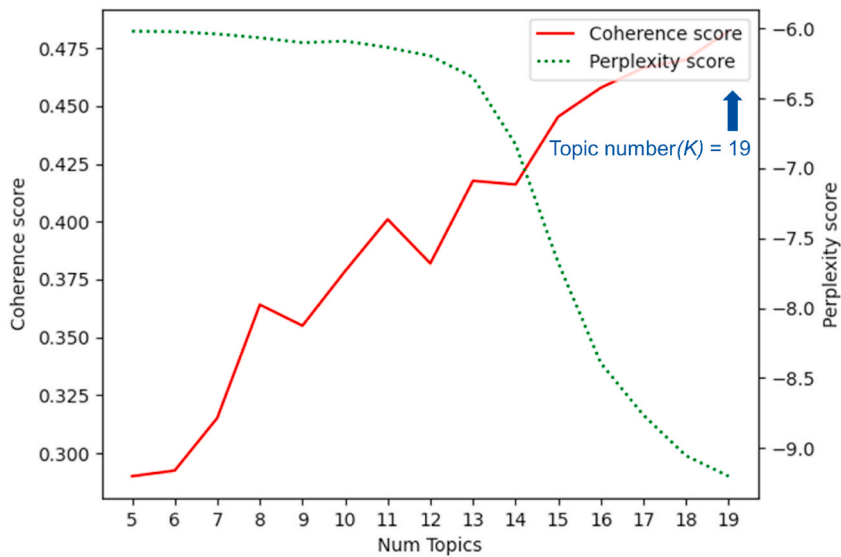


Fig. 2. The interpretability of topic modeling.

and words in document materials. We were able to identify and rank the keywords appearing in the topics compared to the frequency of keywords that appeared in all the documents, as each topic was divided into relatively clear subject areas (Fig. 3).

4.3. Topic selection and labeling

The subjects of topics derived from LDA topic modeling should be carefully determined after the researcher’s comprehensive reviews of the keywords, representative document contents, and topic ratio and weight [58]. A high topic ratio and weight in each text

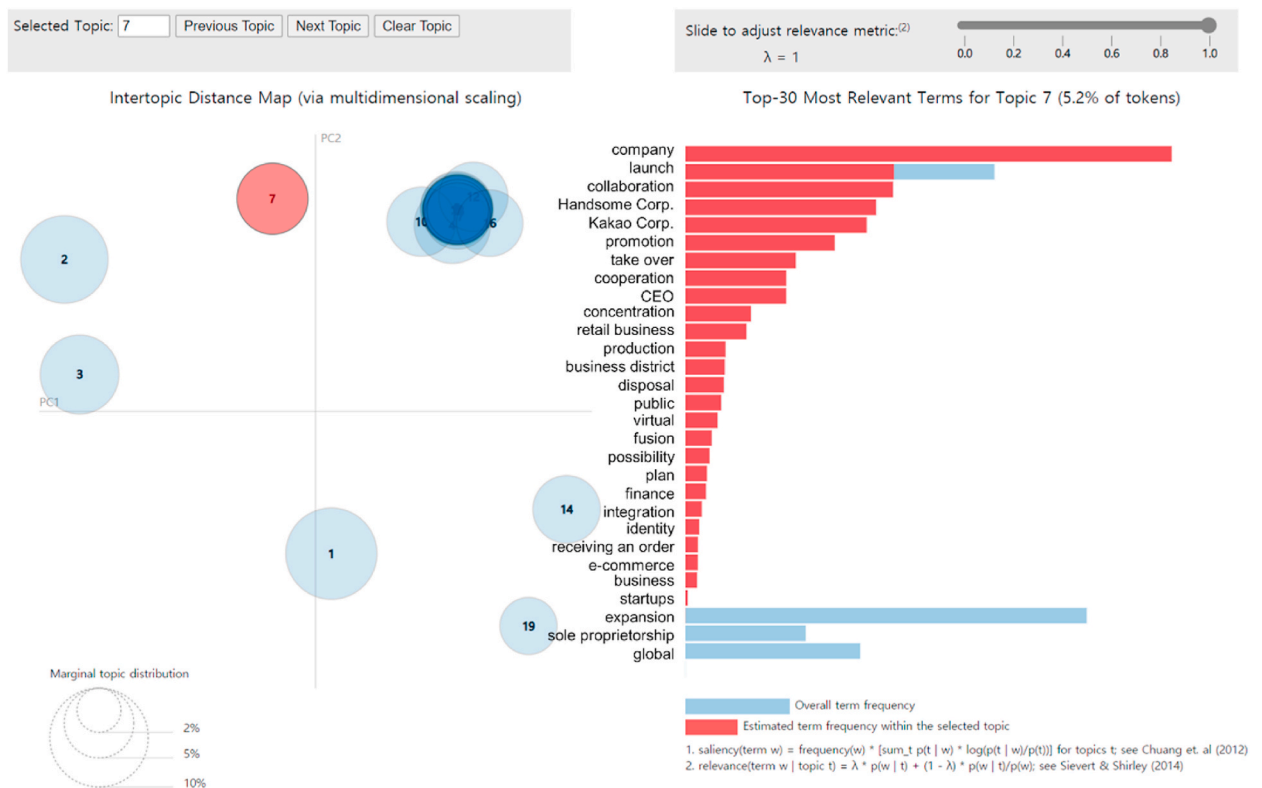


Fig. 3. Intertopic distance map (IDM) of fashion industry news LDA topic modeling.

document signify that the certain topic’s probability value is substantially contained. Hence, it is necessary to perform a qualitative analysis by closely reading the documents with high topic weight sequentially when selecting subjects. Accordingly, a panel of five fashion industry experts collaborated to review the news content and its associated keywords. Subsequently, the panel conducted a meticulous analysis of the news article titles and content, utilizing representative documents results containing the topic ratio and weight in descending order. Therefore, a total of 19 distinctive topic subjects were derived from contents analysis with reference to the high topic index (Table 2). The top 15 keywords, according to the results of numerical validity, are shown in the word cloud, and the topic categorizations are presented in Table 3.

The representative document’s contents derived for [Topic 1] “Real estate investment development,” were highly related to “Shinsegae Department store draws a new blueprint from advertising, cosmetics, and real estate rental” [77], “LF Corp., food-real estate diversification prospects?” [78], and “SG Corp., real estate value exceeds the market cap, ‘emphasis on asset stocks’” [79]. This shows that companies are shifting from a single, fashion-focused aspect to business diversification by expanding the retail distribution network through real estate investment.

[Topic 2] “Brand collaboration” was related to “Lotte Department Store begins first collaboration experiment with social media brand” [80], “From private brand to collaboration’ ... Department stores and hotels must adapt to survive!” [81], and “Tony Moly launches collaboration collection with luxury brand ‘Moschino’” [82]. This result indicates that fashion companies focus on sales growth and strengthening brand positioning by creating various products through collaboration strategies.

[Topic 3] “Financial performance evaluation”: “Kolon Industries highlight 4Q performance improvement” [83], “Lotte Department Store boosts ‘AI’ retail competitiveness” [84], and “Hyundai Department Store’s business continues with sluggish performance in 3Q” [85]. This content implied that articles were reported wherein fashion companies strengthened their sales strategies by applying technologies such as artificial intelligence due to sales performance evaluation.

[Topic 4] “Pop-up store”: “LF Corp.’s Hazzys opens pop-up store in Marais district of Paris to ‘raise global status’” [86], “‘Gentle Monster’ opens flagship store in New York and enters global fashion industry” [87], and “Kolon FnC’s brand ‘Record’ opens pop-up stores in 3 European cities” [83]. This indicates that fashion companies are broadening their consumer base by expanding their brands’ retail networks using domestic and overseas pop-up stores.

[Topic 5] “Collection launch”: “FILA Holdings Corp. Launches limited edition of ‘Fur Slide’ presented at New York Fashion Week” [88], “Sejung Group’s ‘Didier Dubot’ launches ‘Signature D collection’” [89], and “Catch the faster fashion cycle ... Fashion industry launches capsule collections one after another” [90]. This signifies that companies launch capsule collections reflecting the latest trends and establish e-platforms to increase sales.

[Topic 6] “Sales growth”: “Hansae Co., Ltd. reaches sales of KRW 360.5 billion in the Q1, 12.2% increased” [91], “Lotte Department Store’s fashion business division spin-off, achieve KRW 1 trillion in sales by 2022” [92], and “F&F Co., Ltd. stocks remain to ‘buying,’ sales expected to grow next year thanks to favorable MLB in China” [93]. Therefore, based on the extracted contents, we expected fashion companies’ sales growth gains to impact the management evaluation and stock returns.

[Topic 7] “Corporate mergers and acquisitions”: “Fashion and beauty industry in stagnation; the breakthrough solution is mergers and acquisitions” [94], “Kakao Corp. invested KRW 2 trillion in mergers and acquisitions last year due to the infinite love of contents business” [95], and “Fashion company LF Corp. joins in taking over Skinfood Co., Ltd.” [96]. This signifies that fashion companies are expanding into diverse business areas such as beauty, content, and food service through mergers and acquisitions, gradually transforming into complete lifestyle brands.

[Topic 8] “CEO’s business management policy”: “Lotte Corp.’s Chairman Dong-bin Shin, ‘Be professional like Hitachi, Aeon, and Uniqlo’” [97], “Fashion rivals, Samsung C&T Corp.’s President Seo-hyun Lee vs. LF Corp.’s Chairman Bon-geol Koo ... ‘Obsessed with new business’” [98], and “Fashion Group Hyungji’s CEO Byeong-oh Choi, ‘We will achieve mutual growth with agencies by reinforcing

Table 2
Document number, representative document, topic per contribution, weight, and date of Topic 7 & 9.

Topic #	Document #	Title	Topic Percent Contribution	Weight	Date
[Topic 7] Corporate mergers and acquisitions	120946	Jeong Ji-sun’s mergers and acquisitions Handsome Corp., 8 years of acquisition ‘cash cow’	.623	3.351	20200224
	121137	Handsome Corp. invests 203.3 billion won in Hyundai G&F, and aims to acquire SK Networks’ fashion division	.479	3.208	20170224
	121167	LF Corp. completed the acquisition of Koramco Reits Management and Trust Co., Ltd.	.460	3.189	20181122
	124456	50.74% stake, 189.9 billion won F&F Co., Ltd. acquires Duvetica, High-end padding market targeting	.322	.321	20180508

[Topic 9] Cosmetic business expansion	133524	The CEO of LF Corp. said “We will release men’s cosmetics this year and women’s cosmetics next year”	.479	.479	20180323
	132414	Fashion company’s reasonable affair... make their own cosmetics	.479	3.207	20170716
	133923	Handsome Corp. enters the cosmetics business...“Targeting into the premium cosmetics market”.	.460	.460	20180723
	131311	Cosmetic company that makes inroads into beauty devices...the fashion company that recommends cosmetics foundations	.389	3.745	20190617

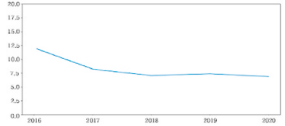
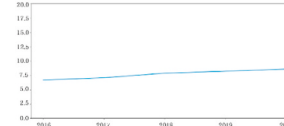
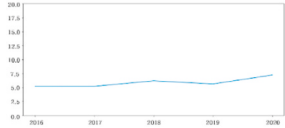
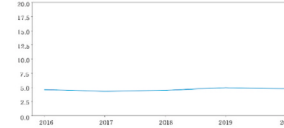
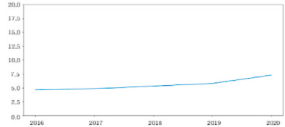
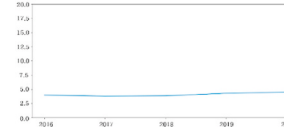
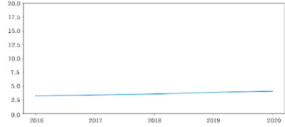
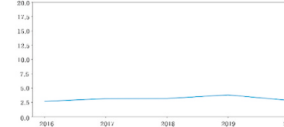
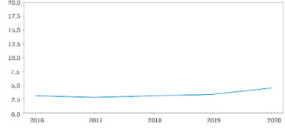
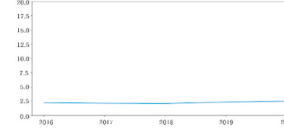
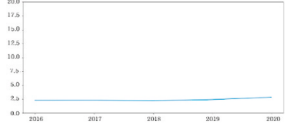
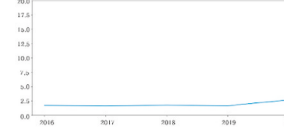
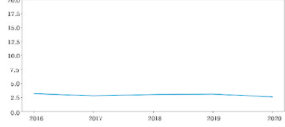
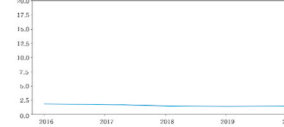
Table 3
LDA topic modeling analysis of fashion industry news in South Korea (2016–2020).

<p>[Topic 1] Real estate investment development</p>	<p>[Topic 2] Brand collaboration</p>	<p>[Topic 3] Financial performance evaluation</p>	<p>[Topic 4] Pop-up store</p>
<p>[Topic 5] Collection launch</p>	<p>[Topic 6] Sales growth</p>	<p>[Topic 7] Corporate mergers and acquisitions</p>	<p>[Topic 8] CEO's business management policy</p>
<p>[Topic 9] Cosmetics business expansion</p>	<p>[Topic 10] Financial structure improvement and divestiture</p>	<p>[Topic 11] Global investment</p>	<p>[Topic 12] Increase of online retail platforms</p>
<p>[Topic 13] Culture marketing</p>	<p>[Topic 14] Global fashion business vitalization</p>	<p>[Topic 15] Samsung C&T Corp.'s fashion division and Samsung Electronics Co., Ltd.</p>	<p>[Topic 16] Entry into the Chinese fashion market</p>
<p>[Topic 17] Fashion week and trade show</p>	<p>[Topic 18] Digital innovation</p>	<p>[Topic 19] Strengthening store operation</p>	

Note: Topic categories

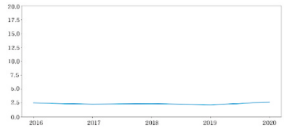
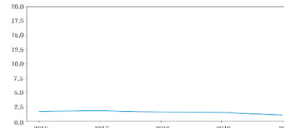
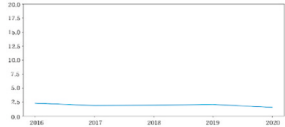

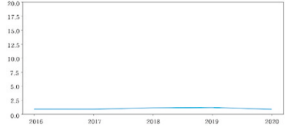
Business management strategies to increase sales	Diversification of the retail structure
The Influence of the CEOs	Merchandise planning and marketing activities

Table 4
Result of the topic trend change after time series regression analysis.

Topic	Graph	Statistical indicator	Topic	Graph	Statistical indicator
[Topic 1] Real estate investment development		coefficient -2.417 p-value .018 Durbin-Watson 1.778 hot/cold/neutral cold	[Topic 2] Brand collaboration		coefficient .501 p-value .001 Durbin-Watson 2.381 hot/cold/neutral hot
[Topic 3] Financial performance evaluation		Coefficient .445 p-value .080 Durbin-Watson 3.187 hot/cold/neutral neutral	[Topic 4] Pop-up store		coefficient .093 p-value .304 Durbin-Watson 2.510 hot/cold/neutral neutral
[Topic 5] Collection launch		coefficient .617 p-value .021 Durbin-Watson 1.750 hot/cold/neutral hot	[Topic 6] Sales growth		coefficient .153 p-value .111 Durbin-Watson 1.684 hot/cold/neutral neutral
[Topic 7] Corporate mergers and acquisitions		coefficient .217 p-value .001 Durbin-Watson 2.388 hot/cold/neutral hot	[Topic 8] CEO's business management policy		coefficient .097 p-value .555 Durbin-Watson 2.394 hot/cold/neutral neutral
[Topic 9] Cosmetics business expansion		coefficient .335 p-value .102 Durbin-Watson 1.679 hot/cold/neutral neutral	[Topic 10] Financial structure improvement and divestiture		coefficient .078 p-value .172 Durbin-Watson 1.489 hot/cold/neutral neutral
[Topic 11] Global investment		coefficient .127 p-value .114 Durbin-Watson 1.491 hot/cold/neutral neutral	[Topic 12] Increase of online retail platforms		coefficient .187 p-value .202 Durbin-Watson 2.120 hot/cold/neutral neutral
[Topic 13] Culture marketing		coefficient -.080 p-value .322 Durbin-Watson 2.523 hot/cold/neutral neutral	[Topic 14] Global fashion business vitalization		coefficient -.102 p-value .037 Durbin-Watson 1.761 hot/cold/neutral cold

(continued on next page)

Table 4 (continued)

Topic	Graph	Statistical indicator	Topic	Graph	Statistical indicator
[Topic 15] Samsung C&T Corp.'s fashion division and Samsung Electronics Co., Ltd.		coefficient .019 p-value .807 Durbin-Watson 2.39 hot/cold/neutral neutral	[Topic 16] Entry into the Chinese fashion market entry		coefficient -.162 p-value .049 Durbin-Watson 2.188 hot/cold/neutral cold
[Topic 17] Fashion week and trade show		coefficient -.125 p-value .144 Durbin-Watson 2.604 hot/cold/neutral neutral	[Topic 18] Digital innovation		coefficient -.007 p-value .697 Durbin-Watson 1.825 hot/cold/neutral neutral
[Topic 19] Strengthening store operation		coefficient .026 p-value .660 Durbin-Watson 1.952 hot/cold/neutral neutral			

on-site management” [99]. This suggests that the management policies pursued by the CEO of a company can become a turning point in determining the long-term business direction.

[Topic 9] “Cosmetics business expansion”: “Shinsegae International Inc’s stock price is expected to be rising, new cosmetic brands continue to launch” [100], “Run with K-beauty ... fashion industry hurries to start cosmetics business” [101], and “Everyone challenging the beauty market, will ‘J. ESTINA Beauty’ succeed?” [102]. This implies that fashion companies are launching new cosmetic brands due to K-beauty’s overseas success and the cosmetic market’s high sales profitability [103].

[Topic 10] “Financial structure improvement and divestiture”: “E-Land Group improves financial structure, ‘KRW 1 trillion sales of ‘Teenie Weenie’” [104], “SG Corp. completes KRW 70 billion asset sale...Improved financial structure,” [105], and “SK Networks Co. Ltd. sells ‘fashion business division’ to Hyundai Department Store Group” [106]. This indicates that fashion companies are concentrating on improving their financial structure by enhancing asset management efficiency, and by selling brands to supplement operating losses.

[Topic 11] “Global investment”: “E-Land Group attracts investment in Chinese children’s clothing” [107], “SK Networks Co., Ltd. to expand global investment” [108], and “Fashion startups attract large-scale investments” [109]. This demonstrates that fashion corporations are building new overseas production systems and strengthening new businesses with competitive technologies.

[Topic 12] “Increase of online retail platforms”: “‘Target online shoppers’ ... Fashion industry actively expands overseas through online platforms” [110], “Golden age of ‘online only’ and ‘online first’ products” [111], and “Online retailing decides success or failure of fashion company’s inventory management in the first half” [112]. This shows that the surge in demand for Internet shopping malls and other contactless sales has created online-centered consumption patterns, such as mobile shopping and live-streaming commerce.

[Topic 13] “Culture marketing”: “Fashion industry broadens customer touch points through cultural experiential marketing” [113], “Sports and fashion companies ‘strengthen’ their relationship with consumers through experiential and cultural marketing” [114], and “Catch social media influencers, big players in the distribution industry” [115]. This indicates that recently, fashion companies have started to promote cultural marketing strategies that reflect customers’ lifestyles, compared to traditional promotional methods using famous models or advertising the main products.

[Topic 14] “Global fashion business vitalization”: “LF Corp.’s ‘Hazzys’ opens pop-up store in Marais district of Paris to ‘raise global status.’” [116], “Hyundai Home Shopping’s ‘J BY’ participating in US fashion trade show...Beginning of entry into global fashion market” [117], and “This is Korean upcycling; Kolon FnC’s brand ‘Records’ enters France market” [118]. This demonstrates that entering the overseas market offers the opportunity to test the global market’s growth prospects for the new brands and helps to earn export profits for mid-level enterprises.

[Topic 15] “Samsung C&T Corp.’s fashion division and Samsung Electronics Co., Ltd.”: “Samsung C&T Corp. records operating profit of KRW 216.4 billion in 3Q...Fashion division loses KRW 15 billion” [119], “Samsung C&T Corp. focuses on governance restructuring; high interest in stock market” [120], and “[Exclusive] Samsung Electronics Co., Ltd. attracting fashion experts” [121]. After Samsung C&T Corp. merged with Cheil Industries Inc, the former affiliate of Samsung Group, its operating profit was continuously evaluated, and stories highlighting the management system of Vice-Chairman Jae-yong Lee dominated news reports.

[Topic 16] “Entry into the Chinese fashion market”: “Why are domestic clothing and cosmetics stocks focused on China in 2020?” [122], “Chinese influencers in Hongdae fashion alley... Live streaming broadcasts and clothing monopoly” [123], and “Fashion Group Hyungji’s stock price rise due to the brand ‘Elite’ Chinese market expansion” [124]. As a manufacturing hub with a massive market, China has grown into the world’s largest textile and fashion trading destination and has increasingly traded with Korean fashion companies. Consequently, domestic fashion companies have strengthened their brand development and localization policies to enter the Chinese market by collaborating with local manufacturers or broadening their local online sales networks.

[Topic 17] “Fashion week and trade show”: “LF Corp.’s brand ‘Hazzys’ participates in London Fashion Week with Baoxiniao Holding Co., Ltd. of China” [125], “‘MCM’ debuts at London Fashion Week, one of the Big Four” [126], and “‘J. ESTINA’ successfully participated in Basel, Switzerland trade show ... ‘Full-fledged global market expansion’” [127]. Although the articles showed a high topic ratio, we can assume the Korean domestic fashion companies participate in the fashion weeks or trade shows to target overseas markets with huge growth potential.

[Topic 18] “Digital innovation: “K-Fashion digital runway showcased at New York Fashion Week ‘successful’” [78], “Handsome Corp.’s high-end online fashion business proves resilient; CEO Kim Min-deok leverages COVID-19 crisis as an opportunity” [128], and “Fashion Group Hungji’s brand ‘Castelbajac’ establishes new digital business headquarters ... Promoting digital innovation” [129]. This indicates that the fashion industry is enhancing its digital capabilities and gradually transforming into a contactless retail environment as mobile shopping becomes more prevalent.

[Topic 19] “Strengthening store operation”: “LF Corp.’s brand ‘Athe Vanessa Bruno’ expands exclusive shoe store in the second half of the year” [130], “Lotte Mart to strengthen fashion stores” [131], and “Fashion industry strengthens specialized stores, from exhibition to cafés” [132]. These findings show that stores selling fashion products are evolving into cultural spaces for customers by exhibiting artworks or providing a separate rest space.

4.4. Time series regression analysis

According to Griffiths and Steyvers [72], hot topics with an upward trend and cold topics with a downward trend can be identified by analyzing significant regression values after building a linear regression model for each topic. Hence, this study conducted a linear regression analysis using year as the independent variable and share of topic subjects by year as the dependent variable to identify the trends in fashion industry news topics. Python package statsmodels [133] and matplotlib module [134] were employed to analyze the time-series model’s statistical indicators. For topics with a Durbin–Watson value between 1.5 and 2.5, if the p -value was significant at

the 95% level and the regression coefficient was positive, such topics were classified as hot topics, whereas the negative was defined as cold topics. If the probability value was not statistically significant, it was classified as a neutral topic.

Following a regression analysis of the 19 topics, the derived hot topics were “[Topic 2] Brand collaboration ($\beta = 0.501$; p -value = .001; Durbin–Watson = 2.381),” “[Topic 5] Collection launch ($\beta = 0.617$; p -value = .021; Durbin–Watson = 1.750),” and “[Topic 7] Corporate mergers and acquisitions ($\beta = 0.217$; p -value = .001; Durbin–Watson = 2.388).” In contrast, the cold topics were “[Topic 1] Real estate investment development ($\beta = -2.417$; p -value = .018; Durbin–Watson = 1.778),” “[Topic 14] Global fashion business vitalization ($\beta = -0.102$; p -value = .037; Durbin–Watson = 1.761),” and “[Topic 16] Entry into the Chinese fashion market ($\beta = -0.162$; p -value = .049; Durbin–Watson = 2.188).” The remaining 13 topics showed insignificant regression values, indicating neutral topics (Table 4).

The share of topic subjects in “[Topic 2] Brand collaboration” shows a statistically significant increase over time. “Collaboration” is defined as maintaining a cooperative relationship based on the company’s competitive advantage factors [135]. The news articles about collaborations with luxury products and lifestyle brands imply that fashion companies are joining various product groups to enhance their brands’ intangible value and pursue sales growth through event-based strategies such as limited sales [81,82]. The topic subject share of “[Topic 5] Collection launch” gradually increased from 2015 to 2019 and then significantly increased in 2020. The collection system informs the public of the brand’s identity and introduces new products that reflect market trends. However, the fashion industry has begun to eliminate the seasonal system and has started to release capsule collections with a smaller number of products due to cost reduction and immediate trend adoption. Moreover, news reports have regularly noted that fashion brands promote their collections in real-time via social media channels to boost online sales [80, 90, 123]. Fashion industry news about “[Topic 7] Corporate mergers and acquisitions” was a constant topic in media reports from 2015 to 2019. Mergers increased capital investment internally in the stock market, while acquisitions caused business expansion by purchasing other companies or combining two companies into one [136]. The representative news documents on this topic suggest that fashion companies seek to transform into total lifestyle brands by integrating diverse areas such as cosmetics and food service [95,100,130].

For the cold topics, “[Topic 1] Real estate investment development” had the highest topic subject share in 2016 and then declined until 2020. Although the real estate business helped improve asset revenue through leasing [77,79,114], its popularity has been decreasing because of the low economic growth rate and consumption stagnation [137]. The prevalence of the topic subject of “[Topic 14] Global fashion business vitalization” continuously decreased from 2016 to 2020. The long-term economic slump has limited the global fashion business’s acceleration, and news reports on this topic likely decreased as sales declined due to production slowdowns and falling export prices [138]. For “[Topic 16] Entry into the Chinese fashion market,” the Korean domestic fashion companies tried to expand their retailing networks by establishing stores [93], and entering the local online platforms [139]. However, this has led to long-term side effects, with rising cases of unauthorized design theft and trademark infringement [140].

5. Discussion

5.1. Theoretical implications

The fashion industry trends over the last five years (2016–2020) largely consist of the following: (1) business management strategies to increase sales, (2) distribution of the retail structure, (3) the influence of CEOs, and (4) merchandise planning and marketing activities, as stated previously (Table 3). This finding provides theoretical insights into how media news can shape the major issues in fashion journalism by supporting the agenda-setting theory mainly discussed in communication studies [18,19]. The public perceives the major issues through official news because they do not have access to every piece of information that happens in the fashion industry [141,142]. Moreover, the Internet portals’ online news coverage has increased enormously due to their convenience and usefulness [143,144]. The news agendas change the attitudes of information recipients [35], determining the level of public trust in the company [18] and the direction of the business management [26, 45, 46]. The study findings support prior research that used LDA topic modeling analysis with media report data [5, 52, 57, 58, 144]. It also confirmed that the importance of issues in the fashion industry’s major agendas could be highlighted through media reports. Jung [145] observed the fashion industry’s major agendas through the top ten fashion industry news articles. However, this study differs in that it excluded fashion design and style elements and examined only the business and economic media news through big data analysis.

This study derived the hot topics of “[Topic 2] Brand collaboration,” “[Topic 5] Collection launch,” and “[Topic 7] Corporate mergers and acquisitions,” and the cold topics of “[Topic 1] Real estate investment development,” “[Topic 14] Global fashion business vitalization,” and “[Topic 16] Entry into the Chinese fashion market.” This implies that regularly confirming changes in the major agendas is necessary since fashion industry trends mentioned in the media change over time. The results of this study support the claim of [135] that collaboration through strategic alliances among companies is important for sales growth and can provide a theoretical basis for fashion companies to start capsule collections [90]. Additionally, we discovered that fashion companies are growing into lifestyle brands that incorporate various industries through mergers and acquisitions [94–96, 109]. Conversely, real estate investment development diminished due to the long-term consumption slump [137], while the global businesses of fashion companies have suffered from falling export prices and production slowdowns [138]. Furthermore, active investment in the Chinese market is gradually declining due to trademark infringement lawsuits [140]. Previous researchers have noted the importance of periodically observing changes in trends [146]. For example, Kim et al. [147] noted that analyzing fintech industry trends yearly is important for identifying key technology trends. Son and Hwang [148] claimed that trend changes should be observed regularly because mathematics education changes with social conditions. Park and Lee [149] analyzed text from fashion trend information sites through social networks from 2004 to 2013 and demonstrated that fashion styles and design elements change in 5-year cycles. Hence, this study

contributes to developing the existing literature by confirming that the fashion industry's agendas are subject to change over time.

5.2. Managerial implications

The following practical implications can be drawn based on the results of this study. The changes in topics and trends in fashion industry news derived in this study will help corporate management make decisions for establishing and executing fashion business strategies from multiple perspectives. For example, long-term business plans such as real estate investment development, sales management, operating profit growth, mergers and acquisitions, and global expansion are management strategies related to operating profit. Furthermore, domestic and overseas pop-up stores, digital platforms, and strengthening store sales are issues related to the diversification of distribution structures. Simultaneously, changes in CEOs and policies reflect the CEO's influence on management decisions. Thus, we expect the systematic classification of fashion industry agendas derived in this study to assist corporate management in reviewing their current and future business promotion methods and procedures.

Government employees who are responsible for deciding local business policies can refer to this study's results to distribute the budgets for supporting the fashion industry sector. To enhance the competitiveness of the fashion industry, the Seoul Metropolitan Government, Ministry of Trade, Industry and Energy, and Ministry of Culture, Sports and Tourism Ministry of Culture, Sports and Tourism hold discussions with experts and collect opinions in the field to devise support policies [150]. As media news reports major issues and facts from society and the overall economy [151], the findings of this study can provide important insights into understanding the current state of the fashion industry. The government's fashion industry budget for 2021 included funds for fashion cultural events, developing global fashion brands, constructing big data, developing premium materials, and supporting local content labs [150]. If government employees recognize "Digital innovation" and "Increase of online retail platforms," topics derived from this study, as new fashion industry trends, it will help promote new policies to vitalize the fashion business.

Furthermore, companies will be able to undertake strategic product collaborations for developing new product lines by referring to the subjects of "Brand collaboration" and "Collection launch," which this study identified as hot topics. By cooperating with various sectors, fashion companies can develop various products, build a differentiated brand image, and enhance their intangible value. Similarly, companies can launch capsule collections that immediately reflect the latest trends to satisfy consumers. Meanwhile, the hot topic of "Corporate mergers and acquisitions" serves as a reminder to business managers of the necessity for business diversification and the importance of new business engines. For instance, our finding that fashion companies are recently expanding into business areas such as beauty, content, and food service through aggressive mergers and acquisitions can provide a basis for promoting new brand businesses focused on sales performance.

5.3. Limitations and future research directions

This study has limitations in understanding the megatrends. Our study checked the five time points of the topic's yearly trend [152] to focus on the mainstream trend changes [146]. However, more significant topics could be generated depending on the time frame and using trend analysis methods [153]. For example, future research should consider the macroscopic social changes that have occurred place in the last decade and expand the analysis period from the 1990s when mass media for the Korean fashion industry became active [12]. Additionally, we selected LDA topic modeling and time series regression analysis because only a few prior studies have used big data analysis to examine the trend changes in South Korea's fashion industry news. In future research, combining BERT-based modeling will be a helpful approach to enhance the quality of topic classification.

Another limitation of this study concerns the COVID-19 pandemic's temporary shocks on the fashion industry from 2020 onward. Although this study used statistical indicators for each topic to examine the yearly changes in trends, future research may test the impulse response effect to investigate the fashion industry news in reaction to a shock as a temporary social phenomenon.

Finally, this study used an LDA algorithm that probabilistically calculates the distribution of words with latent information in news documents to explore the semantic relationships between topics. Although LDA topic modeling is the most popular technique for analyzing news content [53,154] criticized its incapability to provide topic correlation. Therefore, the hierarchical LDA technique can be utilized to reflect correlations between topics in future research.

6. Conclusion

Drawing on the agenda-setting theory [18,35,37], the present study's findings demonstrate that media news influences the fashion industry's main agenda in South Korea, highlighting prevalent trends, such as sales strategy, retail diversification, CEO influence, and fashion merchandising and marketing over the past five years. This study's significance lies in identifying the possibility of whether media news can become a major issue in the fashion industry, consistent with prior research [5,41,44,47,57]. In addition, this study revealed that statistically increasing topics were "Brand collaboration," "Collection launch," and "Corporate M&A," whereas decreasing topics were "Real estate investment and development," "Global business expansion," and "Chinese fashion market entry." Therefore, regularly monitoring changes in fashion industry agendas is essential due to the constantly changing media trends. This study highlights the significance of online news topics in shaping fashion industry trends and will be beneficial for government agencies in determining the allocation and distribution of budgets to support fashion businesses.

Author contribution statement

Hyojung Kim: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Wrote the paper.

Minjung Park: Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data.

Funding statement

This work was supported by the Ministry of Education of the Republic of Korea and the National Research Foundation of Korea (NRF-2021S1A5A2A03071538).

Data availability statement

Data will be made available on request.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Abbreviations

LDA	Latent Dirichlet Allocation
TF	Term Frequency
TF-IDF	TF-Inverse Document Frequency

References

- [1] Statista, Big data market size revenue forecast worldwide from 2011 to 2027, Stat (2021). Retrieved from, <https://www.statista.com/statistics/254266/global-big-data-market-forecast/>.
- [2] IDC, Korea IDC Predicts that the Domestic Big Data and Analytics Market Will Grow at a CAGR of 11.2% to Reach KRW 2.56 Trillion in 2023, 2020. Retrieved from, <https://www.idc.com/getdoc.jsp?containerId=prAP45938720>.
- [3] A. Trice, The Future of cognitive computing, IBM (2015). Retrieved from, <https://www.ibm.com/blogs/cloud-archive/2015/11/future-of-cognitive-computing/>.
- [4] E. Cambria, B. White, Jumping NLP curves: a review of Natural Language Processing research, *IEEE Comput. Intell. Mag.* 9 (2) (2014) 48–57.
- [5] C. Lang, M. Li, L. Zhao, Understanding consumers' online fashion renting experiences: a text-mining approach, *Sustain. Prod. Consum.* 21 (2020) 132–144, <https://doi.org/10.1016/j.spc.2019.12.003>.
- [6] N. Jang, M.J. Kim, Material as a key element of fashion trend in 2010~ 2019-Text mining analysis, *Fashion Textile Res. J.* 22 (5) (2020) 551–560, <https://doi.org/10.5805/SFTI.2020.22.5.551>.
- [7] J. Li, K.K. Leonas, Sustainability topic trends in the textile and apparel industry: a text mining-based magazine article analysis, *J. Fash. Mark. Manag.: Int. J.* 26 (1) (2021) 67–87, <https://doi.org/10.1108/JFMM-07-2020-0139>.
- [8] M.A. Ahmad, M. Ersoy, T.H. Dambo, Influence of political tweets on campaign coverage: building the news agenda in Twittersphere, *J. Pract.* 16 (1) (2022) 103–121, <https://doi.org/10.1080/17512786.2020.1805793>.
- [9] C.E. Carroll, M. McCombs, Agenda-setting effects of business news on the public's images and opinions about major corporations, *Corp. Reput. Rev.* 6 (1) (2003) 36–46, <https://doi.org/10.1057/palgrave.crr.1540188>.
- [10] J.G. Jonkman, M. Boukes, R. Vliegenthart, P. Verhoeven, Buffering negative news: individual-level effects of company visibility, tone, and pre-existing attitudes on corporate reputation, *Mass Commun. Soc.* 23 (2) (2020) 272–296, <https://doi.org/10.1080/15205436.2019.1694155>.
- [11] L. Guo, K. Mays, Y. Zhang, D. Wijaya, M. Betke, What makes gun violence a (less) prominent issue? A computational analysis of compelling arguments and selective agenda setting, *Mass Commun. Soc.* 24 (5) (2021) 651–675, <https://doi.org/10.1080/15205436.2021.1898644>.
- [12] S.E. Kim, M.Y. Kim, A study on the effect of fashion magazine information on the female garment style, *J. Fashion Business* 14 (4) (2010) 146–160.
- [13] M.E. McCombs, D.L. Shaw, D.H. Weaver, New directions in agenda-setting theory and research, *Mass Commun. Soc.* 17 (6) (2014) 781–802, <https://doi.org/10.1080/15205436.2014.964871>.
- [14] S.J. Kim, M.S. Han, New fashion industry trend corresponding to new media & Internet infrastructure, *Res. J. Costume Culture* 10 (3) (2002) 293–305.
- [15] Y.R. Lee, K. Medvedev, P. Hunt-Hurst, Y.J. Choi, How the Korean fashion industry is viewed by WWD USA, *J. Korean Soci. Clothing Textiles* 32 (12) (2008) 1915–1926, <https://doi.org/10.5850/JKSCT.2008.32.12.1915>.
- [16] L.R. Bailey, Y.K. Seock, The relationships of fashion leadership, fashion magazine content and loyalty tendency, *J. Fash. Mark. Manag.: Int. J.* 14 (1) (2010) 39–57, <https://doi.org/10.1108/13612021011025429>.
- [17] Y. Yang, M. Kim, The niche theory analysis of the competition between various fashion content media platforms-Focus on user gratification for fashion magazine, the internet portal, and SNS, *Res. J. Costume Culture* 26 (5) (2018) 679–699, <https://doi.org/10.29049/rjcc.2018.26.5.679>.
- [18] M. Boukes, A. Damstra, R. Vliegenthart, Media effects across time and subject: how news coverage affects two out of four attributes of consumer confidence, *Commun. Res.* 48 (3) (2021) 454–476, <https://doi.org/10.1177/0093650219870087>.
- [19] M.E. McCombs, D.L. Shaw, The agenda-setting function of mass media, *Publ. Opin. Q.* 36 (2) (1972) 176–187, <https://doi.org/10.1086/267990>.
- [20] P. Bertola, F. Vacca, C. Colombi, V.M. Iannilli, M. Augello, The cultural dimension of design driven innovation. A perspective from the fashion industry, *Des. J.* 19 (2) (2016) 237–251, <https://doi.org/10.1080/14606925.2016.1129174>.
- [21] Korea Federation of Textile Industries, Korea Fashion Market Trend 2020 Second Half Statistics, 2021. Retrieved from, http://www.fashionnetkorea.com/kofoti/kofoti/main/cmmboardReadView.do?is_old=0&code=11B1&bid=259653.
- [22] M.R. Solomon, *Consumer Behavior: Buying, Having, and Being*, Prentice Hall, Upper Saddle River, NJ, 2002.
- [23] E.Y. Yun, A study on the big data utilization in domestic fashion industry, *Journal of Cultural Product & Design* 50 (2017) 191–200, <https://doi.org/10.18555/kicpd.2017.50.17>.
- [24] Statistics Korea, Textile Industry Trends, 2021. Retrieved from, https://www.index.go.kr/potal/main/EachDtlPageDetail.do?idx_cd=1160.

- [25] B.C. Jang, Global fashion '2008 financial crisis VS 2020 corona crisis.', *Apparel News* (2020). Retrieved from, http://m.apparelnews.co.kr/news/news_view/?idx=181745.
- [26] A.G. Huang, H. Tan, R. Wermers, Institutional trading around corporate news: evidence from textual analysis, *Rev. Financ. Stud.* 33 (10) (2020) 4627–4675, <https://doi.org/10.1093/rfs/hhz136>.
- [27] B.H. Lee, I.Y. Choi, J.J. Lee, J.K. Kim, H.M. Kang, Exploration of constituent factors for corporate reputation and development of index using online news: sentiment analysis and AHP application, *J. Info. Technol. Serv.* 19 (6) (2020) 145–159, <https://doi.org/10.9716/KITS.2020.19.6.145>.
- [28] X. Zhang, Measuring media reputation: a test of the construct validity and predictive power of seven measures, *Journal. Mass Commun. Q.* 93 (4) (2016) 884–905, <https://doi.org/10.1177/1077699015610065>.
- [29] S. Choi, S. Kim, S.K. Cho, A study on the relationship between news literacy and the ability to identify fake news, *Korean J. Communicat. Stud.* 29 (2) (2021) 5–28, <https://doi.org/10.23875/kca.29.2.1>.
- [30] D.L. Deephouse, Media reputation as a strategic resource: an integration of mass communication and resource-based theories, *J. Manag.* 26 (6) (2000) 1091–1112, <https://doi.org/10.1177/014920630002600602>.
- [31] M. Titton, Fashion criticism unravelled: a sociological critique of criticism in fashion media, *Int. J. Fash. Stud.* 3 (2) (2016) 209–223, <https://doi.org/10.1386/inf.3.2.209.1>.
- [32] J. Lee, J. Chun, Analysis of fashion news based on news value assessment criteria-focused on online fashion news, *J. Korean Societ. Clothing Textiles* 45 (2) (2021) 285–304, <https://doi.org/10.5850/JKSC.2021.45.2.285>.
- [33] I. Roozen, M. Raedts, The power of negative publicity on the fast fashion industry, *J. Global Fashion Market.* 11 (4) (2020) 380–396, <https://doi.org/10.1080/20932685.2020.1798802>.
- [34] W. Lippmann, Group cohesiveness as interpersonal attraction: a review of relationships with antecedents and consequent variables, *Public Opinion. New Brunswick. London: Transaction Publishers.* Lott, BE, & Lott, BE (1965), *Psychol. Bull.* 64 (1922) 259–309.
- [35] B.C. Cohen, *The Press and Foreign. Policy*, Princeton University Press, Princeton, NJ, 1963.
- [36] R.A. Harder, J. Sevenans, P. Van Aelst, Intermedia agenda setting in the social media age: how traditional players dominate the news agenda in election times, *Int. J. Press/Politics* 22 (3) (2017) 275–293, <https://doi.org/10.1177/1940161217704969>.
- [37] R.R. Lau, K. Rogers, J. Love, Media effects in the viewer's choice era: testing revised agenda-setting and priming hypotheses, *Polit. Commun.* 38 (3) (2021) 199–221, <https://doi.org/10.1080/10584609.2020.1763526>.
- [38] V.H. Nguyen, E. Claus, Good news, bad news, consumer sentiment and consumption behavior, *J. Econ. Psychol.* 39 (2013) 426–438, <https://doi.org/10.1016/j.joep.2013.10.001>.
- [39] H.M. Svensson, E. Albæk, A. Van Dalen, C.H. De Vreese, The impact of ambiguous economic news on uncertainty and consumer confidence, *Eur. J. Commun.* 32 (2) (2017) 85–99, <https://doi.org/10.1177/0267323116677205>.
- [40] J. Curran, S. Coen, T. Aalberg, K. Hayashi, P.K. Jones, S. Splendore, R. Tiffen, Internet revolution revisited: a comparative study of online news, *Media Cult. Soc.* 35 (7) (2013) 880–897, <https://doi.org/10.1177/0163443713499393>.
- [41] D.A. Scheufele, D. Tewksbury, Framing, agenda setting, and priming: the evolution of three media effects models, *J. Commun.* 57 (1) (2007) 9–20, <https://doi.org/10.1111/j.0021-9916.2007.00326.x>.
- [42] L. Shen, C. Huggins, Testing the model of influence of presumed influence in a boundary condition: the impact of question order, *Hum. Commun. Res.* 39 (4) (2013) 470–491, <https://doi.org/10.1111/hcre.12013>.
- [43] Y.J. Jin, J.-W. Yoo, The effect of corporate fraudulent activity on consumers' purchase intention, *J. Pract. Res. Advert. Public Relat.* 10 (1) (2017) 167–192, <https://doi.org/10.21331/jprapr.2017.10.1.007>.
- [44] Y. Luo, H. Burley, A. Moe, M. Sui, A meta-analysis of news media's public agenda-setting effects, 1972–2015, *Journal. Mass Commun. Q.* 96 (1) (2019) 150–172, <https://doi.org/10.1177/1077699018804500>.
- [45] Z.F. Chen, Y. Cheng, Consumer response to fake news about brands on social media: the effects of self-efficacy, media trust, and persuasion knowledge on brand trust, *J. Prod. Brand Manag.* 29 (2) (2019) 188–198, <https://doi.org/10.1108/JPBM-12-2018-2145>.
- [46] J.A. Chevalier, D. Mayzlin, The effect of word of mouth on sales: online book reviews, *J. Market. Res.* 43 (3) (2006) 345–354, <https://doi.org/10.1509/jmkr.43.3.345>.
- [47] C.J. Vargo, L. Guo, M.A. Amazeen, The agenda-setting power of fake news: a big data analysis of the online media landscape from 2014 to 2016, *New Media Soc.* 20 (5) (2018) 2028–2049, <https://doi.org/10.1177/1461444817712086>.
- [48] Y. Zhang, C. Dong, Understand corporate social responsibility from an agenda setting perspective: a cross-national analysis of newspaper using computer-assisted content analysis, *J. Global Responsibil.* 12 (2) (2021) 262–286, <https://doi.org/10.1108/JGR-08-2020-0084>.
- [49] S. Jusoh, H.M. Alfawareh, *Techniques, applications and challenging issue in text mining*, *Int. J. Comput. Sci. Issues (IJCSI)* 9 (6) (2012) 431.
- [50] Reports, Data, Text Mining Market Forecasts to 2027, 2020. Retrieved from, <https://www.reportsanddata.com/report-detail/text-mining-market>.
- [51] D.M. Blei, A.Y. Ng, M.I. Jordan, Latent dirichlet allocation, *J. Mach. Learn. Res.* 3 (Jan) (2003) 993–1022.
- [52] D.Y. Lee, H.S. Yi, Exploring methods for determining the appropriate number of topics in LDA: focusing on perplexity and harmonic mean method, *J. Educat. Evaluat.* 34 (1) (2021) 1–30, <https://doi.org/10.31158/JEEV.2021.34.1.1>.
- [53] N. Jang, M.J. Kim, Research trend analysis in fashion design studies in Korea using topic modeling, *J. Digital Convergence* 15 (6) (2017) 415–423, <https://doi.org/10.14400/JDC.2017.15.6.415>.
- [54] K.C. Park, C.H. Lee, A study on the research trends for smart city using topic modeling, *J. Internet Comput. Serv.* 20 (3) (2019) 119–128, <https://doi.org/10.7472/jksii.2019.20.3.119>.
- [55] S.R. Kim, A convergence study on the perception of anorak fashion using big data analysis, *Korean Societ. Sci. Art* 38 (1) (2020) 43–55, <https://doi.org/10.17548/ksaf.2020.09.30.43>.
- [56] Y.H. Choi, K.H. Lee, Ethical fashion research trend using text mining: network analysis of the published literature 2009–2019, *Fashion Textile Res. J.* 22 (2) (2020) 181–191, <https://doi.org/10.5805/SFTI.2020.22.2.181>.
- [57] K. Bastani, H. Namavari, J. Shaffer, Latent Dirichlet allocation (LDA) for topic modeling of the CFPB consumer complaints, *Expert Syst. Appl.* 127 (2019) 256–271, <https://doi.org/10.1016/j.eswa.2019.03.001>.
- [58] Q. Liu, Z. Zheng, J. Zheng, Q. Chen, G. Liu, S. Chen, W.K. Ming, Health communication through news media during the early stage of the COVID-19 outbreak in China: digital topic modeling approach, *J. Med. Internet Res.* 22 (4) (2020), e19118, <https://doi.org/10.2196/19118>.
- [59] J. Gow, R. Baumgarten, P. Cairns, S. Colton, P. Miller, Unsupervised modeling of player style with LDA, *IEEE Transact. Computat. Intelligence AI in Games* 4 (3) (2012) 152–166, <https://doi.org/10.1109/TCAIG.2012.2213600>.
- [60] Newsis, 'Naver' Ranks First in News Usage... about Twice the Difference from Second Place 'Daum.', 2020. Retrieved from, <https://www.donga.com/news/Politics/article/all/20200117/99265423/1>.
- [61] H.L. Jang, G.W. Kang, E.J. Lee, S.R. Kim, Y.S. Lee, Analysis of research subject network in the field of oncogene, *J. Korea Technol. Innovat. Society* 15 (2) (2012) 369–399.
- [62] J. Park, T.Z. Fu, D.M. Chiu, Networking, clustering and brokering keywords in the computer science research, in: Seventh International Conference on Digital Information Management, ICDIM 2012, 2012, pp. 110–115, <https://doi.org/10.1109/ICDIM.2012.6360127>. IEEE.
- [63] T.M. Jauhari, S. Kim, M. Kovacs, U. Serdült, V.V. Kryssanov, Assessing customer needs based on online reviews: a topic modeling approach, in: CEUR Workshop Proceedings, CEUR-WS, 2020, pp. 57–62.
- [64] A. Schober, N. Šimunović, A. Darabant, T. Stern, Identifying sustainable forest management research narratives: a text mining approach, *J. Sustain. For.* 37 (6) (2018) 537–554, <https://doi.org/10.1080/10549811.2018.1437451>.
- [65] J.H. Suh, SocialTERM-Extractor: identifying and predicting social-problem-specific key noun terms from a large number of online news articles using text mining and machine learning techniques, *Sustainability* 11 (1) (2019) 196, <https://doi.org/10.3390/su11010196>.

- [66] Y. Zhang, Y. Dang, H. Chen, Gender classification for web forums, *IEEE Trans. Syst. Man Cybern. Syst. Hum.* 41 (4) (2011) 668–677, <https://doi.org/10.1109/TSMCA.2010.2093886>.
- [67] J.H. Suh, Forecasting the daily outbreak of topic-level political risk from social media using hidden Markov model-based techniques, *Technol. Forecast. Soc. Change* 94 (2015) 115–132, <https://doi.org/10.1016/j.techfore.2014.08.014>.
- [68] C. Manning, H. Schütze, *Foundations of Statistical Natural Language Processing*, MIT Press, 1999.
- [69] G. Attigeri, M.P. Mm, R.M. Pai, R. Kulkarni, Knowledge base ontology building for fraud detection using topic modeling, *Proc. Comput. Sci.* 135 (2018) 369–376, <https://doi.org/10.1016/j.procs.2018.08.186>.
- [70] M. Röder, A. Both, A. Hinneburg, February). Exploring the space of topic coherence measures, in: *Proceedings of the Eighth ACM International Conference on Web Search and Data Mining*, 2015, pp. 399–408, <https://doi.org/10.1145/2684822.2685324>.
- [71] C. Sievert, K. Shirley, June). LDAvis: a method for visualizing and interpreting topics, in: *Proceedings of the Workshop on Interactive Language Learning, Visualization, and Interfaces*, 2014, pp. 63–70, <https://doi.org/10.3115/v1/W14-3110>.
- [72] T.L. Griffiths, M. Steyvers, Finding scientific topics, *Proc. Natl. Acad. Sci. USA* 101 (suppl 1) (2004) 5228–5235, <https://doi.org/10.1073/pnas.0307752101>.
- [73] C. Jacobi, W. Van Atteveldt, K. Welbers, Quantitative analysis of large amounts of journalistic texts using topic modelling, *Digital Journalism* 4 (1) (2016) 89–106, <https://doi.org/10.1080/21670811.2015.1093271>.
- [74] S.C. Choi, H.W. Park, A study on the trend of topic modeling in South Korea using KCI journal publications, *J. Korean Data Anal. Society* 22 (2) (2020) 815–826, <https://doi.org/10.37727/jkdas.2020.22.2.815>.
- [75] N.A. Tresnasari, T.B. Adji, A.E. Permanasari, Social-child-case document clustering based on topic modeling using latent Dirichlet allocation, *IJCCS (Indonesian Journal of Computing and Cybernetics Systems)* 14 (2) (2020) 179–188, <https://doi.org/10.22146/ijccs.54507>.
- [76] G.A. Al-Sultany, H.J. Aleqabie, Enriching tweets for topic modeling via linking to the wikipedia, *Int. J. Eng. Technol.* 8 (15) (2019) 144–150, <https://doi.org/10.14419/ijet.v7i4.19.27969>.
- [77] Aju Business Daily, in: *Shinsegae Department Store Draws a New Blueprint from Advertising, Cosmetics, and Real Estate Rental*, 2016. <https://www.ajunews.com/view/2016031312421695471=T>.
- [78] S.-M. Yoo, K-Fashion digital runway showcased at New York Fashion Week successful, *Money Today* (2020). Retrieved from, <https://news.mt.co.kr/mtview.php?no=2020091708191215318>.
- [79] G.W. Kim, SG Corp., real estate value exceeds market cap, ‘emphasis on asset stocks’, *Money Today* (2018). Retrieved from, <https://news.mt.co.kr/mtview.php?no=2018121911312571834>.
- [80] B. Kim, Lotte department Store, the first collaboration experiment with SNS brand, *Seoul Finance* (2020). Retrieved from, <https://www.sedaily.com/NewsView/1VKCOQ01AM>.
- [81] J.M. Han, ‘From private brand to collaboration’... Department stores and hotels must adapt to survive!, *Global Economic* (2017). https://cmobile.g-enews.com/view.php?ud=201702271219331177819_1&ssk=search&md=201702_28000041_S.
- [82] E. Lee, Tony Moly launches collaboration collection with luxury brand ‘Moschino.’, *Money Today* (2018). Retrieved from, <https://news.mt.co.kr/mtview.php?no=2018110509514136556>.
- [83] B. Kim, Kolon Fnc’s brand ‘Record’ opens pop-up stores in 3 European cities, *Newdaily Economy* (2019). Retrieved from, <http://biz.newdaily.co.kr/site/data/html/2019/09/16/2019091600126.html>.
- [84] J.H. Park, Lotte department store boosts ‘AI’ retail competitiveness, *Econ. Rev.* (2018). Retrieved from, <http://www.econovill.com/news/articleView.html?idxno=343943>.
- [85] J.-S. Hong, Hyundai department store’s business continues with sluggish performance in 3Q, *Global Economic* (2020). Retrieved from, https://cmobile.g-enews.com/view.php?ud=202009140628107915442088f476_1&md=20200914063149_R.
- [86] H.-Y. Cho, LF Corp.’s Hazzys opens pop-up store in Marais district of Paris to ‘raise global status’, *Asia Business Daily* (2017). Retrieved from, <https://cm.asiae.co.kr/article/2017091910174222170>.
- [87] Chosun Biz, Gentle Monster Opens Flagship Store in New York and Enters Global Fashion Industry, 2016. https://biz.chosun.com/site/data/html_dir/2016/02/16/2016021601130.html.
- [88] Y.-S. Park, FILA Holdings Corp. launches limited edition of ‘Fur Slide’ park presented at New York fashion week, *Seoul Economic Daily* (2017). Retrieved from, <https://www.sedaily.com/NewsView/10BXSDVZTV>.
- [89] H.-K. Kim, Sejung Group’s ‘didier Dubot’ launches ‘signature D collection.’, *Seoul Finance* (2020). Retrieved from, <https://www.seoulfn.com/news/articleView.html?idxno=393500>.
- [90] H.-Y. Cho, Catch the faster fashion cycle Fashion industry launches capsule collections one after another, *Asia Business Daily* (2017). Retrieved from, <https://www.asiae.co.kr/article/2017053110463995435>.
- [91] J.W. Lee, Hansae Co., Ltd. reaches sales of KRW 360.5 billion in the Q1, 12.2% increased, *Seoul Economic Daily* (2016). Retrieved from, <https://www.sedaily.com/NewsView/1KWAQ55Q25>.
- [92] Y.J. Yoo, Lotte department Store’s fashion business division spin-off, “achieve KRW 1 trillion in sales by 2022.”, *Chosun Biz* (2018). Retrieved from, https://biz.chosun.com/site/data/html_dir/2018/05/31/2018053101206.html.
- [93] E.-P. Jang, F&F Co., Ltd. stocks remain to ‘buying’, sales expected to grow next year thanks to favorable MLB in China, *Business Post* (2020). Retrieved from, http://www.businesspost.co.kr/BP?command=article_view&num=197563.
- [94] Y.O. Seo, Fashion and beauty industry in stagnation; breakthrough solution is M&A, *Energy Economic News* (2019). Retrieved from, <https://www.ekn.kr/web/view.php?key=425765>.
- [95] I.-G. Im, Kakao Corp. invested KRW 2 trillion in M&A last year due to the infinite love of contents business, *Business Watch* (2017). Retrieved from, <http://news.bizwatch.co.kr/article/mobile/2017/03/07/0003>.
- [96] S.H. Kim, Fashion company LF Corp. joins in taking over Skinfood Co., Ltd. *Seoul Economic Daily* (2019). Retrieved from, <https://signal.sedaily.com/NewsView/1VI2F41A3C/GX1101>.
- [97] H.-J. Lee, Be professional like Hitachi, Aeon, and Uniqlo.’, *Econ. Rev.* (2016). Retrieved from, <http://www.econovill.com/news/articleView.html?idxno=277501>.
- [98] *Energy Economic News*, Fashion Rivals, Samsung C&T Corp.’s President Seo-Hyun Lee vs LF Corp.’s Chairman Bon-Geol Koo... Obsessed with New Business, 2018. <https://www.ekn.kr/web/view.php?key=384342>.
- [99] H.-K. Kim, Fashion Group Hyungji’s CEO Byeong-oh Choi, ‘We will achieve mutual growth with agencies by reinforcing on-site management.’, *Seoul Finance* (2017). Retrieved from, <https://www.seoulfn.com/news/articleView.html?idxno=271029>.
- [100] A. Park, Shinsegae International Inc’s stock price is expected to be rising, new cosmetic brands continue to launch, *Business Post* (2019). Retrieved from, http://m.businesspost.co.kr/BP?command=article_view&num=147437.
- [101] S.-G. Kim, Run with K-beauty fashion industry hurries to start cosmetics business, *Maeil Business* (2016). Retrieved from, <https://www.mk.co.kr/news/business/view/2016/11/811651/>.
- [102] J.E. Lee, Everyone challenging the beauty market, will ‘J. ESTINA Beauty’ succeed? *Seoul Economic Daily* (2017). Retrieved from, <https://www.sedaily.com/NewsView/10EJZU963U>.
- [103] H. Kim, A comparative study on women’s cosmetic culture of Korea and the West in the 20th, *J. Korean Society Costumes* 50 (1) (2000) 85–96.
- [104] E.J. Kim, E-Land Group improves financial structure, ‘KRW 1 trillion sales of Teenie Weenie, FNTIMES (2016). Retrieved from, https://m.fntimes.com/html/view.php?ud=20160902123423161447_18.
- [105] D.-S. Choi, SG Corp. completes KRW 70 billion asset sale...Improved financial structure, *Financ. News* (2019). Retrieved from, <https://www.fnnews.com/news/201910230921263863>.
- [106] S.-G. Kim, SK Networks Co. Ltd. sells ‘fashion business division’ to Hyundai department store group, *Maeil Business* (2016). Retrieved from, <https://www.mk.co.kr/news/business/view/2016/12/851292/>.

- [107] G. Kang, E-Land Group attracts investment in Chinese children's clothing, *Financ. News* (2019). Retrieved from, <https://www.fnnews.com/news/201902141643592006>.
- [108] M.-H. Yoo, SK Networks Co., Ltd. to expand global investment, *FNTIMES* (2017). Retrieved from, https://www.fntimes.com/html/view.php?ud=2017110615425877631ab245d71a_18.
- [109] J.-W. Kang, Fashion startups attract large-scale investments, *Financ. News* (2020). Retrieved from, <https://www.fnnews.com/news/202007271722157762>.
- [110] J.-H. Jung, 'Target online shoppers'... Fashion industry actively expands overseas through online platforms, *Asia Today* (2018). <https://www.asiatoday.co.kr/view.php?key=20180722010012242>.
- [111] Y.-J. Lee, Golden age of 'online only' and 'online first' products, *Maeil Business* (2019). Retrieved from, <https://www.mk.co.kr/news/business/view/2019/06/447663/>.
- [112] J.E. Park, Online retailing decides success or failure of fashion company's inventory management in first half, *Asia Today* (2020). Retrieved from, <https://www.asiatoday.co.kr/view.php?key=20200817010008509>.
- [113] J.-H. Lee, Fashion industry broadens customer touch points through cultural experiential marketing, *Asia Today* (2019). Retrieved from, <https://www.asiatoday.co.kr/view.php?key=20190606010003602>.
- [114] G.M. Yang, Sports and fashion companies 'strengthen' their relationship with consumers through experiential and cultural marketing, *Money Today* (2019). Retrieved from, <https://news.mt.co.kr/mtview.php?no=2019032913582498524>.
- [115] D.-H. Kyun, Catch social media influencers, big players in the distribution industry, *Econ. Rev.* (2018). Retrieved from, <https://www.econovill.com/news/articleView.html?idxno=343605>.
- [116] Y.-Y. Bae, LF Corp.'s Hazzys opens pop-up store in Marais district of Paris to 'raise global status.', *Money Today* (2017). <https://news.mt.co.kr/mtview.php?no=2017112609321184047>.
- [117] S.-H. Lim, Hyundai Home Shopping's 'J BY' participating in US fashion trade show...Beginning of entry into global fashion market, *Newdaily Economy* (2019). Retrieved from, <http://biz.newdaily.co.kr/site/data/html/2019/09/11/2019091100184.html>.
- [118] E.-Y. Kim, This is Korean upcycling; Kolon FnC's brand 'Records' enters France market, *Chosunilbo* (2017). Retrieved from, https://www.chosun.com/site/data/html_dir/2017/01/19/2017011901218.html.
- [119] E.-B. Jo, Samsung C&T Corp. records operating profit of KRW 216.4 billion in 3Q...Fashion division loses KRW 15 billion, *FNTIMES* (2019). Retrieved from, https://www.fntimes.com/html/view.php?ud=2019102317532772501ede9d544a_18.
- [120] J.W. Song, Samsung C&T Corp. focuses on governance restructuring; high interest in stock market, *Money Today* (2018). Retrieved from, <https://news.mt.co.kr/mtview.php?no=2018101116101372041>.
- [121] D.-I. Lee, [Exclusive] Samsung Electronics Co., Ltd. attracting fashion experts, *Maeil Business* (2016). Retrieved from, <https://www.mk.co.kr/news/business/view/2016/11/806682/>.
- [122] S. Jang, Why are domestic clothing and cosmetics stocks focused on China in 2020? *Econ. Rev.* (2019). Retrieved from, <https://www.econovill.com/news/articleView.html?idxno=379232>.
- [123] J.-E. Lee, Chinese influencers in Hongdae fashion alley... Live streaming broadcasts and clothing monopoly, *Chosun Biz* (2018). Retrieved from, https://biz.chosun.com/site/data/html_dir/2018/08/14/2018081400214.html.
- [124] S.P. Park, Fashion Group Hyungji's stock price rise due to the brand 'Elite' Chines market expansion, *Mon. Strat.* (2016). Retrieved from, https://m.moneys.mt.co.kr/article.html?no=2016041811068020035&type=&&VMN#_enliple.
- [125] E.-Y. Kim, LF Corp.'s brand 'Hazzys' participates in London fashion week with Baoxiniaoholding Co., Ltd. of China, *Chosun Biz* (2019). Retrieved from, https://biz.chosun.com/site/data/html_dir/2019/09/16/2019091600936.html.
- [126] E.J. Park, MCM debuts at London fashion week, one of the big four, *Maeil Business* (2016). Retrieved from, <https://www.mk.co.kr/news/business/view/2016/06/420321/>.
- [127] D.H. Jung, J. ESTINA successfully participated in Basel, Switzerland trade show 'Full-fledged global market expansion.', *Asia Business Daily* (2018). <https://news.naver.com/main/read.naver?mode=LSD&mid=sec&sid1=101&oid=277&aid=0004204315>.
- [128] H.-R. Park, Handsome Corp.'s high-end online fashion business proves resilient; CEO Kim Min-deok leverages COVID-19 crisis as an opportunity, *Business Post* (2020). Retrieved from, http://www.businesspost.co.kr/BP?command=mobile_view&num=173817.
- [129] Herald Business, Fashion Group Hungji's Brand 'Castelbajac' Establishes New Digital Business headquarters, Promoting Digital Innovation (2020). Retrieved from, <http://news.heraldcorp.com/view.php?ud=20201217000395>.
- [130] M. Seo, LF Corp.'s brand 'Athe Vanessa Bruno' expands exclusive shoe store in the second half of the year, *Aju Business Daily* (2019). Retrieved from, <https://www.ajunews.com/view/2019080811153359>.
- [131] G. Kang, Lotte Mart to strengthen fashion stores, *Financ. News* (2020). Retrieved from, <https://www.fnnews.com/news/202011160812490201>.
- [132] N.-H. Woo, Fashion industry strengthens specialized stores, from exhibition to cafés, *Asia Today* (2018). Retrieved from, <https://www.asiatoday.co.kr/view.php?key=20180418010010777>.
- [133] S. Seabold, J. Perktold, *Statsmodels: econometric and statistical modeling with python*, *Proceedings of the 9th Python in Science Conference 57* (61) (2010) 10–25080.
- [134] J.D. Hunter, *Matplotlib: a 2D graphics environment*, *Comput. Sci. Eng.* 9 (3) (2007) 90–95, <https://doi.org/10.1109/MCSE.2007.55>.
- [135] G. Lee, A study on the collaboration design trends and strategic implications on cosmetic industry, *J. Indust. Design Stud.* 14 (2) (2020) 55–64, <https://doi.org/10.37254/ids.2020.06.52.05.55>.
- [136] A.W. Chan, H.Y. Cheung, Extraversion, individualism and M&A activities, *Int. Bus. Rev.* 25 (1) (2016) 356–369, <https://doi.org/10.1016/j.ibusrev.2015.05.011>.
- [137] S.-J. Kwon, Fashion company, liquidity emergency! the sale of real estate and brands, *Fashion N* (2021). Retrieved from, <https://m.fashionn.com/board/read.php?table=fashionnews&number=35799>.
- [138] E.-S. Min, There is a problem with fashion global business, *Fashionbiz* (2016). Retrieved from, https://www.fashionbiz.co.kr/article/view.asp?cate=1&sub_num=22&idx=155130.
- [139] M.-J. Son, *Herald Business*, 2016. Retrieved from, <http://news.heraldcorp.com/view.php?ud=20160714000712>.
- [140] H.Y. Sohn, Blatantly copying... 'Kim kwang-chun infamous' behind the fake K in China, *The JoongAng Ilbo* (2021). Retrieved from, <https://news.joins.com/article/24064052>.
- [141] I. Glogger, L.P. Otto, Journalistic views on hard and soft news: cross-validating a popular concept in a factorial survey, *Journal. Mass Commun. Q.* 96 (3) (2019) 811–829, <https://doi.org/10.1177/1077699018815890>.
- [142] J. Oh, Comparative analysis by period and media on the determinants of trust in news media, *J. Soc. Sci.* 60 (2) (2021) 199–232, <https://doi.org/10.22418/JSS.2021.8.60.2.199>.
- [143] T. Burggraf, R. Fendel, T.L.D. Huynh, Political news and stock prices: evidence from Trump's trade war, *Appl. Econ. Lett.* 27 (18) (2020) 1485–1488, <https://doi.org/10.1080/13504851.2019.1690626>.
- [144] H.R. Kim, S.H. Hong, H. Hong, Machine learning based stock price fluctuation prediction models of KOSDAQ-listed companies using online news, macroeconomic indicators, financial market indicators, technical indicators, and social interest indicators, *J. Korea Multimedia Societ.* 24 (3) (2021) 448–459, <https://doi.org/10.9717/KMMS.2020.24.3.448>.
- [145] H. Jung, A study on the megatrend of Korean fashion industry in the new normal era, *J. Basic Design Art* 19 (4) (2018) 391–404, <https://doi.org/10.47294/KSBDA.19.4.29>.
- [146] H.L. Jang, G.W. Kang, E.J. Lee, S.R. Kim, Y.S. Lee, *Analysis of research subject network in the field of oncogene*, *J. Korea Technol. Innovat. Society* 15 (2) (2012) 369–399.
- [147] T. Kim, H. Choi, H. Lee, A study on the research trends in fintech using topic modeling, *J. Korea Academia-Indust. Cooperat. Society* 17 (11) (2016) 670–681, <https://doi.org/10.5762/KAIS.2016.17.11.670>.

- [148] T. Son, S. Hwang, An analysis of domestic and international research trends of assessment in mathematics, *Educ. Using Topic Modeling* 30 (4) (2020) 601–624, <https://doi.org/10.29275/jerm.2020.11.30.4.601>.
- [149] J. Park, Y. Lee, Exploring fashion trends using network analysis, *J. Korean Society Clothing Textiles* 38 (5) (2014) 611–626, <https://doi.org/10.5850/JKST.2014.38.5.611>.
- [150] H.Y. Park, Fiber KRW 730 billion budget fashion, the government confirmed, *Apparel News* (2021). Retrieved from, http://m.apparelnews.co.kr/news/news_view/?idx=187742.
- [151] F. Morstatter, L. Wu, U. Yavanoglu, S.R. Corman, H. Liu, Identifying framing bias in online news, *ACM Transact. Social Comput.* 1 (2) (2018) 1–18, <https://doi.org/10.1145/3204948>.
- [152] J.D. Ampah, C. Jin, I.M.R. Fattah, I. Appiah-Otoo, S. Afrane, Z. Geng, H. Liu, Investigating the evolutionary trends and key enablers of hydrogen production technologies: a patent-life cycle and econometric analysis, *Int. J. Hydrogen Energy* (2022), <https://doi.org/10.1016/j.ijhydene.2022.07.258>.
- [153] K. Sakai, K. Yamada, Machine learning studies on major brain diseases: 5-year trends of 2014–2018, *Jpn. J. Radiol.* 37 (2019) 34–72, <https://doi.org/10.1007/s11604-018-0794-4>.
- [154] D. Blei, J. Lafferty, Correlated topic models, *Adv. Neural Inf. Process. Syst.* 18 (2006) 147.