

Changes in the Research Trends of JKSC through Time Series Network Analysis

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Abstract This paper aims to analyze research trends of the studies published in the *Journal of the Korean Society of Costume (JKSC)*. Time series network analysis and word cloud analysis were employed to examine the articles published from 2008 to 2019. The findings revealed that fashion design and aesthetics research accounted the highest proportion of published articles as well as the highest citation impact, indicating that this field of study was the core research area and specificity of JKSC during the study period. The history of costume research showed a decreasing trend, while fashion marketing and psychology research showed an increase in the number of published articles. Word cloud analysis identified that keywords related to the history of costume research was another specificity of the journal. However, degree centrality value of the keywords related to the history of costume decreased in time series network analysis, indicating that the specificity faded. The importance of keywords related to fashion marketing and psychology has increased, revealing that the research interests shifted from fundamental studies to practical studies on the general apparel industry. The analysis is used as a basis to suggest future research directions to journals and researchers in clothing and textile studies.

Keywords Journal of the Korean Society of Costume (JKSC), Research trends, Semantic network analysis, Time series network, Word cloud, Citing and cited

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Introduction

Journals, as scholarly communications that publish research articles, have played an important role in academic development, reflecting not only the contemporary issues in a specific field of study, but also the characteristics and trait of the conference (Lee, 2002; Song & Chung, 2020). Identifying the reputable journals that are considered credible and relevant to the discipline is necessary for identifying high-quality academic sources, as research areas of journals are determined based on their aims and scope (Siddiqui & Jeon, 2017). Journals can be used as a criterion to assess the significance and reputation of scholars by evaluating their

published articles and contribution (Lanker, Paff, & Din, 1997). Analyzing journals, therefore, has significance in that it allows researchers to identify the academic achievements in their field of study and the future research direction (Goldsmith, 1983). There have been many studies on analyzing journal articles in various fields of study as well as in clothing and textiles. Montgomery and Ritchey (1975) examined the articles published by the journals related to

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home economics from 1971 to 1973, while Chowdhary and Meacham (1983) analyzed the changing focus on textile and clothing subject matter by quantifying and categorizing the articles published in *the Journal of Home Economics* (JHE) and the *Home Economics Research Journal* (HERJ). Oliver and Mahoney (1991) examined the *Clothing and Textiles Research Journal* (CTRJ) in relation to past trends in content areas of research, authorship, affiliation of authors, and sources of citations. In Korea, Eun and Park (2006) analyzed the articles on aesthetic aspects of costumes and design published in *the Journal of the Korean Society of Clothing and Textiles* (JKSCT). Lee and Lee (2007) examined the research topics of papers in the fashion marketing field published in the *Journal of the Korean Society of Costume* (JKSC) and suggested that various methodological approaches are required for curricular development in fashion marketing field. In addition, there have been continuous attempts to analyze the research trends in recognized journals in the clothing and textiles field. Park, Ha, Lee, and Lee (2014) examined academic progress of the Korean Society of Clothing and Textiles by comparing research trends of JKSC-publication to international journals and Siddiqui and Jeon (2017) identified the development of the Fashion and Textiles Research Journal through analyzing research trend based on quantitative variables in articles (Siddiqui & Jeon, 2017). Investigating research topics and content through analyzing trends in published articles facilitates academic development in that field of study or help to establish the identity of journals. The identity of a journal is especially important, because it allows that journal to establish its presence in a specific academic discipline and enables the published literatures to be systematic, so that the need for research trend analysis is emphasized (Song & Chung, 2020).

This study aims to analyze research trends in the JKSC, which is published by ‘The Korean Society of Costume (KSC).’ Established in December 1975, KSC, with 4000 members, has contributed on the study of costume for over 45 years. JKSC, since its initial launch in 1977, has published 228 issues, facilitating academic development in the field of costume studies such as history of costume, fashion design, fashion marketing, and clothing construction. Fifteen papers in relation to research trend studies were identified among

the published articles in JKSC when searched using keywords ‘trends’ and ‘content analysis,’ and three of them analyzed articles only published in JKSC (Choi, 2012; Lee, 2002; Lee & Lee, 2007). Lee (2002) examined articles published in JKSC from 1977 to 2001 in relation to past research trends in general, while the other two studies analyzed specific fields of study: fashion marketing (Lee & Lee, 2007) and fashion design (Choi, 2012). However, considering dramatic changes in the intellectual structure due to the transition to online retailing in the apparel industry since 2000, periodical changes in research trends need to be investigated. Therefore, this study attempts to collect and analyze the quantitative data of the JKSC offered by Korea Citation Index (KCI) from 2008 to 2019 and to investigate changes in research keywords of all works published in JKSC within the period, employing time series network analysis. In addition, this paper aims to identify the specificity of JKSC and explore changes in intellectual structure for academic development by examining the citation report. Given that JKSC is an authoritative journal which has led the clothing and textile studies along with the JKSC and facilitated development in Korean costume and fashion design field, exploring the research trends in articles published in JKSC would have a great significance. The research findings could be used as useful information by conference organizers, journals, and researchers to understand the future directions of clothing and textile studies.

Literature Review and Research Methods

Semantic Network Analysis

This research employed semantic network analysis to explore changes in research trends and keywords in JKSC over time. Semantic network analysis is a method used to analyze the context of semantic structure comprising an article, compared to social network analysis, which explores the interactions among social actors (Mitchell, 1969; Seo, Choi, Oh, & Lee, 2019). As computer-based content analysis, semantic network analysis overcomes limitations of the traditional

content analysis, which is labor-intensive and influenced by subjectivity of researchers (Park & Leydesdorff, 2004). Semantic network analysis allows patterns to be recognized at high levels of conceptual abstraction based on the frequency of referred words and semantic relationships among co-occurred words (Seo et al., 2019). Importance of the nodes is calculated by centrality measures, which provide statistical data to describe individual actors' positions in the network (Hanneman & Riddle, 2005). Node centrality measures include degree centrality (C_d), eigenvector centrality (C_e), betweenness centrality (C_b), and closeness centrality (C_c); in this research degree centrality was used. Degree centrality measures ranks nodes based on the number of links held by each node, showing prominence of a node in connecting other nodes. Degree centrality needs to be normalized as a value between 0-1 to be comparable across networks, because the centrality value tends to increase when the amount of collected document or networks are large (Zafarani, Abbasi, & Liu, 2014). Therefore, this research employs the following formulation from the previous research to compute normalized degree centrality:

$$C_d^{norm} = \frac{D_a}{(n-1)}$$

(Zafarani et al., 2014)

Recently, semantic network analysis has been increasingly employed in clothing and textile studies to identify research trend. Park et al. (2014) investigated the relative position of researchers using a co-occurrence matrix based on the quantified data of authors and analyzing centrality to identify a pattern of authors' interaction and the most contributed authors in the network. Seo et al. (2019) identified trends of keywords in articles published in the *Research Journal of the Costume Culture (RJCC)* from 2016 to 2018 and observed changes in a time series. Seon, Kim, Lee, and Lee (2019) examined the intellectual structure of apparel research and the academic influence of RJCC through bibliometric citation analysis. As identified in the previous studies, keywords, quantitative information, and bibliometric citation index can be useful data to measure trends and influence of journals. The present research, therefore, aims to examine the research trends of published

articles in JKSC by subject area and changes in the intellectual structure of the journal, using quantitative data and semantic network analysis with the following research aims:

- Research aim 1. To examine the trend of published literatures by subject area.
- Research aim 2. To identify the citation structure in general.
- Research aim 3. To investigate changes in research trends.

Data Collection and Analysis

To investigate the research trends in JKSC over time, articles from Volume 58, Number 1 to Volume 69, Number 8 published between 2008 and 2019 were used. Quantitative data were collected from JKSC research papers offered by KCI, including the number of articles in each volume, title of research, keywords, and citation impact.

The following process was used for the data analysis. First, based on the advice from three experts in clothing and textile studies, detailed fields of study were classified to analyze the quantitative data of published literature. Six categories are classified including history of costume, fashion design & aesthetics, fashion marketing & psychology, textile, clothing construction, and general costume based on the classifications of KSC, and data were clustered at three-year intervals. Then, collected research titles and keyword data were preprocessed in order to conduct semantic network analysis. For Korean, the morphological analyzer 'Mecab,' which segments words in detail referring to the dictionary, was used to extract the keywords by morphemes, and only nouns were collected. The final list of keywords was determined by removing unnecessary keywords such as special characters, punctuation marks, and numbers and refining keywords through integrating synonyms. TF-IDF score was used for keyword extraction to identify the ratio of a term's occurrence in a document and to measure the importance of a word in a given text by calculating the weights of rare words in the text.

Based on the literature review, word cloud analysis and

time series network analysis were utilized for visualizing the semantic network. Word cloud analysis is a visual representation of unstructured data that retrieves the frequency of each word within a given text and display the weights of words based on size, color, and the level of cluster (Seon, Park, & Lee, 2020). Word cloud visualization was created through the ‘Tagxedo’ website, using the 100 words that appeared most frequently in the titles and keywords of the JKSC articles from 2008 to 2019 based on TF-IDF score. Time series network analysis analyzes text data continuously recorded in series of particular time periods to identify or compare the features of trends and their changes over time. Based on TF-IDF score, 50 top-ranked keywords in each interval were extracted, and NodeXL is used to visualize the network and measure degree centrality.

Research Results

Quantitative Information of Published Research

Trends of published literatures by subject area. Although 10 issues of JKSC were published per year until 2011, this was reduced to 8 issues from 2012 in order to improve the quality of the research articles in the journal. Therefore, a total of 104 issues were published with 1135 articles within the studied period. Research topics of the articles published in the journal include ‘clothing’ in the life science domain and ‘costume’ in the arts and Kinesiology domain, and research areas are mainly divided into four subjects: ‘history of costume,’ ‘fashion design & aesthetics,’ ‘fashion marketing & psychology,’ and ‘textile, clothing construction & general

costume.’ This study segmented the research areas into six, separating textile, clothing construction, and general costume, respectively. The number of published articles under each subject area is enumerated in Table 1.

First, the total number of published articles was identified by interval; it was the largest in 2008–2010 with 353 papers, but decreased gradually by 35% to 214 papers in the 2017–2019 period. These results were consistent with those of previous research which witnessed a decreasing trend in the number of publications from 2007 to 2010 (Choi, 2012; Choi, 2016). Even considering scaling back of the publication from 2012, the reduction rate is significant, requiring further analysis to investigate the cause.

Looking at the number of published articles by the subject areas for the entire time period, fashion design & aesthetics appeared most frequently, with 542 papers (47.8%) published, followed by history of costume (276, 24.3%), fashion marketing & psychology (216, 19.0%), clothing construction (41, 3.6%), general costume (41, 3.6%), and textiles (19, 1.7%). According to the previous research, JKSC, which specializes in history of costume field, published the largest number of history of costume-related articles from 1977 to 1985, but since 1996, more fashion design & aesthetics related articles have published (Lee, 2002). Despite the reduction in publication numbers, fashion design & aesthetics-related research has shown a high proportion steadily, proving that JKSC is the representative journal in that field of study (Table 1). Meanwhile, history of costume-related research has been decreasing by 50% in the number of published papers by the 2017–2019 period. An increasing number of fashion marketing & psychology studies have published and overtook history of costume

Table 1. Changes in the number of published literatures by subject area

Period	HC	FDA	FMP	T	CC	GC	Total
2008-2010	104(29.5 ^a)	168(47.6)	44(12.5)	4(1.1)	17(4.8)	16(4.5)	353
2011-2013	67(22.3)	155(51.5)	50(16.6)	4(1.3)	11(3.7)	14(4.7)	301
2014-2016	55(20.6)	129(48.3)	56(21.0)	8(3.0)	8(3.0)	11(4.1)	267
2017-2019	50(23.4)	90(42.1)	66(30.8)	3(1.4)	5(2.3)	0(0.0)	214
Total(%)	276(24.3)	542(47.8)	216(19.0)	19(1.7)	41(3.6)	41(3.6)	1135(100)

a. Numbers in parentheses are percentage of each research area by period

HC=History of Costume, FDA=Fashion Design & Aesthetics, FMP=Fashion Marketing & Psychology, T=Textile, CC=Clothing Construction, GC=General Costume

research from 2014–2016 period, indicating changes in intellectual structure of JKSC. These findings are consistent with previous studies which identified an increasing proportion of fashion marketing research (Lee, 2002; Ji & Lee, 2017). Although many clothing construction-related articles were published in 1960, the prevalence of this field gradually weakened (Jung, Park, & Hwang, 1991), and the rate of publication was weak in 2017–2019 as time passed. Also, clothing science was one of the research areas most actively conducted in clothing and textile studies until 1980 (Jung et al., 1991), but JKSC showed a very low publication rate, as in the clothing construction field, implying that the proportion of major research subjects in JKSC is polarized.

Analysis of citation impact. In order to examine the scholarly merit of JKSC, citation index were collected as listed in Table 2. According to the previous research, citation frequency is used as an important index to measure the influence and quality of journals (Seon et al., 2019). Among the articles published in JKSC during a given period, fashion design and aesthetics related papers have cited the most, with a total cited times of 1554 (45.4%), followed by fashion marketing & psychology (987, 28.9%), history of costume (571, 16.7%), clothing construction (151, 4.4%), and textiles (33, 1.0%). These results indicate that JKSC is recognized as a major journal in the fashion design and aesthetics field with academically high-quality papers. Consistent with a decreasing trend in the number of publication, citation impact has decreased especially in fashion design & aesthetics-related research, which showed the highest citation frequency and highest rate of reduction in citations. Citation frequency of the fashion design & aesthetics field

dramatically reduced from 802 in 2008–2010 to 26 in 2017–2019, allowing fashion marketing & psychology studies to be ranked highest. Possible reasons for his occurrence can be the growth of other journals specialized in a specific area or topic. For example, unlike JKSC, which covers all subject areas related to the clothing and textile studies, the *Journal of Fashion Design (JFD)* focuses on the fashion design field. Given that the impact factor of JFD reported by KCI has increased from .25 in 2010, .35 in 2011 to .89 in 2012, the journal seems to have been academically recognized after being registered in 2011. Considering the dramatic decrease in the citation index of JKSC, competitiveness in the fashion design field seems to have been dispersed to other journals. Citation index of history of costume research also showed continuous decline, while clothing construction, general costume, and textile studies were not cited in the 2017–2019 period.

Structure of citations was examined using bibliometric citation data, shown in Table 3. The research domain of journals from which the articles in JKSC mainly cite include life science, which of the same domain; apparel, which is of a similar domain; and design, and fine arts, which is in the arts domain. The articles of JKSC seem to ensure the academic quality and merit by citing articles in similar areas or in the arts, as the core research area of the journal is fashion design and aesthetics. This would be regarded as a specificity of JKSC compared to other journals in the same field of study. In addition, citations from the articles related to journalism and broadcasting and psychology science were identified. This can be considered a result of a recent growth in the fashion marketing & psychology field in JKSC. The journals that cited articles in JKSC are mainly in life science,

Table 2. Changes in citation impact by subject area

Period	HC	FDA	FMP	T	CC	GC	Total
2008-2010	379(20.3 ^a)	802(43.0)	513(27.5)	11(0.6)	82(4.4)	77(4.1)	1864
2011-2013	127(12.9)	465(47.4)	305(31.1)	14(1.4)	40(4.1)	31(3.2)	982
2014-2016	56(11.2)	261(52.2)	130(26)	8(1.6)	29(5.8)	16(3.2)	500
2017-2019	9(12.2)	26(35.1)	39(52.7)	0(0.0)	0(0.0)	0(0.0)	74
Total(%)	571(16.7)	1554(45.4)	987(28.9)	33(1.0)	151(4.4)	124(3.6)	3420(100)

a. Numbers in parentheses are percentage of each research area by period

HC=History of Costume, FDA=Fashion Design & Aesthetics, FMP=Fashion Marketing & Psychology, T=Textile, CC=Clothing Construction, GC=General Costume

Table 3. Citation structure of 20 top-ranked journals: from 2008 to 2019

No.	Journals Citing JKSC			Journals Cited by JKSC		
	Journals	Domain	Frequency (%)	Journals	Domain	Frequency (%)
1	JKSC	Life Sciences	1356(22.4)	JKSC	Life Sciences	1298(18.3)
2	JKSCT	Life Sciences	760(12.5)	JKSCT	Life Sciences	560(7.9)
3	RJCC	Life Sciences	467(7.7)	FTRJ	Life Sciences	549(7.7)
4	FTRJ	Life Sciences	286(4.7)	RJCC	Life Sciences	484(6.8)
5	JFB	Life Sciences	170(2.8)	JKFCDA	Costumes	356(5.0)
6	JKSDC	Design	164(2.7)	JFB	Life Sciences	329(4.6)
7	FER	Life Sciences	151(2.5)	JKSDC	Design	320(4.5)
8	JKTC	Costumes	145(2.4)	JKTC	Costumes	310(4.4)
9	JFD	Costumes	140(2.3)	JFD	Costumes	226(3.2)
10	JKFCDA	Costumes	121(2.0)	JKDF	Design	176(2.5)
11	JBDA	Arts in General	105(1.7)	JKSCos.	Beauty	174(2.5)
12	KJHE	Life Sciences	93(1.5)	KJHE	Life Sciences	141(2.0)
13	JKDF	Design	92(1.5)	JKSKD	Costumes	112(1.6)
14	ADR	Design	72(1.2)	FER	Life Sciences	111(1.6)
15	JCS	Economics	53(0.9)	JBDA	Arts in General	104(1.5)
16	KJA	Journalism and Broadcasting	52(0.9)	KSBA	Beauty	89(1.3)
17	JDD	Design	37(0.6)	AJBC	Beauty	51(0.7)
18	JKSCS	Art	36(0.6)	KSSA	Interdisciplinary Research	48(0.7)
19	KJCAP	Psychological Science	35(0.6)	KSSS	Kinesiology	45(0.6)
20	JKCA	Interdisciplinary Research	31(0.5)	JIC	Beauty	45(0.6)

Note. Shades represent non-overlapping subject categories, and journal names shown are abbreviations for the journal's full name. (Korea Citation Index [KCI], n.d.)

costumes, and design. These results indicate that JKSC has significant influence on the advancement of clothing and textile studies. Also, articles in JKSC were cited in other fields of study such as beauty and Kinesiology. These results show that aesthetics-related studies published in JKSC such as on appearance management, body image, and somatotype are academically excellent and actively used in interdisciplinary research.

Semantic Network Analysis

Identity of journal based on research keywords. Keywords of articles are considered to imply contain comprehensive content contained in the article, that it can be used as major data to identify the research content. Therefore, word cloud analysis was conducted to identify specificity and major features of published articles of JKSC and to explore the intellectual structure of the journal. One-hundred keywords

were extracted from the titles and keywords of all articles published in JKSC from 2008 to 2019. To exclude the researcher's subjectivity when the original data sources are refined, TF-IDF scores of keywords were calculated to extract 30 top-ranked keyword, enumerated in Table 4. The network image was visualized based on the keywords as illustrated Figure 1, and the word cloud image was created using TF-IDF score, as shown in Figure 2.

The network image of whole keywords showed co-occurrence of synonyms such as 'costume,' 'clothing,' and 'apparel' in Figure 1. Each of these keywords are connected to other keywords that represent the specific field of study, suggesting that different terms are used in different research areas. For example, 'costume' was identified to be used in history of costume research, strongly connected with 'Joseon Dynasty (weight=3.2),' 'tradition (weight=3.1),' and 'excavation (weight=2.8).' 'Clothing' was often used in fashion design and aesthetics related research, showing

Table 4. Main research keywords: 30 top-ranked during the whole period

No.	Keyword	Frequency	TF-IDF	No.	Keyword	Frequency	TF-IDF
1	Fashion	629	709.7	16	Development	95	238.4
2	Design	354	573.2	17	Type	78	224.0
3	Image	181	440.9	18	Consumer	68	213.5
4	Costume	160	367.1	19	Influence	73	200.0
5	Brand	120	362.8	20	Behavior	56	197.9
6	Characteristic	189	361.5	21	Purchase	56	196.3
7	Korea	150	355.1	22	Product	55	192.7
8	Woman	130	322.0	23	China	52	182.2
9	Joseon Dynasty	114	297.8	24	Digital	44	175.4
10	Man	84	265.4	25	Formativeness	53	174.5
11	Clothing	84	262.0	26	Tradition	51	170.4
12	Style	81	255.9	27	Pattern	43	165.7
13	Modern	96	246.2	28	Virtual	31	147.6
14	Apparel	78	243.3	29	Color	39	147.1
15	Culture	78	241.7	30	Society	37	142.6

Note. Sorted in descending order by TF-IDF

(197.9), ‘digital (175.4),’ ‘virtual (147.6),’ ‘online (121.0),’ ‘service (109.8),’ and ‘communication (79.2)’ were seen in the list. These results suggest that a variety of research topics are discussed in the journal.

Changes in keywords for research by period. To

identify the changes in research keywords, time series network analysis was conducted. In connection strength analysis, relative connection strength between 1-10 is used. Network visualization and degree centrality values are as shown in Figure 3 and Table 5, respectively. Time series



Figure 2. Main research keywords: Word cloud visualization

network analysis revealed that keywords that appeared together throughout the years include 'fashion,' 'brand,' 'style,' 'China,' 'costume,' 'culture,' 'digital,' 'Korea,' 'woman,' 'apparel,' 'consumer,' 'image,' 'clothing,' 'pattern,' 'characteristic,' 'color,' 'Joseon Dynasty,' 'design,' 'behavior,' 'satisfaction,' 'tradition,' 'influence,' 'development,' and 'man.' These keywords reflect not only the research topics studied often in JKSC, but also core research areas such as fashion design & aesthetics and history of costume. Moreover, keywords such as 'fashion,' 'Korea,' 'characteristic,' 'image,' 'women,' 'design,' 'clothing,' 'development,' 'influence,' and 'consumer' showed higher levels of degree centrality, indicating that they are major research keywords in general clothing and textile studies regardless of time. However, degree centrality of 'tradition' and 'Joseon Dynasty' decreased from .65 and .43, respectively, in the 2008–2010 period to .27 and .16 in the 2017–2019 period. In addition, although 'Hanbok' appeared in the list with degree centrality value of .45 during the first period, it was not included in the 2017–2019 period. These results seem to be related to the decreasing trend of publication in the history of costume field, indicating that the specificity of JKSC has faded slightly. Meanwhile, degree centrality of 'consumer,' 'behavior,' and 'influence' has increased over time, implying that research on fashion marketing & psychology has been extending in JKSC. These results indicate that the research interests in clothing and textile studies have been shifted from the fundamental research area in which basic knowledge is explored to the practical research area such as merchandising and the general apparel industry.

Analysis of changes in research topic over time revealed that keywords in relation to the history of costume field such as 'insignia badge ($C_d=.12$),' 'Hanbok ($C_d=.45$),' 'Jeogori ($C_d=.31$),' 'excavation ($C_d=.29$),' and 'costume ($C_d=.69$)' appeared frequently in the 2008–2010 period. Especially 'costume' was connected more strongly with 'Joseon Dynasty' and 'excavation' than with other keywords, with connection strength values of 3.2 and 2.8, respectively, indicating that costume studies mainly examined relics and excavated clothes. Also, the results showed the fashion design related keywords such as 'illustration ($C_d=.12$),' 'product ($C_d=.55$),' and 'development ($C_d=.55$)' as well as

the aesthetic related keywords such as 'image ($C_d=.82$),' and 'culture ($C_d=.78$)'. Connection strength between 'design' and 'development' was 3.6, while 'development' was connected with 'culture (weight=3.0)' and 'product (weight=2.1),' and 'culture' and 'design' are strongly connected with connection strengths of 5.0. These results imply that many studies have been conducted on development of cultural products were conducted.

During the 2011–2013 period, fashion design and history of costume were the major fields of study. Degree centrality value of keywords such as 'design ($C_d=.84$)' and 'development ($C_d=.61$)' increased compared to previous years, and keywords related to merchandising such as 'uniform ($C_d=.16$)' and 'outdoor ($C_d=.16$)' newly appeared, indicating that research was conducted on development of practical fashion merchandising. In history of costume field, relatively stronger connection strength was identified between 'textile' and 'excavation,' at 2.4, and 'pattern' and 'tradition,' at 2.1, implying that research on excavated clothing and traditional patterns continued to be conducted while traditional patterns were studied. Moreover, connections between 'brand' and 'consumer' and between 'purchase' and 'intention' became stronger than previous years, at 3.6 and 4.2, respectively, indicating a network extension in fashion marketing & psychology field.

This trend continued up to the 2014–2016 period: while research in history of costume field relatively decreased, studies mainly conducted on consumer behavior with keywords such as 'satisfaction ($C_d=.31$),' 'preference ($C_d=.49$),' and 'perception ($C_d=.35$)' and on fashion marketing & psychology with keywords such as 'job ($C_d=.18$),' 'retail store ($C_d=.20$),' and 'advertisement ($C_d=.22$).' Especially, in 2015 when the fourth industrial revolution became an issue, keywords related to the new technology such as 'virtual ($C_d=.33$)' and 'online ($C_d=.12$)' appeared. 'Virtual' was connected to keywords such as 'fashion (weight=1.9),' 'model (weight=1.3),' 'development (weight=1.2),' and 'image (weight=1.2),' implying that studies were conducted on the image and perception of virtual modeling in the advertisement in fashion marketing & psychology field as well as on the development of 3D virtual fitting, 3D CAD programs, and 3D printing in the fashion

design & aesthetic field. This period can be seen as a tipping point when the researchers' interests expanded to application research such as clothing production, technology, and product manufacturing.

Lastly, in 2017-2019 period, degree centrality of 'consumer ($C_d=65$)' increased dramatically while keywords such as 'intention ($C_d=55$),' 'influence ($C_d=61$),' and 'behavior ($C_d=55$)' were ranked higher than previous years, indicating that many studies on consumer behavior were conducted. Especially, 'intention' was strongly connected with 'purchase (weight=4.4),' while 'purchase' was connected with 'cosmetics,' 'satisfaction,' 'service,' 'mobile,' and 'tendency,' showing the extension in fashion marketing field of study. In addition, keywords that reflect social and industrial trends such as 'service ($C_d=35$),' 'mobile ($C_d=33$),' 'content ($C_d=27$),' 'innovation ($C_d=18$),' 'big data ($C_d=14$),' and 'communication ($C_d=14$)' appeared, implying

that the intellectual structure of JKSC was broadened to industrial applications and interdisciplinary convergence.

Conclusion

Retrieving verified academic sources from reputable journals is important for conducting academically valuable research. Therefore, it is necessary to explore the relevant and credible journals and determine their identities in order to discern and gain reliable scholarly information. This study examined the identity, intellectual structure, and research trends of JKSC which is the leading journal in clothing and textile studies, by conducting semantic network analysis based on the quantitative data of the journal. The results of data analysis based on the 1135 papers published from 2008 to 2019 are summarized as follows.

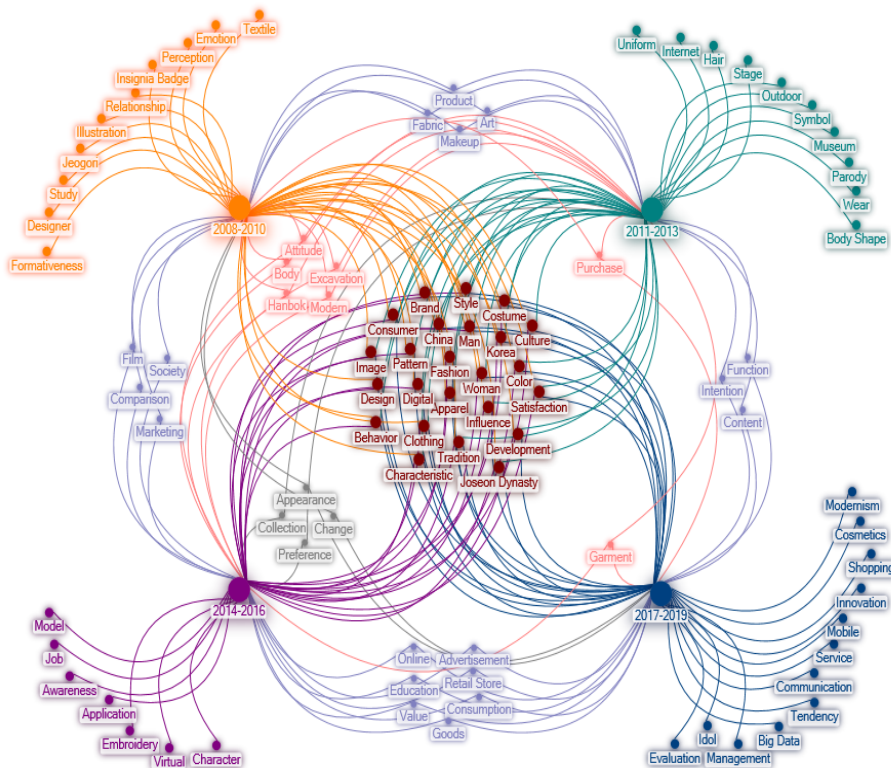


Figure 3. Changes in research Keywords: Time series network

Table 5. Changes in research keywords by period: 30 top-ranked degree centrality

No.	2008-2010		2011-2013		2014-2016		2017-2019	
	Keyword	C _d ^a	Keywords	C _d	Keyword	C _d	Keyword	C _d
1	Fashion	.86	Design	.84	Fashion	.88	Fashion	.90
2	Korea	.84	Fashion	.84	Characteristic	.78	Characteristic	.67
3	Characteristic	.84	Characteristic	.82	Korea	.69	Consumer	.65
4	Image	.82	Korea	.82	Design	.67	Korea	.61
5	Woman	.78	Woman	.80	Application	.65	Influence	.61
6	Culture	.78	Image	.65	Culture	.65	Behavior	.55
7	Design	.76	Costume	.63	Comparison	.61	Woman	.55
8	Costume	.69	Development	.61	Apparel	.61	Intention	.55
9	Tradition	.65	Apparel	.59	Woman	.61	Brand	.53
10	Apparel	.65	Culture	.55	Costume	.59	Purchase	.53
11	Formativeness	.61	Tradition	.55	Image	.59	Goods	.51
12	Modern	.59	Style	.51	Development	.57	Development	.49
13	Color	.57	Modern	.51	Style	.57	Image	.49
14	Development	.55	Influence	.49	Influence	.55	Apparel	.45
15	Product	.55	Product	.47	Consumer	.53	Design	.45
16	Influence	.55	Brand	.47	Attitude	.51	Cosmetics	.41
17	Study	.51	Pattern	.47	Brand	.51	China	.41
18	Pattern	.49	Behavior	.47	Modern	.49	Change	.39
19	Comparison	.47	Consumer	.45	China	.49	Costume	.39
20	Change	.47	Purchase	.45	Preference	.49	Tendency	.39
21	Clothing	.47	Preference	.43	Tradition	.47	Shopping	.39
22	Society	.47	Body	.41	Goods	.41	Evaluation	.39
23	Attitude	.47	Man	.41	Behavior	.39	Culture	.37
24	Consumer	.47	Color	.41	Garment	.39	Service	.35
25	Textile	.45	Clothing	.41	Clothing	.39	Style	.35
26	Hanbok	.45	China	.39	Body	.37	Mobile	.33
27	Joseon Dynasty	.43	Joseon Dynasty	.39	Marketing	.37	Value	.33
28	Man	.43	Satisfaction	.39	Awareness	.35	Satisfaction	.31
29	Purchase	.43	Wear	.39	Color	.35	Man	.29
30	Body	.41	Garment	.39	Model	.35	Advertisement	.29

a. C_d=Degree Centrality

First, the number of published articles over the time period showed a continuous decrease after the peak in the 2008–2010 period with 353 papers. In relation to the number of published articles according to the research subject areas, fashion design & aesthetics-related research showed the highest proportion, followed by history of costume, fashion marketing & psychology, clothing construction, general costume, and textile. Despite the reduction in published

issues, fashion design and aesthetics studies have published steadily at the highest proportion throughout the years as a major research area of JKSC. The number of fashion marketing & psychology related studies has increased and exceeded history of costume related studies from the 2014-2016 period onwards, showing the increasing importance of fashion marketing & psychology field in the intellectual structure of JKSC.

The results of citation structure analysis showed that articles related to fashion design & aesthetics were the most frequently cited, in accordance with the number of published papers, followed in order by fashion marketing & psychology, history of costume, clothing construction, general clothing, and textile. However, as declining trend in citation index was identified in general, the specific reasons and solutions are required to be analyzed. The results of analyzing citations between journals through bibliometric citation data showed that the journals mainly cited by articles in JKSC specialized in the same domain of life science, the similar domain of clothing, and arts domains such as design and fine arts. By citing articles not only in the same field of study, but also similar fields, the published articles in JKSC have ensured academic quality and values. The journals that cited articles of JKSC were specialized in the same domain of life science, the similar domain of clothing, and arts domains such as design. The results suggest that articles on aesthetics published by JKSC are of academically high-quality sufficient to be cited in various fields of study. From its first issue, JKSC had the highest proportion of history of costume research, but after the 1990s, fashion design & aesthetics research consistently surpassed history of costume in volume. The results of word cloud and time series network analysis showed that keywords related to fashion design & aesthetics and history of costume appeared the most frequently and repeatedly over the whole period. Considering fashion design & aesthetics research had the highest citation index, it can be considered as an established research field in JKSC and a competitive advantage over other journals in the related research fields. However, the competitiveness in fashion design & aesthetics field seemed to have faded in 2017-2019 period with lower citation index than fashion marketing & psychology research. Therefore, strategies are required to establish the identity of the journal and improve academic influence. In fashion design & aesthetics research, keywords with high-ranked degree centrality appeared consistently over time, indicating that similar research topics were studied over a long period of time. Therefore, it is required to try new research subjects or methodologies, such as state of the art technology or big data analysis, as well as to broaden intellectual structure by encouraging researchers

to conduct interdisciplinary convergence research actively.

The findings of this study indicate a decreasing trend in history of costume research, which accounted for the high proportion of articles as a major field of study, suggesting that specificity of JKSC has faded. Traditional costume and culture can be used for expression of national identity, and traditional culture became more important in this age of globalization. As demand for the development in Korean traditional culture content and succession of tradition is increasing, history of costume related research is regarded as highly important. Therefore, to reinforce an academic specificity of JKSC, the journal needs to expand history of costume studies by encouraging rising researchers and publishing more articles in the subject area, whereas researchers need to try a multifaceted approach to the research content.

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