RAST MUSICOLOGY JOURNAL | SUMMER 2022, 10(2) 229-241
Research Article

A big data analysis of K-POP on social media: focused on images, figures, and public attitude

Inho Lee*
Johee Lee**

*Corresponding author, Department of Practical Music, Kyonggi University, 2307, Chungjeonggwan, 24, Kyonggidae-ro 9-gil, Seodaemun-gu 03746, Republic of Korea. Email: soulinno@kgu.ac.kr ORCID: 0000-0001-7096-0670

**First author, Department of Performance Music, Graduate School of Hallyu Culture, Kyonggi University, 1410, Geumhwagwan, 24, Kyonggidae-ro 9-gil, Seodaemun-gu 03746, Republic of Korea. Email: li-20301@kgu.ac.kr ORCID: 0000-0001-5652-8355

DOI 10.12975/rastmd.20221024 Submitted April 29, 2022 Accepted June 17, 2022

Abstract

This study aims to present the image and thoughts about K-POP among the public through objective data as we realized that it is necessary to conduct a systematic analysis of the public mentality and attitude toward K-POP to sustain the movement of Hallyu or Korean Wave. To this end, we used the big data in 2014 and 2021 to compare and analyze the K-POP-related images, figures, and public attitude between the two time points. The result can be summarized as follows: First, between 2014 and 2021, the changes over time in the media, where K-POP can be accessed by the audience, are more pronounced than common images about K-POP; Second, the figures that appeared consistently and commonly in 2014 and 2021 were found to be EXO and BTS, popular South Korean boy-bands. In the case of EXO, there was no commonly related figure at both points of time, but as for BTS, it was found that their fan club, A.R.M.Y, appeared as a common related figure; Third, compared to 2014, the rate of positive response toward K-POP decreased while negative response increased in 2021; in other words, the attitude toward K-POP turned negative. Unlike the previous studies that collect data with questionnaires or materials and analyze them, we used the already stored data and Sometrend, Korea's big data analysis software, provided by VAIV Company, to find out what people think about K-POP. This study is significant as it extracts information from the existing data, analyzes the contents, and reinterprets the results from various angles to derive meaningful results. It is expected that the findings of this study, presented through precise data—the K-POP-related images, figures, and public attitude—will be used as basic material to contribute to the sustaining of the K-POP wave.

Keywords

Big Data, BTS, EXO, K-POP, Social Media

Introduction

In the past, communications occurred mostly offline and in oral forms. Along with the widespread use of smartphones and rapid growth of online activities, we are now able to instantly access and exchange information in various forms. High penetration of smartphones increased the use of social networking services (SNS), and the number of SNS users has been continuously increasing as the internet access is becoming available anytime anywhere. In the media convergence environment, SNS users are not just passive consumers as they used to be; they produce information themselves in active and individualized ways and share them with others, via one-to-many bidirectional media. Now we have reached the stage where we can process the data and information produced by the public to suite the purpose and needs, and analyze the result data to predict the behavior and mentality of people. As a part of the 4th Industrial Revolution, SNS plays a central role in providing 'Big Data' to analyze the information sharing algorithms of the public.

The term 'Big Data' became a household word since the victory of the democratic

candidate Barack Obama in the 2008 U.S. presidential election where he was known to use big data to create a voter map to use a digital campaign geared toward the connected set. The explosive data in the digital space is a key resource in the analysis of big data. The traces we make using internet and social media are restored as data. Through the analysis of this accumulated data, we are able to understand the life patterns, desires, and interests of consumers and to establish a marketing strategy to lure them.

A growing number of countries and companies are evaluating big data as an innovative technology of the future, which is predicted to be an era of big data. The analysis of big data has been used a lot in research lately, as it enables us to grasp the newest trends and phenomena, to create new values in combination with other areas, and to establish strategies in various fields (Kim, 2011). Currently, various studies using big data are conducted in collaboration with industries, but there has been lack of research in the music industry. It is time to connect the features and technologies of big data in the field of music through the research conducted from various angles.

Big data can be applied in a number of ways, in various fields. In particular, it can be used for 'the sustaining of K-POP as Hallyu,' a goal for many artists, educators, and researchers, who majored in K-POP (Cho & Sim, 2013; Kim, 2015; Hwang, 2013; Lee & Kwon, 2021; Lee & Jang, 2019). In the 21st century, 'the era of culture,' when the culture of a country is considered a competitive edge, it is important to conduct a primary survey for K-POP consumers to sustain the Hallyu boom. Just as companies pursuing profits use big data to analyze customers' propensity to create products that customers want, and do customized publicity and marketing to win customers' hearts, K-POP would have to make the same efforts.

Characteristics and Use of Big Data

There are three defining properties of big data; the amount of data (volume), the speed of data generation (velocity), and the variety of the formats (variety), dubbed the three Vs (O'Reilly Radar Team, 2012). Since then, as the concept of data has gradually been changing, some argue 6Vs, including veracity, visualization, and value of data. To sum up, big data is an information asset with huge capacity and high speed or diversity, through which we can discover new values to find new insights, make rational decisions based on it, and optimize the process.

Eric Schmidt when he was CEO at Google in 2010 said at the Technomy Conference: "There was 5 exabytes of information created between the dawn of civilization through 2003," he proclaimed, "but that much information is now created every 2 days (Google, 2010). You can see how large it is considering that in 2021 Apple was storing 8 exabytes of data in Google Cloud (Hwang, 2021). According to a report by John Gantz and David Reinsel, the first zettabyte-scale data was created in 2010, with 75% of the data being created voluntarily by individuals. They expected that the data would about double every two years, to grow to 7.9 zettabytes in 2015.

A report of the U.S. government has emphasized that "every Federal agency needs to have a "Big Data' strategy" (President's Council of Advisors on Science and Technology, 2011) and in 2012, announced a R&D plan for big data with a total investment of 200 million dollars (Executive Office of the President, 2012). The EU also announced the draft of the Data Act on February 23, 2022 to form a single market for big data and promote data sharing. Also, in Korea, the Three Data Acts, which utilizes big data, was passed by the National Assembly in 2020.

The advantages of the research using big data are as follows: First, it reduces the problems and sample errors in the existing methods of questionnaire, interview, and sampling, reducing the distortion of the results due to sampling errors (Ham & Chae, 2013); Second,

the unstructured data (SNS posts, photos, music, etc.), of big data, makes it possible to conduct various new research, unthinkable in the past; Third, big data can analyze not only existing stored data, but also data that is being stored in real time. This saves the time to apply the analysis result, increasing efficiency (Lee, Lim & Yoo, 2013). Starbucks Korea predicted the four coffee trends based on the big data of its operation in 2020 as Home Cafe, Order & Pay, Personalized, and Emotional well-being (Starbucks Korea, 2021). In Korea, during the presidential election in 2022, ultra-thin competition was predicted through big data analysis, from Google, Naver, and Daum, which was also proved in the results (Jeong, 2022). Big data is playing an active part in the country, government, corporations, medicine, retail, manufacturing, and public sector, with its application methods suggested in various fields.

Big Data Analysis Method and Using of Music Research

Big data analysis is an analysis of a huge amount of data that exceeds the limits of management, storage, and analysis with existing software, overcoming the limitations of capacity and extracting new value through insight (Kim, Cho & Kang, 2016). It collects and analyzes various types of big data that are being generated in real time, enabling us to predict the characteristics of the relevant field appropriately for the modern society and operate it efficiently, and provide, manage, and analyze the information tailored to the individualized members of the modern society. In the previous research, data was collected and analyzed with questionnaires or other materials, but big data is too extensive for an individual to analyze and needs a company or specific software to analyze (Han & Lee, 2012). As data has the potential to provide meaningful information to society and mankind in all areas such as politics, society, economy, culture, and science and technology, its importance has increasingly been emphasized. By analyzing such big data, it is possible to create new valuable meanings by analyzing hidden patterns and relevance (Kim, 2012; Seo, 2021). Since the result of big data analysis can be interpreted from various angles, researchers should also work to reinterpret the result to make it more meaningful (Ham & Chae, 2013).

As of May 2021, a variety of big data analysis tools are available. For example, Google Trends allows you to view data from all over the world, providing a good visual representation of data with infographics, a strength of Google. Sometrend, provided by VAIV Company, provides the refined thoughts of people, not just based on the search volume, but on keywords from the social media posts. There is various other software, free or charged, including NAVER DataLab, BLACKKIWI, keyzard, ODPia, Keyword Master, DataPlanet, and KWFinder that provide big data analysis and results.

Data mining, a representative method of analyzing structured data, creates new valuable information by identifying the relevance of hidden content from big data, to be applied in the decision-making process. However, the data posted on social media are mostly everyday languages-unstructured data— and requires analysis methods, including Text Mining, Social Web Mining, and Opinion Mining. Text mining is the process of extracting words from large collections of posts to discover the hidden emotions (Korea Information Society Agency, 2012). For example, if the word ‘music’ is searched for in a sentence in the SNS post, the keywords are connected to the words ‘good’ and ‘bad,’ on Twitter or Instagram, to interpret whether it has a positive or negative meaning. Matthew defined social web mining as a method of analyzing the main interests, influential people, songs, etc. according to the conversation content or relationship on social networks (Twitter, Facebook, etc.) (Matthew, 2011). This is mainly used to find the changes in public opinion in marketing. Similarly, opinion mining (or sentiment analysis) analyzes the

SNS text to find out about the sentiment and opinions of the people, turning their thoughts and expressions into objective information (Korea Information Society Agency, 2012). In addition, a descriptive statistical analysis method has been suggested to statistically analyze the changes in various numbers and the following on Twitter, rather than text, and interpret them (Lee, Lim & Yoo, 2013). Recently, as big data becomes commercialized, the three new factors are emerging: Veracity, Variability, and Visualization (Jeon & Seo, 2013). Variability refers to the likelihood of meaning change in the context due to the characteristics of social media where people freely express their thoughts. Veracity means that data processing organizations using big data need to look at the value and accuracy because there is a high possibility of data loss due to the huge amount of data processed. In addition, the user should know and understand the contents easily in processing structured and unstructured data. This means visualization is necessary to make everyone understand data easily not to waste time and money used to collect the data (Lee, 2013).

Problem/Aim of Study

This study aims to present the image of K-POP among the public and their thoughts through objective data based on the realization that a systematic analysis of the public mentality and attitude toward K-POP is necessary to sustain the movement of Hallyu or Korean Wave. The detailed goals of this study are as follows:

According to the analysis of big data,

- What are the differences in public opinion on 'K-POP,' between 2014 and 2021?
- What is the difference in the image of K-POP?
- Who are the K-POP-related figures?
- What is the difference in the public attitude toward K-POP?

According to the big data analysis,

- Who is the leading figure of K-POP, and who are related to the figure, and how is the public attitude?

Method

Research Model

Unlike the previous studies that collect data through the survey or questionnaire, we will use the huge amount of data left by people. To this end, we use Sometrend, operated by VAIV Company, to compare and analyze the difference between the two time points, 2014 and 2021. As a program used to analyze unstructured data, Sometrend helps analyze SNS Big Data easily. When searched with a keyword, the related words are analyzed and search results are presented up to 500 rankings. Furthermore, the related words are divided into positive and negative, to analyze the public attitude towards the search term. The original source text, including the keyword, is provided for the users to read to understand the context.

Documents

This study compares and analyzes the images and figures, associated with K-POP and public attitude toward K-POP, through the big data analysis. The time points were set as 2014 and the current research point, 2021. The year of 2014 was set as a "critical period when Hallyu's popularity and boom began, centering around K-pop, dominated by idol groups." The two periods, set as 2014 (January to December) and 2021(January to December), are compared and investigated.

SNS is a medium that represents the opinion of the people, and Twitter and Instagram are open to the public and easy to access. Thus, we selected these two social networking services as the research target.

To be specific, the target of this study is the posts created on Twitter and Instagram, between January and December 2014, and between January and December 2021, which used keyword 'K-POP.' <Table 1> shows the number of the targets of the study.

Table 1. Search Frequency in the Target SNS N=No. of Cases

Keyword	2014	2021
K-POP	165,495	273,911

Data Analysis

The purpose of this study is to examine the K-POP-related image, figure, and public attitude toward K-POP through the big data. Therefore, we extracted K-POP-related words using Sometrend, operated by VAIV Company. Extracted related words were analyzed using Welch's t-test statistical analysis and Excel in the following way:

First, descriptive statistical analysis was used through the comparison and contrast of types and frequencies of related words, between 2014 and 2021. In particular, in the percent (%) analysis, the result was expressed as a ratio of the frequency of the keyword out of the total frequency of the top 500, by category shown by Sometrend.

Second, Welch's t-test (positive test, significance level: 0.05) statistical analysis was used to check whether there was a significant difference in positive and negative public opinion between 2014 and 2021. As for the data, the percentage of positive and negative public opinion for each week was used for 53 weeks (N: 53).

Twitter is an open network that facilitates user participation and fast spread of issues while Instagram is good at distributing contents and creating service issues as a "vertical SNS platform." (Jeong, 2020) In other words, Twitter and Instagram are the social networking services that show what the public think in the mobile communication society. If a person leaves a SNS post on K-POP, the keyword suggested by the researcher, it can be interpreted that he or she thought or did something related to the keyword. Also, whether the related words, used with the keyword, are positive or negative can be understood as their association with the keywords. Therefore, it can be expressed that analyzing related words used together with the keyword through Sometrend represents people's thoughts about the keyword. In other words, related words explain or express the keyword, and not only do they represent the keyword but also express whether people are interested in the keyword at the time, serving as the data through which we can take a glance at what the public think about the keyword.

Result

The result of this study is summarized as follows:

First, 'sustainability of K-POP as Hallyu' is a familiar slogan to students, musicians, teachers, professors, and popular music scholars studying K-pop. However, the media for the public to access K-pop has been changing in various ways. If 2014 K-POP was centered around performances, 2021 K-POP appeared as various TV programs. This offers an opportunity to think again about the research and activities to sustain K-POP as Hallyu. Good performances are required to continue the K-POP boom but it is also important to think about how to utilize the mass media and internet broadcasting media. In order to increase the public's interest in K-POP, it will be necessary to study effective methods of using the media—what media to use, and how to prepare and practice for it.

Second, it is important to examine the figures related to K-POP, the result of this study. The fact that A.R.M.Y is the only figure that was common in 2014 and 2021 indicates the importance of continued interest of the fans to the activities of the artist. In other words, it will be necessary to think deeply about how K-pop artists can sustain and create synergy with their fans, and how to effectively do that. As shown in the result of this study, we need to think about popularization through the collaboration with other countries,

embracing different genres of music and artists, just like imagining Coldplay through BTS.

We studied the image, related figures, and public attitude toward K-POP using big data, but there is a possibility for more follow-up research. In other words, through big data analysis on various topics, we should analyze the public opinion carefully, with an approach based, not on thoughts or guesses, but on scientific data, to create a sustainable K-POP culture that the public wants.

Images about K-POP

As shown in [Photo 1], all related words about K-POP among the public in 2014 were related to performances such as 'Hallyu' and 'idol group' and 'concert', and 'festival.' In particular, the posts on Twitter and Instagram confirmed that words like 'love you', 'thanks' reveals the sentiment of the public toward K-POP music, targeted to 'idol groups,' which sparked the L-POP craze.

In contrast, in 2021, people associated K-POP with other formats than performances, like TV shows, including 'mama', 'Show Champion', and 'Kingdom'(See [Photo 2].) Also, as a result of checking the words 'follow', 'retweet', and 'voting' on Twitter and Instagram, it was confirmed that the public was communicating by sharing K-POP-related events with the support of their favorite artists.

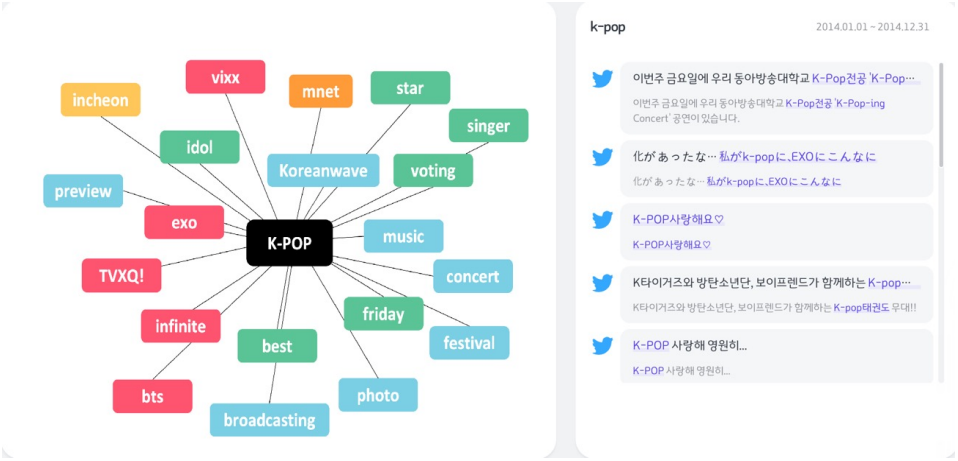

Photo 1. 2014 Map of Related Words to K-POP and Some SNS Posts

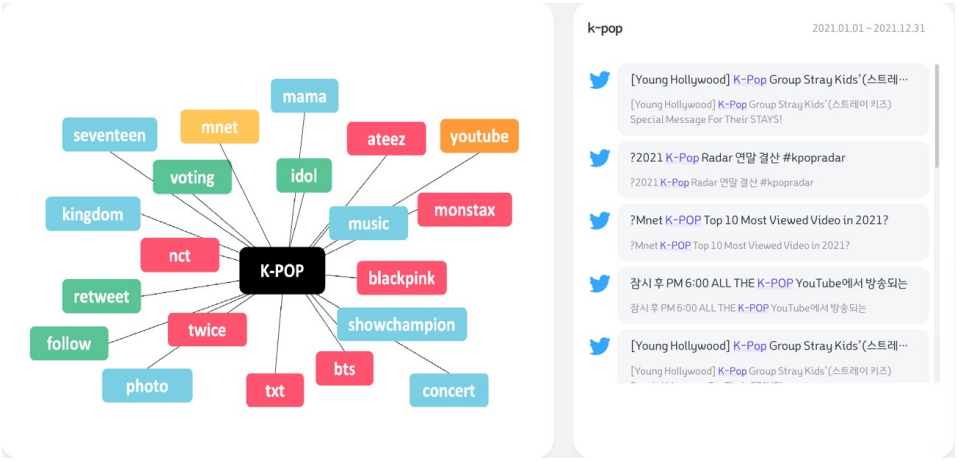

Photo 2. 2021 Map of Related Words to K-POP and Some SNS Posts

Among the top 15 images of K-pop in 2014 and 2021, the common images of K-pop music that the public has are 'Pop', 'IDOL', 'Concert', and 'BTS', as shown in Table 2.

Table 2. Top 10 Images Related to K-POP

Rank	1	2	3	4	5	6	7	8	9	10
2014	Concert 6.74%	EXO 3.43%	POP 3.19%	Video 2.49%	TVXQ! 1.78%	IDOL 1.73%	INFNITE 1.60%	INCHON 1.57%	BTS 1.38%	Stage 1.21%
2021	TREA SURE 18.28%	Music 12.22%	BLAKC PINK 8.33%	ROSE 6.26%	Source 2.12%	POP 2.00%	BTS 1.90%	NAVER 1.60%	IDOL 1.36%	Concert 1.18%

K-POP-related Figures

As shown in <Table 3>, Representative figures for K-pop appeared as EXO in 2014 and BLACKPINK in 2021. However, EXO and BTS were the only figures who were associated with K-POP both in 2014 and 2021. In particular, the top 10 people related to K-pop music in 2014 show that the 3rd generation idol group appeared along with the 2nd generation idol group who led the Hallyu craze at the time.

In 2021, it was found that the related figures expanded to include 4th generation idol groups as well as 3rd generation idol groups. In particular, EXO and BTS have been consistently mentioned in the K-POP field since 2014.

Table 3. Top 10 Images Related to K-POP

Rank	1	2	3	4	5	6	7	8	9	10
2014	EXO 8.57%	TVXQ! 5.13%	VIXX 4.71%	INFINITE 4.59%	BTS 3.43%	2NE1 2.04%	JYJ 1.71%	EUNHYUK 1.65%	Girls' Generation 1.49%	GOT7 1.44%
2021	BLACK PINK 20.81%	TREA SURE 18.95%	ROSE 16.99%	BTS 5.15%	LISA 1.313%	JISOO 1.310%	EXO 1.21%	SUPER JUNIOR 1.09%	ITZY 1.07%	MONS-TA X 0.99%

Search Frequency and Public Attitude Toward K-POP

The search frequency for K-POP increased significantly in 2021 (N=273,911) from 2014 (N=165,495). However, as shown in <Table 4>, the attitude toward K-POP showed a significant decrease in positive rate in 2021, compared to 2014, as a result of the two-sided test (degree of freedom: 79, t: 2.41, p: 0.018). Also, the negative rate significantly increased in 2021, compared to 2014 (degree of freedom: 64, t: -2.17, p: 0.034).

Table 4. Pubic Attitude toward K-POP

K-POP	2014 positive rate	2021 positive rate	2014 negative rate	2021 negative rate
Mean	92.56203721	86.15344678	4.963833	10.14322

K-POP-related Figures and Words, and Public Attitude

The figures who appeared in the top 10 in both 2014 and 2021 were EXO (2014 8.57%: 2021 1.21%) and BTS (2014 3.43%: 2021 5.15%) confirming their status as representative K-POP stars to the public. There were no significant common images between the two time points. As shown in <Table 5>, as for the related images to EXO and BTS, In 2014, images related to music videos (Video, MV) appeared in common, and in 2021, those related to Goods (Photo card, Mini photo card, Album) appeared.

Table 5. Top 10 Images Related to 'EXO' and 'BTS'

Rank	1	2	3	4	5	6	7	8	9	10
2014 (EXO)	Video 6.24%	Concert 3.50%	Mnet 2.96%	Melon 1.51%	MAMA 1.46%	Event 1.43%	MV 1.11%	Gift 1.04%	Ticket 0.91%	Sunny10 0.90%
2021 (EXO)	Mini 6.01%	Album 2.57%	Season 2.39%	Entertainment 2.34%	OST 1.87%	Bambi 1.59%	Photo Card 1.55%	AS 1.49%	Song 1.46%	Birthday 1.43%
2014 (BTS)	Video 5.45%	Luv 3.96%	Fan sing meeting 2.93%	Boy In Luv 2.89%	MV 2.87%	Photo 2.25%	Day 2.16%	American Hustle Life 2.15%	Music 2.09%	Beast 1.55%
2021 (BTS)	DVD 3.97%	MEMORIES 2.43%	Butter 2.04%	Photo card 2.03%	Sale 1.82%	Magic shop 1.64%	Album 1.56%	Card 1.52%	Mini photo card 1.47%	Goods 1.45%

Top 10 figures, related to EXO and BTS are displayed in <Table 6>. In the case of EXO, there was no common related figure in 2014 and 2021, but as for BTS, their fan club, A.R.M.Y, appeared as a related figure, common at both time points. This shows that the growth of BTS as a global artist group was possible due to the interests of A.R.M.Y. However, there was no common related figure partly because the majority of the related figures in 2014 currently stopped their activities or was disbanded.

In the case of EXO, 10 out of 10 teams in 2014 and 7 out of 10 teams in 2021 were K-pop artists while in the case of BTS, 9 out of 10 teams in 2014 and 5 out of 10 teams in 2021 were K-pop artists, as related figures. As the related figure of BTS, the world-class British rock band 'Coldplay' was mentioned as they released the album 'Universe' together in 2021.

Table 6. Top 10 Figures Related to 'EXO' and 'BTS'

Rank	1	2	3	4	5	6	7	8	9	10
2014 (EXO)	S.E.S 4.64%	DEUX 3.52%	BOA 3.43%	DJDOC 3.39%	Jo Seong Mo 3.22%	Lim Chang Jung 3.06%	B1A4 2.63%	INFINITE 2.50%	Girls' Genaration 2.19%	VIXX 2.18%
2021 (EXO)	SuperM 31.86%	Yoo Ji Ha 18.84%	NCT 5.04%	god 1.94%	BOBBY 1.84%	Cho Dal Hwan 1.80%	Bae Jeong Nam 1.47%	BTS 1.33%	Navi 1.29%	WayV 0.91%
2014 (BTS)	BEAST 20.31%	VIXX 7.36%	EXO 7.04%	Park Ji Min 6.02%	A.R.M.Y 5.97%	SUPER JUNIOR 4.73%	BAP 3.88%	2PM 3.21%	GIRLSDAY 2.57%	INFINITE 1.88%
2021 (BTS)	A.R.M.Y 23.33%	Coldplay 3.13%	JJK 3.00%	Park Seo Jun 1.60%	Jessi 1.54%	Lee Geum Hui 1.37%	KRIS 1.16%	Martin 1.15%	Choi Usik 1.06%	TXT 1.04%

The overall search frequency for EXO increased by about 5.5 times in 2021 (N=10,389,424) from 2014 (N=1,859,230). But as shown in <Table 7>, the two-sided test confirmed that there was no statistically significant difference in the positive rates of 2014 and 2021 EXO (degree of freedom: 81, t: -0.48, p: 0.63). In addition, it was confirmed that there was no statistically significant difference in the negative rates of EXO in 2014 and 2021 (degree of freedom: 80, t: -0.28, p: 0.78).

Table 7. Public Attitude toward 'EXO'

EXO	2014 positive rate	2021 positive rate	2014 negative rate	2021 negative rate
Mean	88.6732164	89.5977279	6.881051	7.32485

The overall search frequency for BTS increased by approximately 13.4 times in 2021 (N=4,704,566) from 2014 (N=351,213). As shown in <Table 8>, the two-sided test showed that the 2021 positive rate of BTS increased significantly compared to the 2014 (degree of freedom: 98, t: -2.32, p: 0.023). On the other hand, it was confirmed that there was no statistically significant difference in the negative rates of 2014 and 2021 (degree of freedom: 97, t: 1.81, p-value: 0.074).

Table 8. Public Attitude toward 'BTS'

BTS	2014 positive rate	2021 positive rate	2014 negative rate	2021 negative rate
Mean	83.22480075	89.41319509	12.71313	8.626295

Conclusion

In this study, we used big data to compare and analyze the public images, figures, and public attitude related to K-POP. To this end, Sometrend, operated by VAIV Company, was used to compare and analyze the data of the two periods, from January to December 2014 and from January to December 2021.The conclusion of this study can be summarized as follows:

First, between the two time points of 2014 and 2021, the common images of K-POP appeared as 'Pop,' 'IDOL,' 'Concert,' and 'BTS.' In 2014, K-POP was mainly associated with performances, including 'Hallyu,' 'idol group,' 'concert,' and 'festival.' In contrast, the images of K-POP in 2021 were related with TV shows, a different format from the previous performances, including 'mama', 'show Champion,' and 'Kingdom.'

Also, representative figures for K-pop appeared as EXO in 2014 and BLACKPINK in 2021. And in 2014 and 2021, two teams were common at both time points—EXO and BTS. In 2014, when the 3rd generation of idol groups emerged, they appeared as related figures, along with the 2nd generation of idol groups, which was leading the Hallyu craze at the time. In 2021, 4th generation idol groups, as well as 3rd generation idol groups, were included in the related figures.

The frequency of searches for K-POP increased significantly in 2021 compared to 2014. This shows that a greater number of people are using SNS more in 2021, than in 2014, sharing a lot of information and thoughts. However, as for the public attitude toward K-POP, the positive rate decreased significantly and the negative rate increased significantly in 2021 compared to 2014.

Second, the figures the public is continuously and commonly interested in were EXO and BTS. There were no significant common images between the two time points, but it was found in 2014, images related to music videos (Video, MV) appeared in common, and in 2021, those related to Goods (Photo card, Mini photo card, Album) were common. Also, EXO has no related figures common between 2014 and 2021, which means that most of the people related in 2014 have stopped their activities or disbanded. But as for BTS, their fan club, A.R.M.Y, appeared as a related figure, common at both time points. This shows that the growth of BTS as a global artist group was possible due to the passionate interests of A.R.M.Y.

This study was conducted as part of the efforts to build a database on the public's thoughts on K-POP for the sustaining of K-POP Hallyu. Its significance lies in the fact that the public attitudes toward K-POP or leading K-POP figures, which were guessed or estimated based on feelings, were analyzed scientifically using precise statistic data to

provide scientific information. This study is also significant as it extracts information from the existing data, analyzes the contents, and reinterprets the results from various angles to derive meaningful results.

Recommendations

We studied the image, related figures, and public attitude toward K-POP using big data, but there is a possibility for more follow-up research. In other words, through big data analysis on various topics, we should analyze the public opinion carefully, with an approach based, not on thoughts or guesses, but on scientific data, to create a sustainable K-POP culture that the public wants.

Limitations of Study

➢ Classification and limitations of Big Data-SNS

In 2021, representative social media services include Facebook, Twitter, Instagram, TikTok, and YouTube among others. Since Facebook is mostly not open, although divided into being open and not open, and TikTok and YouTube are based on the videos, which are impossible to collect and analyze the data. Accordingly, this study selected Twitter and Instagram for analysis. As it is not comparison of K-POP, but of people's thoughts about K-POP between 2014 and 2021 K-POP, through the analysis of big data, it was important to use the SNS easily accessible during the study period. As a result, we analyzed the posts related to K-POP on Twitter and Instagram, between January and December, of 2014 and 2021.

➢ Definition of related words and public attitude

Related words means the words used together with the keyword, K-POP, in Twitter and Instagram posts. Through the analysis of those related words, we were able to suggest what K-POP meant to the public. The public attitude toward the keyword can be divided into positive (love, best, like, fighting, cheer) and negative (cry, anger, regret, worst, suffer), defined by VAIV Company's Sometrend.

➢ Result of social matrix analysis

Sometrend provides related words to 500th ranks. In this study, we selected the related words (images, figures, and public attitude) to keyword and analyzed the data, and presenting the top 10 related words in the table. In [Photo 1] and [Photo 2], top 20 were presented to broaden the image of related words.

➢ Definition of 2014 and 2021

In this study, the year of 2014 means the period between January 1 and December 31 of 2014, and the year of 2021 is the period between January 1 and December 31 of 2021. It should be noted that as this study targets a specific period and points of time, its result may not be applied to other periods or points of time.

Acknowledgment

We will do our best to keep K-POP popular in the future. Thanks to everyone who helped with this study. We would like to express our gratitude to the families who have given us encouragement and advice during the course of our research.

References

Cho, B., & Sim, H. (2013). Success Factor Analysis of K-POP and A Study on sustainable Korean Wave, The Korea Contents Society.

Executive Office of the President. (2012). Bigdata across the federal government. U.S. Government Printing Office.

Google. (2010). Eric Schmidt at Technomy. http://www.youtube.com/watch?v=UAcCIsrAq70

Ham, Y., & Chae, S. (2012). Big Data Changes Management. Samsung Economic Research Institute.

Han, S., & Lee, M. (2012). A Big Data Model for Social Information Recommendation Techniques. Communications of the Korean Institute of Information Scientists and Engineers, 39(6), 380.

Hwang, C. (2021). Google Cloud's Biggest Customer Is Apple? Digital Today. http://www.digitaltoday.co.kr/news/articleView.html?idxno=407723

Hwang, H. (2013). A Discussion on the Expansion of K-POP Music to the Global Pop Music Industry Through the Sensation of Korean Singer, PSY, Journal of Music Education Science, 17(17), 187-203.

Jeon, C., Seo, I. (2013). Analyzing the Bigdata for Practical Using into Technology Marketing: Focusing on the Potential Buyer Extraction. Journal of Marketing Studies, 21(2), 81-203.

Jeong, B. (2022). Yun Seok-yeol elected the 20th president…Ultra-thin competition as predicted by big data. Ai Times. http://www.aitimes.com/news/articleView.html?idxno=143368

Jeong, C. (2020). A Comparative Study on Attribute Recognition and Word of Mouth Intention of SNS Advertising - Focused on Facebook, Instagram, KaKaoStory and Twitter. The Journal of the Convergence on Culture Technology (JCCT), 6(2), 421.

Jeong, J. (2012). Three factors for successful big data utilization: resources, technology, and human resources. Korea Information Society Agency.

John, G., & David, R. (2011). Extracting value from chaos. IDC iView, 1.

Kim, E. (2015). Analysis on the Musical Value and Sustainable Growth of K-pop, Korea Association of Global Culture.

Kim, S., Cho, H., and Kang, J. (2016). (The) Status of Using Text Mining in Academic Research and Analysis Methods. Korea Institute of Enterprise Architecture, 13(2), 317-329.

Kim, Y. (2011). Social Network Analysis, Seoul: Pakyoungsa, 5.

Lee, B., Lim, J., and Yoo, J. (2013). Utilization of Social Media Analysis using Big Data. The Journal of the Korea Contents Association, 13(2). 211-219.

Lee, I., & Kwon, S. (2021). Beyond K-POP Paradigm: Value Creation driven by Big Hit Entertainment's Korean Culture Innovation, Korea Business Review, 25(1), 57-77.

Lee, S. (2013). Network Analysis Methodology. Seoul: Nonhyung, 11.

Lee, S., & Jang, M. (2019). Analysis of global success factors of K-pop music, The Korea Entertainment Industry Association.

Matthew A, R. (2013). Mining the social web. O'Reilly.

O'Reilly Radar Team. (2012). Planning for Big Data. Newton: O'Reilly.

President's Council of Advisors on Science and Technology. (2011). Report to the President: Every Federal Agency Needs a 'Big Data' Strategy. https://www.prnewswire.com/news-releases/report-to-the-president-every-federal-agency-needs-a-big-data-strategy-118433704.html

Starbucks Korea. (2021). The coffee trend for 2021 predicted by Starbucks big data is “H.O.P.E.”. Starbucks Korea. https://www.starbucks.co.kr/bbs/getBodoView.do?seq=4040

Suh, Y. (2021). An Analysis of Security Issues Caused by COVID-19: Focusing on News Data. Chung-Ang University.

Yoon, S., Namgung, H., Yang, S., and Kim, H. (2012). Big data-based large-capacity semantic web search technology trend. The Journal of Korean Institute of Communications and Information Sciences, 29(11), 24-29.

Biodata of Author

Inho Lee is an assistant professor of practical music at Kyonggi University. His research covers a variety of musical themes, including Korean pop music and music education. He received his master's degree and PhD from Kyung Hee University and has worked as a vocal trainer for many K-pop artists. Research fields: Popular Music, Applied Music, Music Education, K-Pop. Affiliation: Department of Practical Music, Kyonggi University Phone: +8223905315. Email: soulinno@kgu.ac.kr ResearchGate: https://www.researchgate.net/profile/Inho-Lee-6 AcademicEdu: https://kyonggi.academia.edu/InhoLee

Johee Lee is an assistant professor of performance music at Kyonggi University. His research covers a variety of analysis in composition, including film music and computer music. He received his master's degree and PhD from Kyonggi University. Research fields: Film Music, Computer Music, Music Education. Affiliation: Department of Performance Music, Graduate School of Hallyu Culture, Kyonggi University. Phone: +8223905163 Email: li-20301@kgu.ac.kr ResearchGate: https://www.researchgate.net/profile/Johee-Lee AcademicEdu: https://kyonggi.academia.edu/JoheeLee