

Article

A Study on MBTI Perceptions in South Korea: Big Data Analysis from the Perspective of Applying MBTI to Contribute to the Sustainable Growth of Communities

Hyejin Lee ¹  and Yoojin Shin ^{2,*} 
¹ Division of Liberal Arts, Wonkwang University, Iksan 54538, Republic of Korea; 24youth@hanmail.net

² Division of Business, Chosun University, Gwangju 61452, Republic of Korea

* Correspondence: yoojinshin@chosun.ac.kr; Tel.: +82-62-230-6843

Abstract: This study aimed to assess the potential contributions of the Myers–Briggs Type Indicator (MBTI) to the sustainable growth of communities by conducting a comprehensive analysis of social perceptions of the MBTI in South Korea through big data analysis. The investigation encompasses three primary stages: data collection, preprocessing, and analysis, involving text mining, network analysis, CONCOR analysis, and sentiment analysis. A total of 31,308 text data pieces (13.73 MB) from various sources, including news, blogs, and other sections of Naver and Google, over the past three years, were collected and analyzed using the keyword “MBTI”. Tools, such as Textom SV, UCINET, and NetDraw, were employed for data collection and analysis. The study’s key findings include the identification, through term frequency (TF) and TF-inverse document frequency analyses, of top-ranking terms, such as 16Types, 4Indicators, Test, Myself, OthersMBTI, Situation, and Contents. The CONCOR analysis further revealed six clusters, encompassing themes like interest in MBTI personality tests, application of 16 types in daily life, MZ’s MBTI consumption patterns, trending of MBTI characters, extension to K-Test, and professional use of MBTI. Moreover, sentiment analysis indicated that 68.5% of individuals in South Korea expressed a positive sentiment towards MBTI, while 31.5% conveyed a negative sentiment. The specific emotions identified included liking (Good Feeling), disgust, and interest, in order of prominence. In light of these findings, this study delineates a spectrum of perceptions regarding MBTI in South Korea, encompassing both positive interests and negative concerns. To ensure the responsible use of MBTI, it is imperative to implement reliable scientific testing and education, mitigate the potential harm of stereotyping, and reshape social perceptions surrounding MBTI usage. Only through these measures can MBTI genuinely contribute to the sustainable growth of communities without being confined to limiting stereotypes.

Keywords: MBTI; sustainability; big data; text mining; CONCOR analysis



Citation: Lee, H.; Shin, Y. A Study on MBTI Perceptions in South Korea: Big Data Analysis from the Perspective of Applying MBTI to Contribute to the Sustainable Growth of Communities. *Sustainability* **2024**, *16*, 4152. <https://doi.org/10.3390/su16104152>

Academic Editors: Maria Rita Sergi, Laura Picconi, Chiara Aleffi and Marco Tommasi

Received: 4 March 2024

Revised: 11 May 2024

Accepted: 14 May 2024

Published: 15 May 2024



Copyright: © 2024 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

1. Introduction

The Myers–Briggs Type Indicator (MBTI[®]) is a self-report personality type indicator devised by Katharine Cook Briggs and Isabel Briggs Myers, rooted in Carl Gustav Jung’s psychological types theory, for practical application in daily life [1].

Jung’s theory posits that, beneath the apparent diversity of human behavior, there exists order and consistency arising from fundamental differences in people’s perceptions and judgment preferences [2]. The dichotomy of extroversion and introversion represents contrasting attitudes within Jung’s psychological types, further classified into psychological functions of sensation, intuition, thinking, and feeling.

Myers and Briggs meticulously observed human subjects for over two decades to develop the MBTI, a psychological analysis tool aligning with Jung’s theory [3]. They enhanced the MBTI by introducing the J–P (Judging–Perceiving) preference indicator, adapting Jung’s theory for practical use [4]. The completed MBTI comprises four preference indicators for individuals [5]. (1) E (Extroversion)–I (Introversion): direction of energy, (2) S

(Sensing)–N (Intuition): ways of receiving information, (3) T (Thinking)–F (Feeling): ways of making decisions, (4) J (Judging)–P (Perceiving): related to approaches to the outside world. These opposing preference indicators combine to form 16 personality types, offering a comprehensive description of an individual's personality.

The MBTI assessment, available in 29 languages globally, is widely embraced, with millions undergoing this psychological test. Its applications span team development, leadership enhancement, communication, decision-making, conflict management, coaching, career development, and job exploration [6].

In South Korea, the use of the MBTI has been prevalent in diverse fields, including education and counseling, since its introduction in the 1990s. However, in recent years, the widespread popularity of the MBTI in South Korea has surged without a discerning filtration process, fueled by the sharing of experiences and reviews on understanding and application in social life. Online, information about MBTI proliferates like an intricate mind map, captivating individuals with its algorithm, and drawing endless clicks, akin to a black hole [5].

Consequently, terms like the “MBTI boom [7]”, “MBTI culture [8]”, and “MBTI craze [9]” have emerged in the South Korean context. The MZ generation, which refers to young people in South Korea's newly coined term, has made it a trend to disclose their MBTI on social media profiles, using it as an identifier during group assignments or blind dates at university [10]. In 2021, the Consumption Trend Analysis Center at Seoul National University labeled the phenomenon a “labeling game” [11], describing it as a game-like attempt to resolve identity uncertainty. Some experts posit that the influence of COVID-19 might have played a role. With decreased social interactions and increased solitary time at home, people found more time for self-reflection, sparking an interest in MBTI as a means to explore questions about themselves and understand others in a straightforward manner [9].

However, the indiscriminate expansion of MBTI has resulted in negative side effects. Common issues include “stereotyping” and “denial by reasoning”. Stereotyping can lead to problems such as self-rationalization, stigmatizing others, and limiting human relationships. Denial by reasoning refers to discomfort with MBTI, preventing individuals from experiencing its benefits [12]. These side effects pose a risk of undermining sustainability at the individual or community level.

While the discourse on sustainability typically encompasses growth, environment, society, community, governance, economy, energy, transportation, science, technology, and the future, the side effects of the MBTI are not a prominent consideration. However, embracing a broader perspective on oneself and the surroundings and making thoughtful decisions one by one contribute to efforts to ensure sustainability. When such endeavors accumulate, the society's resilience to crises increases, fostering a more “sustainable” community [13]. Therefore, a proper understanding and use of the MBTI can play a role in reducing ignorance or misunderstanding about oneself and interpersonal relationships, mitigating the risk factors that lead to unsustainability.

Then, what are the prerequisites for a correct understanding and use of the MBTI? The MBTI serves as a tool for comprehending psychology, and its articulation is dependent on the user. The utility or potential harm of the tool is intrinsically tied to the individual wielding it. In essence, the focal point lies with the person utilizing it. Consequently, this study delved into people's perceptions of the tool known as the MBTI. This emphasis is justified as perceptions form the starting point for understanding and constitute a pivotal foundation for determining its application.

The analysis of social perceptions of the MBTI is conducted through the examination of big data generated on the web. This approach is chosen because big data analysis transcends specific groups, making it apt for uncovering perceptions and phenomena prevalent in society at large. Moreover, data collected through big data not only offers quantitative insights but also aids in comprehending the present and forecasting future trends through analysis [14].

Therefore, the objective of this study was to discern the direction for leveraging the MBTI in building sustainable communities and to explore associated issues by scrutinizing the social perception of the MBTI in South Korea through big data analysis. The research questions formulated to achieve this aim are as follows: (1) What are the main keywords related to the MBTI identified through big data? (2) What are the outcomes of a CONCOR (CONvergence of iteration CORrealtion) analysis of the MBTI based on big data? (3) What are the findings of sentiment analysis of the MBTI conducted through big data?

2. Related Studies

2.1. MBTI-Related Studies

Since its development by Myers and Briggs, numerous studies on the MBTI have been conducted, spanning personal growth and organizational behavior in diverse domains, such as education, counseling, and organizations. In the realm of education, researchers have explored its applicability and effectiveness in relation to learning experiences [15], academic achievements [16], preferences for online/face-to-face classes [17], team building, conflict resolution, and communication in project-based learning [18], as well as its relevance to education for specific majors [19,20] and career paths [21,22], based on MBTI personality types.

Within the counseling field, some studies have applied MBTI group programs to adults or students [23–25]. Additionally, certain studies have examined subjective well-being [26] and life satisfaction [27] in connection with personal growth. Additionally, the MBTI has been applied to studies on organizational behavior [28], leadership development [29], job satisfaction [30], and organizational commitment [31].

While many of the aforementioned studies emphasized the usefulness of the MBTI, some researchers have criticized its scientific foundation and rigor, expressing concerns about reliability and validity [32–35]. Boyle (1995) [32], in particular, highlighted the popularity of the MBTI in practical applications but underscored its limitations in terms of reliability and validity. He emphasized caution regarding its potential misuse in various organizational and occupational environments [32]. These studies have primarily concentrated on the utility and scientific validation of the MBTI. In recent years, interdisciplinary approaches have emerged, including the use of machine learning to predict MBTI types [36–38] and employing computational linguistics to examine the correlation between voice characteristics and MBTI types [39].

2.2. Analysis of MBTI-Related Big Data

Big data, characterized by its extensive volume, diverse data types, and rapid generation and change [40], undergoes analysis to unveil concealed patterns and extract unknown information from substantial datasets [41]. This analytical process is harnessed to predict future trends, devise optimal strategies, and foster innovative values [42]. Unlike the restricted scope of a specific group's perception, big data analysis proves apt for comprehensively examining societal perceptions and phenomena [43]. Employing this methodology in our study allows for an in-depth analysis of the prevailing social phenomenon related to the MBTI and facilitates exploration of its potential application for a sustainable future.

In reality, big data analysis is applied in numerous studies focused on social phenomena and perceptions.

In a study on early childhood sensibility education, Kim (2023) [44] conducted a big data analysis to explore perceptions and proposed directions for program development. Suh et al. (2021) [14] delved into the social perception of process-based evaluation using big data, analyzing text data from news and social media over 5 years to enhance process-based evaluation in education. Lee (2023) [45] examined the change in perception of delivery apps before and after the COVID-19 pandemic through big data analysis of social media, identifying the necessity for a system to adapt to altered consumer behaviors. Shon et al. (2023) [40] employed big data to study social perception during the COVID-19 era,

investigating the safety awareness of leisure sports participants through text mining and semantic network analysis.

There is another study that delves into the social issues of the MBTI using big data, similar to our study. Lee (2022) [46] conducted a big data analysis to explore society's perception of the MBTI in South Korea. The study investigated the MBTI as a social phenomenon beyond psychological tests, focusing on data from March 2022, 2 years after it gained attention in a 2020 entertainment show. Through topic modeling, this study identified four major topics: "related counseling program", "actual treatment and professional utilization method", "MBTI expert course", and "celebrities and issues" [46]. While our study shares a thematic alignment with Lee's, there are three key differences.

Our study takes into consideration the 3V (volume, variation, and velocity) characteristics of big data. The initial distinction lies in the volume aspect of big data. Volume is a fundamental characteristic, and a large dataset is a primary requisite [47]. In the prior study, 6000 data points were chosen for analysis, whereas our study utilized 31,308 data points. While data size alone does not determine the value of big data [48], securing an adequate volume is crucial as it directly relates to insights.

The second distinction involves the scope of data crawling, tied to the variety of big data [47]. Lee's study focused on news titles from the Naver channel, a reasonable approach given that news forms and reflects public opinions [49]. However, data from blogs, cafes, and knowledgeiN are equally valuable, considering their strong characteristic of online users producing and sharing information based on their interests [43]. Examining these diverse data sources contributes to a comprehensive understanding of MBTI perceptions.

The third difference pertains to velocity, representing the speed of data accumulation and analysis [47]. In big data research, it is important to analyze and respond to the latest possible data. The perceptions of the MBTI explored in previous studies were based on data up to March 2022, a period when the MBTI began gaining recognition as a trend. In contrast, our study provides insights as of January 2024, reflecting the MBTI's evolution into a tool, much like blood types, for defining individuals beyond syndromes in Korean society. What sets this study apart is that it analyzes the latest data related to rapidly changing social phenomena. The timing difference may be unique compared to previous studies. This study includes data that are as recent as possible at the time of the study.

3. Research Methodology

3.1. Research Procedures

This study followed a meticulous procedure to analyze social big data on the MBTI. In the initial stage, we collected 31,308 pieces of raw data (rawDATA) with a total size of 13.73 MB through web crawling. Subsequently, during the data refinement stage, unnecessary words were filtered out. In the third stage, dedicated to data analysis, we conducted keyword extraction based on frequency and term frequency-inverse document frequency (TF-IDF) analysis. This was followed by network analysis, CONCOR analysis, and sentiment analysis. The primary program used throughout stages one to three was the TEXTOM SV program. Additionally, UCINET 6 was employed during the analysis stage, and the NetDraw program was utilized to visualize the research results.

3.2. Data Collection

Data collection was executed using TEXTOM SV, a program designed for web data crawling. TEXTOM is a paid big data web program renowned for facilitating data collection, storage, cleaning, matrix, and visualization. Its reliability is evidenced by its use in over 300 published papers as of 2021 [50]. The collection channels encompassed Naver and Google, which, according to an internet statistics site in South Korea (<http://www.internettrend.co.kr/trendForward.tsp>, accessed on 3 March 2024), hold utilization rates of 60.07% and 30.83%, respectively, as of 1 January 2024. The combined market share of these two portals, at 90.9%, was deemed suitable for investigating the general perception of the MBTI among South Koreans. Specifically, the sections utilized

from Naver included blog, news, cafe, knowledgeiN, and web documents, while those from Google included news, web documents, and Facebook. Since Naver and Google are different sources, we considered collecting data to compare each array but did not extract it separately as it was not meaningful during the preliminary review process. The keyword used for data collection was MBTI, including Korean MBTI notations. The collection period spanned 3 years, from 1 January 2021, when the MBTI was introduced as one of the top 10 trends in South Korea [51], to 31 December 2023, the conclusion of the study (Table 1).

Table 1. Data Collection.

Keyword	Channel	Section	Number of Sources
MBTI	Naver	Blog	5560
		News	4040
		Café	6000
		KnowledgeiN	6000
		Web document	6000
	Google	News	1452
		Facebook	1621
		Web document	635
Total			31,308

3.3. Data Refinement

The data refinement procedure was executed to prepare the collected words for analysis. In the initial step, data with duplicate URLs were removed, followed by data preprocessing using MeCab, a morphological analysis program within TEXTOM (Table 2). Unlike Espresso K, which classifies based on word segment patterns, MeCab offers highly consistent results by analyzing with reference to a dictionary, irrespective of the spacing form in the original text. In the subsequent step, stopwords among the refined keywords were eliminated. These were words not relevant to the subject or that were deemed meaningless. Additionally, divided compound words were merged using N-gram information.

Table 2. Data filtering.

Process	Refinement	Content/Example
Primary	Elimination Analysis	Remove URL duplicate data Noun, Verb, Adjective
	Substitution	Some, Blind date, Lover, Love → Love Case, Context, Situation → Situation Hot, Trend → Trend
Secondary	Combination	Personality Assessment Tool → PersonalityAssessmentTool MBTI Expert → MBTIExpert Over Indulgence → Overindulgence
	Delete	Meaningless numbers Postposition Interjection
Tertiary	Integration	ISTJ, ENFP, ESTJ, INFP, etc. → 16Types E, I, S, N, T, F, J, P → 4Indicators Family MBTI, Friend MBTI, Colleague MBTI → OthersMBTI Cosmetics Marketing, Food Marketing, Fashion Marketing → Marketing

On the other hand, if the word does not have global universality but is only used in Korean culture, it has not been processed to make use of its unique meaning. For

example, there are “Some” and “SajuGunghap”. The term “Some (sseom)” is a neologism originating from the English word “something”, denoting “something that is not exact”. It captures the ambiguous emotions experienced by individuals, typically a man and a woman, during the initial stages of a relationship. These feelings arise when there is mutual interest or attraction before formalizing the commitment through dating (retrieved from Wikipedia). In SajuGunghap, saju (four pillar-based horoscope) refers to fortune-telling based on a person’s birth date (year, month, day) and time, while Gunghap (fortune-telling for marital compatibility) involves predicting the marital compatibility between a man and a woman using saju and the five elements (retrieved from the Naver Korean dictionary). In addition, in this step, we also carried out control work to identify keywords that seemed to overly encompass the topic (general content related to personality or self-reflection, etc.) by checking the original text and refining it. Lastly, in the third step, keywords contextual to the MBTI were integrated into representative keywords. This process involved collaboration with two MBTI experts to derive keywords aligned with the research purpose.

3.4. Data Analysis

The analysis process unfolded in the following steps. Initially, we calculated TF and TF-IDF for the refined data. TF represents the frequency of a specific word in a document, while TF-IDF assigns a weight to a word based on its importance in a document, considering that a word appearing in multiple documents simultaneously has higher universal significance [52,53]. The outcomes of the keyword analysis were visually represented using word clouds. Subsequently, network analysis was performed, where the structural arrangement of the top 50 keywords extracted by TEXTOM from the TF results was calculated as a 1-Mode Matrix. This matrix was then input into the UCINET 6 program to analyze overall network properties. UCINET, a widely used social network analysis package, serves as a valuable tool for visualization and metrics-based analysis [54].

Moving on, CONCOR analysis was carried out to identify similarity groups at an optimal level, utilizing a matrix representing the frequency of simultaneous appearance between words through iterative correlation analysis [44]. For this study, we employed the NetDraw program within UCINET 6 to visualize and derive clusters. Lastly, sentiment analysis was conducted by analyzing the frequency of sentiment words. This analysis reveals how many times sentiment-related keywords appear in the original text data through machine learning. The sentiment words were based on the sentiment word lexicon created by TEXTOM, which contains three positive and six negative words within the positive/negative category. Each word in the lexicon expresses the corresponding emotion standardized according to its intensity [55]. Emotional intensity refers to the intensity of expression within detailed emotions and is measured on a 7-point Likert scale. TEXTOM’s emotional vocabulary dictionary is based on the Korean language.

4. Research Results

4.1. Keyword Frequency and TF-IDF Analysis Results

We have gathered and refined extensive MBTI-related big data, presenting the top 50 keywords of TF and TF-IDF in Table 3. For both TF and TF-IDF, the first to the seventh places are occupied by 16Types, 4Indicators, Test, Myself, OthersMBTI, Situation, and Contents, affirming the prominence and significance of these seven words. In addition to these keywords, other frequently appearing words in the TF analysis include Trend, Love, Understanding, Marketing, Fun, and Doubt. The TF-IDF analysis results exhibit similar rankings to the TF results, with higher importance assigned to Marketing, Counselling, MZ, Gender, Science, and MBTI Expert. Figure 1 illustrates a word cloud visualizing the primary keywords of TF.

Table 3. Keyword TF/TF-IDF.

TF			TF-IDF		
Rank	Keyword	N	Rank	Keyword	TF-IDF
1	16Types	62,185	1	16Types	30,970.931
2	4Indicators	26,656	2	4Indicators	29,976.35
3	Test	20,358	3	Test	23,416.014
4	Myself	13,188	4	Myself	16,527.227
5	OthersMBTI	9826	5	OthersMBTI	15,480.209
6	Situation	8976	6	Situation	14,291.832
7	Contents	7430	7	Contents	13,830.119
8	Trend	6712	8	Marketing	12,998.464
9	Love	5936	9	Love	12,937.528
10	Understanding	5893	10	Trend	12,400.253
11	Marketing	5562	11	Understanding	11,467.823
12	Analysis	5403	12	Analysis	11,281.97
13	Fun	5295	13	Fun	10,773.827
14	Doubt	4647	14	Program	10,613.784
15	Program	4501	15	Counseling	10,190.804
16	Difference	4481	16	Difference	9970.578
17	Internet	4300	17	Use	9957.801
18	Use	4109	18	Doubt	9835.675
19	Question	4074	19	Internet	9771.819
20	Counseling	3950	20	Question	9588.718
21	Celebrity	3124	21	SajuGunghab	8823.298
22	Relationship	3015	22	Celebrity	8276.16
23	SajuGunghab	2984	23	MZ	7735.066
24	Belief	2946	24	Gender	7668.522
25	Talk	2905	25	Relationship	7619.829
26	MZ	2903	26	Science	7590.634
27	PersonalityAssessmentTool	2815	27	Belief	7584.149
28	Stress	2680	28	MBTIExpert	7527.522
29	Character	2652	29	Talk	7509.749
30	Science	2640	30	Character	7360.589
31	Daily	2629	31	Official	7259.875
32	MBTIExpert	2617	32	PersonalityAssessmentTool	7227.755
33	Gender	2567	33	Stress	7214.449
34	Curiosity	2384	34	Employment	7033.197
35	Official	2330	35	Daily	7027.176
36	Employment	2193	36	Curiosity	6389.2
37	Overindulgence	1997	37	Overindulgence	5921.17
38	MBTIChange	1793	38	KTest	5535.292
39	KTest	1789	39	Guess	5359.162
40	Guess	1769	40	MBTIChange	5328.782
41	Reference	1510	41	Education	5067.348
42	Free	1479	42	Free	4963.212
43	Education	1418	43	Reference	4720.476
44	Mind	1393	44	Mind	4549.302
45	Interest	1160	45	Interest	3956.034
46	BloodType	646	46	BloodType	2642.034
47	Enneagram	465	47	Enneagram	2140.815
48	SideEffect	444	48	FormQ	1970.015
49	FormQ	430	49	SideEffect	1946.212
50	Gathering	371	50	Teenager	1742.352

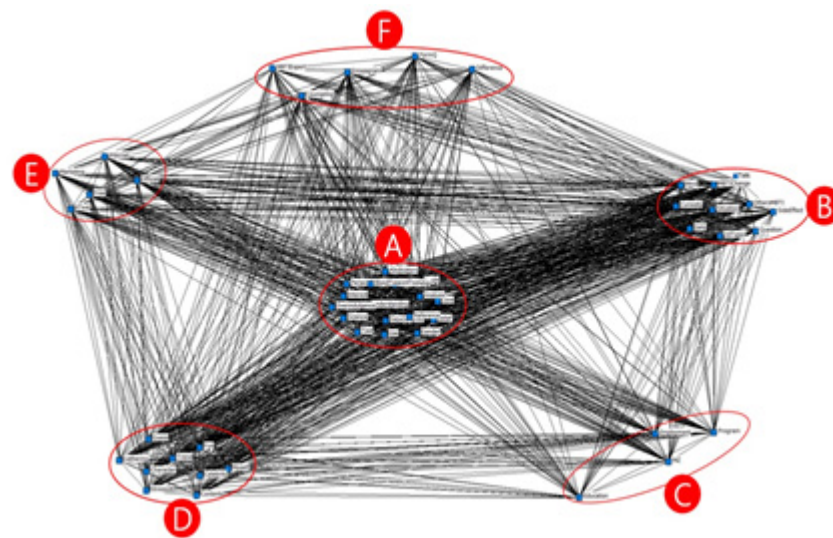


Figure 3. CONCOR analysis results.

Table 5. CONCOR analysis results.

Group	Cluster Topics	Keyword
A group	Encompassing themes like interest in MBTI personality tests: Reference, Belief, and Overindulgence	4 Indicators, Test, Love, Understanding, Analysis, Doubt, Use, Relationship, Saju Gunghab, Belief, Personality Assessment Tool, Science, Gender, Overindulgence, Reference, Interest, Blood Type
B group	Application of 16 types in daily life: Curiosity and Side Effect	16 Types, Others MBTI, Situation, Question, Talk, Daily, Curiosity, MBTI Change, Mind, Side Effect
C group	MZ's MBTI consumption patterns: Education and Employment	Program, MZ, Employment, Education
D group	Trending of MBTI characters: Fun and Stress	Myself, Contents, Trend, Fun, Celebrity, Stress, Character, Guess, Gathering
E group	Extension to K-Test: Ranging from the free internet version to the official version	Marketing, Internet, Official, K-Test, Free
F group	Professional use of MBTI: FormQ and Enneagram	Difference, Counseling, MBTI Expert, Enneagram, FormQ

The contents of Table 5 are as follows. Group A, comprising the largest number of nodes, forms a cluster of keywords such as “4 Indicators”, “Test”, “Love”, “Doubt”, “Use”, “Relationship”, “Belief”, “Personality Assessment Tool”, “Science”, “Overindulgence”, “Reference”, and “Interest”. This suggests an “Interest in and utilization of MBTI personality tests: Reference, Belief, and Overindulgence”. Group B is a cluster of keywords including “16 Types”, “Others MBTI”, “Situation”, “Talk”, “Daily”, “MBTI Change”, “Mind”, and “Side Effect”, reflecting the perception of “16 types applied in everyday life: Curiosity and Side Effect”. Group C encompasses “Program”, “MZ”, “Employment”, and “Education”, indicating “MZ’s MBTI consumption: Education and Employment”. Group D is themed around the “Trending of MBTI characters: Fun and Stress”, including keywords like “Myself”, “Contents”, “Trend”, “Fun”, “Celebrity”, “Stress”, and “Character”. Group E incorporates “Marketing”, “Internet”, “Official”, “K-Test”, and “Free”, revealing public interest in the MBTI test, ranging from the free Internet version to the official version, and its application in marketing. Group F forms a cluster of keywords, such as “Difference”, “Counseling”, “MBTI Expert”, “Enneagram”, and “FormQ”, reflecting public perceptions of the professional use of MBTI. Personality differences are utilized for education or career

counseling through experts, and there is interest in FormQ (an enhanced version of MBTI) or Enneagram (a type of personality test tool).

4.4. Sentiment Analysis

After conducting a sentiment analysis of the MBTI, it was observed that the positive sentiment accounted for 68.5%, while 31.5% expressed negativity (Figure 4). The positive category encompasses specific emotions such as Good Feeling, Interest, and Joy, while the negative category includes Disgust, Sadness, Fear, Anger, Fright, and Pain. Among the specific emotions, Good Feeling (Good, Recommend, Accurate), from the positive category, holds the top rank, followed by Disgust (Dislike, Expensive, Difficult), from the negative category, in the second position, and Interest (Fun, New, Curious), from the positive category, in the third position.

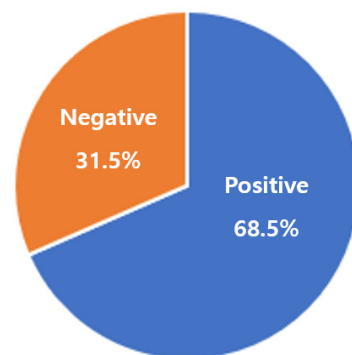


Figure 4. Results of sentiment analysis.

The upper level presented emotion classification and the corresponding frequency and emotional intensity (Table 6). Detailed emotions other than the upper level include fourth-rank Joy (positive), fifth-rank Sadness (negative), sixth-rank Fear (negative), seventh-rank Anger (negative), eighth-rank Fright (negative), and ninth-rank Pain (negative). In Table 6, sentiment intensity is presented alongside frequency, highlighting the notably high sentiment intensity of Dislike among the negative sentiments, reaching 6.5556 (out of 7). This implies that Dislike exerts a significant influence on the sentiment of Disgust, surpassing the actual frequency. This sentiment analysis could be useful information for inferring the emotionality of social perception in this study exploring the perception of the MBTI. However, researchers have concerns about generalizing the results of sentiment analysis. This study applied sentiment vocabulary analysis within TEXTOM, a big data analysis tool, to sentiment analysis, because it does not suggest the validity of related indicators. To solve this problem, the researchers independently reviewed related papers and made inquiries to TEXTOM, but there were limitations in revealing the validity. Therefore, the results of sentiment analysis should be approached cautiously as a tendency to infer MBTI perception. This part will be mentioned again in the suggestions for future research.

Table 6. Results of sentiment analysis.

Rank	Detailed Sentiment	Division	Category	Frequency	Sentiment Strength	Frequency × Sentiment Strength
1	Good Feeling	Positive	Good	4472	4.3333	19,378.5176
			Recommend	1332	4.7778	6364.0296
			Accurate	945	3.7778	3570.021
2	Disgust	Negative	Dislike	810	6.5556	5310.036
			Excessive	710	4.4444	3155.524
			Difficult	479	3.5556	1703.1324

Table 6. Cont.

Rank	Detailed Sentiment	Division	Category	Frequency	Sentiment Strength	Frequency × Sentiment Strength
3	Interest	Positive	Fun	1294	2.6667	3450.7098
			New	588	2.7778	1633.3464
			Curious	487	5.3333	2597.3171

5. Conclusions

This study aimed to explore the utilization of the MBTI for sustainable communities by analyzing recent perceptions of the MBTI, a tool gaining popularity for defining individuals in South Korea, and examining related issues using big data. In comparison to prior studies, we expanded the data volume and variety while considering the velocity of data changes, allowing for an agile investigation into the rapidly evolving social perception of the MBTI. We crawled and analyzed 31,308 data points from news, blogs, and cafes on Naver and Google, representing a 90.9% utilization rate in South Korea. The main analysis tools were TEXTOM and UCINET 6. TEXTOM is a big data analysis solution that crawls and purifies online data and generates analysis data using various algorithms. UCINET is a software package for social network data analysis. This study attempted to analyze a lot of unrefined information related to the MBTI online in a short period of time by applying these digital technologies to research. Through this, recent social issues were explored more quickly than with existing research methodologies. Timely and novel research could be conducted using the latest big data analysis technology [58].

We will now discuss the main research results. Firstly, in both TF and TF-IDF analyses, keywords like 16Types, 4Indicators, Test, Myself, OthersMBTI, Situation, and Contents ranked from first to seventh place. This suggests that Korean interest in the MBTI primarily revolves around the 16 types, the four perception indicators, using the test for self and others, and situations and contents revealing specific types. Keywords with higher TF-IDF values than TF include Marketing, Counseling, MZ, Gender, Science, MBTI Expert, and Official. This indicates a growing interest in specific MBTI applications, culturalization among certain generations, and a scientific understanding of the MBTI. These findings differ from a study by Lee (2022) [46], where professional qualification training keywords showed high frequency. In our study, conducted 2 years later, we found increased interest in easily taking the MBTI test online and applying the 16 types to various situations. This demonstrates that the MBTI is consumed in diverse ways, serving as a popular self-informing tool, an icebreaker in social encounters, a criterion for choosing romantic partners among Generation MZ, and a strategy to attract customers in a market economy. It was possible to confirm the ‘routineity’ of the MBTI in South Korean society.

Secondly, the network analysis revealed that the MBTI network has a density of 0.998. Network density reflects the overall degree of connection between keywords within the network, ranging from 0 to 1, with higher values indicating greater network cohesion [59]. With a network density close to 1 in this study, at 0.998, it suggests high cohesion within the MBTI network. This implies that certain keywords influence others or propagate in connection with them. Additionally, the network centralization of 14.3% indicates that the MBTI network lacks concentration on specific keywords, highlighting active exchanges or interactions among keywords expressing various topics. The MBTI network demonstrates not only the public’s reception of MBTI-related information but also its reproduction and dissemination through active engagement. Therefore, it can be said that the MBTI has ‘expandability’ through members of society.

Thirdly, the CONCOR analysis unveiled the grouping of complex networks associated with the MBTI, reflecting the diversified public perception of the MBTI as it has become a prominent trend in everyday life. Six clusters emerged: (1) “Interest in MBTI personality test: Reference, Belief, and Overindulgence”, (2) “16 Types applied in daily life: Curiosity and Side Effect”, (3) “MZ’s MBTI consumption: Employment and Education”, (4) “Trending

of MBTI characters: Fun and Stress”, (5) “Extension to K-Test: Free to Official”, and (6) “Professional use of MBTI: FormQ and Enneagram”.

These clusters provide insights into various perceptions: (1) High public interest in understanding what the MBTI is, contemplating the perception indicators forming the MBTI, and concerns about potential overindulgence. (2) The use of the 16 types of MBTI in everyday conversations or specific situations, aiding in understanding or inferring others’ behavior but accompanied by discomfort due to side effects like stigmatization. (3) Active usage of the MBTI by Generation MZ for programs or employment-related information. (4) The MBTI as a representative character that can symbolize an individual enjoyed in connection with celebrities’ MBTI or trends, yet causing stress when excessive interest is shown in relationship situations like gatherings. (5) The MBTI is recognized as a universal and representative cultural phenomenon in South Korea, akin to K-pop, widely used in marketing, and available through various test formats from free Internet tests to official ones. (6) Public awareness of the professional use of the MBTI in South Korea, expressing interest in utilizing personality differences for education or career counseling through experts, as well as showing interest in FormQ (an enhanced version of the MBTI) and Enneagram (a type of personality test tool). Through these results, it was possible to confirm the ‘two sides of the coin (utility and fatigue)’ of the MBTI.

Fourthly, in examining the results of the sentiment analysis, we observed that the public’s perception of the MBTI in South Korea leans significantly towards positivity, with 68.5% expressing positive sentiments and 31.5% expressing negative sentiments, highlighting a prevailing positive sentiment. Delving into the detailed emotion ranking, “Good Feeling” secured the top spot, and “Interest” claimed the third position.

The sentiment classification of “Good Feeling” reveals that people view the MBTI favorably, wanting to recommend and share it with others. Additionally, through the sentiment classification of “Interest”, it is evident that the MBTI is embraced as an enjoyable, curious, and novel concept. There exists a perception that the MBTI serves as a tool for self-understanding, facilitating communication with others, and is positively experienced and consumed as engaging cultural content in daily life.

However, alongside the predominantly positive sentiments, there are also negative sentiments associated with the MBTI. The second-ranking specific emotion is “Disgust”, encompassing categories such as “Dislike”, “Excessive”, and “Difficult”. These emotions can be speculated to arise from overindulgence in the MBTI, side effects, or stress. Notably, the sentiment intensity of “Dislike” is 6.5556, as shown in Table 6, the highest among the emotions, suggesting that antipathy towards the MBTI can be particularly intense when individuals recognize a sense of disgust. The results of this emotional analysis should be considered as a ‘task of MBTI’. This is because there is a need for a check on the proper use of the MBTI at the present time, as it has spread from use as a specific psychological test to use in daily culture.

After examining the diverse range of perceptions of the MBTI currently prevalent in Korean society, both positive interest and negative concerns have surfaced.

Meanwhile, the researchers realized the need to discuss the results of this study in more depth through consultation. Accordingly, after reviewing the research results from various angles, we decided to apply the theory to infer the factors that have recently changed the perception of the MBTI in South Korean society. As this inference was an area excluded from the initial design of the study, it will not be discussed in more detail herein. However, we would like to discuss this in the sense that it may serve as a suggestion for future work.

Why has the MBTI, which was developed more than half a century ago, rapidly spread socially in recent years? This was similar to the process of innovation diffusion, where something new spreads throughout society. According to Rogers’ (2003) innovation diffusion theory, “an innovation is an idea, practice, or product that is recognized as new by individuals or other adoption units”, and the innovation diffusion theory states that a new technology, idea, or practice is adopted by an individual and is then adopted by

several people. It is a theory that explains the process of spreading into a group [60]. From the perspective of this theory, the recent practice of South Korean society newly recognizing the MBTI is an innovation. Discussing the process of innovation diffusion through innovation diffusion theory can help us understand the process by which the MBTI is shared and used by members of society. A major factor that affects the 'rate of adoption' in innovation diffusion theory is perceived attributes. These include the following: (1) relative advantage: the degree to which innovations that are perceived as new, such as ideas, are perceived more positively than previous ones; (2) compatibility: the degree to which the innovation is compatible with the experiences, values, and desires of potential adopters; (3) complexity: the extent to which the content of the innovation is perceived as difficult or the innovation is felt to be difficult to use; (4) trialability: the extent to which the innovation can be tested or experienced in a limited way; (5) observability: the extent to which the results of the innovation are directly or indirectly communicated to potential adopters [60]. Applying the spread of the MBTI to this, (1) relative advantage: the MBTI is more helpful in understanding oneself and others than blood type, which was previously a tool for personality; (2) compatibility: that it met the desire to know oneself or to form a positive relationship with others (especially in line with the pandemic); (3) complexity and (4) reliability: that the free, simple Internet test, which can measure the type of MBTI, was popular, so it was relatively easy to experience; (5) observability: it can be considered that it was easily observed through cases of daily use of the MBTI in schools and workplaces or through celebrities. We discussed the MBTI by paying attention to the recent rapid spread of social and cultural ideas as a new idea. Although this discussion is cautious in that it is an idea-level discussion, it is significant that it suggests the possibility of a theoretical review of the social spread of the MBTI.

Now, I would like to conclude the discussion as follows. The MBTI serves as a valuable tool for self-understanding, allowing individuals to comprehend and accept others to the extent that they understand and accept themselves. In Korean society, the emphasis on solidarity and belonging to the collective "we" has traditionally surpassed the significance attributed to individual "I" or "you". However, a paradigm shift is evident, with contemporary Korean society acknowledging the importance of the lives and values of each individual within a group. The MBTI provides a means to express an individual's unique identity in a universally understandable and acceptable language [5]. When used appropriately, this socially spread tool has the potential to enhance the community's understanding of both "I" and "you", facilitating careful collective decision-making for a sustainable community characterized by social connectivity free from restrictive boundaries. Therefore, understanding community members' general perceptions of the MBTI and exploring conditions for its utilization could contribute to the formation of a foundation for a 'sustainable community' where individual psychological well-being can be possible.

To achieve this, a redesign of the social perception of the MBTI is necessary. This requires the implementation of reliable scientific tests and education, avoiding harm or stress caused by "stereotyping", and refraining from usage beyond the original purpose. Only through these measures can the MBTI effectively contribute to the development of sustainable communities.

6. Future Works

First, our focus on MBTI-related texts from news, blogs, cafes, etc., for big data analysis excluded unstructured data, such as videos or images, which are experiencing a rapid and substantial increase in volume. Future research should broaden data collection methods and employ multi-layered analysis to unveil insights that might be elusive using text-based data alone.

Second, the MBTI culture is relatively new, and, when a nascent culture emerges, it requires observation to discern its acceptance and potential trend-setting impact on the public. Determining whether it is a passing trend or if it will become deeply ingrained in individuals and society as a whole necessitates a wait-and-see approach [5]. Given that

big data swiftly captures such social phenomena, subsequent studies tracking the social contextual changes of the MBTI are anticipated.

Third, this paper involved a comprehensive study of the perception of the MBTI over three years. If a longitudinal study is conducted to confirm the trend of changes in interest in subsequent studies, the evolution and impact of MBTI-related perceptions can be confirmed. This is expected to provide useful insights from a sustainable community perspective.

Fourth, this study was conducted by limiting the perception of the MBTI to South Korean society in recent years. In South Korea, free simple tests (not formal MBTI tests) are easily accessible online, and the MZ generation, which leads culture, tends to actively consume the MBTI. This context may have influenced the results of this study. Accordingly, the authors propose a qualitative study that analytically explores South Korean perceptions. In addition, research is needed to compare South Korean perceptions with those of other cultures. This can help us to understand the universality and cultural differences of the MBTI.

Fifth, the pandemic seems to have had an important impact on the perception of the MBTI, but there is no academic research on this. The newspaper article only presents an expert's analogical interpretation. The research topic comparing pre-pandemic and post-pandemic perceptions would be an interesting attempt to understand not only the MBTI perception but also the impact of the pandemic on society.

Sixth, verification of sentiment analysis is necessary. This study applied sentiment vocabulary analysis within TEXTOM, a big data analysis tool, to sentiment analysis, and the emotional dictionary used here was developed by TEXTOM researchers. This tool is useful in terms of guessing the tendency of emotion, but it has a limit to generalization in terms of validity. Accordingly, the researchers propose a quantitative study that can verify the validity by comparing the results of sentiment analysis using big data with actual values as a future study.

Seventh, in this study, the possibility of applying the innovation diffusion theory in relation to the spread of the MBTI was explored. This can be said to be a rudimentary level in terms of the application of the conceptual framework. In subsequent studies, it is necessary to study in-depth the innovation process (knowledge-persuasion-decision-implementation-determination) and the factors of innovation suggested in the innovation diffusion model. Through this, one will be able to understand the perception of members of society regarding acceptance and resistance to the MBTI.

Eighth, reproducibility is important for scientific health, but this paper is a paper that explores social perception, so it has limitations in this area. Therefore, the researchers propose the verification of the MBTI diffusion factor using structural equation modeling as a follow-up study. The Partial Least Squares structural equation modeling method (PLS-SEM) is applied to exploratory research or research models in which the relationship between multiple indicators, paths, and variables exists to verify the predictive model [61], and it is thought that it will contribute to reproducibly, revealing significant variables in the spread of the MBTI.

Lastly, there is a limit to predicting future trends in the perception of the MBTI based on the data analysis results performed in this study. As identifying the current perception and predicting the future are separate items, the methodology for accurately predicting the MBTI recognition trend seems to be a task to be explored in future studies. However, this study contributes to investigating the perception of the MBTI by using big data analysis through text as one methodology.

Author Contributions: Conceptualization, H.L. and Y.S.; formal analysis, H.L.; methodology, H.L.; visualization, H.L.; writing—original draft, H.L.; writing—review and editing, H.L. and Y.S. All authors have read and agreed to the published version of the manuscript.

Funding: This paper was supported by Wonkwang University in 2023.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: All data that can reproduce the results in this study can be requested from the corresponding author.

Conflicts of Interest: The authors declare no conflicts of interest.

References

1. Korea MBTI Institute. Available online: <https://www.mbti.co.kr/> (accessed on 27 December 2023).
2. Barbuto, J.E., Jr. A critique of the Myers-Briggs Type Indicator and its operationalization of Carl Jung's psychological types. *Psychol. Rep.* **1997**, *80*, 611–625. [CrossRef]
3. Zhao, X. A Study of Image Representation of Female Characters in Disney Animations Based on MBTI Personality Types. Ph.D. Dissertation, Sangmyung University, Seoul, Republic of Korea, 2023. Available online: <https://www.riss.kr/link?id=T16842068> (accessed on 20 December 2023).
4. Myers, I.B.; Mccaulley, M.H.; Quenk, N.L.; Hammer, A.L. *MBTI® Form M Manual*; Kim, J.; Shim, H., Translators; ASSESTA: Seoul, Republic of Korea, 2015.
5. Kim, J. *MBTI You Didn't Know*; Threechairs Publishing Company: Seoul, Republic of Korea, 2022.
6. The Myers-Briggs Company. Available online: <https://www.themyersbriggs.com/en-US/Connect-With-Us/Blog/2018/October/MBTI-Facts%E2%80%94Common-Criticisms> (accessed on 3 January 2024).
7. Jung, Y.; Kim, T.; Bae, E.; Yang, S.; Lee, J. Meet Me in Four Letters: The World of MBTI. *The Chungbuk Times*, 28 September 2020. Available online: https://press.cbn.ac.kr/ktimes/m_view.php?mode=view&no=4336§ion=119 (accessed on 12 December 2023).
8. Bang, Y. Cultural Tools for Understanding Yourself and Others MBTI. *Urimunhwa*, May 2022. pp. 76–79. Available online: http://urimunhwa.or.kr/data/vol307/sub/sub04_01.php (accessed on 12 December 2023).
9. Kim, B. In Korea, MBTI Is Very Popular. *MK Health Journal*. 20 April 2022. Updated 21 April 2022. Available online: <https://www.mkhealth.co.kr/news/articleView.html?idxno=57417> (accessed on 12 December 2023).
10. Yoo, J. Psychological Test, Is It a Playground for Young People or a Reflection of Anxious Psychology. *The JoonAng Sunday*. 6 March 2021. Updated 6 March 2021. Available online: <https://www.joongang.co.kr/article/24005854#home> (accessed on 12 December 2023).
11. An, S. Trend Korea 2021, Outlook for the Pandemic Crisis. *Daily Tomorrow*. 13 January 2021. Available online: <https://www.dailytw.kr/news/articleView.html?idxno=21553> (accessed on 12 December 2023).
12. Koh, Y. *The MBTI You Knew Wasn't Really MBTI*; Inspiration: Gyeonggi, Republic of Korea, 2022.
13. Lee, T. Our thoughts on creating a sustainable future. *KDIans* **2022**, *55*, 14–17. Available online: https://www.kdi.re.kr/share/kdiansView?art_no=24&year=2022&season=4 (accessed on 2 December 2023).
14. Suh, W.; Won, H.; Kim, S. A Study on Social Perception of Process-Based Evaluation Using Big Data: Focused on Keyword Network Analysis. *J. Educ. Innov. Res.* **2021**, *31*, 113–136.
15. Russell, A.L. MBTI® Personality Preferences and Diverse Online Learning Experiences. *Sch. Libr. Worldw.* **2001**, *8*, 25–40. [CrossRef]
16. Ayoubi, R.M.; Ustvani, B. The relationship between student's MBTI, preferences and academic performance at a Syrian university. *Educ. Train.* **2014**, *56*, 78–90. [CrossRef]
17. Harrington, R.; Loffredo, D.A. MBTI personality type and other factors that relate to preference for online versus face-to-face instruction. *Internet High. Educ.* **2010**, *13*, 89–95. [CrossRef]
18. Rodríguez Montequín, V.; Mesa Fernández, J.M.; Balsera, J.V.; García Nieto, A. Using MBTI for the success assessment of engineering teams in project-based learning. *Int. J. Technol. Des. Educ.* **2013**, *23*, 1127–1146. [CrossRef]
19. Capretz, L.F. Implications of MBTI in Software Engineering Education. *ACM SIGCSE Bull.* **2002**, *34*, 134–137. [CrossRef]
20. Lee, H. Relationship between the MBTI Test and Painting Expression—Focusing on students of Painting Department at Incheon Catholic University. *Korean J. Art Media* **2019**, *18*, 201–235.
21. Sung, G.; Leem, J. The Effects of MBTI Career Program Based on Blended Learning on Learners' Psychological Type-Related Career Comprehension and Motivation. *Psychol. Type Hum. Dev.* **2017**, *18*, 1–23.
22. Lim, S.; Chin, C. A Study on the Relationship between MBTI of Beauty therapy Department Students and their Career Selection. *Korean J. Aesthet. Cosmet. Soc.* **2006**, *4*, 155–164.
23. Shin, H.; Sim, H. The Effect of Group Counseling Program Based on the MBTI for Middle-Age Women on Their Self-Image and Life Satisfaction. *Women's Stud.* **2008**, *75*, 93–133.
24. Lee, S.; Kim, H. Effects of a Group Counseling Program Using MBTI on Self-Acceptance, Others-Acceptance and Friendship in Nursing College Students. *Psychol. Type Hum. Dev.* **2023**, *24*, 73–91.
25. Jung, S.; Kang, M. Meta-analysis of the Effects of Group Counseling Program using MBTI: Focusing on Students. *Korean J. Appl. Dev. Psychol.* **2023**, *12*, 121–136.
26. Lee, M. Psychological Effects of MBTI Uses among Undergraduate Students: The Impacts of MBTI Trust on Self-Determination Motivation, Self-Perception, Interpersonal Communication Competency, and Subjective Well-Being. *Korean J. Commun. Inf.* **2023**, *122*, 133–160. [CrossRef]

27. Kim, M.; Kim, K. The Impact of MBTI Understanding on Life Satisfaction of College Students: The Moderating Effect of Self-Acceptance. *Korean J. East West Mind Sci.* **2023**, *26*, 103–118.
28. Park, J.; Lee, M.; Chung, Y. A Study on the Effects of R&D Employee's Personality Type (MBTI) and Working Conditions on Organizational Effectiveness: Personality Type (MBTI) Focused on Actions. *J. Soc. Korea Ind. Syst. Eng.* **2012**, *35*, 136–147.
29. Stothart, C. Coaching with 360 and MBTI: A case study. *Assess. Dev. Matters* **2011**, *3*, 5–7. [\[CrossRef\]](#)
30. Kang, M.; Park, J. A Study on the Relation among MBTI Personality Types, Job Satisfaction, Customer Orientation, and Willingness to Change Job. *Manag. Inf. Syst. Rev.* **2017**, *36*, 151–173.
31. Kim, J.; Kim, S. A Study on Job Satisfaction and Organizational Commitment in terms of MBTI Types of Individuals Employee of Position in a Point of Customer Contact. *J. Corp. Educ. Talent. Res.* **2008**, *10*, 97–116.
32. Boyle, G.J. Myers-Briggs Type Indicator (MBTI): Some psychometric limitations. *Aust. Psychol.* **1995**, *30*, 71–74. [\[CrossRef\]](#)
33. McCaulley, M.H. Myers-Briggs Type Indicator: A bridge between counseling and consulting. *Consult. Psychol. J. Pract. Res.* **2000**, *52*, 117–132. [\[CrossRef\]](#)
34. Randall, K.; Isaacson, M.; Ciro, C. Validity and reliability of the Myers-Briggs Personality Type Indicator: A systematic review and meta-analysis. *J. Best Pract. Health Prof. Divers.* **2017**, *10*, 1–27.
35. Edwards, J.A.; Lanning, K.; Hooker, K. The MBTI and social information processing: An incremental validity study. *J. Personal. Assess.* **2002**, *78*, 432–450. [\[CrossRef\]](#) [\[PubMed\]](#)
36. Tsao, H.Y.; Lin, C.C.; Lo, H.Y.; Lu, R.S. Predicting Consumer Personalities from What They Say. *Appl. Sci.* **2023**, *13*, 6148. [\[CrossRef\]](#)
37. Ryan, G.; Katarina, P.; Suhartono, D. MBTI Personality Prediction Using Machine Learning and SMOTE for Balancing Data Based on Statement Sentences. *Information* **2023**, *14*, 217. [\[CrossRef\]](#)
38. Amirhosseini, M.H.; Kazemian, H. Machine learning approach to personality type prediction based on the myers-briggs type indicator[®]. *Multimodal Technol. Interact.* **2020**, *4*, 9. [\[CrossRef\]](#)
39. Lee, S.; Park, J.; Um, D. Speech characteristics as indicators of personality traits. *Appl. Sci.* **2021**, *11*, 8776. [\[CrossRef\]](#)
40. Shon, J.; Cho, D.; Yoon, H. A Study on the Safety Perception of Leisure Sports Participants in the COVID-19 Environment: Text Mining and Semantic Network Analysis. *Korean Soc. Study Phys. Educ.* **2023**, *28*, 247–255. [\[CrossRef\]](#)
41. Lee, G. A study on the consumer perceptions of meal-kits using big data: Anticipating after the COVID-19 pandemic ends. *Int. J. Tour. Hosp. Res.* **2021**, *35*, 227–239.
42. Jang, J.; Lee, E.; Jung, H. Analysis of Food Delivery Using Big Data: Comparative Study before and after COVID-19. *Foods* **2022**, *11*, 3029. [\[CrossRef\]](#)
43. Kim, K.; Kim, E. Exploration of a direction of early childhood parent education through big data analysis. *Korean J. Early Child. Educ.* **2017**, *37*, 741–758.
44. Kim, G. Analysis of Early Childhood Emotional Education Network in Big Data. *Korea J. Child Care Educ.* **2023**, *139*, 1–23. [\[CrossRef\]](#)
45. Lee, Y. A Study on the Change of Perception of Delivery Apps by Consumers and Restaurant Owners Before and After the COVID-19 Pandemic Through Keyword Analysis: Focusing on the 'Baemin'. *J. Korean Career-Entrep. Bus. Assoc.* **2023**, *7*, 1–15. [\[CrossRef\]](#)
46. Lee, Y. Korean society's perception of MBTI using big data. *J. Learn.-Centered Curric. Instr.* **2022**, *22*, 797–809.
47. Choi, D. Problems of Big Data Analysis Education and Their Solutions. *J. Korea Converge. Soc.* **2017**, *8*, 265–274.
48. Kim, Y. Current status of big data-related study and tasks of early childhood education in Korea. *Korean J. Early Child. Educ.* **2016**, *36*, 181–206.
49. You, H.; Moon, G. A Study on the Social Recognition of Children's Creativity and Playing through Big Data. *J. Learn.-Centered Curric. Instr.* **2019**, *19*, 23–51. [\[CrossRef\]](#)
50. Baek, S.; Moon, I. The Study on the patient safety culture convergence research topics through text mining and CONCOR analysis. *J. Digit. Converge.* **2021**, *19*, 359–367.
51. Kim, N.; Jeon, M.; Choi, J.; Lee, H.; Lee, S.; Seo, Y.; Kwon, J.; Han, D. *Trent Korea 2021; Window of the Future Publishing Company*: Seoul, Republic of Korea, 2020.
52. Qaiser, S.; Ali, R. Text mining: Use of TF-IDF to examine the relevance of words to documents. *Int. J. Comput. Appl.* **2018**, *181*, 25–29. [\[CrossRef\]](#)
53. Jeong, G. A Study of Foresight Method Based on Textmining and Complexity Network Analysis. Korea Institute of Science and Technology Evaluation and Planning. 2010. Available online: https://www.kistep.re.kr/board.es?mid=a10305080000&bid=0002&act=view&list_no=34224&tag=&nPage=103 (accessed on 27 December 2023).
54. Kim, D. Analysis of News Regarding on Shared Housing Using Text Mining Techniques. *J. Korean Hous. Assoc.* **2023**, *34*, 159–169. [\[CrossRef\]](#)
55. TEXTOM. Available online: <https://www.textom.co.kr/home/main/main.php> (accessed on 3 December 2023).
56. Son, D. *Social Network Analysis*; Gyeongmun Publishing Company: Seoul, Republic of Korea, 2010.
57. Kim, Y. Semantic Network of Korean Pop Songs- Changing meaning Structure from 1960's to 2000's. *J. Pop. Narrat.* **2015**, *21*, 145–171.
58. Kim, S.R.; Kang, M.M. Big data analysis technology today and the future. *Commun. Korean Inst. Inf. Sci. Eng.* **2014**, *32*, 8–17.
59. Kwak, K. *Social Network Analysis*; Cheongram Publishing Company: Seoul, Republic of Korea, 2017.

60. Rogers, E.M. *Diffusion of Innovations*, 5th ed.; Free Press: New York, NY, USA, 2003.
61. Henseler, J.; Dijkstra, T.K.; Sarstedt, M.; Ringle, C.M.; Diamantopoulos, A.; Straub, D.W.; Ketchen, D.; Hair, J.; Hult, G.; Calantone, R.J. Common beliefs and reality about PLS: Comments on Rönkkö and Evermann (2013). *Organ. Res. Methods* **2014**, *17*, 182–209. [[CrossRef](#)]

Disclaimer/Publisher’s Note: The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of MDPI and/or the editor(s). MDPI and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.