

## A study on Metaverse keyword Consumer perception survey after Covid-19 using big Data

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### **Abstract**

*In this study, keywords from representative online portal sites such as Naver, Google, and Youtube were collected based on text mining analysis technique using Textom to check the changes in metaverse after COVID-19. before Corona, it was confirmed that social media platforms such as Kakao Talk, Facebook, and Twitter were mentioned, and among the four metaverse, consumer awareness was still concentrated in the field of life logging. However, after Corona, keywords from Roblox, Fortnite, and Geppetto appeared, and keywords such as Universe, Space, Meta, and the world appeared, so Metaverse was recognized as a virtual world. As a result, it was confirmed that consumer perception changed from the life logging of Metaverse to the mirror world. Third, keywords such as cryptocurrency, cryptocurrency, coin, and exchange appeared before Corona, and the word frequency ranking for blockchain, which is an underlying technology, was high, but after Corona, the word frequency ranking fell significantly as mentioned above.*

**Keywords:** *Metaverse, Consumer perception, COVID--19, Keyword analysis, Big Data*

### **1. Introduction**

In the virtual reality technology that experiences the virtual world, we are entering the era of the metaverse in which activities and interactions are made through the connection between objects that experience the virtual world [1]. Facebook, which had led the market for interactive communication services on computer networks, changed its name to Meta and decided the company's future direction to be metaverse. Metaverse focuses on interactive experiences and participation, such as avatars replacing themselves in a virtual space, communicating and interacting with each other as in everyday life[2]. The focus is on a one-way experience using the sense organs (sight, hearing, touch, taste, and smell). In other words, it can be seen that the metaverse provides the second and third living spaces where each person lives.

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## 2. Experiments

Based on the metaverse consumer perceptions shown in social media, we investigated what keywords consumers perceive metaverse as and whether they need an accurate platform and technology. Based on the survey on metaverse consumer perception, we compare and analyze the current metaverse policy technologies and trends of metaverse policies, and present the directions for metaverse policies and technology development [3]. As a research method, this thesis is meaningful in establishing the policy and technology direction by establishing the metaverse consumer image model after analyzing each keyword through big data keyword analysis and investigating the correlation by taking the metaverse as the central keyword [4]. This paper analyzes the metaverse as keywords for four years from January 2018 to December 2021 using Textom, a specialized text analytics tool. After comparative analysis of data for the period of 20-21 years, it was confirmed that consumer perception changed. As for the scope of collection, Naver, Daum, Google blogs, cafes, intellectuals, news, and web documents were selected. Textome was used for data preprocessing, purification and morphological analysis, and Ucinet 6.0 and Netdraw were used for analysis tools. visualized. By analyzing the correlation of keywords with big data, the relation of keywords is verified through word frequency, TF-IDF.

## 3. Result

Data preprocessing is a refining procedure that decomposes, refines, and filters text based on natural language processing technology, which is the most basic in machine learning. In order to extract the exact meaning of the text from the textome, sentence structure and part-of-speech determination, stopword removal, and synonym unification are performed [5]. Therefore, in this study, data preprocessing was performed on text data through data purification, morpheme and data editing process. As the data purification method, a direct purification method was selected, and word filtering, duplication removal, and analysis language were set to Korean. In addition, by selecting Espresso K, proper nouns and compound nouns themselves were reflected in the result value. For the part-of-speech analysis, nouns and adjectives were selected among simple parts-of-speech, and the user dictionary was not used. Afterwards, proper nouns and stopwords were directly removed from the refined data. For example, similar synonyms such as ‘lecture’ and ‘course’ were unified into one word.

**Table 1. Metaverse keyword Frequency after COVID-19**

Rank	Word	Freq.	Rank	Word	Freq.
1	Metaverse	261767	51	The trend	4199
2	virtual	44182	52	Convergence	4184
3	world	37579	53	Exhibition	4155
4	Game	31321	54	Space	4114
5	Platforms	26468	55	Implementation	4098
6	skill	24362	56	Planning	4097
7	The coronavirus	19236	57	Outlook	4076
8	Industry	18429	58	Internet	4053
9	Corporation	18250	59	Innovation	3933
10	Space	17764	60	Change	3893
11	Digital	17477	61	Augmented reality	3880
12	Investment	16173	62	Theme	3657
13	Research	14671	63	real estate	3577
14	Contents	14512	64	Issue	3448
15	Economy	14112	65	Experience	3417
16	Service	12609	66	Communication	3393
17	Future	12548	67	Movies	3375
18	Development	11101	68	Smart	3375

19	Education	10537	69	Design	3368
20	Geppetto	10015	70	Expansion	3341
21	Meta. (meaning 'meta')	9971	71	Core	3234
22	Virtual reality	9774	72	Ecology	3097
23	Online	8844	73	UNIVERSE	2938
24	an avatar	8397	74	Cacao. (meaning 'cacao')	2933
25	Blockchain	8301	75	Mobile	2882
26	Culture	6915	76	Fortnite	2869
27	Video	6904	77	Business	2803
28	Global	6802	78	performance	2739
29	Dimension	6366	79	Users	2707
30	Sharing	6172	80	Brand	2654
31	transcendence	6114	81	Bitcoin	2623
32	Media	6071	82	Ifland	2610
33	Growth	6066	83	Solutions	2600
34	Interest	5993	84	property	2495
35	Concept	5677	85	Currency	2489
36	Naver	5564	86	Introduction	2485
37	Roblox Corporation	5529	87	Spreading	2477
38	Launch	5429	88	Model	2475
39	List of awards	5395	89	Data	2456
40	Science	5391	90	Google	2446
41	Coin	5206	91	Bank	2445
42	Project	5098	92	Marketing	2425
43	Facebook	5060	93	the stock market	2354
44	finance	5038	94	a hot wind	2352
45	Analysis	5019	95	Popularity	2337
46	Expansion	4895	96	Start-up	2329
47	build	4892	97	the client.	2295
48	Artificial intelligence	4470	98	university	2294
49	Strategy	4394	99	School	2247
50	Sandbox	4374	100	Management	2236

The words for the central word "metaverse" were analyzed in 2020, 2021, that is, after COVID-19, and a total of 100 were selected and analyzed. Except for the central word "metaverse" as shown in the table above, words appear in the order of virtual (44182), world (37579), game (31321), platform (26468), and technology (24362). In particular, the number of metaverse keywords was 261767, which was larger than the data from 18-19. The most important word in the post-COVID-19 period, "COVID-19 (19236), appeared, and Corona emerged as the biggest issue. As a result, COVID-19 has led to non-face-to-face services, and many industries have changed according to social distancing and control. The aforementioned keyword Corona is seventh, showing a high frequency, and due to Corona, metaverse technology, platform, and content have been accelerated due to the activation of non-face-to-face and the attention of the virtual world. In addition, not only large companies such as Naver, Kakao, and Sandbox, which implement and develop metaverse in 3D such as Geppetto, Roblox, Fortnite, and Ifland, but also startups that produce content have increased significantly[7]. As a result, metaverse' mirror world areas such as Meta (9971), Naver (5564), and Roblox (5529), ranked 37th, were large, and NFT and 69th cryptocurrency related to pre-COVID-19 metaverse fell significantly to 126th in the post-COVID period, while Bitcoin, ranked 76th, fell slightly to 81st. However, the blockchain, ranked 25th after COVID-19, increased significantly compared to before COVID-19, and education in 19th place also increased significantly. When we checked the original metaverse data after Corona, consumers said, "I want to decorate my house on Naver, Geppetto, Metaverse platform, please recommend me." "I heard that Roblox implemented a squid game, which is interesting." It has confirmed that new persona trends are emerging in the

MZ generation, such as Avatar (8397), the 24th-ranked avatar (8397) that recognizes the virtual world and mirror world of metaverse and creates another me. In addition, not only avatars but also original data on the metaverse platform were dominant, and content for consumers to enjoy within the platform was also dominant. As a peculiarity mentioned above, the key keywords for cryptocurrency in metaverse fell significantly after Corona, confirming that consumers' perceptions have deteriorated due to regulations in various countries around the world due to social issues, such as "The government tightens regulations on Bitcoin" and "Virtual currency exchanges are too reckless."

As shown in the table above, TF-IDF for pre-COVID-19 metaverse appeared in the order of virtual (83249.7183), broadcast (71890.49152), technology (69242.07036), news (64580.71544), and metaverse (63749.07139). Table. Compared to the top 91% 100 words in the pre-COVID metaverse word frequency table, the words "technology", "news", and " metaverse" are in the top 5, but the TF-IDF value is in the second place (71890.49152). In addition, metaverse, an important keyword, ranked first in word frequency, but 5th in TF-IDF. Thus, metaverse, an important keyword, confirmed that it is relatively unimportant within the sentence than virtual, broadcasting, technology, and news. Keywords about metaverse in the media are important by confirming in the original data, such as "How much metaverse can be implemented in the virtual world?" and "What state is metaverse related to the metaverse technology that keeps coming up in broadcasts and news?" Table. Comparing the TF-IDF values of 100 words in metaverse, it shows that the ranking change of words is not large. In other words, it is interpreted that the frequency analysis result of the metaverse and the TF-IDF result are similar.

**Table 2. Metaverse keyword TF-IDF after COVID-19**

Rank	Word	TF-IDF	Rank	Word	TF-IDF
1	virtual	83249.7183	51	the industry	22390.82609
2	Broadcasting	71890.49152	52	a venture	21949.26205
3	skill	69242.07036	53	Launch	21440.78923
4	News	64580.71544	54	Goal	21389.73288
5	Metabus	63749.07139	55	Management	21136.64697
6	Research	61543.57538	56	Analysis	20846.97338
7	Game	61049.59158	57	Evaluation	20576.10464
8	Sharing	59505.70709	58	Let's go	20085.23132
9	Industry	58542.01528	59	Currency	20051.00678
10	Corporation	51961.46054	60	Robot	19865.87962
11	Investment	47097.01013	61	Institution	19765.2366
12	Coin	46722.02026	62	Space	19665.17939
13	Development	45713.10181	63	Strategy	19628.39879
14	Economy	43726.45893	64	Management	19568.47552
15	Platforms	43643.80975	65	an exchange	19542.56362
16	Education	42234.43065	66	City	19325.97268
17	Contents	41811.47364	67	Movies	18939.10567
18	Culture	41733.19304	68	Art	18747.97725
19	Facebook	38652.80278	69	Cryptocurrency	18710.00629
20	Science	37875.63005	70	Meta. (meaning 'meta')	18484.23085
21	market	36532.23548	71	Design	18384.34303
22	Data	36433.56948	72	university	17874.63277
23	Service	36020.18812	73	Performance	17848.8331
24	Twitter	35627.78293	74	stock price	17779.91452
25	Space	35390.93473	75	Rising	16823.742
26	Group	35385.61587	76	Bitcoin	16449.5165
27	Kakao Talk	33368.0272	77	Experience	16382.17281
28	Future	33252.28407	78	Mobile	16366.18805
29	Digital	32451.58743	79	Smartphone	16234.14179

30	Global	30257.88164	80	Innovation	16030.12297
31	Blockchain	30001.11885	81	the client.	16023.53035
32	Target	29746.84919	82	Advertising	16013.31464
33	Securities	28641.57186	83	Sales	15924.53007
34	Sports	28517.70871	84	Enhance	15898.80313
35	Smart	28428.02563	85	Convergence	15829.69298
36	The coronavirus	27662.21707	86	Security	15658.32066
37	Business	27402.57692	87	Core	15566.07405
38	Communication	27165.46012	88	Student	15538.76228
39	Online	26790.74484	89	propulsion	15241.61467
40	Virtual reality	26385.07946	90	inside the room	15178.72911
41	real estate	26284.53029	91	Implementation	15176.81763
42	Environment	25556.75265	92	Program	14740.23398
43	Brand	24713.86278	93	Channel	14483.86017
44	finance	24634.82702	94	Outlook	14260.01402
45	Artificial intelligence	24519.03658	95	bio	14236.60109
46	Festival	24209.59432	96	Life	14184.18717
47	the product	24080.0484	97	The trend	13866.40267
48	Concept	23981.11818	98	Recruitment	13820.96247
49	Center	22450.5512	99	Tightening	13812.87581
50	Media	22431.82296	100	History	13759.62107

#### 4. CONCLUSION

The Pandemic Sanghwa caused by COVID-19 has changed all services from face-to-face to non-face-to-face services, and as a result, metaverse has begun to gain attention in virtual space. Therefore, new added value is being formed as the development of NFT technologies such as coins and the emergence of new economies due to metaverse. As a result, metaverse policies and trends are mainly based on technology, and content development through technology development is drawing attention as a wealth, and a lot of investment is being made. It is also important to focus on the development of metaverse technology, but there is a need to analyze the perceptions of consumers using metaverse. For research purposes, metaverse, or virtual reality, requires not only implementation technology but also many factors. Platforms and contents within the metaverse are used by consumers and developed as open source, but it is difficult to confirm consumer perception. As a result, since the paper on metaverse consumer perception is insufficient, the consumer perception of metaverse appearing on social media was improved and analyzed. Based on the metaverse consumer perception shown on social media, consumers surveyed what keywords they perceived metaverse as and what exact platforms and technologies were needed.

#### References

- [1] Kim, Seong-Yong, "A Study on the Subjectivity of Consumers to Accept the Culture of Eating out through the YouTube Platform", *The Journal of the Korea Contents Association*, Volume 28, Number 9, pp. 179-189, 2014  
DOI: <https://doi.org/10.5392/JKCA.2020.20.09.414>
- [2] Kim, Young-Sook, "Effect of Educational Attainment of Household Head on Eating-out Demand", *Journal of the Korean Society of Food Science and Nutrition*, Volume 34, Number 9, pp. 1407-1413, 2005  
DOI: <https://doi.org/10.3746/jkfn.2005.34.9.1407>
- [3] Kim, Sook, "A Study on the Relationship of Korean and Chinese Consumers' Eating-out Motivation, Dining Out, and Delivery-Takeout in COVID--19 : The Moderating Role of Interpersonal Contact Anxiety", *The Journal of the Korea Contents Association*, Volume 22, Number 4, pp. 324-336, 2022  
DOI: <https://doi.org/10.5392/JKCA.2022.22.04.324>

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- [4] Suh, Yoon-Suk, “Comparison of Nutritional Status of the Daejeon Metropolitan Citizens by Frequency of Eating Out”, *Journal of Nutrition and Health*, Volume 43, Number 2, pp. 171-180, 2010  
DOI: <https://doi.org/10.5392/JKCA.2020.20.09.414>
- [5] Kim, Na-Hyung, “The Effects of the Dietary Lifestyle and Demographic Characteristics on the Brand Image of Restaurants with Nutritional Labeling”, *Journal of the Korea Academia-Industrial cooperation Society*, Volume 20, Number 6, pp. 548-556, 2019  
DOI: <https://doi.org/10.5762/KAIS.2019.20.6.548>
- [6] Kim, Hyun-Ah , “University students' eating behavior and consumer attitude in social commerce service”, *Journal of Nutrition and Health*, Volume 47, Number 6, pp. 426-434, 2014  
DOI: <https://doi.org/10.4163/jnh.2014.47.6.426>
- [7] Jin-young, “The Effect of Depression, Anxiety, and Stress on International Students’ Adjustment to College Life in the Context of the COVID-19 Pandemics”, *International Journal of Advanced Culture Technology* Vol.10 No.3 1-10,2022  
DOI <https://doi.org/10.17703/IJACT.2022.10.3.1>