

A Study on the Consumer Perception and Keyword Analysis of Meal-kit Using Big Data

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Abstract

As the level of consumption is improved and cultural life is pursued, the consumer's consciousness structure is rapidly changing, and the demand for product selection level, variety, and quality is becoming more diverse. The restaurant economy is falling due to the prolonged COVID-19, the economic recession, income decline, and changes in population structure and lifestyle, but the Meal-kit market is growing rapidly. This study aims to identify the consumer perception of Meal-kit, which is rapidly growing as an alternative to existing meals in the fields of dining out, food, and distribution due to the development of technology and social environment using big data. As a result of the analysis, the keywords with the highest frequency of appearance were in the order of Meal-kit, Cooking, Product, Launching, and Market and were divided into 8 groups through the CONCOR analysis. We want to identify consumer trends related to the key keywords of Meal-kit, present effective data related to Meal-kit demand for Meal-kit specialized companies, and provide implications for establishing marketing strategies for differentiated competitive advantage.

Keywords: Meal-kit, Big Data, Consumer Perception, Text Mining, Semantic Network Analysis

1. Introduction

As eating habits become westernized amid rapidly changing economic growth, personal income increases due to changes in individual values and the development of various leisure cultures, the increase in double-income couples and single-person households, and the expansion and aging of women's social activities have a significant impact on the overall lifestyle change.

As social distancing continues in the long term after the recent COVID-19 pandemic, the paradigm of the

Manuscript Received: April. 22, 2022 / Revised: April. 25, 2022 / Accepted: April. 27, 2022

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restaurant industry is changing from offline to online distribution and delivery apps [1], and non-face-to-face services are increasing. Changes in consumer consumption trends have reduced eating out and increased demand for home-cooked meals, and increased non-face-to-face services due to the rapid increase in telecommuting and remote education, the market for HMR (Home Meal Replacement) is rapidly growing [2]. In this paper, due to the COVID-19 situation in which consumers' diets change rapidly, consumption patterns are also changing rapidly amid rapid growth and fierce competition in the Meal-kit product industry, so we intend to examine changes in consumers' perceptions of Meal-kit selection attributes through big data analysis. Section 2 of this paper is described as a related study, section 3 is described as a research method, section 4 is the analysis result, and section 5 is described as a conclusion.

2. Related research

2.1 Meal-kit

'Meal-kit' means Meal and Kit, and it is also called 'Cooking box' and 'Recipe' [3]. It is a slightly different concept from HMR, and Meal-kit is a meal set that can be cooked easily and quickly using prepared ingredients and prepared sauces. It is good for those who are not good at cooking or have no time, and these days, it is sold as a variety of products in famous chefs, restaurants, home parties, and camping, and it is defined as a premium health meal set.

2.2 Big data

The fundamental reason for applying the technology of big data is to identify flows and find patterns hidden in them among the vast amounts of data that exist in technical, social, and economic conditions. Data starts from the scale of data and technologies such as storage, management, and analysis, but today Big Data is interested in raw data, although it is classified as structured, semi-structured, and unstructured data. In the field of social science, quantitative research methods such as surveys and statistics and qualitative research methods through personal interviews or group interviews were the most important part, but simple randomization is impossible. In this study, we intend to utilize text mining and semantic network analysis using big data analysis techniques.

2.2.1 Text mining

Text mining means mining, and is one of the big data analysis techniques as a method of extracting relational data from a vast amount of unstructured data. Based on natural language processing technology, the frequency of meaningful words in the data and the relationship between words and words are identified and extracted as meaningful information [4].

2.2.2 Semantic Network Analysis(SNA)

Semantic Network Analysis (SNA) is a social network analysis technique that analyzes the systematization of structures based on shared meanings between words to identify the connection relationship between keywords of data collected [5]. SNA is based on word-to-word sharing meaning and is a social network analysis technique that analyzes statistical structures to identify the linkages between keywords from the data collected. It is a method for which words are used and which words are placed, and structural analysis between words is possible.

3. Research method

This paper analyzed social media big data to investigate consumer perception of Meal-kit products, a product that can easily eat a healthy and delicious meal by parcel-packaging fresh ingredients, a type of HMR home-cooked meal. Identify main keywords and issues that are most frequently presented to consumers about Meal-kit. In order to understand the meaning of the connection network around the key keyword, the central keyword was set as a Meal-kit, and the analysis period was set by integrating 4 years from 2018 to 2021 as a temporal collection range. From 2018 to 2018, there were 18,174 cases in 2018, 21,066 cases in 2019, 27,721 cases in 2020, and 23,890 cases in 2021, with a total of 90,851 data collected during the set period.

The spatial collection scope was set as NAVER, Daum, and Google's blogs, cafes, intellectuals, news, and web documents. TEXTOM, a social media Analytic website, was used to show text data and mattress information according to the frequency of related core keywords, remove keywords that are less related to core keywords from the TEXTOM, and analyze similar keywords by grouping them into the same keywords. In order to find out the network between words related to Meal-kit, it was visualized using UCINET's NetDraw function, and the relationship between blocks was identified by conducting network analysis and CONCOR analysis.

4. Analysis result

4.1 Frequency Analysis of Key Words for Meal-kit

Table 1 shows the frequency of appearance of related extraction key words when referring to Meal-kit in big data as the top 100.

Table 1. Top 100 list of key word

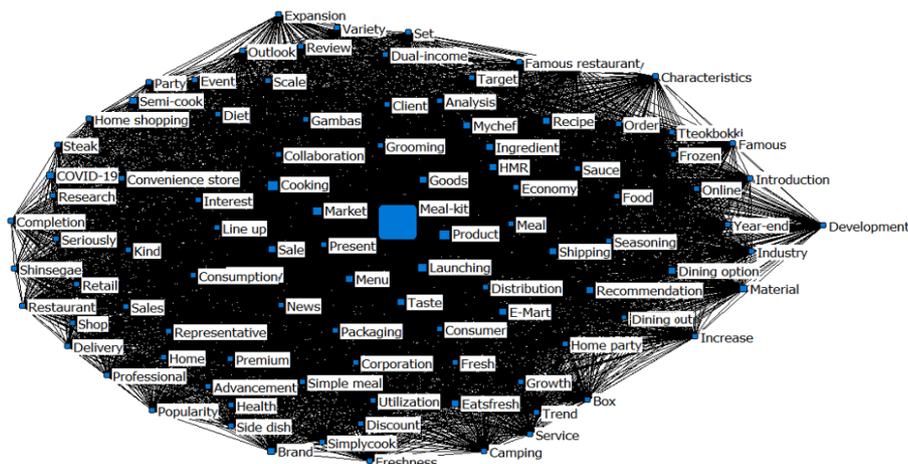
Rank	Word	Freq	Rank	Word	Freq	Rank	Word	Freq	Rank	Word	Freq
1	Meal Kit	99861	26	Grooming	3716	51	Tteokbokki	2427	76	Convenience store	1761
2	Cooking	18637	27	Dining out	3683	52	Food	2401	77	Shinsegae	1736
3	Product	16742	28	Fresh	3643	53	Increase	2389	78	Present	1717
4	Launching	11262	29	Home party	3437	54	Sauce	2383	79	Collaboration	1698
5	Market	9158	30	Box	3394	55	Online	2371	80	Interest	1632
6	Sale	8026	31	Economy	3357	56	Consumer	2195	81	Kind	1618
7	E-Mart	6927	32	Order	3325	57	Year-end	2190	82	Review	1618
8	Taste	6844	33	Meals	3213	58	Restaurant	2146	83	Completion	1612
9	Mychef	6303	34	Retail	3115	59	Research	2113	84	Freshness	1593
10	Menu	6263	35	Simple meal	3027	60	Famous	2081	85	Trend	1527
11	Fresheasy	6016	36	Camping	3010	61	Industry	2078	86	Steak	1524
12	Semi-cook	5994	37	Famous restaurant	2958	62	Target	2078	87	Shop	1499
13	Material	5598	38	Frozen	2950	63	Client	2073	88	Seriously	1462
14	HMR	5417	39	Representative	2928	64	Growth	2068	89	Line up	1454
15	Goods	5396	40	Service	2924	65	Sales	2029	90	Consumption	1444
16	Brand	5156	41	Home	2879	66	Packaging	1970	91	Characteristics	1422
17	Recommendation	4915	42	Distribution	2858	67	Development	1963	92	Scale	1397
18	Eatsfresh	4868	43	Professional	2786	68	Introduction	1930	93	Gambas	1380
19	Ingredient	4728	44	Popularity	2759	69	Health	1914	94	Party	1349
20	Shipping	4704	45	Corporation	2746	70	Utilization	1877	95	Variety	1298
21	Dining option	4657	46	Delivery.	2673	71	Discount	1876	96	Diet	1296
22	COVID-19	4572	47	Premium	2667	72	Dual-income	1792	97	Home shopping	1296
23	Recipe	4550	48	Seasoning	2667	73	Side dish	1789	98	Analysis	1291
24	Simplycook	3917	49	Advancement	2648	74	Expansion	1787	99	Event	1224
25	Set	3716	50	Company	2594	75	News	1764	100	Outlook	1215

As a result of analyzing the top 100 words among refined words through the frequency analysis of Meal-kit

keywords, the 2nd-place ‘Cooking’, 3rd-place ‘Product’, and 4th-place ‘Launching’, 5th-place ‘Market’ were found centering on the central keyword, Meal-kit. As a result of checking the original data, it was found that as the Meal-kit market grew after COVID-19, consumers preferred fresh and healthy premium Meal-kit products, and consumers confirmed changes in Meal-kit keywords by checking product reviews to find customized Meal-kit. Consumers were also found to purchase Meal-kit at offline stores, and the 55th ‘Online’ word confirmed diversification in Meal-kit purchase behavior. Although the online Meal-kit market has grown, consumers purchase Meal-kit through offline stores because they want to see the quality and freshness of ingredients with their eyes due to the nature of the Meal-kit. When I checked the original data, it was confirmed that "I purchased the Meal-kit online, but the delivery was fast, but the contents were broken", and "I ordered the Meal-kit in the summer, but the contents were damaged, so I will request a refund". In addition, as the number of people was limited due to COVID-19, consumers used Meal-kits at camping or home parties.

4.2 Network Analysis of Key Words

Figure 1 shows the network text for the Meal-kit using the NetDraw function of UCINET 6, which is a network of 100 key words.



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Figure 1. Network analysis visualization

It can be seen that the connection relationship of 100 words forms a complex relationship. The option was added so that the node size and the line connecting the nodes were proportional to the word connection relationship according to the frequency. ‘Food’, ‘Market’, ‘Meal’, ‘Launching’, and ‘Product’ appeared as the central word of this paper, focusing on the Meal-kit. In addition, words such as online and sales confirmed changes in form through the Meal-kit sales app and website at offline stores due to COVID-19. In the surrounding words, ‘Research’, ‘Variety’, ‘Camping’, ‘Party’, ‘Home shopping’, ‘Delivery’, ‘Brand’, ‘Health’, ‘Increase’, ‘Discount’, and ‘Dual-income’ were identified. In the original data, we can see the classification of consumers who consume Meal-kit in the case of dual-income and family members. Words such as ‘Recommendation’, ‘Review’, and ‘Discount’ identified as marketing words.

4.3 CONCOR analysis

COCOR (CONvergence of iteration CORrealtion) analysis is easy to interpret when clustering 100 words

to confirm group similarity because certain words are less likely to be included in overlapping groups [6]. Therefore, in this paper, we performed and visualized COCOR analysis to understand the characteristics of network structures. The results are shown in Figure 2. The clustering method performed COCOR analysis, which is a structural equivalence measurement method using existing correlations. COCOR analysis is a method of identifying simultaneous words at nodes and identifying relationships between blocks according to Pearson correlation in the matrix to form relationships between keywords and clusters [7]. As a result of analyzing the consumer perception of Meal-kit, it was clustered into eight as shown in Figure 2.

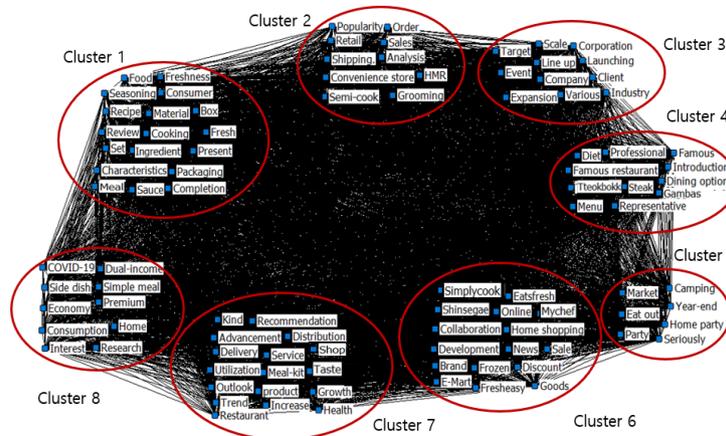


Figure 2. Visualization with CONCOR analysis

The cluster name was set as a factor name for the selection attributes and product characteristics of the Meal-kit. Cluster 1 was determined as a quality factor based on ‘Food’, ‘Seasoning’, ‘Cooking’, ‘Taste’, and ‘Ingredient’. It can be seen that as consumers begin to be interested in the taste of food, which is the third generation of Meal-kit, beyond convenience, it is changing as an important means of choosing the freshness of ingredients, sauces, and sets. Cluster 2 was set as convenience through ‘Convenience store’, ‘Shipping’, ‘Retail’, ‘Sales’, ‘Order’, ‘Semi-cooked’, ‘Grooming’, etc. Words in the cluster may confirm the intention to use a Meal-kit for the convenience of the consumer. Cluster 3 was designated as a recognition through ‘Industry’, ‘Scale’, ‘Company’, ‘Corporation’, ‘Expansion’, etc. It was found that awareness of Meal-kit products in the steady growth stage affects consumers according to the company name and size of the company. Cluster 4 confirmed through ‘Introduction’, ‘Professional’, ‘Menu’, ‘Diet’, ‘Professional’, ‘Tteobokki’, ‘Steak’, ‘Gambas’, and ‘Famous Restaurant’ that consumers are looking for reliable menus and restaurants when choosing a Meal-kit, and the cluster name is set as reliability. Cluster 5 was determined as a diversity factor through ‘Camping’, ‘Home party’, ‘Party’, and ‘Year-end’. Due to COVID-19, it has been confirmed that the intention to use Meal-kit is changing from home meal to various intention to use it, such as year-end, home party, and camping. Cluster 6 was branded through ‘Simplycook’, ‘Eatsfresh’, ‘Mychef’, and ‘Fresheasy’. Based on previous studies, it was confirmed that the Meal-kit brand is one of the attributes selected by consumers, and the brand is recognized as important. Cluster 7 was determined to be interested in the service and delivery of companies that provide Meal-kit through ‘Delivery’, ‘Service’, and ‘Utilization’, so it was selected as an economic (service) factor. Cluster 8 was set as a socio-environmental factor through ‘COVID-19’, ‘Premium’, and ‘Dual-income’. It was confirmed that consumer awareness of Meal-kit increased as the overall industrial structure of the restaurant industry changed due to the increase in double-income couples with COVID-19.

5. Conclusion

As social distancing has been prolonged since the COVID-19 pandemic, the paradigm of the restaurant industry has changed from offline to online distribution and delivery apps, and non-face-to-face services have also increased. With the creation of an alternative market for restaurant meals, products such as baby Meal-kit, silver meals, patient meals, nutritional meals, and educational meals are diversifying, and Meal-kit are becoming a high-tech trend through research on product materials and processing technologies. Therefore, in this study, which words are mainly used in relation to the Meal-kit, and related words are distributed as central keywords, and words with high similarity are grouped and analyzed based on word frequency. As a result of big data analysis, the words related to Meal-kit were not subdivided due to the concentration of consumer awareness like a simple meal, but it was confirmed that customized Meal-kit are being developed to meet consumer needs as the number of Meal-kit products and the market rapidly develops. It is differentiated from previous studies in that it is a study of various newly emerged products and consumers' needs based on the socio-environmental background that has changed before and after the outbreak of COVID-19 through analysis data over the past four years. Companies that produce and sell Meal-kits are expected to be helpful if they use it for promotional and marketing materials based on this result. We believe that rapid data collection and response will become a major factor in solidifying its position as a Meal-kit brand amid the market competition where various menus are introduced through social networks and YouTube, and popular foods are soon made into Meal-kits.

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