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A Study on the Trend Change of Restaurant Entrepreneurship through Big Data Analysis

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Abstract

Notable trends in the restaurant start-up market after the lifting of social distancing include increasing interest in start-ups, emphasizing the importance of food quality and diversity, decreasing the relative importance of delivery services, and increasing interest in certain industries. The data collection period is three years from April 2021 to May 2023, including before and after social distancing, and texts extracted from blogs, news, cafes, web documents, and intellectuals provided by Naver, Daum, and Google were collected. For the collected data, the top 30 words were derived through a refining process. In addition, based on April 2021, the application period of social distancing, data from April 2021 to April 2022, and data from May 2022 to May 2023, Through these changes in trends, founders can capture new opportunities in the market and develop start-up strategies. In conclusion, this paper provides important insights for founders in accurately understanding the changes in food service start-up trends and in developing strategies appropriate to the current market situation.

Keywords: Restaurant Start up, Big Data, Social Distancing, Trend

1. Introduction

Big data analysis is widely used in various industries and academic fields in modern society. This trend is no

exception in the restaurant industry. Past sales data, customer reviews and ratings, and even trends on social media are all collected as data and analyzed [1]. Such big data greatly helps the restaurant industry make important decisions, and based on this, new menu development, price setting, and promotion strategies can be determined to increase the success rate of restaurant start-ups [2]. As a result, many founders and companies are actively introducing and using data-based decision-making methodologies. However, the COVID-19 outbreak, which began in 2020, and the resulting social distancing policies have significantly changed the existing patterns and trends in the restaurant industry [3]. New consumption patterns were created, such as a decrease in the rate of restaurant visits and an increase in demand for delivery services, and the start-up strategy had to change significantly. In particular, one of the biggest changes is the consumption behavior of customers. Under the social distancing policy, the number of people who order online and receive delivery has increased more than those who visit restaurants in person [4]. In this case, it has become important to understand which menu customers prefer and what factors influence their choices.

Social distancing measures have been completely lifted in about two years and a month since April 15, 2022, according to a press release from the Ministry of Health and Welfare [5]. With the lifting of social distancing, consumers' interest in starting a restaurant has increased. SNS, which is optimized as a personalized interactive communication media with a rapidly increasing number of users as smartphones spread, is being effectively marketed through real-time feedback and information provision through interaction. In addition, the quality of the product that consumers feel is natural and they try to find other differences, and this differentiation is an important factor in deciding to purchase right away [6]. Therefore, this study compares the changes in food service start-up trends before and after the implementation of social distancing through big data analysis to find out what start-up strategies should be established, what differentiation strategies should be established, and how trends in the food service industry have changed in the current situation when social distancing is lifted.

2. Theory

2.1 Restaurant Start-up

In the dictionary sense of the food service industry, the meaning of the food service industry is as follows, according to Article 2 of the Food Service Industry Promotion Act.
1. The term "eating out" means a type of meal in which food is purchased at a restaurant, etc. without preparing food through cooking at home.
2. The term "food service product" means products produced for food service, services related to food service, education and training, operating system, trademarks, services, etc.
3. The term "food service industry" means industries that plan, develop, produce, distribute, consume, export, import, franchise business, and other industries prescribed by Presidential Decree.
4. The term "food service business" means economic activities related to the food service industry.
5. The term "food service business operator" means a person who runs a food service business.

In addition, the process of starting a restaurant generally consists of several stages, starting with opportunity recognition, business planning, financing, and team formation [7]. This process applies equally to restaurant startups, and various variables determine the success of startups at each stage. In particular, market research and marketing strategies play an important role in restaurant start-ups because the restaurant industry must react sensitively to changes in consumer preferences and food culture [8]. One of the characteristics of the

restaurant industry is known to be relatively stable to economic fluctuations. Because of this, many people choose the restaurant industry as a start-up field [9]. But like all start-ups, restaurant start-ups have various failure factors. Difficulties in financing due to lack of initial capital, failure to select a location due to insufficient market research and analysis, and lack of operational capabilities of individual founders are cited as major failure factors, and appropriate plans and strategies are needed to overcome these problems..

2.2 Big Data

The information society is changing very rapidly from system-oriented in the past to people-oriented in the present. Accordingly, the power of social networks is increasing and being applied socially. Among them, big data analysis plays a role in responding to the future society. It is growing into a key engine that creates opportunity factors [10]. In the early days, big data was defined as data that exceeded the processing capacity of existing database systems. Currently, the meaning is expanding with the value and utilization obtained through many big data analysis, and a unified definition of big data has not been established, and it is defined variously by scholars according to various perspectives. Big data analysis refers to the process of finding useful information in a large data set, discovering hidden patterns, and making future predictions. This is accomplished using various statistical and machine learning techniques [11]. According to IBM, it is defined as "big data analysis is an advanced analysis technology used to find meaningful patterns and relationships in large amounts of unstructured data" [12]. Characteristics of big data analysis has the characteristics of '7V' that are difficult to process in a traditional way: Volume, Velocity, Variety, Veracity, Value, Validity, and Volatility [13]. Although it has complexity due to these various characteristics, it provides information at the same time.

Formal data refers to data stored in fixed filters such as numeric data, which is actually the easiest to use because it has a systematic uniform format and rules, and is actually actively extracted and processed into advanced information through analysis techniques such as data mining in various DB systems and information fields. These include statistical techniques, scientific data, data stored in DB, or Excel data, and formal data is not stored in a constant and fixed filter, so it has the characteristics of unstructured data, but it is much less uncertain than unstructured data by including metadata or schema, such as HTML or XML text. On the other hand, unstructured data is the same as video, image, document, and voice data that can be text-analyzed, mainly SNS-related data generated on mobile devices or online. Messages, DM conversations, and smartphone GPS data sent from Instagram, Facebook, Twitter, and KakaoTalk cannot be categorized in a certain frame, and data cannot be managed in a fixed field through a certain format, and in the era of the 4th Industrial Revolution, the proportion of unstructured data is relatively increasing, and any organization collects and accumulates unstructured data, The demand to create various added values through processing and analysis is on the rise.

2.3 Social distancing

Social distancing is one of the ways to prevent the spread of contagious diseases such as the coronavirus, in which individuals try to prevent transmission by maintaining a constant distance from others physically. Social distancing is used to prevent large-scale group infections and is widely recognized in public health [14]. However, the effects and limitations of these approaches have not yet been fully understood. It is known that social distancing can help reduce infection rates and ease hospital loads, but it can also restrict economic activity and cause serious mental health problems. Several studies have explored the utility and limitations of

social distancing. concluded that various social distancing policies implemented by country greatly contributed to the reduction of infection rates. showed similar results, proving that the hospital load was also reduced. Nevertheless, these policies lead to a number of side effects that occur outside of the immediate public health threat [15].

3. Experiments

3.1 Purpose of Research

The purpose of this study is to select food service start-ups as the central keyword and compare and analyze changes in keywords related to food service start-ups before and after the lifting of social distancing. In addition, by looking at integrated keywords for restaurant start-ups, we would like to define important keywords related to restaurant start-ups and check keywords that prospective restaurant start-ups search with interest. This is to confirm whether the keywords derived through the process are related to keywords related to restaurant start-ups generated through big data analysis. In other words, by checking the search frequency of Naver, Daum, Google, etc., which are representative social media and search platforms in Korea, an exploratory analysis of words related to restaurant start-ups is conducted to analyze the connection between them. In addition, we would like to identify research models related to restaurant start-ups for clusters and derive them as social science models. Based on the connection and association between food service start-up keywords derived through the analysis, we intend to use it as basic data for comparative analysis of food service start-up trends.

3.2 Research Methods

This study aims to collect and analyze data by setting food service start-ups as central words to confirm the relationship between food service start-ups and consumer selection attributes, investigate the relationship between consumer selection attributes, and identify what attributes consumers value in choosing food service start-ups.

In this study, image research on food service start-ups was applied through text mining, one of the big data formal analysis methods, not quantitative research methods, which are questionnaire methods of social science models. To conduct this study, data related to restaurant start-ups were extracted using TEXTOM as a data collection and analysis tool. The data collection period is three years from April 2021 to May 2023, including before and after social distancing, and texts extracted from blogs, news, cafes, web documents, and intellectuals provided by Naver, Daum, and Google were collected. For the collected data, the top 30 words were derived through a refining process. In addition, based on April 2021, the application period of social distancing, data from April 2021 to April 2022, and data from May 2022 to May 2023, after the lifting of social distancing, were compared and analyzed. Therefore, the analysis was conducted by defining the period of application of social distancing from April 2021 to April 2022, and the period from May 2022 to May 2023 after the release of social distancing.
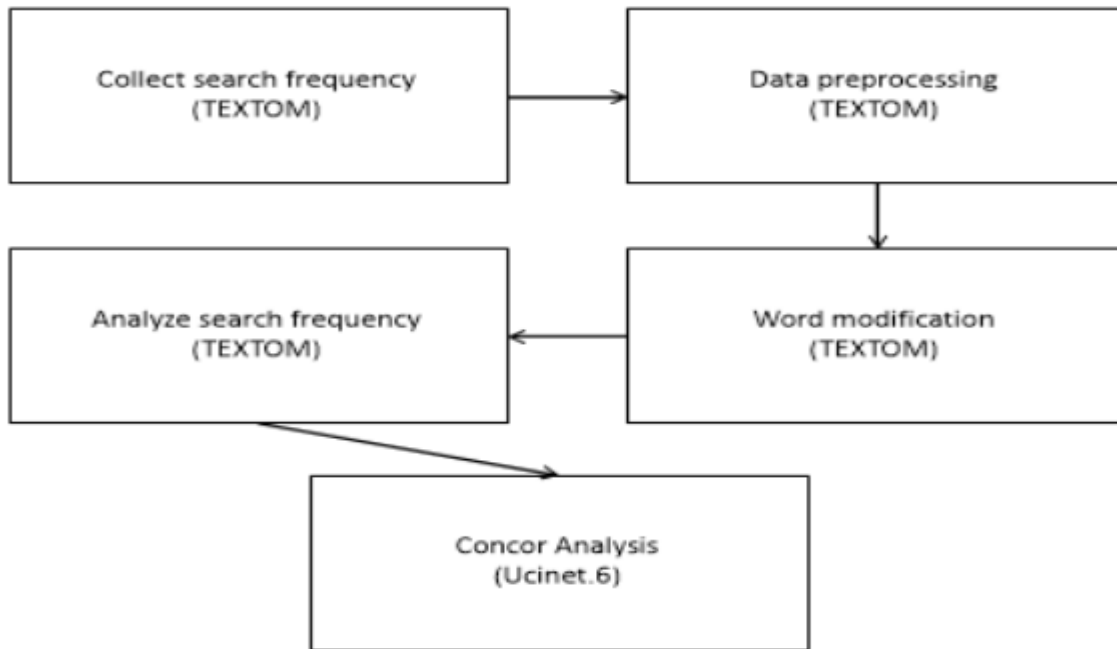
Figure 1. Analysis Method

3.3 Data Collection Procedure

  Data preprocessing is a purification procedure that decomposes, refines, and filters texts based on natural language processing technology, which is the most basic of machine learning. In order to extract the correct meaning of text from text, sentence structure and part speech decisions, terminology removal, and synonymy unification are performed. Therefore, in this study, data pre-processing was performed through data purification/ morpheme and data editing processes. As a data purification method, a direct purification method was selected, and word filtering, deduplication, and analysis languages were set in Korean. In addition, Espresso K was selected to reflect the proper and complex nouns themselves in the result value. Nouns and adjectives were selected among simple parts of speech as analysis parts, and user dictionaries were not used. Subsequently, proper nouns and non-verbal terms were directly removed from the refined data. For example, similar synonyms such as 'lecture' and 'lecture' were unified into one word.

4. Results

4.1 words frequency analysis

Table 1. Word Frequency during social distancing

WORD	FREQUENCY	WORD	FREQUENCY
Startups	13919	founder	1342
The restaurant	8685	Delivery	1339

industry

WORD	FREQUENCY	WORD	FREQUENCY
Restaurant start-up	4044	Transferring	1299
Youth	3527	Success	1284
Menu	3090	Development	1189
Support	2929	Consulting	1097
Franchise	2694	Shop	1091
Operation	2453	Covid-19	901
Education	2197	News	858
Brand	2171	market	856
Business	1869	Items	837
a specialty store	1729	Marketing	815
Representative	1501	Recipe	801
reserve	1486	Corperation	793
provision	1419	Open	785

Table 2. Word Frequnecy after social distancing

WORD	FREQUENCY	WORD	FREQUENCY
Startsups	16530	Cook	1320
Restaurant	8964	Food	1285
Youth	4947	Success	1209
Education	4689	Market	1156
Franchise	3388	Item	1114
Recruitment	2930	Delivery	968
Cooking	2577	Professional	958
Brand	2319	Consulting	922
Restaurant industry	2257	Preliminary	915
Founder	2105	Cafe	900

Menu	1969	Marketing	879
Kitchen	1864	Development	861
Meal	1832	Famous Restaurant	852
Dining Room	1307	Open	846
Chicken	1143	Cost	836

The frequency of words at the time of social distancing in Table 1 shows that words such as "start-up" (13919), "restaurant business" (8685), and "restaurant start-up" (4044) were used at a very high frequency. This indicates a high interest in start-ups and restaurant businesses. In addition, words such as "youth" (3527) and "support" (2929) appeared frequently, confirming that interest and support for youth start-ups were high at that time, and that there were many support projects related to youth start-ups. The reason why words such as "franchise" (2694) and "brand" (2171) appeared frequently is that prospective restaurant founders focused on building franchise models and brands when starting a restaurant when considering starting a business. The use of the word "delivery" (1339) has been shown to be high, confirming that delivery services have played an important role in the pandemic. Finally, the word "COVID-19" (901) was included in the top 30 keywords at the time of social distancing, confirming that the pandemic situation affected the restaurant start-up and the restaurant industry. If you look at Table 2, which is the frequency of words after social distancing, you can see that the frequency of "first, start-up" has increased from 13919 to 16530, and it seems that interest in start-ups has increased after social distancing. also

Words such as "cooking" (1320) and "food" (1285) appear at a high frequency, and interest in food quality and diversity seems to have increased. And the frequency of "delivery" decreased from 1339 to 968, suggesting that the importance of delivery services was relatively reduced due to the recovery of the restaurant industry after the lifting of social distancing, and that the number of in-person visits to restaurants has increased rather than delivery services. In addition, "café" (900) is found to be highly wordy, suggesting that interest in certain industries has increased Finally, the biggest change is that when looking at the frequency of words after social distancing, the word "COVID-19" is not seen like before, indicating that consumers do not show much sensitivity to COVID-19 unlike before after the lifting of social distancing. The results of checking the trends in the restaurant start-up market after lifting social distancing through word frequency analysis are as follows. It seems that interest in start-ups has increased, and interest in food quality and diversity has increased. The importance of delivery services has decreased relatively, and interest in certain industries has increased It was also confirmed that consumers were not relatively sensitive to COVID-19 after the lifting of social distancing. These changes can serve as basic data for identifying new trends and opportunities in the restaurant start-up market.
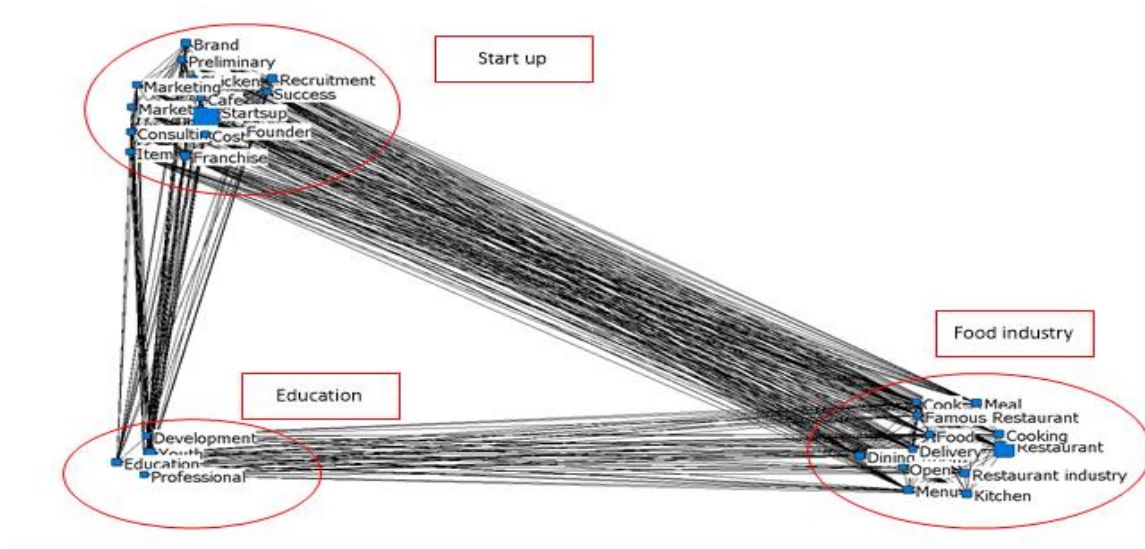
4.2 CONCOR Analysis

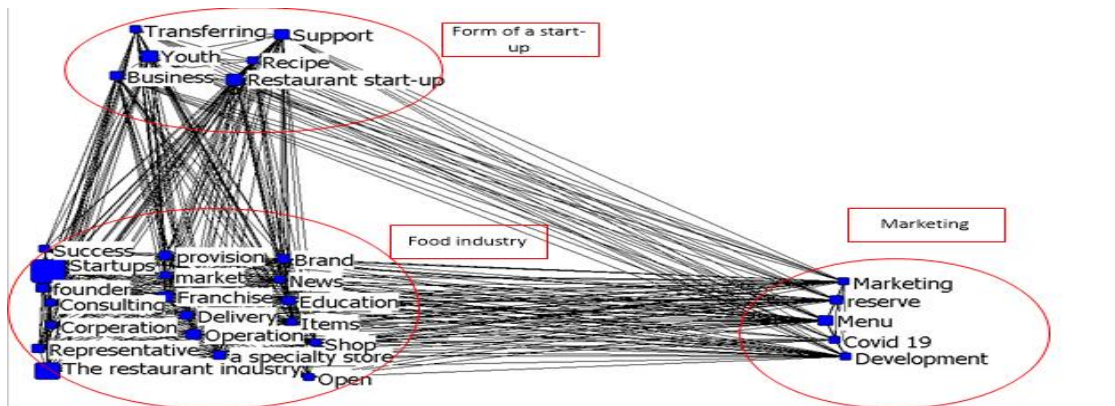**Figure 2. Concor Analysis during Social distancing**

Figure 3. Concor Analysis during Social distancing

Concor analysis is a form of cluster analysis in which nodes with high correlations, that is, keywords, are grouped into one group in the overall network structure. In this study, a key keyword called "restaurant start-up" was set, comparing and analyzing the timing of applying social distancing due to COVID-19 and the frequency of words after lifting social distancing, and classifying them into different cluster names. Through the analysis of word frequency after the application and release of social distancing, the trend of restaurant startups was analyzed through the search frequency of the portal site, and based on this, Concor analysis was conducted. The results are shown in Figure 2 and Figure 3. In Figure 2., keywords were classified into three clusters, and the first cluster was found to be startup-related keywords, with a total of 14 keywords, including

"startup," "franchise," "recruitment," and "brand," having a high connection. A total of 12 keywords, including "dining out," "cooking" and "dining out," were found to be highly connected to the second cluster as keywords related to education, and keywords such as "youth," "education," "professional" and "development" were found to be highly connected to the last cluster was found to be related to education. [Figure 3.] In addition, keywords were classified into a total of three clusters, and the first cluster was related to the type of start-up, with a total of six keywords, including "youth," "support," "full number," and "recipe," showing a high connection. The second cluster is a keyword related to the restaurant industry, and a total of 19 keywords, including "startup," "restaurant business," "delivery," and "brand," were confirmed to have a high connection. The last cluster is marketing-related keywords, with a total of five keywords, including "marketing," "menu," and "COVID-19," showing a high connection.

5. CONCLUSION

In this study, changes in food service start-up trends before and after social distancing was implemented were compared through big data analysis and analyzed using Textom, a big data analysis tool, to find out what start-up strategies, what differentiation strategies, and how trends in the food service industry changed in the current situation when social distancing was lifted. The results of checking the trends in the restaurant start-up market after lifting social distancing through word frequency analysis are as follows. It seems that interest in start-ups has increased, and interest in food quality and diversity has increased. The importance of delivery services has decreased relatively, and interest in certain industries has increased It was also confirmed that consumers were not relatively sensitive to COVID-19 after the lifting of social distancing. These changes can serve as basic data for identifying new trends and opportunities in the restaurant start-up market. In addition, CONCOR analysis was additionally used to confirm clustering and connectivity between each keyword, not just word frequency analysis.

The implications of this paper are as follows. First of all, the growing interest in restaurant startups even after the lifting of social distancing shows that founders are discovering new business opportunities. However, simply interest in starting a business is not enough, and it should be considered that customers' expectations for food quality and diversity have also increased. Thus, when planning their business models, founders will have to think deeply about not only how to develop menus or provide services, but also how to satisfy the quality and diversity of food demanded by customers. In addition, while the importance of delivery services has decreased relatively, they remain essential. This indicates that the restaurant industry is recovering as a whole, but at the same time, it shows that delivery services have become a new consumption pattern. Therefore, founders need to make efforts in other areas, such as improving their experience in restaurants, while maintaining delivery services. Finally, the results that consumers are not relatively sensitive to COVID-19 after social distancing suggest that a new normal state is being formed. Therefore, founders should accurately grasp the current changing environment and consumption patterns and set up a flexible business strategy accordingly. In conclusion, the food service start-up trend identified through this study provides important insights for founders to understand the current market situation and establish strategies accordingly. Based on this, restaurant founders will be able to plan and execute more successful businesses.

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