Principal Component Analysis on the Twitter Data in the Restaurant Industry

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Abstract

Social Networking Service (SNS) is prevailing rapidly in Japan in recent years. Facebook, mixi and Twitter are the popular one. These are utilized in various field of life together with the convenient tool such as smart-phone. In this paper, principal component analysis and cluster analysis are executed in order to clarify the relationship among the corporate performance and the SNS utilization condition. We focus on restaurant industry and convenience store industry, where marketing competition which utilizes SNS to consumers is fierce. Marketing application would then be extracted. Reviewing past researches, there are some related papers, but they do not handle these analysis techniques. Moreover there have been few researches made on our theme stated above. Some interesting results were obtained.

Keywords: SNS, twitter, twitter followers, principal component analysis, cluster analysis

1. Introduction

Social Networking Service (SNS) is prevailing rapidly in Japan in recent years. Facebook, mixi and twitter are the popular one. In particular, the number of users is increasing year by year and it has reached 328 million users at the point of September 2017. These are utilized in various field of life together with the convenient tool such as smart-phone. Twitter is well used in the marketing activities of each company. They carry out campaign through SNS, which become very popular in Japan. It is reported that many companies have improved corporate performance by utilizing SNS. In this paper, principal component analysis and cluster analysis are executed in order to clarify the relationship among the corporate performance and the SNS utilization condition. We focus on restaurant industry and convenience store industry, where marketing competition which utilizes SNS to consumers is fierce. Marketing application would then be extracted. Reviewing past researches, there are some related papers, but they do not handle these analysis techniques. Moreover there have been few researches made on our theme stated above. Some interesting results were obtained.

Reviewing past researches, Sako et al. (2013) devised the system to identify the user’s sex by extracting characteristics from the tweet big data through using Support Vector Machine. Kadowaki et al. (2014) proposed the method to inquire recipe which fit to the user by the analysis of twitter text. Tamai et al. (2016) estimated the degree of depression from the tweet data.

There are many related papers concerning twitter but there are few papers which analyze the correlation between twitter related data and corporate performance by using principal component analysis and/or cluster analysis.

The rest of the paper is organized as follows. Principal component analysis is executed in section 2. Cluster analysis is carried out in section 3, which is followed by the Remarks of section 4.

2. Principal Component Analysis

The analysis data for restaurant industry and convenience industry is attached in Appendix. Most of the big and famous companies are covered. Principal component analysis is executed on these data. Analysis results are as follows. Eigen value and cumulative hitting ratio are exhibited in Table 1.
Table 1. Eigen value and Cumulative hitting ratio

| Component | Eigen value | Cumulative hitting ratio % |
|-----------|-------------|----------------------------|
| 1         | 7.542       | 44.364                     |
| 2         | 2.600       | 59.657                     |
| 3         | 2.051       | 71.724                     |
| 4         | 1.674       | 81.569                     |
| 5         | .930        | 87.040                     |
| 6         | .835        | 91.952                     |
| 7         | .597        | 95.462                     |
| 8         | .321        | 97.352                     |
| 9         | .271        | 98.944                     |
| 10        | .084        | 99.438                     |
| 11        | .057        | 99.771                     |
| 12        | .018        | 99.877                     |
| 13        | .010        | 99.937                     |
| 14        | .009        | 99.989                     |
| 15        | .001        | 99.996                     |
| 16        | .001        | 100.000                    |
| 17        | .0000004325 | 100.000                    |

Cumulative hitting ratio of the 1st principal component is 44.364% and cumulative hitting ratio up to the 2nd principal component is 59.657%, 3rd principal component is 71.724% 4th is 81.569%. i.e., nearly 60% of the data is explained by up to the 2nd principal component and over 80% of the data is explained by up to the 4th principal component.

Next, factor loading matrix is exhibited in Table 2. In this Table, up to 4th principal component is exhibited.

Table 2. Factor Loading Matrix

| Factor 1 | Factor 2 | Factor 3 | Factor 4 |
|----------|----------|----------|----------|
| Total assets | .916     | .167     | -.312    | -.001 |
| Net Income   | .890     | .199     | -.326    | .058  |
| Operating Income | .875   | .183     | -.364    | .027  |
| Ordinary income | .873   | .183     | -.375    | .024  |
| Number of stores | .828   | .075     | -.146    | -.078 |
| Number of tweets | .802   | .058     | .358     | -.402 |
| twitter followers | .791   | .537     | .035     | -.017 |
| replies       | .723     | -.266    | .336     | .409  |
| amount of sales | .708    | .248     | .424     | -.106 |
| user mentions | .640     | -.309    | .346     | .375  |
| Number of twitter follow | .628   | .017     | .565     | -.443 |
| retweets      | -.306    | .756     | -.088    | .085  |
| tweets retweeted | -.495  | .692     | .062     | -.283 |
| tweets favorited | -.496  | .672     | .060     | -.223 |
| links         | -.009    | .018     | .696     | -.223 |
| hashtags      | -.089    | .355     | .337     | .690  |
| Number of likes | -.075   | .558     | .282     | .567  |

Next, plot chart is exhibited in Figure 1 where X axis is the 1st principal component and Y axis is the 2nd principal component.
Figure 1. Plot chart of 1st principal component and 2nd principal component

The 1st principal component shows scale, corporate performance, number of tweets, number of followers etc., which means “Scale”. The 2nd principal component has a large value at retweets, tweets retweeted, tweets favorited, which implies “Diffusion”.

Next, plot chart is exhibited in Figure 2 for the 3rd principal component (X axis) and the 4th principal component (Y axis).

Figure 2. Plot chart of 3rd principal component and 4th principal component
The 3rd principal component has a large value at links, number of followers etc., which means “Cooperation”. The 4th principal component shows hashtags, number of likes, replies etc., which implies “Communication”.

Now, the score for each company is exhibited in Table 3 where up to 4th principal component are shown.

Table 3. Score for each company

| Company Name                          | Factor 1  | Factor 2  | Factor 3  | Factor 4  |
|---------------------------------------|-----------|-----------|-----------|-----------|
| Lawson                                | 2.42283   | 0.14188   | 2.37471   | -1.97311  |
| Seven & i Holdings                    | 2.80948   | 0.82845   | -2.48136  | 0.54066   |
| FamilyMart                            | 1.07412   | -0.63105  | -0.27529  | -0.12329  |
| KFC Holdings Japan                    | 0.08515   | -0.47291  | 1.64471   | 2.21423   |
| ANRAKUTEI                             | -0.48214  | -0.53992  | -0.34107  | -0.26968  |
| Plenus (Hotto Motto)                  | -0.36807  | 0.31295   | 0.17732   | -0.21455  |
| B-R 31 ICE CREAM                      | -0.06776  | -1.35694  | 0.71687   | 0.37918   |
| MINISTOP                              | -0.4068   | 0.82209   | 0.65113   | -0.56251  |
| McDonald’s Holdings Company (Japan)   | -0.45266  | 3.11114   | 0.31551   | 1.00773   |
| SKYLARK (GUSTO)                       | 0.56741   | -0.49616  | 0.55266   | 2.20142   |
| KURA Corporation                     | -0.70145  | 0.76172   | 0.2195    | -0.87386  |
| KAPPA CREATE                          | -0.58062  | -0.65942  | 0.14445   | -0.9163   |
| MOS FOOD SERVICES                     | -0.69925  | 0.83189   | -0.25741  | -1.04256  |
| Torikizoku                            | -0.14886  | -1.18067  | -0.14184  | 0.33088   |
| CHIKARANOMOTO GLOBAL HOLDINGS (IPPUDO)| -0.68238  | 0.65007   | 0.15277   | 0.52569   |
| RINGER HUT                            | -0.55311  | -0.17269  | -0.17231  | -0.18492  |
| KOURAKUEN HOLDINGS                    | -0.62458  | -0.20648  | -0.70228  | -0.30892  |
| HOTLAND (Tsukiji Gindako)             | -0.55063  | -0.21304  | -0.84945  | -0.02372  |
| AKINDO SUSHIRO                        | -0.30514  | -0.64715  | -0.7976   | -0.36096  |
| TORIDOLL (MARUKAME UDON)              | -0.33556  | -0.88177  | -0.93282  | -0.34543  |

Next, plot chart is exhibited in Figure 3 (The 1st principal component for X axis and the 2nd principal component for Y axis).

![Plot chart](image)

Figure 3. Plot chart (The 1st principal component for X axis and the 2nd principal component for Y axis)

We can observe the following 5 big clusters.

Right: Seven & i Holdings, Lawson

This is a high corporate performance, high frequency SNS utilization group.

Left Upper: McDonald’s Holdings Company (Japan)
This is a single group. It is strong for retweets group. It makes many campaign and has good communication with consumers.

**Lower Right: KFC Holdings Japan, SKYLARK (GUSTO), FamilyMart**

This cluster has the characteristics that corporate performance and scale are rather big and retweets group are slightly low.

**Left: MOS FOOD SERVICES, KURA Corporation, Plenus (Hotto Motto), MINISTOP**

MOS FOOD SERVICES carries out the campaign, where the rival is McDonald. But it does not make so much hit as McDonald in the number of retweets.

**Lower Left: ANRAKUTEI, Torikizoku, KAPPA CREATE, RINGER HUT, B-R 31 ICE CREAM, KOURAKUEN HOLDINGS, Torikizoku**

Scale is rather small and the number of tweets is rather few. They do not make so much effort to SNS or it does not make so much hit.

Next, plot chart is exhibited in Figure 4 where the 3rd principal component is located at X axis and the 4th principal component is placed at Y axis.

![Plot chart](http://ibr.ccsenet.org)

**Figure 4. Plot chart (the 3rd principal component is located at X axis and the 4th principal component is placed at Y axis)**

We can observe the following 6 clusters.

**Upper Right: KFC Holdings Japan, SKYLARK (GUSTO)**

Although the number of retweets is slightly small, there are many reply from the company. Therefore it is regarded as a high communication group.

**Lower Right: Lawson**

It has many followers and links but communication level is low.

**Center Upper Right: McDonald’s Holdings Company (Japan), B-R 31 ICE CREAM, Torikizoku**

Communication and the number of followers are rather high. It can be said that they make effort to a certain degree.
They have certain number of followers but communication level is low.

It is in the low level communication and the number of followers is in the low level. It can be said that it is a low active group in SNS.

Thus we could obtain fruitful results by utilizing principal component analysis.

3. Cluster Analysis

Cluster analysis is executed in order to confirm the relationship/closeness among companies. The data used are the same with those of principal component analysis. First of all, cluster cohesion process is exhibited in Table 4.

| Steps | Combined Cluster | Coefficient | First stage of cluster | Next step |
|-------|-----------------|-------------|------------------------|-----------|
| 1     | Cluster 1 Cluster 2 | .235       | Cluster 1 Cluster 2    | 9         |
| 2     | Cluster 1 Cluster 2 | 1.326      | Cluster 1 Cluster 2    | 7         |
| 3     | Cluster 1 Cluster 2 | 2.625      | Cluster 1 Cluster 2    | 6         |
| 4     | Cluster 1 Cluster 2 | 4.287      | Cluster 1 Cluster 2    | 6         |
| 5     | Cluster 1 Cluster 2 | 6.672      | Cluster 1 Cluster 2    | 10        |
| 6     | Cluster 1 Cluster 2 | 10.094     | Cluster 1 Cluster 2    | 14        |
| 7     | Cluster 1 Cluster 2 | 13.579     | Cluster 1 Cluster 2    | 8         |
| 8     | Cluster 1 Cluster 2 | 18.941     | Cluster 1 Cluster 2    | 11        |
| 9     | Cluster 1 Cluster 2 | 24.791     | Cluster 1 Cluster 2    | 11        |
| 10    | Cluster 1 Cluster 2 | 31.222     | Cluster 1 Cluster 2    | 12        |
| 11    | Cluster 1 Cluster 2 | 39.106     | Cluster 1 Cluster 2    | 12        |
| 12    | Cluster 1 Cluster 2 | 52.321     | Cluster 1 Cluster 2    | 14        |
| 13    | Cluster 1 Cluster 2 | 67.046     | Cluster 1 Cluster 2    | 15        |
| 14    | Cluster 1 Cluster 2 | 87.763     | Cluster 1 Cluster 2    | 17        |
| 15    | Cluster 1 Cluster 2 | 108.636    | Cluster 1 Cluster 2    | 18        |
| 16    | Cluster 1 Cluster 2 | 144.735    | Cluster 1 Cluster 2    | 19        |
| 17    | Cluster 1 Cluster 2 | 181.154    | Cluster 1 Cluster 2    | 18        |
| 18    | Cluster 1 Cluster 2 | 223.698    | Cluster 1 Cluster 2    | 19        |
| 19    | Cluster 1 Cluster 2 | 360.349    | Cluster 1 Cluster 2    | 0         |

Distance is calculated by using Euclidean square distance. Dendrogram by Ward method is exhibited in Figure 5.

![Figure 5. Dendrogram by Ward method](http://ibr.ccsenet.org/Ibr.012.01.2019/93.jpg)
Watching carefully in detail, we could find astonishing results. In the principal component analysis for the 1st principal component and the 2nd principal component, we could observe 5 big clusters. Cluster analysis wholly coincided with these results.

The group of AKINDO SUSHIRO ~ B-R 31 ICE CREAM is the same with those of Lower Left in Figure 3.

The group of Plenus (Hotto Motto) ~ MOS FOOD SERVICES is the same with those of Left Center in Figure 3.

McDonald’s Holdings Company (Japan) corresponds to Left Upper in Figure 3.

KFC Holdings Japan ~ FamilyMart group is the same with those of Lower Right in Figure 3.

Lawson, Seven & i Holdings is located right in Figure 3.

Examining it more in detail, we could find that the classification by Cluster analysis corresponds to the positive part of 1st principal component, negative part of 1st principal component, positive part of 2nd principal component and negative part of 2nd principal component. If we indicate large positive part of 1st principal component as ++, and small one as +, then the expression by the combination of (1st principal component, 2nd principal component) become as follows.

AKINDO SUSHIRO ~ B-R 31 ICE CREAM: Lower Left in Figure 3  (−,−)
Plenus (Hotto Motto) ~ MOS FOOD SERVICES: Left Center in Figure 3  (−,+)
McDonald’s Holdings Company (Japan): Left Upper in Figure 3  (−,++)
KFC Holdings Japan ~ FamilyMart: Lower Right in Figure 3  (+,−)
Lawson, Seven & i Holdings: Right in Figure 3  (++,+)

Lower two groups consist of positive part of 1st principal component and the upper groups consist of negative part of 1st principal component.

Each group of positive and negative part of 2nd principal component is built by dividing the above big group. These are expressed in Figure 6.

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Figure 6. Divided groups by Principal Component Analysis and Cluster Analysis

Principal Component Analysis has much more information than Cluster Analysis because Principal Component Analysis has the information of distance in the plotting plane. Principal Component Analysis and Cluster Analysis are not used at the same time so far, because the method and the objective of using it is quite different. But we have obtained marvelous results as stated above. This relationship should be examined in various cases.
4. Remarks

4.1 Convenience Store Industry

We have obtained the result that Seven & i Holdings and Lawson are in the high corporate performance, high frequency SNS utilization group. They have twitter followers for more than 2 million consumers and are distinct from other companies.

MINISTOP has rather small 380 thousand followers but the number of likes is 2811 which is the most in the convenience store industry. Total retweet is 966527 which is also the most in the convenience store industry. MINISTOP maybe makes some device for the consumers to retweet. Looking into the retweet in detail, MINISTOP makes tweet that if the consumers make follow and retweet, consumers can get coupon by lottery. Thus, many consumers make retweet.

4.2 Restaurant Industry

From Figure 3, we can observe that McDonald is overwhelming in retweet theme. The example of McDonald’s campaign to stimulate retweet is as follows.

If consumers follow McDonald’s account (@McDonalds Japan) and retweet the tweet which is to be executed on 20 o’clock May 23, 5 persons are selected by lottery and “Suitable burger” are given for the number of followers.

From Figure 4, we can observe that KFC Holdings Japan is in a high communication group. Followers are 540 thousand, which is 1/4 compared with McDonald, but the number of tweet is 240 thousand, which is 30 times, and the number of follow is 6 thousand, which is 15 times, and the number of replies 3 thousand, which is 30 times compare with McDonald. KFC Holdings Japan is making device as follows.

Consumers can get KFC’s LINE stamp by free of charge only by making follow even if the consumers do not retweet.

Thus each company is making every effort to sharpen swords.

5. Conclusion

Social Networking Service (SNS) is prevailing rapidly in Japan in recent years. Facebook, mixi and Twitter are the popular one. These are utilized in various field of life together with the convenient tool such as smart-phone.

In this paper, principal component analysis and cluster analysis are executed in order to clarify the relationship among the corporate performance and the SNS utilization condition. We focus on restaurant industry and convenience store industry, where marketing competition which utilizes SNS to consumers is fierce. Marketing application would then be extracted.

The main results of principal component analysis are as follows.

In the chart of the 1st principal component (X axis) and the 2nd principal component (Y axis), we can observe the following 5 big clusters.

Right: Seven & i Holdings, Lawson
This is a high corporate performance, high frequency SNS utilization group.

Left Upper: McDonald’s Holdings Company (Japan)
This is a single group. It is strong for retweets group. It makes many campaign and has good communication with consumers.

Lower Right: KFC Holdings Japan, SKYLARK (GUSTO), FamilyMart
This cluster has the characteristics that corporate performance and scale are rather big and retweets group are slightly low.

Left: MOS FOOD SERVICES, KURACorporation, Plenus (Hotto Motto), MINISTOP
MOS FOOD SERVICES carries out the campaign, where the rival is McDonald. But it does not make so much hit as McDonald in the number of retweets.

Lower Left: ANRAKUTEI, Torikizoku, KAPPA CREATE, RINGER HUT, B-R 31 ICE CREAM, KOURAKUEN HOLDINGS, Torikizoku
Scale is rather small and the number of tweets is rather few. They do not make so much effort to SNS or it does not make so much hit.
Cluster analysis was executed in order to confirm the relationship/closeness among companies. The data used were the same with those of principal component analysis.

In the principal component analysis for the 1st principal component and the 2nd principal component, we could observe 5 big clusters as stated above. Cluster analysis wholly coincided with these results. This is really an astonishing result. Principal Component Analysis and Cluster Analysis are not used at the same time so far, because the method and the objective of using it is quite different. But we have obtained marvelous results as stated above. This relationship should be examined in various cases.

These are utilized for constructing a much more effective and useful marketing plan building for SNS. Although it has a limitation that it is restricted in the number of research, we could obtain the fruitful results. To confirm the findings by utilizing the new consecutive records would be the future works to be investigated.

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### Appendix

| Name of enterprise | Financial | Number of employees | Amount of sales | Per-store sales figures | Operating Income | Ordinary income |
|--------------------|-----------|---------------------|----------------|-------------------------|-----------------|-----------------|
| Lawson             | consolidated | 5446               | 583,452,000,000 | 44,500,953            | 72,541,000,000  | 69,622,000,000  |
| Seven i Holdings   | individual  | 440                | 217,860,000,000 | 11,217,176             | 194,297,000,000 | 193,329,000,000 |
| Family Mart        | individual  | 5638               | 175,203,000,000 | 7,151,143              | 23,183,000,000  | 26,791,000,000  |
| KFC Holdings Japan | consolidated | 4602             | 88,032,000,000  | 76,616,188             | 2,558,000,000   | 2,425,000,000   |
| ANRAKUTEI          | consolidated | 99,999,999        | 152,720,000,000 | 99,999,999             | 22,000,000,000  | 243,000,000,000 |
| YOSHINOYA CO.,LTD | individual  | 173                | 56,565,000,000  | 46,864,126             | 281,000,000     | 344,000,000     |
| Duskin Co., Ltd.(Mister Donut) | individual  | 3667             | 134,245,000,000 | 115,728,446            | 4,069,000,000   | 6,478,000,000   |
| Pleus (Hotto Mott) | individual  | 9361              | 138,282,000,000 | 51,966,178             | 6,338,000,000   | 7,590,000,000   |
| B-R 31 ICE CREAM   | individual  | 333                | 19,706,000,000  | 16,714,165             | 486,000,000     | 557,000,000     |
| MINISTOP           | consolidated | 896               | 196,955,000,000 | 87,032,700             | 1,241,000,000   | 2,284,000,000   |
| McDonald`s Holdings Company (Japan) | consolidated | 99,999,999        | 226,646,000,000 | 71,858,486             | 6,930,000,000   | 6,614,000,000   |
| SKYLARK (GUSTO)   | consolidated | 99,999,999        | 354,513,000,000 | 115,551,825            | 31,249,000,000  | 26,832,000,000  |
| KURACorporation    | consolidated | 10707            | 119,949,000,000 | 288,179,221            | 671,000,000     | 602,002,000     |
| KAPPA CREATE       | consolidated | 112               | 662,570,000,000 | 186,766,382            | -668,000,000    | -522,000,000    |
| MOS FOOD SERVICES  | consolidated | 1035              | 52,346,000,000  | 38,433,186             | 5,923,000,000   | 4,090,000,000   |
| Torikizoku         | consolidated | 99,999,999        | 293,930,000,000 | 59,626,016             | 1,457,000,000   | 1,426,000,000   |
| CHIKARANOMOTO GLOBAL HOLDINGS (P) | consolidated | 99,999,999        | 1,983,000,000,000 | 14,909,744             | 289,000,000,000 | 251,000,000,000 |
| RINGER HUT         | consolidated | 659               | 20,194,000,000  | 31,217,391             | 1,648,000,000   | 1,520,000,000   |
| KOURKUEN HOLDINGS  | consolidated | 4664             | 14,423,000,000  | 26,512,668             | 1,004,000,000   | 1,362,000,000   |
| HOTLAND (Takiji Gindaco) | consolidated | 99,999,999        | 26,536,000,000  | 39,903,750             | 1,492,000,000   | 1,416,000,000   |
| AKINDO SUSHI       | individual   | 99,999,999        | 156,042,000,000 | 353,850,679            | 924,000,000     | 895,000,000     |
| Pepper Food Service Co., Ltd. | individual  | 365               | 223,370,000,000 | 82,121,324             | 99,999,999      | 103,000,000     |
| COCO'S JAPAN CO.   | individual   | 6219              | 58,532,000,000  | 100,226,027            | 99,999,999      | 2,481,000,000   |
| TOHODOLL (MARUKAME UDON) | individual   | 9378             | 89,611,000,000  | 102,179,019            | 9,888,000,000   | 9,498,000,000   |
| Ohsho Food Service Corporation | individual  | 8138             | 75,078,000,000  | 104,711,297            | 5,494,000,000   | 5,801,000,000   |

The ordinary profit rate (sales) Net Income Net income per share Total assets Net assets per share Sales volume per person Net Income per person

| Name of enterprise | Financial | Number of employees | Amount of sales | Per-store sales figures | Operating Income | Ordinary income |
|--------------------|-----------|---------------------|----------------|-------------------------|-----------------|-----------------|
| Ohsho Food Service Corporation | individual  | 8138           | 75,078,000,000  | 104,711,297            | 5,494,000,000   | 5,801,000,000   |
| Ohsho Food Service Corporation | consolidated | 9378         | 89,611,000,000  | 102,179,019            | 9,888,000,000   | 9,498,000,000   |
| Ohsho Food Service Corporation | individual  | 8138           | 75,078,000,000  | 104,711,297            | 5,494,000,000   | 5,801,000,000   |
| Name of enterprise | Number of follow | Number of tweets from June 08, 2015 to December 12, 2017 | Average annual income |
|--------------------|-----------------|--------------------------------------------------------|----------------------|
| Lawson             | 1,99,294        | 244,172                                                | 3200                 |
| Seven & i Holdings | 8,436           | 2,765,962                                              | 3,300                |
| Family Mart        | 523,233         | 83,700                                                  | 19                   |
| KFC Holdings Japan | 60,54           | 54,230                                                  | 153,02                |
| ANRAKUTEI         | 5,994           | 75,12                                                   | 456                  |
| YOSHINOYA CO., LTD | 99,999,999      | 95,418                                                  | 17,6                  |
| Duskin Co., Ltd.   | 1,50,712        | 63,082                                                  | 3200                 |
| Planus (Hato Muto) | 12,725          | 44,979                                                  | 533                  |
| B·R·T·31 ICE CREAM | 34              | 14,456                                                  | 614                  |
| MINSTOP            | 415,27          | 37,778                                                  | 2811                 |
| McDonald’s Holdings Company (Japan) | 391 | 219,1058                                              | 168,57               |
| SKYKUR (GUSTO)    | 13,369          | 178,783                                                  | 62                  |
| KUPA Corporation  | 4543            | 49,115                                                  | 324                  |
| KAPPA CREATÉ      | 1713            | 19,820                                                  | 128                  |
| MOS FOOD SERVICES | 3               | 38,1175                                                  | 135                  |
| Torokizou         | 17,122          | 21,011                                                  | 227                  |
| CHIKARANOMOTO GLOBAL HOLDINGS JP | 60,555     | 92,21                                                   | 881                  |
| RINGER HUT        | 30              | 15,988                                                  | 17                   |
| KOURAKUEN HOLDINGS | 2384        | 41,158                                                  | 1177                 |
| HOTLAND (Tsukiji Gindako) | 45       | 25,020                                                  | 31                   |
| AKINO SUSHIRO      | 8               | 63,334                                                  | 201                  |
| Pepper Food Service Co., Ltd. | 215    | 39,883                                                  | 46                   |
| COCO’S JAPAN CO.  | 99,999,999      | 73,122                                                  | 99,999,999            |
| TORIDOLL (MARUKAME UDON) | 30 | 34,477                                                  | 2                   |
| Ohsho Food Service Corporation | 99,999,999 | 44,65                                                  | 99,999,999            |

| Name of enterprise | Number of likes | Number of retweeted | Number of stores | Mean age |
|--------------------|-----------------|---------------------|------------------|----------|
| Lawson             | 143             | 1311                | 82904            | 28.1     |
| Seven & i Holdings | 230             | 126                 | 12704            | 41.1     |
| Family Mart        | 19              | 179                 | 23064            | 39.7     |
| KFC Holdings Japan | 528215         | 229                 | 483206           | 44.1     |
| ANRAKUTEI         | 306165          | 300                 | 361983           | 37.9     |
| YOSHINOYA CO., LTD | 15301           | 114                 | 157916           | 39.7     |
| Duskin Co., Ltd.   | 6945            | 85                  | 157916           | 39.7     |
| Planus (Hato Muto) | 19958           | 1850                | 4589              | 46.9     |
| B·R·T·31 ICE CREAM | 2108            | 3064                | 188682           | 46.9     |
| MINSTOP            | 2496            | 566                 | 22667            | 46.9     |
| McDonald’s Holdings Company (Japan) | 4648      | 576                  | 668267           | 46.9     |
| SKYKUR (GUSTO)    | 1182            | 1895                | 41268            | 46.9     |
| KUPA Corporation  | 111255          | 311                 | 111255           | 46.9     |
| KAPPA CREATÉ      | 9596            | 240                 | 969237           | 46.9     |
| MOS FOOD SERVICES | 1497            | 1830                | 969237           | 46.9     |
| Torokizou         | 87              | 129                 | 101716           | 46.9     |
| CHIKARANOMOTO GLOBAL HOLDINGS JP | 1005    | 138                  | 1100512          | 46.9     |
| RINGER HUT        | 1136            | 1895                | 41268            | 46.9     |
| KOURAKUEN HOLDINGS | 909           | 1830                | 969237           | 46.9     |
| HOTLAND (Tsukiji Gindako) | 2500    | 31                   | 762              | 46.9     |
| AKINO SUSHIRO      | 30              | 179                 | 162              | 22.5     |
| Pepper Food Service Co., Ltd. | 85           | 179                  | 9221             | 22.5     |
| COCO’S JAPAN CO.  | 99,999,999      | 73,122               | 99,999,999       | 22.5     |
| TORIDOLL (MARUKAME UDON) | 45 | 59                     | 151               | 22.5     |
| Ohsho Food Service Corporation | 99,999,999 | 44,65              | 99,999,999       | 22.5     |

※Missing data is set to 99,999,999

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