Competitive Advantages of Hair Salon Business Influencing on Consumer Behavior

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Abstract. This dissertation is to examine competitive advantages for a hair salon, nine of which locations spread over the Greater Tokyo Area, by using the POS data. The number of hair salon in Tokyo reached to 21,028 in 2014 primarily due to the increase in the population of Tokyo Metropolis. Coupons and promotional handouts are ubiquitously distributed and the hair salon industry is currently suffering from discount competition. However, few studies have been probed into among academics nation-wide. Since this business is typically labor-intensive and if the knowledge which has impact on consumer behavior is provided, this will help innovate on the business and gain competitive advantages and sustainability. Two regression models are applied to calibrate model parameters, each salon's competitiveness. One is linear regression model and the other is multiplicative regression mode. The latter regression model is adopted due to the more suitable results of R squares and mean absolute errors. As a further study, a probabilistic choice model, which is based on the Huff Model and another regression model are adopted to estimate model parameters. Distance between each salon and the nearest railway or subway station, and the number of stylists are included as independent variables to estimate parameters.

Keywords: hair salon business, competitive advantages, consumer buying behavior, POS data

1. INTRODUCTION

The total sales of the hair salon industry in Japan as of 2013 sums up US$2.21 billion and decreased by 0.8% compared to 2012. Even though Hannan salon with the brand name of Plage is No.1 market share of salon in Japan, its figure is only 1.6%. The marketplace is fragmented where there is no one company that can exert enough influence to move the industry in a particular direction.

The number of beauty salons in the Metropolitan Tokyo area accounts for 14,166 in 2009 (Economic Census, 2009) out of 176,157 hair salons in Japan. Since approximately 8% of the total salons are located in Tokyo area, it is not difficult to imagine its competition is so fierce and then gaining competitive advantages is crucial to survive in the area.

There have been primarily three empirical models, which calibrate retailer's competitiveness: an analog, a regression and a gravity model. First of all, an analog model is that a retailer describes the site and trade area characteristics for its most successful stores and attempts to find a similar site. Second, a regression analysis explains that factors affecting the sales of existing stores in a chain will have the same impact upon the stores located at new sites being considered. Finally, a gravity model is based on assumption that a certain radius is drawn to stores in a particular area on the basis of variables like a distance to a market, a distance to markets and a store image. Some of the most popularly used models of a gravity are Reilly's law of retail gravitation, Converse's revision and breaking-point model, Huff's model of trade area attraction and Christaller's central place theory.

Since there are lots of invented models regarding genuine gravity models in the past studies, a regression model and a probabilistic choice model are used as new models to estimate parameters for exploring competitive advantages in this paper.

One of major criteria a hair salon needs to set is to decide a store location (Craig et al., 1984). Furthermore, the definition of "good" location is measured by return on investment (Krause-Traudes et al., 2008). Sales are

assumingly regarded as representative criteria of ROI in this study.

2. OBJECTIVES

The objectives of this study are to explore the components of more effective competitive advantages for a hair salon and invent a new model, which precisely detect and forecast parameters with proper statistical significance.

Huge numbers of companies in the tertiary sector of Japan are recently provided with POS systems that can file up tons of transaction data related with sales activities. However, only a few retailers, especially those in the hair salon industry make better use of the precious data toward their marketing strategies and tactics, even though the hair salon industry in Japan has been in the condition of cutthroat competition since a few decades ago.

In general, a more popular hair salon seems to have strengths in its convenient location and a skillful hair dresser. As far as I looked into past studies described in hair salons, only a few papers can be found out, which are not related to strategic themes and only research for customer behavior; e.g. forecasting the probability of customer revisit to a salon or segmentation of salon customers.

This study shows how a hair salon can survive in a competitive market of Tokyo, Japan with the use of a simple regression model.

More concretely, the outcomes to be achieved are (1) to prove how newly found results are more effective by comparing to ones with existing statistical model like a regression analysis and (2) to explore parameters, for which such independent variables as distance from customer's house to a salon and stylist's popularity are adopted accordingly.

3. DATA DESCRIPTION

3.1 PROFILES OF DATA

The period of data collection is from April 1, 2014 to March 31, 2015. The total number of transactions account for 128,945 records and that of customers is 15,409 persons. Only effective data were applied for the study. First of all, sales of items are not inclusive to the data used due to focus on hair services done by hair dressers. Second, so are customers, whose postal codes are unknown and use plural salons among this salon chain, uncounted as effective data. Finally, any salon, which opened between April 1, 2014 and March 31, 2015, is unqualified due to imperfect duration.

As profiles of data, the following statistics are included; dates and times of each purchase, salon names, customer IDs, each transaction number recorded by POS machines, customer's residential postal codes, a straight-line distance from the center point of customer's residential postal code to the salon, which the customer visited shown as three samples in Figure 1, frequency of visit to a salon, payment codes, payment amounts included taxes, names of hair dressers served, with or without appointments of hair dressers, names of hair services offered, numbers of services offered, discounted amounts are contained.

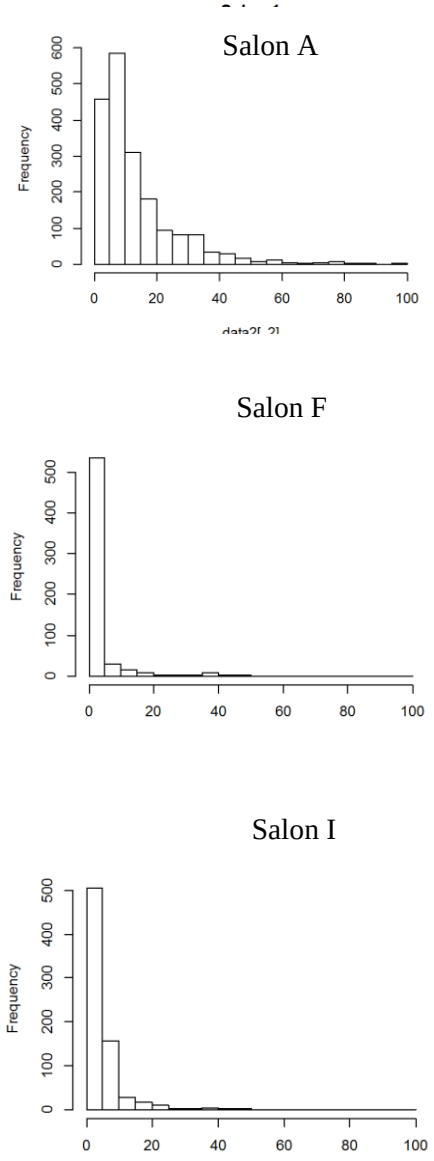

Figure 1: Distribution by distance from postal code

Since Salon A is located in the center of Tokyo, which is supposed as the office and commercial area and less residential habitats exist, the first bar, which indicates their houses are within 5 kilometer to the salon, is smaller than

the second bar, meaning there are less people who live near the salon. On the other hand, almost all customers live near the salon F. This salon is positioned as a community-based salon. If this salon attracts more customers from further distances, it has a potential to increase sales and profits. Salon I is a typical salon, whose customer distribution is applicable to the 80-20 rule or Pareto's law.

3.2 DATA SELECTION

The data were collected from nine salons of a hair salon chain in the Greater Tokyo Area.[1] The salons are categorized into 4 groups; (1) flagship-typed salon located in a major city/ward of Tokyo: A, B, C and D, (2) salons in residential areas: E and F, (3) salons offering services with affordable prices, (4) salons in Suburban areas: H and I.

The total sales account for approximately 1.6 billion yen with more than 15,000 customers and the sales of service units total up to 130,000. The amount of discounts sums up 34 million yen. On the basis of each category, an average sales, the number of customers and sales per capita are indicated in Table 1.

Table 1: Sales per day (10^6, 10^3,10^3 JPY)

Sales per Day	Reservation with Designation	No Designation	Total
Flagship Salon	228	14	243
Salons in residential areas	139	13	142
Salons offering services with affordable prices	50	22	73
Shopis in suburban areas	109	13	122
Averages	106	15	175

Number of Customers per Day	Reservation with Designation	No Designation	Total
Flagship Salon	17	1.6	19
Salons in residential areas	11	1.4	12
Salons offering services with affordable prices	50	2.5	7.5
Shopis in suburban areas	90	1.5	11
Averages	130	2.6	14

Sales per Capita	Reservation with Designation	No Designation	Total
Flagship Salon	13.2	8.9	12.8
Salons in residential areas	12.3	9.7	12
Salons offering services with affordable prices	10.2	8.6	9.7
Shopis in suburban areas	11.7	8.5	11.3
Averages	12.6	8.9	12.2

Each type of a salon has each trend. A flagship-typed salon records the highest figures in three performances; sales per day, the number of customers a day and sales per capita. The reason why the sales amount is almost as twice as that of in suburban areas and residential areas derives from the large volume of daily customer visits.

In general, more customers go for a hair salon on weekends rather than weekdays, shown in Figure 2 as an index. The lowest sales day is Tuesday, 47.4 and the highest is 173.3 on Saturday (approximately 3.7 times). This figure allows us to guess the difficulty of daily manpower management due to the fluctuation of weekly customer demands. A salon needs put more staff members into a working roaster on weekends and vice versa on weekdays. Request for reservation from customers may effectively work to pacify its variance.

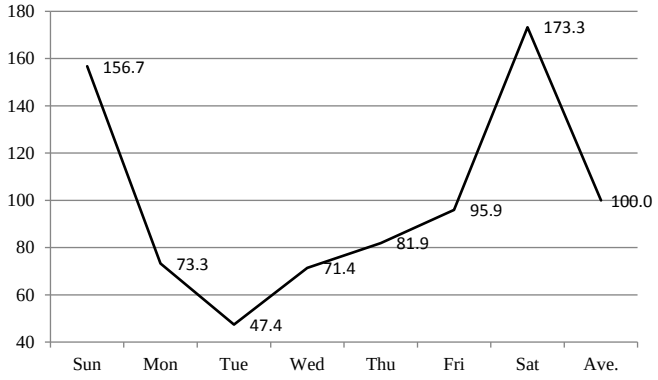

Figure 2: Sales index (average = 100)

Table 2: Sales per day (salon)

Unit: M Yen

Sales per Day	Reservation with Designation		No Designation		Total	
	Sales/day	%*1	Sales/day	%*1	Sales/day	%*2
A	768	97.8%	16	2.0%	785	18.1%
B	806	95.3%	39	4.6%	846	19.6%
C	332	88.5%	42	11.2%	375	8.7%
D	606	91.3%	58	8.7%	664	15.3%
E	304	90.7%	30	9.0%	335	7.7%
F	139	69.8%	59	29.6%	199	4.6%
G	408	90.7%	41	9.1%	450	10.4%
H	170	85.4%	28	14.1%	199	4.6%
I	427	90.7%	43	9.1%	471	10.9%
Total	3,965	91.7%	360	8.3%	4,326	100.0%

*1 Share between Reservation with designation and no designation in one salon

*2 Share of sales among 9 salons

Top three of higher sales volumes are salon B, salon A, and salon D, respectively, all of which belong to a flagship-typed salon. The least sales salon is salon H, followed by salon F. Another trait that salon F renders is a higher percentage of "no designation" customers (29.9%), which can be inferred that there exist a lot of first-time customers due to affordable prices. The performance of this salon may be able to be enhanced through creating the system, which lets first-time customers become repeaters as well as increase the number of first-time customers simultaneously. Each salon's number of customers per day is almost same trend with table 2 can be seen in customer numbers; the result of correlation analysis is 0.993.

Sales per capita are one of important factors for increase in sales volumes in the hair salon industry due to

[1] A, B, C, D, E, F, G and H (Metropolitan Tokyo), I and J (Neighbor Prefecture)

such operational restrictions as tighten labor expenses. In fact, a study of Inada (2012) demonstrates the rate of labor costs in sales is 54.3% in average industry. The average payment of reservation with designation amounts for 12,636 yean, whereas that of no designation is only 8,923 yen. Total average sales per capita are 12,212 yen and the number of standard deviation is 1,197 and salons whose sales per capita are lower are higher share of "no designation" customers. In this point, the more customers who make reservation with designation, the higher sales per capita are, subsequently ending in higher sales figures.

Investigation of cross-selling among 9 salons shows the highest percentage of those associations is between Cutting and redressing. This result is quite logical because a salon is willing to readdress his/her hair style if unsatisfied and because readdressing fees are rarely corrected by a salon. The second highest associations are between coloring and cutting, and between treatment and other services. Ladies tend to have hair colored at a salon once a few times of coloring to regularly make their hair dyed sophisticatedly. Thus the figure, 21.8% is not higher or lower. Treatment is also similar; ladies periodically would like to have hair treatmented with other hair or physical services.

Table 3: Sales of each service

Unit: Yen

Total 9 Salons	Daily Sales	# of Customers	Share of Daily Sales	Share of # of Customers
Redressing	23	0	0.0%	0.2%
Cutting	172,752	17	35.9%	42.0%
Coloring	104,788	7	21.8%	18.4%
Using Coupons	4,924	1	1.0%	1.5%
Straight Permanent	15,073	1	3.1%	2.2%
Other Services	931	0	0.2%	0.2%
Treatment	103,836	7	21.6%	17.7%
Permanent	30,702	2	6.4%	5.2%
Blow/Shampoo/Hair Set	47,528	5	9.9%	12.6%
Designation Fee	127	0	0.0%	0.0%
Total	480,685	39	100.0%	100.0%

42% of total customers make use of cutting service when visiting the hair salon, followed by 18.4% in coloring and 17.7% in treatment, respectively. Although there exist some price fluctuations, coloring and treatment look key factors for a salon to enhance its business performance due to higher sales per unit.

4. REGRESSION MODELS

Two types of multiple regression models are used to predict model parameters more precisely: linear regression and multiplicative regression models (Takano et al. 2015). A linear multi regression model described in (1) is adopted due to the comparison with a new model, multiplicative regression model as one of effective existing models, formula (2). The reason for an estimation used by a multiplicative regression model can perform better than other regression models to select a model, which estimates more statistically significant. Both models applied a daily sales volume per salon as a dependent variable and four independent variables: 1) numbers of daily passengers of a nearest railway or subway station, 2) numbers of hair-dressing stylists at each salon, 3) a day of a week, 4) a weekday or a weekend

$$y = \beta_0 + \beta_1 \times Passengers + \beta_2 \times Stilists + \beta_{31} \times Sunday + \cdots + \beta_{36} \times Saturday + \beta_4 \times Weekends \quad (1)$$

$$y = \beta_0 \times Passengers^{\beta_1} \times Stylists^{\beta_2} \times \beta_{31}^{Sunday} \times \cdots \times \beta_{36}^{Saturday} \times \beta_4^{Weekends} \quad (2)$$

Table 4 provides each regression coefficients for each of latent classes and Figure 3 and 4 show each scatter plotting. Each model's adequacy is examined with the results of parameter estimation. Two criteria are applied in this investigation: R-square and mean absolute error (MAE). The linear regression accounts for 0.87 as R-square and the multiplicative regression 0.86 whereas 70,506 and 67,508 as MAE, respectively.

We also comparison two scatter plots in Figure 3 and 4 for best fitting. The line of best fit of the linear model looks drawing a non-linear trend line and the line of the multiplicative model seems a linear line, even though the fluctuation of the Figure 4 is more spreading than that of Figure 3. Those observation lead us to come to conclusion to adopting the multiplicative regression model in this study.

Table 4: Comparison of regression models

Linear Regression	
R	0.87
R2	0.76
Adjusted R2	0.76
Std Errors	90,981.90
Samples	2,806

Multiplicative Regression	
R	0.86
R2	0.74
Adjusted R2	0.74
Std Errors	0.36
Samples	2,806

	Coefficient	t	P-value
Intercept	-11,207.40	-0.82	0.41
Passengers	-0.01	-11.24	0.00
Stylists	71,799.33	70.22	0.00
Sun	59,343.00	4.34	0.00
Mon	-41,019.22	-3.05	0.00
Wed	-41,713.00	-3.04	0.00
Thu	-50,401.79	-3.66	0.00
Fri	-34,756.83	-2.52	0.01
Sat	70,307.46	5.09	0.00
Weekends	24,117.74	2.60	0.01

	Coefficient	t	P-value
Intercept	10.93	135.51	0.00
Passengers	0.01	1.35	0.18
Stylists	0.97	63.57	0.00
Sun	0.22	4.03	0.00
Mon	-0.18	-3.41	0.00
Wed	-0.17	-3.21	0.00
Thu	-0.17	-3.22	0.00
Fri	-0.10	-1.85	0.06
Sat	0.25	4.66	0.00
Weekends	0.15	4.15	0.00

5. PROBABLISTIC CHOICE MODEL

In this study, we use a probabilistic choice model based on Huff model (Huff, 1963) for estimating model parameters. We introduce some related studies. Onuki((2007) defined the business area for outlet store with meshed area, in this study Huff model are used for estimating buying power for each mesh. Dramowicz (2005) shows an example of GIS system based on Huff model. However, to the best of our knowledge, there are no study that pick up hair salon services. The success of hair salon business is related to grasp repeaters, so the techniques of hair salon stylists are important. A good stylist can get loyalty from many customers. So, the store power of H hair salon is different from the ordinal Huff model (store area). So, we need to discuss how to define the salon power. In this study, we estimate store power based on hair salon business concepts.

The salon j's gravidity for customer i is represented in equation (3)

$$g_{ij} = \frac{salon\_power_j^{\alpha}}{distance_{ij}^{\beta}} \tag{3}$$

where α and β are the parameter. The probability p_{ij} that customer i selects salon j is computed as the next equation (4).

$$p_{ij} = \frac{g_{ij}}{\sum_{\ell} g_{i\ell}} \tag{4}$$

The likelihood of all choices can be written as

$$L = \prod_i \prod_j p_{ij}^{y_{ij}} \left(1 - p_{ij}\right)^{(1-y_{ij})} \tag{5}$$

Solving (5), then we obtain the optimal parameter valu es.

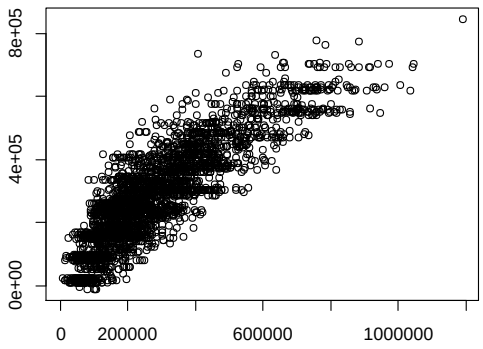

Figure 3: Scatter plot of linear model

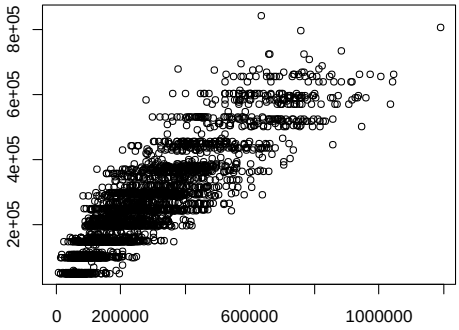

Figure 4: Scatter plot of multiplicative model

Maximum logarithm likelihood estimates of the model parameters can be obtained in a straightforward way by using the choice histories from a sample of consumers.

The formula, in which each salon's parameters (α_j for salon j) are estimated, is

$$g'_{ij} = \frac{salon\_power_j^{\alpha_j}}{distance_{ij}^{\beta}} \tag{6}$$

In addition, the formula, in which each distance's parameters (β_j for salon j) are estimated, is

$$g''_{ij} = \frac{salon\_power_j^{\alpha_j}}{distance_{ij}^{\beta_j}} \tag{7}$$

Equation (6) or (7) is substituted for (4) instead of (3), then we estimate parameters to maximize the likelihood function (5). In this study, we employ the number of stylist of each salon of each day as $salon\_power_j$.

As compared with each AIC of equations (3), (6) and (7), using the formula of (7) is statistically more significant than others. Table 5 indicates each salon's and distance's parameter. Since each salon of A, B, C, D and E is along the Tokyo loop line, a degree of attractiveness regarding a distance is similar. Salon F attracts less customers than any other salons. However, Salon F is less captivating due to its pricing policy.

More stylists do not necessarily work in larger sales volume salons as shown in Table 5. In addition Table 6 proves the same may be said of the relationship between sales volumes and distances. For example, the sales per day of Salon B are the largest but its both parameters are relatively smaller compared to others.

Table 5: Parameters of choice model

Salon	All		Weekday		Weekend/Holiday	
	Salon_power	Distance	Salon_power	Distance	Salon_power	Distance
A	0.744	1.712	0.855	1.787	0.696	1.651
B	0.905	1.702	1.022	1.762	0.758	1.660
C	0.581	1.713	0.655	1.773	0.560	1.679
D	0.805	1.739	0.891	1.800	0.731	1.729
E	0.460	1.803	0.494	1.852	0.501	1.805
F	0.320	2.406	0.298	2.343	0.332	2.571
G	1.100	2.155	1.086	2.134	0.982	2.143
H	0.768	2.059	0.632	2.064	0.804	2.071
I	1.681	2.131	1.652	2.151	1.453	2.122

Table 6: Correlation among three variables

	Sales/day	Salon_Power	Distance
Sales/day	1.000		
Salon Power	0.292	1.000	
Distance	-0.657	0.108	1.000

Salon F and H are busy on weekdays according to Figure 5, which describes the difference of customer volumes between weekdays and weekends. The horizontal items are the salon names and vertical ones are values of parameter. In terms of the degree of distance parameters, only salon F is more accessible on weekends.

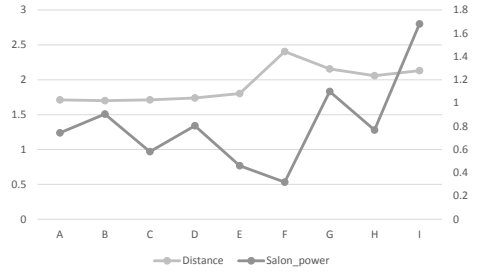

Figure 5: Parameters of equation (7)

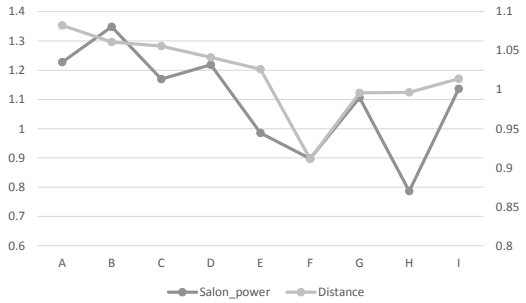

Figure 6: Comparison with weekday and weekend/holiday

Table 7 shows what percentage of customers comes to the salon on the basis of distance between the salon and his/her house. One distance equal 5 kilometers. For example, the percentage of the rank of 5 of Salon A is 8.9%, meaning 8.9% of the total customers come to Salon A, whose houses are located more than 16 kilometers but equal to or less than 20 kilometers.

In general, the closer to a station is, the larger parameter is. This means customers have tendency to choose a salon, whose location is closer to a station. The areas of Salon F and H are not sufficiently commercialized and then the customers, who use those salons, tend to live near the salons. The parameters of Salon F looks attracting only nearer residential environment. Customers, who visit Salon E come from even long distance. This salon possess certain competitive advantages. Since the location of Salon C is near the one of biggest terminal station in Tokyo, which is a station at end of several railway lines, the first rank accounts for 80.3%. In sum, salons located in urban areas attract neighborhood customers, whose houses are near a salon. Salons typed flagship do not have obvious correlation with distances. However, more concrete correlation or each salon's competitive advantages can be figured out if each salon's characteristics and profiles are investigated.

Table 7: Distance rank of selected salon

Salon	1	2	3	4	5	6	7	8	9
A	9.4%	16.8%	22.9%	33.4%	8.9%	8.1%	0.5%	0.0%	0.0%
B	42.7%	9.7%	11.7%	9.3%	5.9%	6.5%	8.6%	4.1%	1.4%
C	80.3%	6.9%	1.7%	2.4%	1.9%	1.8%	2.0%	1.1%	2.0%
D	29.2%	23.3%	18.9%	10.8%	8.8%	2.9%	5.4%	0.6%	0.0%
E	49.7%	5.0%	8.7%	3.2%	21.5%	11.0%	1.0%	0.0%	0.0%
F	85.4%	9.3%	1.4%	0.7%	0.2%	2.9%	0.0%	0.0%	0.0%
G	61.1%	11.5%	9.8%	3.9%	2.6%	2.4%	8.8%	0.0%	0.0%
H	89.8%	7.1%	0.2%	0.2%	0.6%	0.0%	0.2%	0.2%	1.7%
I	56.3%	36.0%	0.8%	0.9%	0.8%	0.9%	0.8%	3.7%	0.0%
Total	48.4%	15.7%	10.5%	9.6%	6.1%	4.3%	3.5%	1.3%	0.5%

6. RESULTS AND DISCUSSIONS

There are primarily three findings in view of each result. First of all, Flagship salons show larger estimated parameter of salon power. It means those salons are more attractive than other relatively smaller salons. In other words, the smaller the salon's size, the smaller its estimated parameter. Second, since fewer competitors exist in the neighborhood of salon I, the estimated parameter of salon power is larger than others'. Finally, Salon A, B, C, D and E are hypothesized that fewer customers visit those salons on weekends because the locations are on the way to their workplaces, where customers use those salons after work. However, the outcome is different and those salons attract more customers on weekends.

7. CONCLUSION

This research shows how to estimate more effective competitive advantages and the probabilistic choice model newly invented in this study is proven to be a more efficient model with its estimated parameters. These findings contribute to the development of studies for a gravity model. The current study, however, has several limitations. Overall, a more segmented analysis is required so that

concrete and logical outcomes can come out to explain each salon's competitive advantages. It is further suggested that, for example, the salons be segmented on the basis of prices like 1) regular and affordable ones, 2) with and without designation, 3) more detailed salon groups in the future.

ACKOWLEDEGEMENTS

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REFERENCES

Statistic Bureau, Ministry of Internal Affairs and Communications (2009), *Economic Census 2008*.

Craig, C.S., Ghosh A. and McLafferty S. (1984), Models of the retail location process: A review, *Journal of. Retailing*, **60 (1)**, 5-36.

Dramowicz, E. (2005), Retail Trade Area Analysis Using the Huff Model, Directions Magazine, http://www.directionsmag.com/entry/retail-trade-area-analysis-using-the-huff-model/123411

Huff, D.L. (1963), A Probabilistic Analysis of Shopping Center Trade Areas, *Land Economics*, **39**, 81-90.

Inada, Y. (2012), *Textbook for recruiting – a company can be changed within one week*, Business Best Seller

Krause-Traudes M., Scheider S., Ruping S. and Mebner H. (2008), *Spatial data mining for retail sales forecasting*, 11st AGILE International Conference on Geographic Information Science 2008, University of Girona, Spain

Onuki, M. (2007), Defining a Trading Area by Regional Mesh Statistics Data, *Bulletin of University of Marketing and Distribution Sciences, Distribution and Management*, **29 (1)**, 41-53.

Takano, Y., Wada, Y., Namatame, T. and Muraki, M. (2015), "Effectiveness of Framework for Determining Bidding Strategy for Banner Advertising in Ad Networks," *Bulletin of the Institute of Information Science, Senshu University*, 35, 1-17.