The Ninth International Symposium on Operations Research and Its Applications (ISORA'10)
Chengdu-Jiuzhaigou, China, August 19–23, 2010

Factors to Determine the Length of Staying Time of Consumer Shop-around (Kaiyu) at City Center

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Abstract These days we see many shopping malls all over the world. One of the most critical concerns for management of the malls is how they motivate their visitors to stay longer at their facility. The same holds for management of city center commercial district. The purpose of this study is to answer the question of what factors determine the time length of duration of consumer shop-around at a city center commercial district. Based on the survey of consumer shop-around behavior conducted at the city center of Fukuoka City, first we have analyzed how sojourn time is different among consumers with different individual characteristics. Next we have performed the variable selection procedure in the multiple regression analysis to extract significant factors that affect consumers' staying time. From the analysis, we found the followings: Female consumers stay longer than males. The longer the travel time distance to the city center the shorter the sojourn time. In particular, we found that behavioral purposes consumers perform at the city center such as theater, hospital, school, cinema, shopping, etc., have great significant effects on the consumer shop-around staying time.

Keywords Consumer Shop-around Behavior; Staying Time; Behavioral Purpose; City Center Commercial District

1. Purpose

These days we see many shopping malls all over the world. The most critical concerns for management of the malls are how they attract people and how they motivate their visitors to stay longer at their facility. The same holds for the management of city center commercial district. In order for a city center

commercial district to be attractive, it should be a pleasant and entertaining place for people so that people are glad to visit there and want to come again. Here the visitor's satisfaction is a key for making them visit once again and for recruiting new visitors. Thus to facilitate a wide range of visitors' activities, many of city center shopping districts offer not only the shopping establishments but also some amusement functions such as theaters, cinema complexes, restaurants and so on. Hence several shopping malls in Japan even boast that they are not just a shopping facility only for the shopping purpose but an establishment where the purpose of visitors becomes staying and spending their time there in itself. For the shopping malls, they can expect that their turnover would increase if their visitors extend the length of their staying time. Therefore, the problem for them is to know what kinds of facilities, functions, or events are most effective to make visitors' staying time much longer.

The purpose of this paper is to answer this problem of what factors determine the time length of duration of consumers shop-around, called Kaiyu in Japanese, at a city center commercial district. Based on data obtained from the survey of consumer shop-around behavior at the city center of Fukuoka City, Japan, we analyze how sojourn time is different among consumers with different individual characteristics. To extract the significant factors, we also perform the explanatory variable selection procedure in the multiple regression analysis in such a way that we can evaluate the size of the effects of significant factors by measuring the dependent variable of staying time in terms of minute and by expressing most of explanatory variables as dummy variables.

2. Framework of the Analysis

2.1. Definition of the length of staying time of shop-around

Our survey of consumer shop-around behavior includes 4 question items concerning time which can be utilized to define the length of staying time at the city center. They are 1) the leaving time when respondents left home, 2) the arrival time when respondents arrived at the city center, 3) the survey interview time when respondents were asked by interviewers to answer survey questions, and 4) the estimated departure time when respondents will depart from the city center.

To be precise, the time length of duration of consumer shop-around at the city center should be the difference between the estimated departure time and the arrival time. However the estimated departure time from the city center respondents answered is just a schedule that has yet to finish. Respondents also may well often change their departure time. Moreover, we would like to find some significant relations between the staying time and the history of shop-around behaviors which already have finished. From these considerations, we define the length of staying time as the difference between the survey interview time and the arrival time.

Generally speaking, the staying time defined as above is called truncated data. While there are statistical methods to deal with truncated data we will not treat our data as truncated data and would like to leave it for further study since this is the first empirical analysis to analyze the staying time of consumer shop-around

behavior.

2.2. Data used

We use data obtained from the on-site survey of consumer shop-around behavior (The 7th Fukuoka Shop-Around Survey) conducted from June 28 through 30 in 2002. The data contains 945 samples in total.

Table 2-1 List of the explanatory variables

Main purpose	Shopping	1	Men's clothes	Main purpose	Affairs	50	Travel agency
		2	Women's street clothes			51	Ticket office
		3	Women's home clothes			52	Culture lesson
		4	Children's wearing			53	Beauty salon, Haircut
		5	Underwear			54	Hospital
		6	Traditional costuming			55	Part-time job
		7	Shoes			56	Job application
		8	Handbag			57	Government office
		9	Jewelry, accessories			58	Errand for financial institute
		10	Fresh foods			59	Post office
		11	Furniture			60	Layover
		12	Bedding			61	Visit
		13	Home electric appliances			62	Lodgment
		14	AV			63	Wedding･Party
		15	Computer			64	School
		16	Household utensils			65	Work
		17	Cosmetics		Day of the survey	66	*June 28th Saturday*
		18	Books			67	June 29th Saturday
		19	CDs			68	June 30th Sunday
		20	Precise instruments	Others	Sex	69	*Male*
		21	Toys			70	Female
		22	Medicine		Job	71	Fixed job
		23	Sports appliances			72	*Others*
		24	Souvenirs		Age	73	10s
		25	Automobile			74	20s
		26	Motorcycle, Bicycle			75	30s
		27	Artwork			76	40s
		28	Gifts			77	50s
		29	Window-shopping			78	60s
		30	Foods			79	*over 70s*
		31	Others		Marriage	80	Married
	Leisure	32	Movie			81	*Unmarried*
		33	Game arcade		Car	82	Having a car
		34	Karaoke			83	*Having no car*
		35	Event		Accompanying person	84	Family
		36	Exhibition			85	Same-sex friends and acquaintances
		37	Concert			86	Opposite sex friends and acquaintances
		38	Theatergoing			87	Business associate
		39	Watching a sports game			88	*Others*
		40	Gamble		Commuting to work, school to the city	89	Yes
		41	Taking up sports			90	*no*
		42	Walking, Jogging		Continuous variables	91	Time distance to the city center (unit: minites)
		43	Sightseeing			92	Travel cost to the city center(unit:hundred yen)
		44	Festival			93	Visit of frequency (unit: times per month)
		45	Praying			94	Budget(unit:thousand yen)
		46	Killing time			95	Number of accompanying person (unit: persons)
	Drinking and eating	47	Tea drinking				
		48	Taking a meal				
		49	Drinking				

* No.1-No.90 are dummy variables.
* Italicized variables are not used in this analysis.

The 7th Fukuoka Shop-Around Survey is an on-site questionnaire interview

survey which takes about 15 minutes and asks the respondents who visit the city center about the history of their shop-around behavior, that is to say, the sequence of the triple decisions made by the respondents; places visited, purposes done, and expenditure spent there, which is recorded in the order of their occurrence. We set up 9 shopping facilities as sampling points and the respondents are randomly sampled at those sampling points. Other items we asked the respondents are their individual characteristics such as age, gender, and place of residence, travel mode, travel time, and transport fare to city center, and the frequency of visits at city center and so on.

2.3. Multiple regression analysis employed

We wish to clarify what factors affect the time length of shop-around and to determine the size of their influences. For the purpose, while we simply employ multiple regressions analysis most of explanatory variables are provided as dummy variables since the sizes of effects of explanatory variables can be expressed as the multiple regression coefficients.

In Table 2-1 we give the list of explanatory variables. From Table 2-1 we see explanatory variables include many behavioral purposes performed at places visited. The Fukuoka Shop-Around Survey distinguishes behavioral purposes at the city center as about 90 kinds of purposes. They are broadly classified into 5 classes: shopping, eating and drinking, leisure, work, and transportation. The class of shopping includes 35 kinds of shopping purposes distinguished mainly by the kinds of commodities to purchase. Similarly we have 42 kinds of behavioral purposes concerning eating and drinking, leisure, and work. We also have 16 kinds of transportation purposes such as get-on and get-off public transport, and parking. From all of these purposes except 16 transportation purposes we employed 77 kinds of purposes of shopping, eating and drinking, and leisure as explanatory variables in the form of dummy variable. These dummy variables take 1 if the respondent has finished those purposes before the respondent takes the survey interview and 0 otherwise. In addition to behavioral purposes, we include the following explanatory variables: personal attributes, travel cost to city center (unit: Yen), time distance to city center (unit: minute), frequency of visit to city center (unit: times per month), and the weekend dummy, i.e., 1 if the survey day is Saturday or Sunday and 0 otherwise. The dependent variable is the length of staying time of shop-around at city center (unit: minute).

In this analysis we only use the sample whose main purpose to visit the city center commercial was shopping, eating and drinking, or leisure. Two kinds of multiple regression models are applied: The one is the multiple regression model using all explanatory variables and the other the multiple regression model using backward variable selection method.

Table 3-1 Average shop-around staying time

N	average (unit: minute)	SD
851	173.0	162.38

3. The Length of Shop-around Staying Time Differs among People with Different Individual Characteristics?

3.1. Average length of shop-around staying time

Table 3-1 shows average shop-around time by all samples. The average shop-around time is 173 minutes, approximately 3 hours.

3.2. Average shop-around staying time by gender

Table 3-2 shows the averages of shop-around staying time at city center by gender. From the table, we see that the average shop-around staying time, about 175 minutes, for female visitors is longer than that of male visitors, about 167 minutes, by 8 minutes.

Table 3-2 Average shop-around staying time by gender

	average (unit: minute)	N	SD
male	167.2	222	165.98
female	174.5	623	160.13
all	172.6	845	161.62

3.3. Average shop-around staying time by age

Table 3-3 gives the averages of shop-around staying time at city center by age. We classify ages into 7 age groups. From the table we see that the length of shop-around staying time assumes the longest of 207 minutes for the age group of 25 to 29, which is followed by 183 minutes for the age group of 50s and 180 minutes for the age group of 30s.

Table 3-3 Average shop-around staying time by age groups

	average (unit: minutes	N	SD
10s	178.3	192	170.43
20 to 24	154.4	296	145.50
25 to 29	206.5	109	180.41
30s	179.7	89	165.93
40s	168.9	55	178.26
50s	183.3	54	160.80
over 60s	175.3	53	157.92
all	173.3	848	162.46

3.4. Average shop-around staying time by main purposes

In Table 3-4 we give the average lengths of shop-around staying time by main purposes the respondents plan to do at the city center.

Table 3-4 Average shop-around staying time by main purposes

	average (unit: minutes	N	SD
shopping	159.1	501	143.86
leisure	159.1	46	167.82
eating and drinking	115.1	63	126.43
work	223.8	108	192.53
others	239.4	91	190.60
all	173.3	809	160.60

One of the questionnaire items of this survey asks the respondents to choose which one is their main purpose to visit the city center among the five: shopping, leisure, eating and drinking, work and others. The purpose classified as others assumes approximately 239 minutes, the longest among all. The shortest length of shop-around staying time becomes 115 minutes for eating and drinking. The purposes of shopping and leisure have the same length of staying time of 159 minutes.

3.5. Average shop-around staying time by travel time distances

Table 3-5 shows the averages of shop-around staying time by travel time distance to the city center. Here the travel time distance is defined as the response to the question of how many minutes it takes from your home to the city center today. We classify the travel time distance into the following 4 classes: less than 30 minutes, 30 minutes to less than 1 hour, 1 hour to 2 hours and more than 2 hours.

Table 3-5 clearly shows a very interesting fact that the longer the travel time distance the shorter the shop-around staying time. Considering the constraint of total amount of time given to visitors it can be said that if the travel time from home to city center increases the remaining amount of time that can be allocated to shop-around decreases so that the length of shop-around staying time may inevitably be shortened.

Table 3-5 Average shop-around time by travel time distances

	average (unit: minutes)	N	SD
less than 30 minutes	182.7	385	159.29
less than 1 hour	181.2	239	158.78
less than 2 hours	177.6	122	178.15
over 2 hours	114.6	104	152.46
all	173.2	850	162.39

3.6. Average shop-around staying time by travel costs

Similarly we show in Table 3-6 the averages of shop-around staying time by travel costs. Here the travel cost is the response to the question of how much you have paid for transportation from home to the city center today. We classify travel costs into four classes: less than 200 yen, 201 to 500 yen, 501 to 1000 yen, and more than 1001 yen.

Table 3-6 Average shop-around time by travel cost to the city center

	average (unit: minutes)	N	SD
0–200 yen	170.9	213	166.78
201–500 yen	171.4	281	153.47
501–1000 yen	180.3	95	157.97
1001 yen or more	165.7	59	152.72
all	172.0	648	158.23

We see from the table that visitors who spend the transportation expense of 500 to 1000 yen show in average the longest length of shop-around staying time of about 180 minutes. In contrast, visitors who spend more than 1000 yen for transportation spend in average the shortest shop-around staying time. This result

Table 4-1 Estimated model with all explanatory variables

variables	estimate	SD	t value	p
38.Theatergoing	291.16	119.91	2.43	0.0155
65.Work	229.80	53.17	4.32	<.0001
54.Hospital	218.99	118.35	1.85	0.0649
64.School	212.85	46.55	4.57	<.0001
34.Karaoke	176.52	104.78	1.68	0.0927
56.Job application	130.75	60.16	2.17	0.0302
25.Automobile	117.69	178.98	0.66	0.5111
52.Culture lesson	115.29	121.87	0.95	0.3447
59.Post office	112.90	70.66	1.60	0.1108
10.Fresh foods	112.05	46.57	2.41	0.0165
53.Beauty salon, Haircut	109.95	145.84	0.75	0.4512
32.Movie	100.25	87.18	1.15	0.2508
20.Precise instruments	99.34	55.39	1.79	0.0735
28.Gifts	95.56	69.73	1.37	0.1712
23.Sports appliances	91.32	85.59	1.07	0.2865
2.Women's street clothes	88.55	15.00	5.90	<.0001
22.Medicine	86.48	42.59	2.03	0.0428
14.AV	83.46	122.50	0.68	0.4960
29.Window-shopping	78.90	12.11	6.51	<.0001
1.Men's clothes	78.06	23.25	3.36	0.0008
43.Sightseeing	76.43	85.76	0.89	0.3733
3.Women's home clothes	75.52	19.47	3.88	0.0001
9.Jewelry, accessories	71.05	39.16	1.81	0.0702
31.Shopping others	69.22	34.07	2.03	0.0427
18.Books	68.45	36.01	1.90	0.0579
87.Business associate(Accompanying person)	62.82	43.44	1.45	0.1488
40.Gamble	61.35	118.18	0.52	0.6039
7.Shoes	60.91	23.94	2.54	0.0113
27.Artwork	60.90	75.17	0.81	0.4183
73.10s(Age)	60.28	21.64	2.79	0.0056
15.Computer	58.17	125.79	0.46	0.6440
74.20s(Age)	55.79	20.69	2.70	0.0073
55.Part-time job	52.64	83.98	0.63	0.5311
80.Married	51.06	19.90	2.57	0.0106
84.Family(Accompanying person)	47.60	19.45	2.45	0.0148
48.Taking a meal	46.19	14.77	3.13	0.0019
5.Underwear	44.47	61.54	0.72	0.4703
19.CDs	37.93	69.99	0.54	0.5881
85.Same-sex friends and acquaintances(Accompanying person)	36.02	13.60	2.65	0.0083
42.Walking, Jogging	30.98	120.33	0.26	0.7970
75.30s(Age)	29.95	26.67	1.12	0.2620
24.Souvenirs	25.90	129.99	0.20	0.8422
86.Opposite sex friends and acquaintances(Accompanying person)	20.70	18.11	1.14	0.2535
8.Handbag	18.24	38.05	0.48	0.6320
16.Household utensils	14.14	27.73	0.51	0.6102
12.Bedding	12.52	92.58	0.14	0.8925
17.Cosmetics	11.70	32.16	0.36	0.7162
46.Killing time	11.57	18.77	0.62	0.5381
47.Tea drinking	8.87	26.96	0.33	0.7421
33.Game arcade	4.56	49.75	0.09	0.9270
89.Commuting to work, school to the city center	4.54	13.38	0.34	0.7347
78.60s(Age)	1.31	38.53	0.03	0.9728
93.Visit of frequency(unit:times per month)	0.25	0.98	0.25	0.7991
91.Time distance to the city center(unit:minites)	0.23	0.18	1.26	0.2089
94.Budget(unit:thousand yen)	-0.07	0.32	-0.21	0.8309
92.Travel cost to the city center(unit:hundred yen)	-0.33	1.01	-0.89	0.3730
95.Number of accompanying person(unit:persons)	-0.36	0.41	-0.33	0.7450
60.Layover	-2.54	13.05	-0.19	0.8456
68.June 30th Sunday(Day of the survey)	-2.99	13.57	-0.22	0.8259
77.50s(Age)	-3.18	35.35	-0.09	0.9284
71.Fixed job(Job)	-4.82	13.54	-0.36	0.7219
37.Concert	-6.87	122.16	-0.06	0.9552
67.June 29th Saturday(Day of the survey)	-7.77	13.48	-0.58	0.5650
82.Having a car(Car)	-7.84	11.57	-0.68	0.4985
70.Female(Sex)	-15.51	14.76	-1.05	0.2940
30.Foods	-20.28	31.53	-0.64	0.5204
4.Children's wearing	-20.36	86.10	-0.24	0.8132
76.40s(Age)	-30.85	34.31	-0.90	0.3690
11.Furniture	-42.13	85.26	-0.49	0.6214
58.Errand for financial institute	-80.96	70.39	-1.15	0.2507
13.Home electric appliances	-122.16	99.67	-1.23	0.2209
Adj R^2	0.6656			

can be said to parallel the above fact that the longer the travel distance the shorter the staying time.

4. Multiple Regression Analysis for Exploring Factors to Determine the Length of Shop-around (Kaiyu) Staying Time.

4.1. The model using all the explanatory variables

Table 4-1 reports estimated results of the multiple regression model using all the explanatory variables. In the table, we arrange the estimated multiple regression coefficients in the descending order of their values.

Table 4-2 Estimated model obtained by backward selection method

variables	estimate	SD	t value	p
38.Theatergoing	290.50	115.05	6.38	0.0119
64.School	223.60	41.91	28.46	<.0001
65.Work	219.58	50.48	18.92	<.0001
54.Hospital	216.58	114.45	3.58	0.0590
32.Movie	139.92	67.41	4.31	0.0384
56.Job application	126.19	58.36	4.68	0.0310
10.Fresh foods	105.89	44.25	5.73	0.0170
20.Precise instruments	99.86	52.42	3.63	0.0573
2.Women's street clothes	93.15	12.99	51.43	<.0001
1.Men's clothes	90.18	19.93	20.47	<.0001
22.Medicine	90.09	37.51	5.77	0.0167
29.Window-shopping	76.50	10.88	49.46	<.0001
3.Women's home clothes	71.92	18.14	15.72	<.0001
31.Shopping others	65.29	32.54	4.03	0.0453
7.Shoes	64.55	22.62	8.14	0.0045
87.Business associate(Accompanying person)	64.20	37.80	2.88	0.0900
48.Taking a meal	60.21	13.07	21.23	<.0001
18.Books	59.27	32.82	3.26	0.0715
73.10s(Age)	53.17	13.91	14.62	0.0001
80.Married	46.75	14.52	10.36	0.0014
74.20s(Age)	43.42	11.18	15.09	0.0001
84.Family(Accompanying person)	39.72	16.68	5.67	0.0176
86.Opposite sex friends and acquaintances (Accompanying person)	34.50	16.22	4.52	0.0339
85.Same-sex friends and acquaintances (Accompanying person)	34.06	12.00	8.05	0.0047
76.40s(Age)	-42.91	23.94	3.21	0.0736
Adj R^2	0.6936			

It should be noticed that most of factors that have large effects on shop-around staying time are related to specific objectives visitors plan to do at the city center.

The factor that has the largest effect on shop-around staying time turns out the purpose of "Theatergoing" and the next largest one is "work", followed by "Hospital", "School" and "Karaoke".

4.2. The model estimated by backward variable selection method

We have tried to obtain the optimal model all of which explanatory variables become significant by employing backward variable selection method.

The backward selection method is an automatic model selection method in which at each step one explanatory variable that has the least contribution is deleted and the step is repeated until all remaining explanatory variables become significant. We set the significant probability level as 10%.

In Table 4-2 we give the estimated model obtained by backward variable selection method. From the estimated result it turns out that the purpose of "Theatergoing" has the largest significant effect on shop-around staying time of 290 minutes, which is followed by "School" (223 minutes), "Work" (219 minutes) and "Hospital" (216 minutes).

If we restrict our attention only to the purposes of shopping, leisure, and eating and drinking, the next largest to "Theatergoing" is the purpose of "Movie" whose effect is 139 minutes, and the purposes of "Fresh foods", 106 minutes, "Precise Instruments", 100 minutes, and "Women's Street Clothes", 93 minutes, follow.

If you want to go to theater you need more than 3 or 4 hours at least. Similarly if you want to see movies you need more than two hours at least. From these considerations, the above estimated results quite conform to our intuition.

5. Concluding Remarks

While there have been few empirical researches to measure actual consumer shop-around staying time at city center commercial district, we have clarified what factors determine the length of shop-around staying time and what size of effect they have based on the survey of actual consumer shop-around behavior at the city center of Fukuoka. We have the following findings.

1) Most important factors that affect the length of shop-around staying time are related to the behavioral purpose visitors plan to do at city center. In particular, the purpose of theatergoing has the largest effect on the staying time. The purpose movie also has the large effect on staying time.
2) Female visitors stay longer than male visitors. The age group of 25 to 29 shows the longest staying time among all age groups.
3) The longer the travel time distance the shorter the staying time.

It is quite interesting to note that the first findings are consistent with the recent fad to attach cinema complexes with multi-screens to most large shopping malls. As for "Theatergoing", in the city center of Fukuoka we have a theater, Hakataza, where Japanese traditional drama Kabuki is performed every year, which takes 3 or 4 hours. Thus Hakataza seems to play an important role for extending visitors staying time at Fukuoka. It would be an interesting topic to investigate to what extent Hakataza contributes to extend visitors staying time at the city center of Fukuoka. Also important is to compare visitors staying time among different cities

and to explore its relation to the composition and functions of their facilities provided at their city centers.

As for the economic theory of allocation of time, there is vast literature. (See [1] and [2] among others.) The results we obtained here quite coincide with the so-called household production approach, which says consumers must use input such as time and money to get the final consumption services or commodities as if they are producing the final consumption services and commodities using various input resources. For example, to get the service of movies and theater, consumers must spend some amount of time. Our results seem to reflect these simple facts.

The mechanism behind how consumers decide the length of shop-around (Kaiyu) staying time should be explored further.

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