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QUANTITATIVE METHODOLOGY OF POTENTIAL CUSTOMER'S KANSEI IN ANALYSIS OF FOODSERVICE DEMAND

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Abstract: From the foodservice point of view, each consumer's *Kansei* as influenced by the senses, dining experiences, personality, preference, feeling and so on, will be bonded into real eating at various types of restaurants. In this paper, we regard the real eating as foodservice demand, and study it through quantitative methods in a variety of commercial environments. In our approach, we extend the framework for foodservice demand analysis, extracted as a rule of thumb by an experienced US consulting firm, leading to the required purchasing/eating number of food (meals), based on required seat number, type of restaurant and eating occasion/time. Based on the logical modeling for foodservice demand structure, our proposed methodology is characterized by taking into account 2 major types of commercial environments, namely "Demand Source" and "Patron Pool," and to apply quantitatively 3 major factors, namely "Ratio of effective foodservice demand", "Ratio of distribution by eating occasion" and "Ratio of distribution by business type". This is done to estimate the feasible scale of business, as calculated in required seat number for each of three proposed major categories of restaurant business types. In order to evaluate the validity of our proposed logical modeling, we have applied it to real data collected from a comparative study on an existing local Shopping Center, as gathered from actual POS data.

Keywords: Demand analysis, Foodservice demand, Feasibility study, Sales estimation, Kansei business

1. INTRODUCTION

Today, we can see various types of foodservice businesses in downtown areas and shopping centers. In the field of foodservice business, distribution of floor space is a key factor for appealing to consumers and in shaping commercial concepts. As a matter of fact, commerce on a large scale location results in success: e.g. we can see those successes in "Universal Studios" in Osaka, located next to a Theme Park, "Venus Fort" in Odaiba, Tokyo, and "Experi" in Maihama, where Tokyo Disneyland is also located. These examples are characterized not only by large sales proceeds in foodservice but also by large variation in location size, consumer profiles targeted by their developers, and expected number of consumers. These variables, as well as expected business benefit must have been taken into account as important aspects during the formation of their foodservice structures.

However, in the business planning approach, there has been no previous study on theoretical models or analyses that discuss how an appropriate scale should be set for foodservice from the perspective of the expected number of consumers. Model setting or methodological development should be compared to techniques in feasibility study. Development in these kinds of techniques are quite important because we should establish a methodology and system to evaluate risks in today's business environments, in which commerce is highly developed and the price of commercial real estate depends on business profit.

To do so, we set a methodology for analysis of a theoretical model assuming prospective consumers' *Kansei* (i.e. consumption of commercial service and evaluation of eating behavior, decided by individual sensation, experience, characteristics, liking, and mood) and then, propose a methodology and appropriate rule of hypothesis based on analysis of a case study on projects conducted both domestically and internationally.

In the following sections, we clarify the methodology in approach to foodservice demand. In section 2., we set factors of foodservice demand. In section 3, we suggest a logical model. In sections 4 and 5, we propose appropriate rules for quantitative factors. In section 6, we describe the process of required business scale estimation. In section 7, and finally, in section 8, we explain the result, and demonstrate a sample of the applied rule for quantitative factors shown in section 7.

2. APPROACH TO FOODSERVICE DEMAND

In order to infer required business scale and profits, most developers investigate commercial development cases corresponding to similar facilities. The mapping to business types, style of foodservice business and level of seat numbers depends on slight adjustment levels after estimation of required scale and profits. From this, we can see that the method of analyzing foodservice demand is not used generally as a standard. On the other hand, in the field of café or fast food business, a location evaluation system (as computer software) has been developed by private

enterprise [1], where given the candidate location, it is able to estimate the number of prospective customers from visibility and walking traffic in front of a shop. This kind of modeling and standardization has been accomplished based on experiences of developing McDonald's restaurants. However, it only systematizes the relationship between walking traffic numbers and customer capture ratio with date and time (occasion to eat out), and it can function properly only when concrete shops are located. This kind of development in software and standardization crossing over to other business types / styles and enterprises has not been developed yet. That is, individual enterprises evaluate business locations by their own concrete methodologies. The representative style is the evaluation based on 3 aspects, namely residents, traffic condition and street condition, and prospective customers' condition [2].

In the United States, the circumstances are very similar. However, in the case of difficult commercial complex compositions with large customer capacities – including redevelopment plans, such as convention centers or commercial complex services, professional commercial development consulting firms [3] analyze foodservice demand at the request of the developer or construction company. Such foodservice demand (falling into category by time or estimated number of styles for every occasion of eating out, and the number of seats used) provides results in association with space estimation or profit. Although these are applied as a professional company's own methodology for each project, as a concrete technique to analyze foodservice demand, there is no real verification considered.

Investigation of methodologies in approach to foodservice demand inside and outside the country clarified that demand analysis was actually standardized and associated with space distribution and profit verification only in the United States. However, there is nothing related to whole development or its verification but the profit approach from estimated locations of concrete shops.

Moreover, there are a number of articles written by U.S. institutions discussing effects or interactive relationships, such as attribution factor of foodservice demand [4-5], sales promotion [6], price setting [7], customer satisfaction [8], service quality [9], nutritional function [10], customers' characteristics [11], and brand registration [12], however, we found few articles discussing logical models and methodologies to understand foodservice demand quantitatively.

3. FACTORS INFLUENCING FOODSERVICE DEMAND

It has been stated that the sense of food is a comprehensive consequence composed of the food place and

reference to basic level of the individual disposition who evaluates [13]. However, this study concretely discusses how the commercial environment as food place and mixture of varied types of business shops are correlated with the human sense of consumption. In this context, the following 6 (six) factors [14] were mainly considered the concrete factors that affect choice by sense of consumption or decision-making on eating.

- 1) Concept of surrounding shop location, use, and size.
- 2) Time duration to stay at certain place or area.
- 3) Time afforded to spend on purchasing food products (or eating).
- 4) Number of times to spend on purchasing food products in a day (eating opportunities).
- 5) Characteristics of potential customers (age, sex, income, and so on).
- 6) Pattern of eating (concentration on certain time, types of menu, eating time, and so on).

4. LOGICALLY HYPOTHETICAL MODEL SETTING/ CATEGORY OF DEMAND STRUCTURE

The following 2 categorized models were set for macro categorization of the causal structure of foodservice demand.

- 1) When causal demand source of foodservice demand can be specified or shared within a specific commercial area, for example, the number of passengers on a railway (such as JR), the number of local residents, complex office building, downtown, street shops, and so on.
- 2) When demand source cannot be specified but patron pool can be inferred by the number of people entering or leaving. When an entire facility with large capacity (core equipment) was estimated as commercial range / location, theme park, fair, shopping center complex, stadium, subway, and airport could be a prototype.

It is assumed that generational categories such as customers' characteristics and each demographic attribution in the category could be combined.

5. LOGICALLY HYPOTHETICAL MODEL SETTING/ QUANTITATIVE METHODOLOGY FOR SENSE OF CONSUMPTION AND FACTOR SETTING

The following three (3) stages describe the process through which the potential customers' sense of consumption on eating could be converted into something quantitative. (see Figure.1.)

The 1st stage: Certain rates of people depending on each

factor, as customers (passenger on railway or generation, etc.) actually have eating behavior (at certain time). The rate of effective foodservice demand is set.

The 2nd stage: In the case of source demand, eating behavior actually occurs at a certain rate for every eating occasion. The rate of distribution for each eating occasion is set.

The 3rd stage: The frequency of eating at a certain time lag (or eating occasion) is determined for each foodservice style. Rate of distribution for business type is set.

The quantitative factors set in the quantitative stage of customers' sense are explained below.

- 1) Ratio of effective foodservice demand: In the demand source model, the ratio of targeted people (the number of visitors) that would eat for each factor of potential customer (including generational category) was explained. In the patron pool model, the proportion of patron pool that would eat for certain time lag (for example, for one hour from 9:00 to 10:00) was explained.
- 2) Ratio of distributed eating occasion: Only in the demand source model, the ratio of distribution for the estimated number of actual eating behavior for every eating demand occasion (6-times a day - morning, forenoon, noon, afternoon, evening, and night) was explained.
- 3) Ratio of distribution for business type: In the demand source model, the ratio of actual prospective number of eating times (inferred number of meals) is distributed for each eating business style depending on the factors of potential consumer and eating occasion. In

the patron pool model, the ratio of actual prospective number of eating times (inferred number of meals) as distributed to the actual estimated effective ratio of eating times was explained.

Contents of eating business style explained here are basically general categorizations shown in Tables 1 & 2. Table 1 describes services and menu-centered category frequently used in the United States, and Table 2 shows customer-centered price category which is generally accepted in Japan.

6. RULES FOR APPLICATION OF QUANTITATIVE FACTOR

While we have set and defined quantitative factors required for analysis of foodservice demand above, the evaluation of applied experience in actual cases of project planning results in variable actual rules for application. These could be generalized as follows;

- 1) Ratio of effective foodservice demand: In demand source model, value settings vary depending on kinds of demand source or kinds of potential consumers' elements. However, 50-70% of targeted customers at commercial facilities, and half those values (25-35%) of stop-by-customers could be used as a general rule and adjusted accordingly. Also, residents or neighborhood sources are set less than 10%. In the case shown in Table 3, total demand was predicted by changeable elements of the number of customer (weekdays, holidays, and season) and specified demand source.

Moreover, predicted number of eating times was

Figure 1: Concept of logically hypothetical model

Table 1: Categories of foodservice business type-1

A. Seated Restaurant	
Definition:	Table service restaurant operated by waiter and waitress
Feature:	Be used by prospective customer who want to take rest/services, so usually not required to be positioned into center of customer pool and/or main flow of customer moving line.
B. Major Fastfood Shop	
Definition:	Large scale, variety of menu, self-service shop like a food court, Cafeteria, Buffeteria, etc.
Feature:	Be used by prospective customer who always wish to take food anytime they want, so usually required to take center position of customer pool and/or main flow of customer moving line. However, since it tend to keep seats at first, the will take secondary action, it will be required to set close space relationship between food supply area and seating area, therefore, it will be usual way to lay usual area of entrance/exit and attraction's neighbor area.
C. Minor Fastfood Shop	
Definition:	Limited menu shop such as Hamburger, Hot Dog, Pizza, Candy, Ice Cream, Bakery, snack's kiosk and cinnession stand.
Feature:	Same as B. and have flexibilities as impulse sales

Table 2: Categories of foodservice business type-2

	Low Profile	Medium Profile	High Profile
Basic Characteristics			
Usual Business Type	Fast Food	Family Restaurant	Dinner Restaurant
Menu	Limited	Variety	Variety
Service Style	Self /Table	Self /Table	Table
Functional Characteristics			
Merchandizing/Marketing	◎ (Excellent)	○ (Good)	○
Service Grade	△ (Passive)	○	◎
Size of Facilities	Small	Mid-Large	Mid-Large
Average Check	Low	Medium	High
Entertainment	△	◎	○
Interior Deco.	△	○	◎
Others			
Seat Turnover range	1.6-3.0	1.6-2.8	0.6-1.2
Seating Efficiency range	90%-95%	80%-90%	70%-80%
Size of Facility per seat(sq.mt)	2.3-2.9	2.5-3.2	2.8-3.8
Space Occupancy (Standard)	20%	65%	15%

Table 3: Actual example of ratio of effective foodservice demand (demand source model, weekdays, Office building complex case)

(Unit: person, %)							
Type of demand source	Initial criteria	Condition for calc.	Sum of f.s. demand	Rate of potent. customer	Sum of potent. demand	Ratio of effec. f.s. demand	Est. eating customer
■ Population inside bldg.							
Workers in bldg.	5,500	in bldg.workers	4,675	40%	1,870	60%	1,122
Visitors to bldg.	5,500	25% of no.of visitors	1,375	20%	275	60%	165
■ Population of neighborhood inhabitants							
A area (ward, town etc.)	29,584	Adjust coefficient=0.7	20,709	5%	1,035	7%	72
B area (ward, town etc.)	29,066	Adjust coefficient=0.7	20,346	5%	1,017	7%	71
■ Increase of daytime population							
A area (ward, town etc.)	20,709	Est.	23,401	25%	5,850	7%	410
B area (ward, town etc.)	20,346	Est.	22,991	25%	5,748	7%	402
■ Population for re-development area							
Official announced	36,230	in bldg.workers	30,796	40%	12,318	3%	370
Business visitor	30,796	25% of no.of visitors	7,699	20%	1,540	3%	46
■ Visitor for incidental institution (art hall etc)							
Variable population	1,045	Est.	888	20%	178	50%	89
■ Visitor for incidental institution (exhibition hall etc)							
Variable population	681	Est.	681	20%	136	50.0%	68
Total			133,561		29,968		2,815

calculated with multiplying a ratio of prospective occasion of eating (referred to as ratio of the number of potential customer) and set ratio of effective foodservice demand.

As Table 4 shows the peak at lunch time and dinner time were 35% and 25% respectively. This type of patron pool model could be characterized as having an M-shape. Leisure park type expecting entrance from 8:00 to 9:00 is the baseline here. However, the ratio of daytime and night time is sometimes reversed, as in the case of a general shopping center at which entrance is admitted at 10:00 a.m..

This kind of reverse example can be seen in the case shown in Table 5. The longer customers in the foodservice demand stay, the more the size of the patron pool increased, with the result of an increase in frequency of eating for every customer. The extent and content depend on purpose of core customer facility, its concept, and accessibility. Ratio of foodservice demand can be also changed according to time, in other words, eating occasion, and, in general leisure related facilities including shopping center, total time average is expected to be about 15-25%.

2) Ratio of distribution for eating occasion: This is applied to demand source model. For 6-time daily eating occasions, M-shape characteristics are observed in the ratio of effective foodservice demand as with the patron pool model, and these can be applied to the general rule in Table 6. The value is subject to elements of potential customers or their categorization by generation in detail,

Table 4: General rule for ratio of effective foodservice demand (as patron pool model)

Time of a day	Ratio of effective foodservice demand	Time of a day	Ratio of effective foodservice demand	Time of a day	Ratio of effective foodservice demand
9:00~10:00	5%	14:00~15:00	20%	19:00~20:00	25%
10:00~11:00	10%	15:00~16:00	10%	20:00~21:00	20%
11:00~12:00	15%	16:00~17:00	10%	21:00~22:00	10%
12:00~13:00	35%	17:00~18:00	15%	22:00~23:00	8%
13:00~14:00	30%	18:00~19:00	20%		

Table 5: Actual example of ratio of effective foodservice demand (patron pool model, shopping center complex case)

(Unit: person, %)							
Total entering no. of people/day	Time of a day	Rate of entering no. of people	No. of entering people	No. of leaving people	patron pool numbers	Ratio of effective foodservice demand	No. of eating customer
37,800	9:00-10:00	4%	1,512	0	756	20%	151
	10:00-11:00	7%	2,646	756	4,158	25%	1,040
	11:00-12:00	13%	4,914	2,079	7,560	30%	2,268
	12:00-13:00	13%	4,914	3,780	9,828	30%	2,948
	13:00-14:00	9%	3,402	4,914	8,316	23%	1,913
	14:00-15:00	5%	1,890	4,158	5,292	20%	1,058
	15:00-16:00	5%	1,890	2,646	3,780	20%	756
	16:00-17:00	8%	3,024	1,890	4,914	23%	1,130
	17:00-18:00	10%	3,780	2,457	6,804	25%	1,701
	18:00-19:00	13%	4,914	3,402	8,694	35%	3,043
	19:00-20:00	10%	3,780	4,347	8,694	25%	2,174
	20:00-21:00	3%	1,134	4,347	4,914	15%	737
	21:00-22:00	0%	0	3,024	1,134	0%	0
	Total	100%	37,800	37,800	74,844	Ave. 22%	18,919

allowing a range of distribution ratios from daytime to nighttime. In the case of extreme lunch peaks, such as office building type for office workers and office restaurants, the maximum value is applied to daytime while the minimum value is applied to afternoon or evening. Table 7 shows the case in which office building elements were emphasized, so the difference between weekdays and holidays, competition with local neighborhood, and tran-

Table 6: General rule for ratio of distribution for eating occasion (as demand source model)

morning	forenoon	noon	afternoon	evening	night	As Total
0 - 5%	0 - 5%	20 - 55%	5 - 30%	20 - 45%	5 - 20%	100%

Table 7: Actual example of ratio of distribution for eating occasion (as demand source model)

Type of demand source	Initial Criteria	6 time eating occasion a day (breakdown for foodservice demand)						Total
		morning	forenoon	noon	afternoon	evening	night	
■ Workers in bldg. (See Tab.3.)	5,500							
Sum of foodservice demand	4,675							
Estimated eating customer	1,122							
Ratio of distribution for eating occasion			5%	5%	55%	5%	20%	100%
Est. eating customer		56	56	617	56	224	112	
■ Visitors to bldg. (See Tab.3.)	5,500							
Sum of foodservice demand	1,375							
Estimated eating customer	165							
Ratio of distribution for eating occasion			5%	5%	55%	5%	20%	100%
Est. eating customer		8	8	91	8	33	17	

(unit: person, %)

Table 8: General rule for ratio of distribution for business type (demand source model)

Restaurant business type	6 time eating occasion a day (breakdown for foodservice demand)					
	morning	forenoon	noon	afternoon	evening	night
Low	40~100%		5~40%	30~70%	20~45%	15~55%
Medium	0~50%		40~65%	15~55%	35~65%	25~55%
High	0~5%		10~20%	5~20%	10~40%	15~40%
Total	100%		100%	100%	100%	100%

Table 9: Actual example of ratio of distribution for business type (demand source model, weekdays, office building complex case)

Type of demand source	noon (lunch time)						evening (dinner time)					
	(1)	Low	Medium	High	(1)	Low	Medium	High	(1)	Low	Medium	High
Notation:	(1) Sum of potential demand	(2) Ratio of distribution for business type	(3) Estimated no. of eating customer									
Population inside bldg.	708	20%	142	65%	460	15%	106	25%	20%	51	65%	167
Population of neighborhood	37	20%	7	65%	24	15%	6	44	20%	9	65%	29
Population for redevelopment area	585	25%	146	65%	380	10%	58	231	25%	58	65%	150
Visitor for incidental	11	20%	2	55%	6	25%	3	38	20%	8	55%	21
Total	1,341		297		870		173	571		126		367
Seat turnover per eating occasion		3		2		1				3		2
Required gross number of seat		99		435		173				42		184
Estimated seat efficiency (%)			90%		85%		80%			85%		80%
Required net numbers of seat			110		512		216			49		229
Required space per seat (sq.mt)			2.5		3.0		3.0			2.5		3.0
Required total space (sq.mt)			275		1,535		648			123		688

sition in population from day to night have a great influence on setting ratio of distribution.

3) Ratio of distribution for business type: In the demand source model, depending on the element of potential customers, the general ratio of distribution shown in Table 8 can be applied. The characteristics are the same as the patron pool model described below. Depending on core customer facility, commercial environment, and scale of foodservice facility, in the case of the environment of core facilities with characteristics of high attraction, the comparison of distributed structure (total amount-100%) are likely to move to Low from High, or minor type from seat type. Only in the case of unrealistic theme type with core facility concept or large scale of foodservice facility, the tendency described above could be reversed. In the case of core facilities in office building type, there is overwhelming comparison of distributed structure, Medium and Low distinction. The case in Table 9 shows the result that distinction between Medium and Low has 80% or higher ratio of distributed structure.

On the other hand, in the patron pool model, it can be represented as the characteristics in average value for every category of service, like categorization by time in Table 10, and included in the valuable range of generally distributed ratio of demand source in Table 8. Thus, in this setting of ratio of distribution for business type, there is no border line based on the distinction of demand structure. In the case as shown in Table 11., it was attempted to multiply the inferred number of eating times by the ratio of distribution for business type for a whole day in common both on weekdays and holidays, in order to analyze the tendency. As is related to estimation of required business scale stated later, this methodology can be applied when there is no big difference in inferred number of eating customer between weekdays and holidays.

Table 10: General rule for ratio of distribution for business type (patron pool model)

Time of a day	Ratio of distribution for business type								Total
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	
Notation:	(1) High profile = Seated restaurant; (2) Medium profile = (4)+(5); (3) Low profile = (6)+(7)+(8); (4) Major fast food/ cafeteria; (5) Major fast food/ others; (6) Minor fast food/burger etc.; (7) Minor fast food/ take-out etc.; (8) Minor fast food/ cart etc.								
9:00-10:00	5%	52%	43%	27%	25%	23%	10%	10%	100%
10:00-11:00	5%	52%	43%	27%	25%	23%	10%	10%	100%
11:00-12:00	5%	52%	43%	27%	25%	23%	10%	10%	100%
12:00-13:00	8%	55%	37%	30%	25%	19%	10%	8%	100%
13:00-14:00	8%	55%	37%	30%	25%	19%	10%	8%	100%
14:00-15:00	8%	55%	37%	30%	25%	19%	10%	8%	100%
15:00-16:00	5%	55%	40%	30%	25%	19%	10%	11%	100%
16:00-17:00	5%	55%	40%	30%	25%	19%	10%	11%	100%
17:00-18:00	15%	57%	28%	30%	27%	15%	5%	8%	100%
18:00-19:00	15%	57%	28%	30%	27%	15%	5%	8%	100%
19:00-20:00	15%	57%	28%	30%	27%	15%	5%	8%	100%
20:00-21:00	15%	57%	28%	30%	27%	15%	5%	8%	100%
21:00-22:00	15%	57%	28%	30%	27%	15%	5%	8%	100%
22:00-23:00	15%	57%	28%	30%	27%	15%	5%	8%	100%
Average	10%			29%	26%	18%	8%	9%	100%

7. ESTIMATION PROCESS OF REQUIRED BUSINESS SCALE

With qualitative analysis of foodservice demand (frequency of eating) depending on time (eating occasion) and business type, it would be possible to estimate the number of seats, taking into account the number of seat rotations, and moreover, using space by the points both of the seat effect and usage per seat. In many cases, this resultant variable is considered appropriate required scale in final setting. The following states should be noted, however.

1) The peak in the number of seats in use usually occurs in daytime/ evening eating occasions every day. In the case that the difference in the peak variable in both occasions, approximately 80% (referred to as design peak) of the maximum value in the number of seat should be final setting.

2) The number of seat turnover (usually indicated on a per hour basis, but, sometimes per day depending on eating occasion) is fixed at less than 1 rotation for seat sitting/ High, less than 2 rotations for major fast food/ Medium, and more than 2 rotations for minor fast food/

Table 11: Actual example of ratio of distribution for business type (patron pool model, shopping center complex case)

(Unit: person, seats)

(1): Weekdays/ sum of eating customer		[Estimated no. of eating customer] Ratio of distribution for business type are set as follows; Low profile=40%, Medium profile=40%, High profile=20%									[Required seat numbers] Seat turn-over setting are depend on business type as follows; Low profile=1.66, Medium profile=2.12, High profile=0.98								
		Weekdays			Holidays			Weekdays			Holidays								
Time of a day	(1)	(2)	Low	Med	High	Low	Med	High	Low	Med	High	Low	Med	High					
9:00-10:00		70	0	0	0	28	28	14	0	0	0	17	13	14					
10:00-11:00	660	715	264	264	132	286	286	143	159	125	135	172	135	146					
11:00-12:00	2,254	1,560	902	902	451	624	624	312	543	425	460	376	294	318					
12:00-13:00	1,614	2,028	646	646	323	811	811	406	389	305	329	489	383	414					
13:00-14:00	956	1,316	382	382	191	526	526	263	230	180	195	317	248	269					
14:00-15:00	529	728	212	212	106	291	291	146	127	100	108	175	137	149					
15:00-16:00	378	520	151	151	76	208	208	104	91	71	77	125	98	106					
16:00-17:00	565	777	226	226	113	311	311	155	136	107	115	187	147	159					
17:00-18:00	851	1,170	340	340	170	468	468	234	205	161	174	282	221	239					
18:00-19:00	1,521	2,093	608	608	304	837	837	419	367	287	310	504	395	427					
19:00-20:00	1,087	1,495	435	435	217	598	598	299	262	205	222	360	282	305					
20:00-21:00	369	507	148	148	74	203	203	101	89	70	75	122	96	103					
Total	10,784	12,979	4,314	4,314	2,157	5,192	5,192	2,596	2,599	2,035	2,201	3,127	2,449	2,649					

Table 12: Verification of applied rules (ratio of distribution for eating occasion)

Verification objects	morning	forenoon	noon	afternoon	evening	night	Total
Proposed rules basis	2%	2%	25%	25%	39%	7%	100%
Actual data basis	2%	2%	25%	29%	33%	6%	100%

Table 13: Verification of applied rules (ratio of distribution for business type)

3 hr interval for eating occasion	morning ~9:00	forenoon ~12:00	noon ~15:00	afternoon ~18:00	evening ~21:00	night ~24:00	Proposed rules basis (daily ave.)	Actual data basis (daily ave.)
Low	100%		40%	65%	30%	24%	42%	48%
Medium	0		42%	17%	40%	36%	34%	32%
High	0		18%	18%	30%	40%	24%	20%
Total	100%		100%	100%	100%	100%	100%	100%

Low, however, sales mount per seat would be balanced when it comes to single customer price (see Table 9.).

8. VERIFICATION OF APPLIED RULES FOR QUANTITATIVE FACTORS

We have applied the demand source model in this study to a domestic shopping center [15] to investigate sum of sales amount in all foodservice tenants by time (for a total of 3days; 2 weekdays and 1 holiday). Results corresponding to rate of distribution for eating occasion are shown in Table 12. The sum of ratio of distribution for business type shown in Table 13 supports congruency. In difficult methodology in ratio of effective foodservice demand effects to be verified and applied general rules and estimation process by eating occasion in distinction of demand source, it is underpinned with congruency in the results.

9. CONCLUSION

Analysis of foodservice demand with quantitative methodology in customers' sense requires confirmation of qualitative factor based on hypothesis. The estimation process can be verified based on POS data as the result of required business scale estimation after facility opened. More sophisticated applied rules would be expected as the result of this study with continued prospective verification in many fields.

This could lead to the only management methodology which could follow constant change in business environment and customers' sense and imply problem-solving in business administration for both developers and foodservice business enterprises.

In addition to this point, it would be possible to categorize service distribution into more concrete representative shops level in detail with methodology of category by lifestyle [16]. This suggests the possibility to analyze foodservice demand targeted in this study, and presents further research implications regarding discussions of brands in general industrial products and verification work on concepts.

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