THE CHANGE OF THE SYSTEM AND FUNCTION OF THE SERVICE CENTERS IN RURAL AREAS: THE CASE OF KIMJE

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I. Introduction

Since the 1960's, Korea has experienced an extreme polarization of the national settlement system defined as the concentration and growth of higher-order settlements and the weakening of lower-order ones. In most areas, except major metropolitan and industrial regions, the stagnating or declining phenomena of small and medium-sized towns have continued.[1]

Under these circumstances, geographers and rural planners after Ryu(1972) have tried to find the characteristics of a lower-order settlement system[2] and the factors causing those changes. Their studies show that the threshold population size enabling the rural centers to exist has been reducing through rural-to-urban migration. Rural consumers have been inclined to use the higher-order service center which is far away, rather than the nearby lower-order service center. The function of the rural lower-order service center has been

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[1] Cities in Korea consist of one special city, five metropolitan cities, sixty-eight small and medium-sized cities, and one hundred seventy-eight Eups(Ministry of Home Affairs, 1995). The capital city of Korea, Seoul, is a special city. A metropolitan city is defined as one having more than one hundred million in population, a small and medium-sized city is defined as one having a population more than fifty thousands and less than one million, and Eup is defined as one having more than twenty thousand in population and less than fifty million. Eup as well the seats of Myeon office are called a small town or a rural service center.

[2] The lower-order settlements system in this study means a spatial system that consists of small service centers and their rural hinterland. It is called a rural settlement system in terms of its relatively strong rurality compared to the urban settlement system.

dramatically weakened.

However, there are few officially published statistics or materials about the seats of Myeon office. In the case of Eup, we would not be able to get reliable results because of the inaccuracy of published statistics.[3] Owing to these statistical limitations, most studies could not help using field survey data based on a specific time period and limited areas.

In the case of analyzing the choice of service centers or shopping behaviors of rural residents, there have usually occurred many errors in the process of sampling and interview. As a result, it was very difficult to understand the pattern or mechanism of the changes in the rural settlement system.

On the other hand, although the Korean government has emphasized the establishment of a well equipped settlement system and the development of a central place in depth from the beginning of the 1980's,[4] the relevance of their plans or the performance of those policies were not good enough because of the lack of basic studies concerning the rural lower-order settlement system.

It is still very important to establish lower-order settlement systems rationally and to strengthen the function of the lower-order service centers in order to vitalize rural areas and develop the nation equally as a whole. The lower-order service center plays an important role as a key place providing social service, a spatial focus of rural society, a point of integrated urban-rural development, and a node of rural informatization. Further study is required to find out how the lower-order service centers have been changed and what must be done to cope properly with the problems of the lower-order centers.

Thus, this study tries to depict the fashions and factors of the change in the lower-order settlement system, comparing the characteristics of the past and present settlement system based on one area studied in the past. For this purpose, first, we selected Kimje

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[3] In the case of Eup, although the built-in area as a central place covers a little portion of administrative district, the official statistics include the total Eup administrative district. Accordingly, if we use statistical data about Eup as it is, we may overestimate the function of Eup as a service center.

[4] The Korean government carried out the Integrated Local Settlement Area Development Plan(Ministry of Home Affairs: 1981～1984), and the Integrated Rural Area Development Plan(Ministry of Agriculture and Foristry: 1985～1994).

region, which was Park's study area(1975), set the service centers through field study, and found out and classified functional establishments. Second, we analyzed the changes of the hierarchical structure and function of the service centers in Kimje region using W. K. D. Davies' Functional Index Method same as Park's. Third, we supplemented the weakness of indirect analysis by finding out the substantial functional capacity and influential surface of each service center through the shopping behavior of rural residents.

II. Identification of Service Centers and Measuring Method of Centrality

1. Spatial Condition of Kimje Region and Service Centers

Kimje agropolitan city was formed as an administrative district by the integration of Kimje city and Kimje-gun in March, 1995.[5] However, the condition of this region has not changed a lot.

Here after, in order to avoid the confusion of names, the entire area of Kimje Agropolitan City is now called Kimje region, what was called Kimje city in the past is called Kimje, and the area other than Kimje is called a rural area-hinterland. The rural area includes the seats of Myeon office.

Kimje region is flat and its major paved roads are distributed radiately from Kimje to its rimland areas. It satisfies the assumption of the Central Place Theory which means equal accessibility to a central place. In 1974, because only the main road connecting Kimje with Chonju City was paved, the accessibility of the whole areas at that time was considerably lower than that of today's.

The population of rural areas are distributed evenly as it was in 1974, but the average population decreased 2.7% every year between 1974 and 1994. On the contrary Kimje's population has increased 3.4% every year.

The ratio of agriculture, forestry and fishery to the whole industry in the rural areas has decreased from 84% in 1974 to 61.2% in 1994. The ratio of mining and manufacturing has increased from 0.4% in 1974 to 5.6% in 1993, but agriculture is still the main industry.

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[5] Kimje city was changed from Kimje Eup in Jan., 1989.

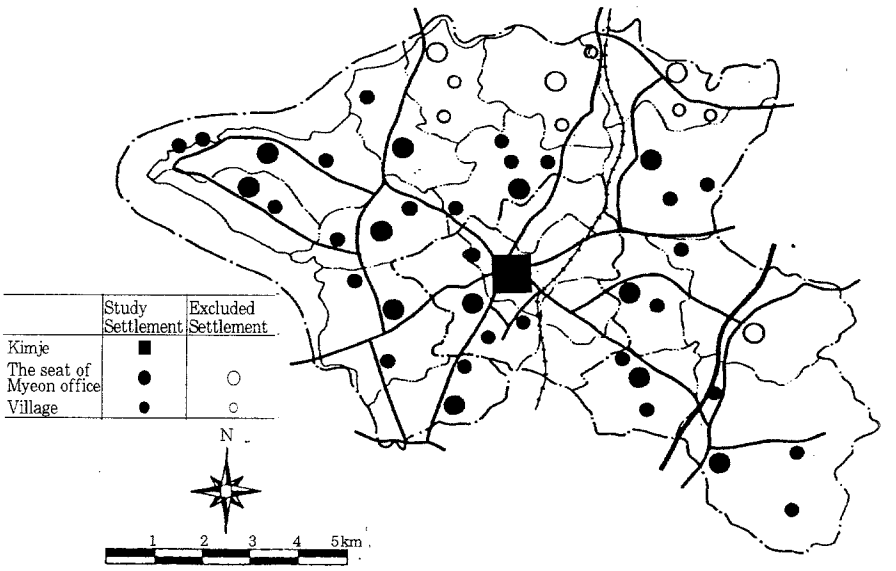
Commercial and service functions are placed at the seats of Myeon office as they were in 1974.

As mentioned above, compared to 1974, the present condition in Kimje region is not different in terms of natural geographical conditions and industrial structure. However, Kimje's accessibility has improved and the population in rural areas as major consumers has decreased extremely.

We set the study area based on considering not only the results of previous research about shopping patterns of the residents in Kimje region, but also the substantial life sphere confirmed by field survey and interviews. The areas under the strong influence of Iri City and Kunsan City are excluded in this study as Park's study; they are Chungha-Myeon, Gongduk-Myeon, Baekku-Myeon and a part of Yongji-Myeon. Geumgu-Myon, a vicinity of Chonju City, is also excluded.

Forty central places were selected by the field survey. Five more areas were added to the thirty five that were in 1974. These include Kimje, eleven seats of Myeon office, and auxiliary service centers which retain establishments such as grocery store, elementry school, tavern, and barber shop.

FIGURE 1 Study Area and Distribution of Service Centers



2. Identification of Central Function

All markets and service establishments in all central places except those in Kimje were studied by the field survey. In the case of Kimje, we surveyed its central functions using a telephone book.

Also, special public functions and the functions unique to that area were excluded because they were not associated with the level of functions of central places within a certain settlement system. If these functions are included and analyzed, the level of central areas as well as the settlement system of Kimje might be figured out inaccurately. Furthermore, because these specific functional establishments are only one or two and have an abnormally large location coefficient value, the centrality of these central areas might be overestimated.

TABLE 1 Classification of Central Goods and Services

Type of Central Function			Number
Commercial Function	· Goods Sale	·Groceries	6
		· Clothing	1
		· Electric Home Appliances	3
		· Daily Commodities	29
	· Private Service	· Restaurant Business	8
		· Lodging Service	1
		· Educational/Training Institute	1
		· Leisure, Amusement	11
		· Other Commercial Service	17
	· Market		2
Administrative Function	· Administrative Institution		6
	· Other Public Institution 1		
Banking			5
Medical Service, Social Welfare Service			8
Agricultural Service			5
Educational Service			3
Total Number			112

3. Measurement of Centrality

In order to examine the classified structure of these central areas, we have to measure centrality. Centrality is defined as the pulling capacity which attracts the surplus after the residents in central areas consume. It also means the attractive force which pulls residents who live outside of the central place. The index of centrality measures the size of goods and services supplied by certain central areas to outside residents. The 'population size of central place,' 'the number of central function,' and 'the number of establishments' are used as variables(Park, p.5).

There are three methods measuring centrality; factor analysis, relative homogenity, and functional index.[6]

In this study, we employed W. K.. D. Davies' functional index method to compare the results of Park's study. This method does not use a certain proxy index, but derives a functional index of a certain area from combination of central function and establishment. Centrality, which a certain function has within a settlement system, is assumed to be 100. Accordingly, the degree of centrality of a certain area has a proportional relationship with the number of establishments. If the area to be studied is a closed spatial system and is in a condition that all establishments in the area equally satisfy the demand, it is assumed that the higher the number of establishments of a certain function, the lower the functional centrality.

The centrality of each place is calculated by the following two steps. First, the location coefficient of each function is calculated by the following formula.

$$C = \frac{t}{T} * 100 = \frac{1}{T} * 100$$

C : location coefficient of function t,

t : one facility of function t,

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[6] Factor analysis refers to the method classifying central places with socio-economic characteristics. The classification of central places is divided not by the difference in size but by the structural difference of central functions. The method using relative homogenity classifies by homogenity among central places with the number of facilities. It does not consider the absolute score concerning the characteristics of each central place. The difference among higher-order central places is large in the number of establishments, but the difference among lower-order central areas is slight and unclear.

T : total number of establishment of function t in the system

Second, the volume of centrality of a central place is obtained by multiplying the number of establishments of a functional type by its location coefficient. Lastly, the functional index, the aggregate centrality, is derived by adding up the degree of the centrality of every function in a certain central place.

$$F_a = \Sigma A_t * C_t$$

C_t: location coefficient of function t,
A_t: number of establishment of function t
F_a: functional index of service center A

III. Change of Type and Number of Central Function

The number of functions of a central place has increased sharply. The number of central functions increased from 56 in 1974 to 112 in 1994. If Kimje's specific functions are included, the total number of functions is far greater. The number of establishments has increased from 2,085 in 1974 to 3,428 in 1994.[7]

The functions either disappeared, decreased, increased, and was newly born. And various functions exist together within one building, or one function has been divided into several ones.

The disappeared functions are sewing machine shops, livestock markets, and farming tools shops. At present, farming machineries are sold at hardware stores or agri. coop. stores. Watch repair is additionally dealt at jewelery stores.

The decreased functions are paper goods stores, stationary shops, shoe shops, dressmaking shops, tailor's shops, firewood/briquet shops, footware stores, miscellaneous stores, home appliance shops, taverns, theaters, periodic markets, livestock markets, and primary schools.

The extremely increased functions are auto-parts and repair shops, electric home appliance and its repair shops, cosmetic shops, tearooms, lodging houses, billiard rooms, insurance agencies,

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[7] In these numbers, many establishments are excluded because of inaccuracy for evaluating centrality. Most of these establishments are located in Kimje.

veterinary hospitals, agricultural chemicals and agri. coop stores, hospitals, and public health centers.

The new born functions include appliance shops, leisure and sport shops, gift shops, gas providers, follow shops, computer shops, auto dealer shops, health food stores, tavern equipped wither singing facilities, private teaching institutions for piano, fine art, computer, foreign languages, and entrance examinations, electric game rooms, cable TV, health clubs, singing rooms, boiler and its repair shops, travel agencies, rental shops of heavy machineries, health insurance associations, and job-placement centers.

The diversity and complexity of functions have progressed. Special goods and services located at the higher-order center tend to be diversified into several. At the lower-order center, various functions are converged into one establishment. In the case of functions with a lower level of demands and seasonality, integrating various similar functions into one establishment enables to increase management efficiency. This tendency is similar to the past periodic market function which arranged opening time and place periodically to maintain demand density(Ryu, 1972). Handling more than two items among agricultural chemicals, fertilizer, seed, and farming tools in a store is an example.

These phenomena reflects the changes in production and consumption pattern in rural areas-the industrialization or functional urbanization of the rural society. Some functions have disappeared or decreased when they became unnecessary according to the change in the way of rural life. Also, it happened when the population size has gotten below the marginal level without change in consumption pattern. The close of elementary school is a good example. Some functions like auto-parts/repair have increased due to the change in demanding trend. These functions were used intermittently and thus had few establishments in the past, but today the residents use them daily. As a result, the location coefficient became lower. The new born functions have a tendancy of expanding gradually from high-order centers to lower-order centers.

TABLE 2 Comparison of Location Coefficient by Functional Type between 1974 and 1994

Function		1974			1994		
		No. of Place	No. of Facility	Location Coefficient	No. of Place	No. of Facility	Location Coefficient
Commodity shops	Auto-parts & Repair Shop	1	3	33.33	8	34	2.94
	Sewing Machine Shop	2	5	20.00	0	0	0
	Optician	2	5	20.00	2	7	14.29
	Record Shop	2	5	20.00	3	7	14.28
	Photo Materials Shop	3	6	16.67	0	0	0
	Electric Home Appliance	3	8	12.50	8	48	2.08
	Paper Goods Store	3	19	5.26	3	18	5.26
	Jewelery Store	3	21	4.76	4	27	3.70
	Cosmetic Shop	7	14	7.14	3	25	4.00
	Book Store	4	10	10.00	4	18	5.56
	Stationary	9	32	3.13	7	24	4.17
	Toyshop	1	1	100.00	4	12	12.50
	Furniture Shop	5	15	6.67	3	21	5.26
	Shoe Shop	8	22	4.55	3	17	5.88
	Hardware Store	8	31	3.23	13	53	1.89
	Firewood/Briquet Shop	12	43	2.33	10	12	8.33
	Miscellaneous Store	35	579	0.17	36	48)	0.21
	Agri. Coop Store	8	8	4.55	13	14	7.14
	Appliance Shop	6	17	5.88	3	9	11.11
	Footware Store	6	35	2.86	5	24	4.17
	Clothing Shop	5	69	1.45	5	12)	0.83
	Linen Shop	3	34	2.14	3	48	2.08
	Dressmaking Shop	6	37	2.70	5	23	7.14
	Tailor's Shop	10	56	1.79	7	59	2.17
Commercial Services	Theater	3	4	25.00	1	1	100.00
	Tearoom	3	22	4.55	14	84	1.96
	Lodging House, Inn	3	31	3.23	3	40	2.50
	Billiard Room	4	8	12.50	11	36	2.78
	Laundry	7	22	4.55	5	34	2.94
	Watch Repair Shop	9	19	5.26	0	0	0
	Photo Shop	10	29	3.45	7	29	3.45
	Radio/TV Repair Shop	11	37	2.70	0	0	0
	Barber Shop	31	98	1.02	19	62	3.13
	Beauty Shop	11	40	2.50	13	95	1.07
	Bicycle Shop	19	67	1.49	12	95	1.82
Food Premises	Restaurant	13	74	1.35	17	463	0.22
	Tavern	35	288	0.35	7	47	2.13
	Butcher Shop	14	47	2.13	12	63	1.59
Banking Institutions	Bank	1	2	50.00	1	4	100.00
	Agricultural Cooperative	13	16	6.25	16	21	4.76
	Insurance Agency	1	1	100.00	7	43	2.33
Markets	Periodic Market	6	6	16.67	2	2	100.00
	Livestock Market	3	3	33.33	0	0	0
Agricultural Services	Farming Tools Shop	2	6	16.67	0	0	0
	Veterinary Hospital	4	8	12.50	5	17	5.88
	Agricultural Chemicals	10	30	3.33	6	65	1.54
Administrativ Offices	City/County Office	1	1	100.00	1	1	100.00
	Myeon Office	13	13	7.69	11	11	9.09
	Post Office	14	14	7.14	15	18	5.56
Educational Institutions	Primary School	34	37	2.70	31	37	2.70
	Middle School	7	12	8.33	7	12	8.33
	High School	4	8	12.50	3	9	11.11
Medical Facilities	Drug Store	13	38	2.63	16	55	0.82
	Clinic	4	15	6.67	3	30	3.33
	Public Health Center	10	10	10.00	21	21	4.76

Note: Because the function items of this table are based on 1974, new items of 1994 are excluded.

IV. Change of Hierarchical Structure and Function of Service Centers

1. Hierarchical Structure of Service Centers

The rank classification of central place based on central place theory are assumed as the followings(Park, pp. 5-6): First, the hierarchical characteristic of central place, in general, is that the higher-order central place in a certain area has less volume and more central functions and the complementary area; second, the central place in a system is included in a certain rank, each rank has obvious functional group related to it, and the higher-order place has its unique functional group besides functional group which lower-order central place has; and third, a complete functional system has spatial inter-dependence among central places. Therefore, the discrete stratification of centrality among the ranks should be appeared, because a central place in a certain rank has functional similarity, and the difference of the functional complexity between the ranks is bigger than that within the ranks.

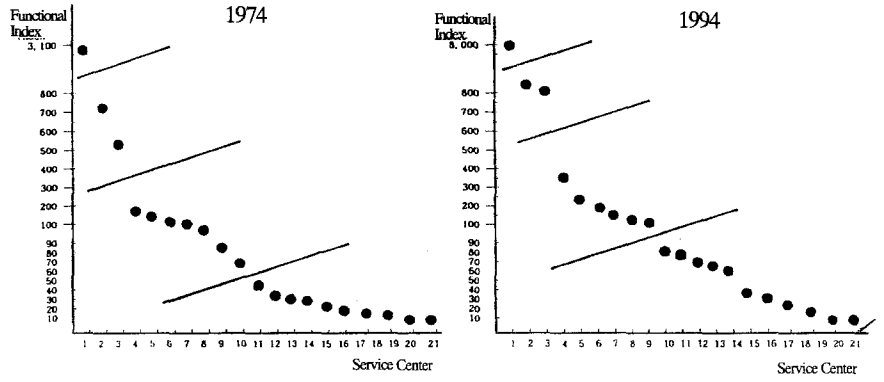
In order to find out the rank in the central places in Kimje region, as figure 2 shows, we ranked the central places according to the natural breaks after listing them with their functional index value arranged in a descending order.

The ranks of Kimje's central place in 1994, which had increased by one since 1974, were classified into five ranks, and were changed by the number of central places in each rank.

In the case of the first and second ranks, the number of central places are the same as 1974. However, the number in the third rank decreased by 2, and the number in the fourth rank decreased by 19. In the fifth rank, there are 26 central places including the five which have been newly found in 1994.

The difference in the degree of centrality between the first and second ranks and the second and third ranks in 1994 increased since the case of 1974. The difference in the degree of centrality between the third and fourth ranks does not differ very much from that in 1974. Among the central places which belong to the fourth rank, the difference in centrality or functional complexity has increased. However, the difference in centrality between the fourth and fifth

FIGURE 2 Hierarchy of the Service Centers in Kimje Region



ranks are very small.

To take a closer look, 69.1 percent of the total centrality within Kimje region's central place system is concentrated on Kimje. In 1974, Kimje's centrality was 54.8 percent out of the whole. Mankyong and Wonpyong, which are the central places of the second rank, have occupied 12.6 percent and 9.2 percent of the whole centrality respectively in 1974. However, in 1994, it decreased to 7.7% and 7.4%, respectively. The centrality of the central places in the third rank decreased from 17.1% in 1974 to 10.1% in 1994. The centrality of the central places in the fourth and fifth ranks are below 6.0%(Table 3). Accordingly, the settlement which belongs to the fourth rank loses its value as a central place, and the settlement which belongs to the fifth rank is already nothing more than a common rural village.

As the results of this analysis show, the Kimje region's central place system has strengthened its top central place, which is Kimje, and has weakened the function of other central places in the past twenty years. The actual ranks of central places have reduced from four to three. When we assume substantial service centers only up to the third rank, it becomes more fitting rank arrangement to the Christaller's market principle(K=3) showing A:B:C=1:3:6.

2. Change of Functional Charateristics of Service Centers

Each rank's characteristics of central places, which derived

from the population size, the numer of functions, the number of establishments, and functional index, are as follows(Table 3).

The number of central functions and establishments in Kimje, which belongs to the first rank, have increased twice as much, and the population has grown by 31 percent. Kimje still plays a key role as an economic, administrative, social, and cultural center of rural areas surrounding it. Also, specific and new functions with high threshold are initially located in Kimje.

The population of Mankyong, the seat of Jinbong-Myeon Office and Wonpyong, the seat of Geumsan-Myeon Office, which belongs to the second rank, have decreased by 25.0 percent and 19.4 percent respectively. However, the number of central functions have increased almost twice as much, and the number of establishments has increased by 57.1% and 55.7 respectively. This means that the function of the central places in this rank has become diversified. Also, even though the types of the functions are the same as the third rank, the functions are high in the level of quality and specificity. However, because the periodic market has closed already(Mankyong) or is in the stage of being closed(Wonpyong), we cannot say that the increase of fixed facility has led to the increase of centrality with the same extent in a central place.

Although the kinds of central functions in the third rank have increased from form 9 to 22, the number of establishments have decreased and the population at all central places except Daesong has decreased very much. The central places that belong to this rank are all the seats of Myeon office. Several functions such as shoe store, dressmaking shop, tailor's shop have decreased. On the other hand, other functions such as electric home appliance and repair shop, video shop, health restaurant, tearoom, private institute of mathematics, private piano institution, billiard room, gas station, moving center, insurance agency, agricultural tools repair shop, farming materials including agricultural chemicals, fertilizer, seed, and farming tools have increased.

Although the number of central functions in the fourth rank have increased a little, the population and the number of establishments have decreased. Even if the private functions at four seats of Myeon office is very weak, the functional index is shown to be high because of the increase in administrative and public facilities. The rest of the

village, Geumsan(the seat of Geumsan Temple) and Shimpo(the seat of fishing pot) have high value of functional index by carrying out special functions or keeping one or two facilities-videoshop(Sangjung), gas station(Yongsung), and electronic game room(Bokjook), which have high value of location coefficient. Accordingly, the functional index scores of a central place in this rank, in general, tend to be overestimated. The common functions the central places of this rank possess are, butcher shops, drug stores, farming machinery repair shops, restaurants, and agricultural chemical shops. All index scores at the settlements of the fifth rank, which is at the lowest settlement level, have decreased. There are in this rank, elementary schools, miscellaneous stores, and rice treatment factories. In some places, there is also a public health center. Barber shops and taverns have almost disappeared.

The change in the position of individual central places and the relationship among variables are as follows:

There is no change in the position at the central places which belong to the first and second ranks.

In the central places of the third rank, the population and the number of establishments have decreased, but the number of central functions have increased from 9 to 22. According to this fact, its ranking became the fifth from the tenth. The ranking of Nampo, which is not a seat of Myeon offce, has fallen to the fourth rank because of the drop of variables.

Among the central places below the fourth rank, the number of central functions and establishments have increased at Geumsan. In case of Simpo, the number of establishments have decreased by one, but the number of functions have increased by six. As a result of these changes, the ranks of both Geumsan and Simpo have improved. In cases of Seokkyo, Shineung, Shino, Wolseong, Youngsu, and Sunok, the ranks have fallen because of the decrease in the number of central functions and establishments. In the case of other settlements, although the ranks have increased, the centrality has become lower due to the decrease in population, the number of central functions, and the number of establishments.

TABLE 3 Comparision of Functional Index by Central Place between 1974 and 1994

	1974					1994					
	Centers	Funct. Index	No. of Funct.	No. of Estab.	Pop. Size	Centers	Funct. Index	No. of Funct	No. of Estab.	Pop. Size	
1	kimje	3,067.15	56	1,081	36,029	Kimje	7,742.32	112	2,428	47,204	1
2	Mankyong	703.97	49	154	2,840	Mankyong	864.01	89	242	2,130	2
3	Wonpyong	518.13	45	158	3,305	Wonpyong	823.27	87	246	2,663	3
4	Juksan	266.82	36	81	1,531	Juksan	346.59	58	106	959	4
5	Daesong	160.52	27	59	1,276	Guam	213.11	48	69	680	5
6	Nampo	135.01	26	52	1,211	Daesong	190.57	43	51	941	6
7	Okpo	109.04	23	39	1,204	Okpo	132.41	36	46	636	7
8	Bongwol	102.70	21	49	1,214	Bongwol	130.20	32	44	989	8
9	Gosa	95.95	19	49	806	Gosa	113.98	28	34	644	9
10	Guam	84.82	19	26	1,066						
11	Daepyong	65.30	16	30	598	Geumsan	80.55	15	46	760	10
						Daepyong	79.59	26	27	618	11
12	Hajeong	42.11	11	17	799	Shimpo	66.40	13	24	738	12
13	Ipseok	30.24	8	14	704	Nampo	65.15	16	22	782	13
14	Geumsan	28.46	7	25	868	Hajeong	54.29	16	18	587	14
15	Yongsung	25.07	9	23	127						
16	Seokdong	20.36	7	10	607	Seokdong	32.65	9	10	484	15
17	Shimpo	17.85	7	25	738	Ipseok	30.25	10	16	684	16
18	Seokkyo	14.58	7	13	505	Yongsung	23.16	10	12	342	17
19	SangKwol	11.48	6	17	503	Sangjung	18.75	6	10	344	18
20	Shineung	10.82	5	15	346	Bokjook	15.53	5	5	500	19
21	Shinho	10.25	6	11	553	Hwapo	11.93	5	6	226	20
22	Wolseong	10.13	5	12	247	SangKwol	10.99	6	8	202	21
23	Hwapo	7.39	5	7	383	Geumsong	8.55	4	5	386	22
24	Yongsan	7.33	4	9	240	Namsan	8.47	3	6	362	23
25	Myora	6.42	5	8	566	Chungwoon	8.26	3	5	211	24
26	Namsan	5.98	4	10	636	Seokkyo	8.16	5	7	334	25
27	Geumsong	5.45	4	9	464	Yongam	7.84	3	3	214	26
28	Wolbong	5.11	4	7	760	Yeonpo	7.21	4	4	342	27
29	Bokjook	4.94	4	6	260	Jojong	7.00	2	2	231	28
30	Yongsu	4.91	3	5	266	Hoeryong	6.80	4	5	184	29
31	Yongam	4.75	4	7	492	Yongsan	6.51	4	4	458	30
32	Yeonpo	4.61	3	8	250	Guidong	5.81	5	7	321	31
33	Jojong	4.41	4	5	219	Jongsin	5.67	4	5	367	32
34	ChungWoon	3.91	3	6	367	Wolbong	5.12	3	4	553	33
35	Sunok	3.73	2	6	198	Wolseong	5.05	3	4	211	34
36						Myora	5.05	3	4	282	35
37						Shineung	5.05	3	4	266	36
38						Shinho	5.05	3	3	381	37
39						Younjeong	4.92	4	7	213	38
40						Youngsu	2.84	2	2	320	39
						Sunok	2.84	2	2	157	40

3. Influential Area of Service Centers

The central function of Kimje analyzed by the study of the residents' purchasing behavior is much lower than the results analyzed by the functional index method. The central places below the second rank are almost neglected by the residents of the rural areas.

According to the study about the residents' market use rate in 1990 within Kimje region, 54.3 % of the market users were from Kimje. Wonpyong, Mankyong, and Geumgu have 2.0%, 1.7%, and 1.5% of market users, respectively. The central places below the third rank rarely induce market users except their own residents. On the other hand, 38.6% of Kimje's residents are using Chonju City and Iri City. Particularly, the dependence upon these cities for the higher-order function such as electric appliance and wedding materials are growing(Kimje County, 1990).

Accordingly, we can depict the characteristics of the central place system in the following two aspects.

First, if we assume that Kimje region is a closed system, Kimje's influence is very determinant. Kimje's market area is growing with a shape convexing to the lower-order centers.

Second, if we assume that Kimje region is an open system, which is a partial area out of a whole region, Kimje's self-containment as a primate city of the Kimje region will be weakened by the nearing upper-rank cities.

It is expected this phenomenon will be continued. The more accessibility is improved, the more rural residents will be willing to go farther to use the higher-order central places, because the marginal utility of consumers and marginal profit of sellers are high at the higher-order centeral places. Together with this, the rural residents can increase their consumer's utility by multiple-purpose trip toward the higher-order central places where the price is cheap and the kind of goods are various.[8]

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[8] However, the effects of the improvement of the transportation system will differ according to the age, sex, and job characteristics of the resident at rural areas. As the young, the student, the aged, women and economic poverty groups depend a lot upon public transportation, the traveling patterns to the central places are affected by the running frequency and the running system of the public transportation. On the other hand, adults and the rich who possess automobile or motocycle have a tendency to bypass the small centers in rural areas. The more the owners of cars and motorcycles, the faster the decline of the lower-order central places.

FIGURE 3 Spatial Distribution of Service Centers and Market Area in Kimje Region

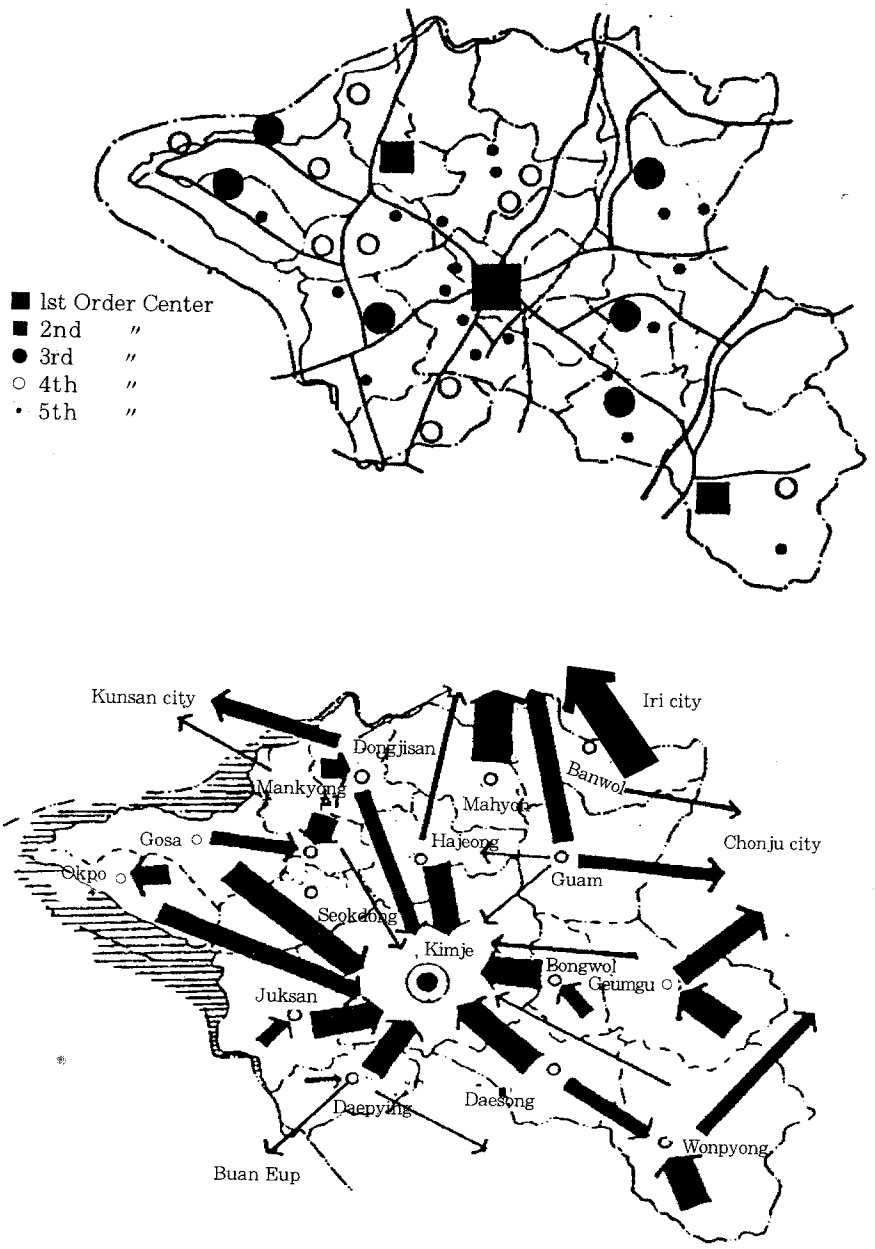

TABLE 4 Shopping Places of Residents in Kimje Region

Unit: %

	Kimje City				Other City			
	kimje	Wonpyong	Geumgu	Mannkyung	Chonju	Iri	Kunsan	Puan
Household Commodities	54.5	2.0	1.0	1.3	13.7	17.9	5.9	1.0
Electric Home Appliance	52.1	1.9	0.5	0.4	19.7	19.5	6.7	0.7
Marriage Goods	32.3	0.7	-	-	33.3	22.7	6.7	0.3
Farming Machinery	62.3	4.0	4.5	5.2	9.1	18.1	2.8	6.7
Average	50.3	2.0	1.5	1.7	19.0	19.6	5.5	2.2

Source: Kimje County, Comprehensive Kimje Region Development Plan, 1990.

According to these factors, the change of the central place system at rural areas is characterized as the increase of centrality at the higher-order central places and the decrease of centrality at the lower-order central places. However, the degree of functional concentration of the higher-order central places is determined by the competition with the upper-rank cities. In any case, the self-containment of the central places at a rural areas will have been weakened.

V. Concluding Remarks

This study tried to find out how the functions and systems of the service centers have changed at rural areas using the case of Kimje, which was studied twenty years ago.

The findings of the study are as follows:

The general conditions of Kimje region - geographical and industrial conditions - have not changed. However, its whole accessibility was improved by the development of the transportation system. The population of all regions except Kimje, a primate city, has decreased.

According to the characteristics of central functions, various types of changes have occurred such as the disappearance, decrease, increase, and new born of the functions. The increase or new born of the functions reflect the principal or new life style of a local society. The disappearance or decrease of the functions occur when the functions are not fit for the change in the way of life and the mode of production.

The types of functions have been diversified and the number of functions have increased at the central places of the higher ranks. The

types and the number of functions have decreased at the central places of the lower ranks. The first-order central place has remarkably increased in the number of functions, the number of establishments and the populaton size. In the case of the central places of the second rank, the numbers of functions and establishments has increased, but the population size has decreased. In the case of the central places of the fourth rank, the number of functions has increased, but the number of establishments and the population size have decreased. All scores of the central places below the fourth rank have decreased.

According to these changes, the difference of centrality among the three high ranks has become bigger. The difference of centrality among the third to fifth ranks has not been clear, but the functional heterogenity among these ranks has become bigger. Based on the functional index, only the centrality of Kimje, which is the first rank, has increased. In particular, the central places below the fourth rank has lost its central functions in the real sense; that is, the hierarchical structure of centers in the Kimje region has shrinked from the four ranks to the three ranks. The third and fourth ranks can function only supplementarily, and it is expected that these ranks will lose their function as service centers in the near future.

The centrality of the central places in the Kimje region in terms of the residents' shopping behavior is far below than that of the functional index method. Within the Kimje region, Kimje as a primate center absorbs gradually the market area of the lower central places. On the other hand, the central places of Kimje, in a broad sense, have lost their market areas by the higher-order local centers.

These trends will continue because of the increase in mobility by the popularization of automobiles and the increase in accessibility by reforming the transportation network. Therefore, the self-containment of the rural centers will be lowered and one or two central places within an administrative district will play a key role as a rural service center.

The weakness of the central place function and the decrease in the number of central places inevitably will expand the travelling distance and lead to the increase in transportation cost. Particularly, the life of those who are at social disadvantage such as the young, students, the aged, and the poor will be more deteriorated.

It is desirable to study further the changing direction and the

mechanism of the lower-order settlement system, and the role of the central place in each rank to support rural society sufficiently.

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