The Changing Face of the Korean Urban System

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Abstracts: The urban system within the Korean peninsular has developed separately between South and North Korea. This paper intends to investigate general characteristics of the Korean urban system development from a systems perspective by dividing attributes, linkages, hierarchical structure, and urban system change. The Korean urban development is characterized by metropolitanization, conurbation, emergence of new industrial cities (towns) and satellite cities, and stagnation of small cities. The polarized patterns of population distributions on Seoul and Pusan have been alleviated towards the growth of medium sized and provincial regional centers, which can be identified in the linkage structure. Although Seoul and Pusan is still too powerful in the Korean urban system, regional centers and medium sized cities have gained their own power in the urban system. The next urban system is expected to be under influence of globalization, unification, and other socio-environmental changes in the way of enhancing interdependences.

Key Words: Korean urban system, Systems perspective, Urban development

1. Introduction

Recent rapid urbanization in Korea has resulted in a highly urbanized society that Korea has never experienced before. Throughout economic development that has taken place since the 1960s, Korean urban system has experienced a remarkable transformation. Large cities have grown so fast to make mega-cities through conurbation and urban expansion. Small cities have stagnated or declined in terms of their population and urban functions. A stock of new cities has added to the traditional cities in the form of satellite cities and newly industrializing cities. Urban structure has transformed from single centered structure to multi-centered structure especially for large metropolises such as Seoul and Pusan. Actually,
the Korean urban system has had a unique record of its change, which is deeply rooted in the long history of Korea. In near future, more changes are expected in the Korean urban system according to the changes of socio-economic environments such as globalization, technology development, political unification and so on. In order to understand the nature of the Korean urban system, it is necessary not only to clarify the characteristics of the urban system development, but also to consider the direction of urban system change in Korea on a broad scale.

This study intends to investigate both general trends and characteristics of the Korean urban system after the 1960s from a perspective of systems theory. In regard of systems approach, system framework is composed of three conceptual components such as elements with attributes, linkages between elements, and its surrounding environment. Moreover, hierarchical structure is an important subject in order to understand the nature of systems at different scales. Under these terms, cities and urban places can be recognized as elements with attributes within a whole urban system. Also, we need to put emphasis on the interdependence and linkages among different cities in order to understand urban system. In other words, the urban system is understood as a set of cities, which are interdependently linked and that spatially interact with one another. Such growth of a city may be attributed to changes of total urban system as a part of a whole in relation to other cities.

To be concrete, this paper focuses on three different aspects of the Korean urban system; (1) general characteristics of the urban system development in the case of both South Korea and North Korea: (2) attributes and linkage structure within the Korean urban system: (3) direction of urban system change concerning rank size rule and institutional changes.

Up to now, research into the Korean urban system can be divided into three different categories. First, several studies have focused on elements and attributes of the Korean urban
system itself. Those studies include such subjects as the characteristics of location, distribution, and hierarchical structure of the Korean cities (Hong 1964; Sung 1979; Park 1972; Nam 1979; Lee 1984), and research of dimensional characteristics by using factor analysis and cluster analysis (Joo 1978), and issues about functional classification and comparative studies for individual cities (Hong 1964; Lee 1963; Park 1966; Park 1970). Second, there are some studies which have focused on linkages and spatial interactions in examining hierarchical structure within the Korean urban system by using different indicators including telephone flows, financial flows, commodity flows, traffic flows, and so on (Yang 1979; Choi 1987 1993; Lee 1990; Lee 1992).

Third, some papers have been concerned with the growth of urban system and development in relation to economic development, the economic base of individual cities, and the change of rank size rule in the Korean urban system (Kim 1976 1983; Choi 1976 1979 1980; Kwon 1977 1998; Kwon 1988). Recently, there have been some discussions towards impacts of globalization upon the Korean urban system (Kim 1993). However, some limitations have been found in the most of research about Korean urban system due to lack of time sequence data for comprehensive analysis, especially for North Korea. Due to lack of relevant data, this study mainly focuses on the South Korean urban system. Normally, a term of Korean urban system just means South Korean urban system. If necessary, the term of ‘north’ is added to the North Korean urban system.

2. General Characteristics of the Urban System Development in Korea.

The current Korean urban system has been deeply based on traditional administrative cities since the ‘Chosun dynasty’ at 15th century and before. Traditional cities in Korea were characterized by economically self-supplied and consuming cities with weak interurban
linkages and so on. Traditional Korean cities shared most common features of pre-industrial cities including isolated central managing functions, closed population with weak interregional migration, and the spatial distribution of urban places along with cultivated lands based on an agriculture economy. However, the Korean urban system had begun to confront dramatic transformation during the Japanese colonial times (1910-1945) when industrialization and urbanization had been intentionally introduced into the Korean urban system by colonial policies. Here, we can explain the urban system development in the case of both South Korea and North Korea.

First, during the Japanese colonial times, cities in South Korea had developed not only around traditional administrative centers but also around seaports and railway crossings which were convenient locations to transport agricultural products and mineral resources to Japan. Especially, Inchon and Pusan have experienced rapid growth in the 1920s as open ports for commercial activities. In the 1930s, cities located at nodal points in transportation systems of railways and road systems have grown quickly in relation to Japanese colonial policies to promote agriculture production. For example, Mokpo, Sangju, Kwangju, Masan, Kunsan, Chonju, Chinju, and Cheju belonged to fast grown cities in the 1930s. In the 1940s and 1950s, South Korean cities experienced lots of inward migration from its oversea population after the Japanese colonial period ended in 1945 as well as southward migration from North Korea to South Korea after Korean War began in 1950. However, as most of immigrants preferred to reside in large cities rather than rural area, large cities added to their importance in the Korean urban system. Furthermore, since the 1960s, government-led economic development projects have focused on rapid growth of large cities because the Korean government took growth pole strategies for regional development in order to develop a few large cities first, such as Seoul and Pusan in expecting spillover effects on the urban
system.

Therefore, Korean urban system has resulted in the following features; (1) the primacy of Seoul has continuously increased thanks to rural to urban migration along with economic development. Also, large cities have experienced spatial expansion of built-up area towards outer area filled up with residential area, which led to metropolitanization and conurbation for large cities such as Seoul, Pusan, Taegu, Taejon, Inchon, Kwangju and so on; (2) Export oriented industrial policies have driven the growth of cities in southeastern coastal area which could provide convenient locations for large industrial complexes. Thus, corporate cities and hinterland centers for heavy industrial complexes have been established in such places as Ulsan, Masan, Pohang, Yosu, Kwangyang and so on; (3) Satellite cities have developed around Seoul and Pusan for the purpose of population dispersion and relief from urban congestions, which put a new face on the Korean urban system; (4) However, at the same time, small cities have suffered a lot from population loss and from stagnating urban functions. Furthermore, the apparent regional disparities between large cities and small cities have led to spatial polarization in the Korean urban system, especially by making ‘X pattern’ with two axis, one for Seoul and the other for Pusan.

Second, cities in North Korea had mostly developed under strong influences from Japanese colonial policies that intentionally pursued the growth of industrial cities in the war economy. Thus, during the Japanese colonial period, rapid growing cities in North Korea were mining cities such as Aoji, Hworyoung, Kanggye and Kilju, as well as cities with water-powered electricity such as Heungnam, Songjin, Hamheung, Wonsan, Chongjin, Pukchong, and transport centers such as Euju, Manpo, Sonchon and so on. As a result, there were two development axes in the North Korean urban system during the colonial times; one was for western side axis lying along Shineuju - Pyongyang- Jinnampo- Haeju- Kaesong and
the other was for eastern side axis extending to Wonsan- Hamheung- Heungnam- Chongjin. However, since the 1950s, north Korea has attempted to develop inland military complexes centered at Heecheon and Kanggye, which adds one more inland development axis to the north Korean urban system. As a result, there have been three different axis of spatial development in North Korea, such as the western axis, the eastern axis, and the inland axis.

It can be said that the development of North Korean urban system has been directed under an influence from urban framework in the Japanese colonial period. This is because urban investment has poured into advantageous locations according to resource management, landform, population potentiality, accessibility, and so on. For example, new cities, such as Nampo and Pyongsong, have arisen on the western development axis nearby Pyongyang which could provide high potentialities for regional development. Pyongyang has been the largest city in North Korea continuously increasing its population to over a million. Chongjin, Hamheung, Nampo have taken the secondary positions with over half million population. Other small and medium sized cities, such as Sonchon, Danchon, Hyesan, Heechon, Pyongsong, Kusong, were built to make administrative centers with industrial functions in order to develop inland mountainous regions as military bases.

The attitude toward urban development is quite different from between south and North Korea. South Korea puts more emphasis on efficiency and growth in allowing spatial polarization by taking growth pole strategies and urban development policies, while North Korea emphasizes urban –to –rural balance or equity by regarding cities as just a tool for rural development. However, both sides would similarly admit the importance of urban development in regional development. In terms of urban policies at a regional base, North Korea emphasizes industrial development of inland cities by placing more importance on military and national defense, whereas South Korea stresses urban development of coastal
cities under the export-oriented national growth policies.

Concerning the general characteristics of the Korean urban system, it would be important to improve connectivity between the western side and the eastern side as well as between inland area and coastal area in order to allow for balanced development on the whole Korean peninsular after unification.

3. Attributes and Linkages of the Urban System.

Population distribution in the Korean urban system shows the following characteristics in table I and figure I. First, there are high urban concentrations in the large cities as well as clear spatial disparities in the urban hierarchy by population size. The proportion of large cities with population over one million has continuously increased during 1960-1980, and has slightly declined since 1990, but it still occupied over 55 percent in 1999 suggesting their significance in the Korean urban system. The different ratio of population groups shows disadvantageous ones in the Korean urban hierarchy. For instance, the population group with the lowest ratio goes to medium sized cities with population of 0.5 -1 million in 1960, and goes to cities with population of 250-500 thousands in 1970. However, cities in population of 50-100 thousands show the lowest ratio in 1980, 1990, and 1999. This fact indicates that disadvantages urban groups have moved downward on the urban system toward small sized cities, which have undergone relative decline and stagnation in the Korean urban system since the economic development of the 1960s. The increasing proportion of cities with population of 100 – 1,000 thousands between in 1990 and in 1999 would be due to new establishment of city administration units in 1995, so called ‘urban-rural integrated city’, which combine rural area into the adjacent urban area to make easier urban management.

Furthermore, during 1960-1999, both large cities with populations of over one million
have decreased their proportions and small sized cities with populations under one million have experienced population decline in the urban hierarchy. However, in the same period, medium sized cities with a population of 250 thousand to one million have slightly increased their proportion. This fact indicates that urban population has decentralized from large cities and small sized cities towards medium sized cities in the Korean urban hierarchy.

(Insert Table I.)
Second, however, Seoul and SMR (Seoul Metropolitan Region) still experience a high concentration of urban functions. For example, SMR has almost 46% of national population, 55.1% of manufacturing establishment, 80% of government investment institutes, 95% of large corporation headquarters, 55.2% of small firms, 62.9% of value added production for IT industry, 50.2% of hospitals, 52.8% of pharmacies, and 46.4% of GDP. The high concentration of command control function into SMR brings about lots of urban problems, including uneven regional development, environmental pollution, urban congestion, urban sprawl, and political and psychological unbalances. Moreover, concentrated dispersion of population and other urban functions in SMR leads to spatial expansion and conurbation along major transport lines.

Table II Insert
Third, the spatial distribution of urban population reveals a polarized pattern centered on Seoul and Pusan. For example, Kyonggi province nearby Seoul has the twenty-three cities followed by Kyongsangnam province (12) adjacent to Pusan, and Kyongsangbuk province (11) nearby Taegu, the third largest city in Korea. Regarding cities by population size, only Kyonggi, Kyongsangbuk, and Kyongsangnam province have all groups of urban population size. Kwangwon and Cheju province don’t have the cities with population over 500 thousand. This result indicates that Korean urban system has still not escaped from it spatially polarized structure in spite of various policies encouraging spatial dispersion and decentralization.

Meanwhile, let’s consider the dimensions and factors underling the Korean urban system. According to Sung’s study (1990) that was using factor analysis and cluster analysis, there were six different factors to account for Korean urban system; (1) population size factor; (2)
urban growth factor; (3) housing factor; (4) age structure factor; (5) migration factor; (6) city age or history factor. He argues that housing shortage, modernized life style, and attracting point for inward migration characterize large cities. On the contrary, small cities are characterized in the opposite direction by such attributes as poor quality of life conditions and outward migration. He also classifies Korean cities into two broad categories based on same data such as developing cities and stagnating cities. The category of developing cities contains such different sub-categories as; (1) large cities like Seoul, Pusan, Taegu, and Inchon; (2) Industrial cities such as Pohang and Ulsan; (3) suburban cities like Anyang and Songnam; (4) diverse function cities such as Chunchon and Chonju. The category of stagnating cities includes small cities such as Wonju, Chungmu, Chungju, Kimchon, Sunchon and Cheju.

The linkage structure by spatial interaction may reflect the general characteristics of the Korean urban system, which include the metropolitanization of large cities, especially throughout the spatial expansion of Seoul and growth of satellite cities in SMR, regionalization of other large cities such as Pusan and Taegu, and specialization and growth of industrial cities. According to various researches analyzing telephone flow data (Yang 1979; Kim 1987; Lee 1991), Seoul has reinforced its importance in the Korean urban system, while other regional centers has formed their independent regional boundaries in establishing national linkage structure in the urban system. In other words, regional linkage structure has emerged in accordance with diversification of inter-urban interaction at various regional hierarchies. For example, Seoul exercises the most powerful influence over other cities. Below Seoul, other large cities such as Pusan, Taegu, and Kwangju may establish their own areas of influence, while regional cities such as Chinju, Masan, Cheonju, Chongju, and Pohang may have more narrow areas of influence at the sub-regional level.
Financial flows may show more strong influence of Seoul in terms of spatial interaction (Choi 1993). Although regional financial markets have existed for provincial centers, provincial centers have played minor role in financial flows compared with their population size. As financial resources have been redistributed into medium sized cities since 1975, the proportions of medium sized cities have gained slightly their weight from the urban system designed to alleviate highly concentrated pattern present in a few large cities.

It can be expected that the upcoming information age will have an impacts upon the Korean urban system. The direction of change may depend on the infrastructure of information industries and network formation in the Internet age. A city connected to an information network and infrastructure may have more comparative advantages and potentialities than a city without connection to network. According to Lee (1992), Seoul is expected to play more significant role in the future urban system because all information networks make Seoul as a hub center of spatial interaction.

4. The Changing Direction and Prospect

The rank size rule can reveal the dynamics of the Korean urban system. The rank size rule can be expressed as the followings:

\[ P_r = \frac{P_1}{rq} \]

\( P_r \): population size of city in \( r \) rank

\( P_1 \): population size of the largest city

\( r \): city rank

\( q \): constant

If we convert this to log form, we can have the following formulae:
\[ \log Pr = \log P_1 - q \log r \]

If the constant \( q \) is bigger than one, the primate city or large cities may be growing faster than others. If \( q \) is smaller than one, small cities may have considerably more growth than others.

According to Kwon’s study (1998), the \( q \) value has fluctuated during different times. For instances, the \( q \) value increased during the period of 1920 – 1930 which suggests the growth of large cities in the urban system. However, the \( q \) value was kept below 1.0 during 1935-1944 implying the relative growth of small and medium sized cities. After 1949, the \( q \) value remained over 1.0 indicating the relative growth of urban primacy and large cities, again. However, although the \( q \) value seems to have continuously increased since 1955, a slight decrease appeared after 1990. This result may reflect the current direction of urban system changes to the growth of medium sized cities and provincial centers such as Pusan, Taegu, Taejon, Kwangju and others.

Concerning the prospect of the Korean urban system, it would be necessary to consider factors influencing the urban system. Actually, the changes of urban system may reflect the changes of socio-economic environments that we confront now. First, the globalization, telecommunication, and technology development can be factors to be considered in the urban system. The structure of urban system does not so easily respond quickly to change, which may suggest that the future urban system will not be so much different from now and that it will be changed based on the current general characteristics of urban system. There is no doubt that Seoul takes the first position in the Korean urban system and is expected to gain power in the information age as a command control center. However, potentialities of urban growth would be gradually moved towards other regional metropolises and provincial cities equipped with information infrastructure.
Agglomeration diseconomies in large cities can divert urban growth hierarchically into satellite cities in the SMR, then into provincial centers, and into small and medium sized provincial cities in pursuit of amenity and quality of life. Functional specialization and spatial division of labor would be deepened in such provincial centers and cities equipped with information infrastructure. As a result, we can expect that quite different specialized cities such as transacted cities, high tech cities, tourist cities and cultural cities would emerge in the Korean urban system in near future.

Second, unification would be another factor to have an impacts upon the structure of the Korean urban system. South and North Korea have developed their own urban systems separately after 1945, which resulted in big difference between two Korea. The North Korean urban system comprises three major axes as mentioned above. The western axis lies from Shineuju to Haeju and the eastern axis is extended from Chongjin to Wonsan, and the inland axis lies around Kanggye and Heecheon. On the contrary, the South Korean urban system has mainly developed in both emerging new satellite cities centered around Seoul metropolitan region and southeastern region including cities of Ulsan, Masan, Changwon, and Pohang, which led to spatially ‘X form’ by placing Seoul at a center with two axes; one axis goes to Taegu and Pusan, the other axis extends to Kwangju.

After unification, it would be necessary to readjust the spatial structure of the urban system on the whole Korean peninsular in the following directions: (1) maximizing spatial integration would be considered a way of increasing outbound connectivity with the Pacific region, Russia and China. For example, it is suggested a ‘U’ form of national development be designed with three different axes that are from the western developing axis for continental China, to the eastern developing axis for Russia, and to southern developing axis for Pacific countries; (2) enhancing inbound interdependence would be a significant in reducing
regional disparities between north and south and between east and west. First of all, we need to make plans eliminating the quite different dual structure of North’s and South’s urban system, which can include several strategies such as developing cities nearby the demilitarized zone, increasing functional relationship between Seoul and Pyongyang, reinforcing functions in regional metropolises enough to prevent unexpected population influx from North Korea to South Korea, and creating a new administrative center for a unified Korea at a certain place in the middle of Korean peninsular; (3) increasing complementarities between South and North Korea should be considered for urban development and industrial development. Urban and industrial development should be implemented by accepting comparative advantages and regional specialization in different regions between South and North Korea.

5. Summary and Conclusion

Although the concept of urban system is very important with the concept of urban structure, it is hard to do comprehensive studies because of the lack of relevant data in Korea. This study attempts to summarize the result of various research about the Korean urban system in regard to systems perspectives. Even if Korean cities have common roots in traditional cities with administrative command control points during the Chosun dynasty, the urban system on the Korean peninsular has developed separately in South and North Korea recently due to different influences. Since the Japanese colonial period, South and North Korean cities had different colors because the colonial government forced cities in South Korea to be collecting centers for agricultural products whereas it pushed cities in North Korea to be industrial bases for World War II. After 1945, North Korea developed its cities on the socialist philosophy that a city should be only tool for urban-rural balanced
growth, while South Korea created its cities on the capitalist philosophy of the market economy. But both Korean urban developments not only have centered on large cities; Pyongyang and Nampo for North Korea and Seoul and Pusan for South Korea, but also have created uneven regional development. The South Korean urban system has developed mainly around large cities, especially around Seoul and Pusan, in pursuit of growth pole strategies and export-oriented strategies. However, spatial polarization has gradually decreased as other large cities, such regional centers as Taegu, Incheon, Kwangju, Taejon, Ulsan, have regained their own powers in the urban system that can be identified in the linkage structure. The future urban system on the Korean peninsular will be influenced by the process of globalization, unification, and other socio-economic environmental changes. It will be especially necessary to place a focus on various issues such as network city, information infrastructure under the technology development, and information society in order to understand the changing nature of the Korean urban system.
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Table I. Trends of Urban Hierarchical Changes (1960-1999)

<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>%</td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>&gt;1 000 ths.</td>
<td>2 3609</td>
<td>3 8482</td>
<td>65.6%</td>
<td>4 14213</td>
<td>1291</td>
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<tr>
<td>500-1000</td>
<td>1 677</td>
<td>2 1145</td>
<td>8.9%</td>
<td>2 1380</td>
<td>3609</td>
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<tr>
<td>250-500</td>
<td>2 715</td>
<td>2 676</td>
<td>5.2%</td>
<td>7 2366</td>
<td>1145</td>
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<tr>
<td>100-250.</td>
<td>4 705</td>
<td>11 1371</td>
<td>10.6%</td>
<td>21 3033</td>
<td>1371</td>
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<tr>
<td>50-100</td>
<td>18 1291</td>
<td>4 1255</td>
<td>9.7%</td>
<td>6 442</td>
<td>1255</td>
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<tr>
<td>Sum</td>
<td>27 3997</td>
<td>32 12929</td>
<td>100%</td>
<td>40 21434</td>
<td>22873</td>
</tr>
</tbody>
</table>

* (1) Number of Cities  (2) Population (thousands)

Data source: Municipal yearbook of Korea Ministry of government administration & Home affairs each year
Figure 1. Population Distribution in the Korean Urban System, 1975 1985 1990 1995

Table 2. Spatial Concentration into Seoul Metropolitan Region (1998)

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Proportion (%)</th>
</tr>
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<tbody>
<tr>
<td>Area (Seoul)</td>
<td>11.8 (0.62)</td>
</tr>
<tr>
<td>Population</td>
<td>45.5</td>
</tr>
<tr>
<td>Manufacturing Firms</td>
<td>55.1</td>
</tr>
<tr>
<td>Government Investment Institutes</td>
<td>80.0</td>
</tr>
<tr>
<td>Headquarters of 100 large firms</td>
<td>95.0</td>
</tr>
<tr>
<td>Small Firms</td>
<td>55.2</td>
</tr>
<tr>
<td>Medical Hospitals</td>
<td>50.2</td>
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<tr>
<td>Pharmacies</td>
<td>52.8</td>
</tr>
<tr>
<td>Value Added for IT Industry Products</td>
<td>62.9</td>
</tr>
<tr>
<td>GDP</td>
<td>46.4</td>
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</tbody>
</table>

Source: author’s own calculation from various statistical data.
Table 3. Distribution of Cities and Urban Population by Provinces (1998)

<table>
<thead>
<tr>
<th>Province (Do)</th>
<th>Number of Cities</th>
<th>Population Size (Thousands %)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Over 1 000</td>
<td>500-1 000</td>
</tr>
<tr>
<td>Kyonggi</td>
<td>25</td>
<td>2 (62.0)</td>
</tr>
<tr>
<td>Kwangwon</td>
<td>7</td>
<td>-</td>
</tr>
<tr>
<td>Chungchongbuk</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>Chungchongnam</td>
<td>7</td>
<td>1 (54.5)</td>
</tr>
<tr>
<td>Chollabuk</td>
<td>6</td>
<td>-</td>
</tr>
<tr>
<td>Chollanam</td>
<td>6</td>
<td>1 (55.1)</td>
</tr>
<tr>
<td>Kyongsangbuk</td>
<td>11</td>
<td>1 (53.7)</td>
</tr>
<tr>
<td>Kyongsangnam</td>
<td>12</td>
<td>2 (66.2)</td>
</tr>
<tr>
<td>Cheju</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Sum</td>
<td>79</td>
<td>7</td>
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</tbody>
</table>

Source: Ministry of government administration & Home affairs 1999 Municipal yearbook of Korea
Table 4. changes of q value for Korean urban system (1920-1995)

<table>
<thead>
<tr>
<th>Year</th>
<th>q value</th>
<th>Year</th>
<th>q value</th>
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<tbody>
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<td>1920</td>
<td>1.20472</td>
<td>1960</td>
<td>1.15762</td>
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<td>1925</td>
<td>1.05301</td>
<td>1966</td>
<td>1.13384</td>
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<tr>
<td>1930</td>
<td>1.05785</td>
<td>1970</td>
<td>1.14515</td>
</tr>
<tr>
<td>1935</td>
<td>0.84271</td>
<td>1975</td>
<td>1.16522</td>
</tr>
<tr>
<td>1941</td>
<td>0.91226</td>
<td>1980</td>
<td>1.28084</td>
</tr>
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<td>1944</td>
<td>0.89822</td>
<td>1985</td>
<td>1.28051</td>
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<td>1949</td>
<td>1.12169</td>
<td>1990</td>
<td>1.27867</td>
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<td>1955</td>
<td>1.07663</td>
<td>1995</td>
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Source: Kwon (1998) p. 63