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Ethnic Congregation and Residential Changes in Korea

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Abstract

As the number of immigrants staying in Korea has gradually increased since the mid-1990s, the rate of chronicle migration from certain countries such as China and Vietnam remain high. Registered foreign residents have formed ethnic communities depending on their countries of origin, and the purpose of stay, Korean language literacy, rent, and accessibility have resulted in their self-congregation or forced segregation. This study aims to explore the direction in which immigrants' residential distribution move over time, and whether the ethnic communities show any differences in the level of congregation or segregation. It focuses on identifying the residential distribution of Korean-Chinese, Chinese, and Vietnamese at the city, county, and district level across the country in Korea and examining the congregation and residential changes of three groups over the past decade using centrographic method. Comparing the location as well as the level of residential congregation or dispersion of three groups, which account for the majority of non-professional immigrants in Korea, it will provide a basis for further research on residential congregation or segregation of immigrants in the future.

Keywords: Immigrants, centrographic method, ethnic segregation, Korean-Chinese, Chinese, Vietnamese

1. INTRODUCTION

Since the mid-1990s, the number of foreign residents staying in Korea has increased over the past 20 years. Rapid economic growth, industrial restructuring, improved income levels, and low birth rates constitute the major features of the transformation resulting in a shortage of low-skilled workers. As of 2020, the number of registered foreign residents was 1,145,540, and the combined number of both long-term and short-term stayers, long-term stayers including registered foreign residents and foreign nationals living in Korea, and short-term stayers who stay within 90 days for tourism purpose, reached 2,036,075[1]. However, this is a 19.4% year-on-year decrease due to the impact of COVID-19, and in 2019, before the travel restrictions were imposed to prevent the spread of COVID-19, the total number of foreign residents reached 2,524,656, making up 4.87% of national population. Korean society opens the door to cultural diversity and transforms to a multiethnic and multicultural country.

Currently, non-professional workers, marriage immigrants, international students, as well as professional immigrants constitute a multicultural Korean society. The inflow has been led by the foreign workers from 16 countries under the Employment Permit System(EPS), including the Philippines, Mongolia, Sri Lanka, Vietnam, Thailand, Uzbekistan, Pakistan, Indonesia, Cambodia, China, Bangladesh, Kyrgyzstan, Nepal,

Myanmar, Timor, and Laos. As such, the number of foreigners residing in Korea has rapidly increased, but the history of foreign migration is relatively short compared to other countries such as the US or England, so there is still a lack of experience and understanding of various ethnic and racial minorities. However, as the low birth rate and aging society progresses in the future, the movement of people across country borders will continue to increase, which is also expected to have a substantial impact in several dimensions.

Most previous studies on migration have focused on the spatial distribution or residential segregation of immigrants, but yet there have been limited to the metropolitan area where the majority of them reside or where foreign immigrants are identified as homogeneous groups. Various studies have been conducted including the spatial distribution of immigrants by visa type or nationality [2-10], the localization of immigrant groups from specific nationalities [11-13], foreigners' choice of residence and influencing features [14-15], and in particular, residential segregation of immigrants and the development of indicators to measure their segregation [16-21]. Recent studies review the spatial distribution of the largest group of immigrants, Chinese or Korean-Chinese as wells as low-skilled workers, but due to the lack of statistical data currently provided, they are spatially limited to Seoul or the metropolitan area or rely on data since the 2000s. In addition, study on how the ethnic spatial distribution overlaps, in what direction and distance the ethnic congregation moves over time, or in what degree of concentration and dispersion of minority groups are profound but still insufficient.

Therefore, this study seeks to explore how the residential segregation or congregation of ethnic communities including Korean-Chinese, Chinese, and Vietnamese in Korea have been transformed over the past years. Specifically, it examines the spatial distribution and growth of immigrants in 250 cities, counties, and districts nationwide based on the administrative district classification of the National Statistical Office and identifies the congregational sizes and directions of Korean-Chinese, Chinese, and Vietnamese immigrants. Understanding the current status and spatial concentration of these representative ethnic groups may be the basis for analyzing the social, cultural, and regional characteristics of all immigrants. Next, the centrographic method supported by Arc GIS is used to investigate which of the ethnic groups are more segregated or congregated than others, in which locations these concentrations tend to occur, and how their congregations have moved over time, providing evidence to link social and spatial changes of the ethnic communities. Further to previous studies that interpret the impact of the arrivals of immigrants in the destination country from a socioeconomic perspective and discuss policy implications, this study aims to provide the basis for exploring the patterns of movements of ethnic congregations and thus interpreting social and spatial changes in local areas. While previous studies on the spatial distribution of immigrants have focused on forced segregation [22], it is necessary to review the ethnic communities from the perspective of self-congregation. Comparing the ethic congregations and their movements implies that it is important to analyze the relationship between the sizes of ethnic groups and social integration empirically.

2. METHODOLOGY AND RESEARCH PROCEDURE

This study focuses on the fact that some countries of origin, such as China and Vietnam, account for a very high proportion of the total immigrants staying in Korea. The Employment Permit System(EPS) is a non-seasonal guest worker program for low-skilled labor, which was introduced in 2004 in partnership with only 6 countries and expanded now to 16 countries [23]. Low-skilled workers in the manufacturing or agricultural sector arrive mostly from China and Southeast Asia, and workforce from China is in particular led by compatriots. Korean-Chinese account for the largest population of immigrants, and their stock and flow in Korea has developed in accordance with the Korean government's immigration and foreign policy, and has become a representative ethnic group in size as well as history. Meanwhile, the share of Vietnam is the second largest in immigrant groups followed by China and the largest as a non-compatriot group.

The issue of ethnic segregation and congregation is a recurrent research topic along with the increase of immigrants in Korean society due to its potential social impacts such as decomposition of inequality, social polarization or ghettos appeared in US cities. Changes in population movement and demographic structure are particularly noticeable in large cities with a large arrival of immigrants, and therefore comprehensive understanding of segregation and congregation of immigrants may be a basic task to establish desirable policies. The ability to measure the stock and flows of immigrants has significantly improved in the recent decades, which are based on arrival and registration records. According to 2020 Korean Statistical Information Service(KOSIS) survey, the population of registered foreign residents in Korea stood at around 1.15 million, down from about 1.27 million in the previous year. The noticeable congregation of immigrants at the city, county, and district levels across the country is closely related to the distribution of industrial and educational institutions, and considerable changes in the social and spatial environment occurred by the increase of immigrants have been an important factor in forming new locality.

Following the common practice of UN definition, a long-term immigrant is defined as a person who moves to a country other than that of his or her usual residence for more than a year [24]. A foreigner intending to stay in Korea for more than 90 days is required to register to the Korea Immigration Service under the Ministry Justice within 90 days from date of entry (Immigration Act, Article 31). In order to analyze the distribution and growth of top three immigrants' groups across the country, the population census by the Statistics Korea and registered foreign residents' statistics from the Korea Immigration Service Statistics will be used to map the mean centers and standard radii.

The overarching purpose of this paper is to understand how ethnic groups are congregated and grow over time. To do that, immigrants' demographic history is reviewed for 250 cities, counties, and districts across the nation, and the growth rate, gender, age, and visa status of registered foreign residents are discussed. It is useful to identify the population trends of Korean-Chinese, Chinese, and Vietnamese, the top three groups of immigrant populations, from 2009 to 2020, when Korean-Chinese statistics began to be compiled separately from Chinese population, and examine the factors affecting the ethnic segregation and congregation in last ten years. Based on this analysis, the mean centers and standard radii for Korean-Chinese, Chinese, and Vietnamese are displayed every five years in 2010, 2015, and 2020 by using Arc GIS's centrographic methods. It will show how much and in which direction the mean centers have moved over time and the distances between Seoul metropolitan area and standard deviations per each ethnic group, and how they are overlapped. The movement of the mean centers for ethnic congregation may be a process of assimilation to the destination over time, or a forced segregation by clustering its tradition and cultural background of immigrants. Also, it is expected that such a movement may appear in a centrifugal expansion, a linear extension, or a spotted pattern.

The immigration behavior of these three ethnic groups is already known to have led by economic opportunities, but it also can affect the distance and direction of ethnic congregation depending on the purpose of stay, cultural homogeneity, age or gender factors. In addition, it reflects the socioeconomic characteristics, purpose of stay, and gender tendency of the region where the mean center of each group is located, and therefore it is possible to predict how three large population groups will interact with each other and develop in the future.

3. FOREIGN RESIDENTS STAYING IN KOREA

As of 2020, 1,145,540 registered foreign residents were residing in the country, which accounts for 2.5% of nation's total population [25]. The ratio of registered foreign residents was noted 0.1% of the nation's total population which was 66,688 in 1993 when the statistics on registered foreign resident by nationality, status, and region began to be collected. It showed a rapid increase of 20-30% every year in the 1990s and steadily increased after 2000. The overall growth rate has slowed down since the number of registered foreign residents

exceeded 2% of the total national population in 2014, but the number of registered foreign residents has still shown a gradual increase until 2019 despite the temporary fall caused by the Middle East Respiratory Syndrome(MERS) outbreak in 2015 and the retaliatory action against THAAD, the U.S. antimissile system in 2017. However, the onset of the COVID-19 pandemic in early 2020 severely curtailed cross-border mobility with travel restrictions and border closures, and the arrivals of immigrants have also significantly decreased in 2020. The overall picture of COVID-19 has been continued in 2021, which have far-reaching impacts on labor immigrants by dropping their entry around 50,000 every year to 6,000-7,000, and essential labor forces required in agricultural and fishery industries faced serious labor shortages.

Meanwhile, the origin countries of immigrants have been diverse, reaching about 190 different countries. Korean-Chinese or ethnic Koreans comprise the largest group of foreign nationals in Korea, and their ratio was increased to being separated from Chinese population accounting for 41.7% of the entire foreign residents in 2009. Chinese came next with 14.4% of the foreign population, followed by Vietnamese (9.9%), and the ratio of these three ethnic groups accounts for 66% of all registered foreign residents, making the majority of non-professional workers entering into Korea. It also shows a very large gap with the fourth-largest group in the population size of registered foreign residents (Table 1).

Table 1. Registered Foreign Residents by Nationality (2020, Over 10,000)

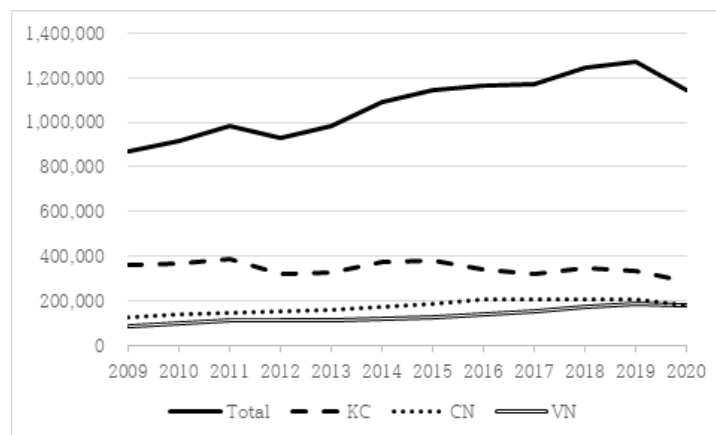| No.	Nationality	Population		Nationality	Population
1	**Korean-Chinese**	**286,933**	11	Myanmar	24,985
2	**Vietnam**	**181,415**	12	Mongolia	24,515
3	**China**	**178,910**	13	Japan	22,798
4	Uzbekistan	48,371	14	Sri Lanka	21,231
5	Philippines	40,687	15	Taiwan	18,357
6	Cambodia	40,222	16	Kazakhstan	14,377
7	Nepal	38,527	17	Bangladesh	13,813
8	Indonesia	33,239	18	Russia	12,227
9	Thailand	30,801	19	Pakistan	10,644
10	US	25,910		Total	1,145,540

Figure 1. Registered Foreign Residents by Nationality (2009 to 2020)

Figure 1 shows migration trends of registered foreign residents in Korea from 2009, when Korean-Chinese began to be counted separately from Chinese. Table 2 shows the population changes of Korean-Chinese,

Chinese, and Vietnamese every five years in 2010, 2015, and 2020. The number of registered foreign residents has grown by an average of 4% every year, but the total number of registered foreign residents has decreased sharply by 10% due to travel restrictions and border closures due to COVID-19 in 2020, and the decline is expected to continue through 2021 and beyond.

While the population and ratio of immigrants from China and Vietnam have steadily increased, the Korean-Chinese immigrants have continued to decline since 2015, and the combined ratio of these three groups has led to a decrease in the total registered foreign resident population. Meanwhile, the average growth rate of these three groups from 2009 to 2019 is around 2.5% except for the sharp decline in 2020, but the increase of registered foreign residents from other countries is as high as 6.3%. Noteworthy trends include a diversification of sending countries over time with an increase in the number of workers coming from China and Vietnam, and an overall decrease in the share of workers of Korean-Chinese.

Table 2. Population Changes of Registered Foreign Residents for KC, CN, and VN

Nationality	2010		2015		2020	
	Population	Ratio(%)	Population	Ratio(%)	Population	Ratio(%)
Korean-Chinese	366,154	39.8	380,091	33.3	286,933	25.0
China	139,261	15.2	187,934	16.4	178,910	15.6
Vietnam	98,225	10.7	128,042	11.2	181,415	15.8
Subtotal	603,640	65.7	696,067	60.9	647,258	56.5
Others	315,277	34.4	447,020	39.1	498,282	43.5
Total	918,917	100	1,143,087	100	1,145,540	100

The migration of Korean-Chinese which represents the registered foreign residents in Korea has been developed in close connection with the Chinese government's economic reform and opening-up policy since 1990, the normalization of diplomatic relations between South Korea and mainland China in 1992, and the implementation of the Employment Permit System in 2004. Korean-Chinese have been classified as overseas Koreans or ethnic Koreans and legally separated from foreign workers from other countries. Implementation of the visiting employee system in 2007 served as an important role to develop their migration from individual to a chronical migration between generations. The two groups show a clear difference in that the majority of Korean-Chinese immigrants are in their 40s and 50s and have a higher proportion of men, meanwhile many immigrants from China are in their 20s and 30s, and the proportion of women is higher than that of men. As of 2020, the proportion of Korean-Chinese in their 40s and 50s was as high as 59.1% while the proportion of Chinese immigrants in their 20s and 30s was only 22.1%. For Chinese immigrants, those in their 20s and 30s accounted for 55.2% of all Chinese, 38.9% for men and 61.1% for women. It is attributed to the history of first-generation of ethnic Koreans from China who were admitted to work in Korea unaccompanied by their families under the Industrial Technical Training Program for Foreigners (ITTP) in accordance with the Korean government's policy for overseas Koreans since the 1990s. At the early stage of labor market opening, the Korean government accepted overseas Koreans, in particular Korean-Chinese by issuing visas based on whether they are ethnic Koreans or related to Korean families without considering individual skills or educational background, resulting in a large number of middle-aged Korean-Chinese engaged in less-skilled, low-wage occupations [26].

Meanwhile, immigrants from Southeast Asian countries such as Vietnam, the Philippines, and Indonesia arrive in Korea as general foreign workers, and the primary reasons for migration lie in income gaps as well as difference in the job market with their countries of origin. Vietnam is the second largest group of immigrants

residing in Korea followed by China. They came to Korea under the industrial trainee system in the 1990s and the employment permit system in 2004, but the inflow of marriage immigrants has had a significant impact on the increase of Vietnam's immigrants since the mid-2000s [27]. Therefore, the population trends of Vietnamese immigrants reveal that people who are not engaged in economic activities is higher than that of immigrants from other Asian countries, which is one of the reasons for the high proportion of women. As of 2020, Vietnamese women made up 51.7%(93,851) of total immigrants, which exceeded Vietnamese men, 48.3%(87,564). The number of marriage immigrants from Vietnam had increased significantly from the mid-2000 to a peak in 2010, however, the number has fluctuated but recently remained high.

Table 3. Registered Foreign Residents by Nationality and Age

Age/ Gender	Korean-Chinese			Chinese			Vietnamese		
	Total	Male	Female	Total	Male	Female	Total	Male	Female
Total	286,933	159,778	127,155	178,910	69,524	109,386	181,415	87,564	93,851
0-9	17,359	8,742	8,617	18,828	9,647	9,181	1,875	916	959
10-19	4,609	2,283	2,326	11,815	5,638	6,177	6,863	2,564	4,299
20-29	10,722	7,249	3,473	52,608	20,474	32,134	84,425	38,530	45,895
30-39	52,616	32,229	20,387	46,090	16,405	29,685	50,935	29,484	21,451
40-49	61,287	37,306	23,981	26,157	8,989	17,168	17,430	8,037	9,393
50-59	108,202	55,535	52,667	17,038	5,691	11,347	14,916	6,076	8,840
Over 60	32,138	16,434	15,704	6,374	2,680	3,694	4,971	1,957	3,014

Table 4. Top Three Foreign Residents by Visa Types

Visa	K-Chinese	Visa	Chinese	Visa	Vietnamese
H-2 (Work & Visit)	129,033(45.0)	D-2 (Student)	44,182(24.7)	F-6 (Marriage migrant)	41,057(22.6)
F-5 (Permanent residency)	95,423(33.3)	F-5 (Permanent residency)	34,320(19.2)	D-4 (Training)	32,628(18.0)
F-1 (Visit & Join family)	19,081(6.6)	F-1 (Visit & Join family)	30,155(16.9)	E-9 (Non-professional)	31,249(17.2)
F-6 (Marriage migrant)	17,318(6.0)	F-6 (Marriage migrant)	23,937(13.4)	F-1 (Visit & Join family)	28,277(15.6)
F-2 (Long-term residency)	11,428(4.0)	F-2 (Long-term residency)	16,877(9.4)	D-2 (Student)	23,691(13.1)
Others	14,650(5.1)	Others	29,439(16.5)	Others	24,513(13.5)
Total	286,933	Total	178,910	Total	181,415

(Unit: people, %)

In 2020, there are two main visa categories for Korean-Chinese with the work and visit visa(H-2) accounting for about 45%, and spouses or underage children of Korean nationals or permanent residents accounting for 49.9%. Meanwhile, Chinese immigrants consist of spouses or underage children of Korean nationals or permanent residents accounting for 59.6%, 24.7% of international students and 7.1% of employment purposes. Foreign residents from Vietnam have the largest number of marriage immigrants and accompanying families at 42%, followed by 23.3% for employment purposes and 13.1% for international students. Sharing similar culture and language between the country of origin and destination helps local assimilation, and the solid social

network of immigrants serves as a positive factor for immigrants. Therefore, Korean-Chinese in general have chronic mobility across borders and better position in the labor market [28].

4. ETHNIC CONGREGATION AND RESIDENTIAL CHANGES IN KOREA

Centrographic method is used to measure the distribution of ethnic groups based on the relationships with and around and migrations of their centers of gravity. It overcomes the coarseness of the Index of Dissimilarity(ID) that is the most commonly used to measure the level of evenness or segregation of a minority group face its inability to measure the spatial distribution of population. The method applies spatial analysis using Geographic Information System (GIS) and statistical analysis to identify the spatial relationship of ethnic groups to the reference community. It measures segregation by taking into account the reference community, as well as the surrounding area, and determining the extent of concentration of dispersal around a core point. This method can answer questions about which ethnic group in the region is more or less dispersed [29]. Centrographic measures can describe two features of discrete distributions, the mean center and standard radius. The mean center is the center of gravity of a particular ethnic community. It is identified using x, y coordinates representing longitude and latitude position of ethnic concentration. Mean center is a measure of spatial central tendency analogous to the classical statistics of mean and weighted mean, and useful in summarizing the overall location of an ethnic community. From the location of mean center, the general trends and features of a particular social group can be identified and compared [30]. The standard radius measures the amount of dispersion of the attributes across the area. The distance of ellipse from the mean center shows how a group is spatially concentrated or dispersed. The extent of integration or segregation can be approximated by the sizes of ellipses, and the area of a standard radius covers about two-thirds of one ethnic population [31].

Figure 2 below shows how the mean centers of Korean-Chinese (KC), Chinese (CN), and Vietnamese (VN) have been moved every five years in 2010, 2015, and 2020. Since the movement of the mean centers is closely related to immigrants' recognition of the region, if physical and psychological obstacles exist, the mean center is likely to move in the opposite direction.

First of all, the mean centers of Korean-Chinese remained to be located near the south of the Seoul metropolitan area. The mean center located in Giheung-gu, Yongin-si city, Gyeonggi-do province in 2010 moved slightly in 2015 and 2020, but is still centered in Hwaseong-si city, Gyeonggi-do province. For Chinese immigrants, the directional bias over time, that is, the overall average direction of a homogeneous group, shows the distinct direction toward the north where the majority population is located. The mean center of Chinese immigrants has moved the most towards the Seoul metropolitan area since 2010, as the mean center located in Heungdeok-gu, Cheongju-si city, Chungcheongbuk-do province in 2010 moved north, arriving in Dongnam-gu, Cheonan-si city, Chungcheongnam-do province both in 2015 and 2020. It is a distinguished pattern that the mean center of Vietnamese immigrants has moved towards south, an opposite to the Seoul metropolitan area. The mean center Vietnamese population in Boeun-gun, Chungcheongbuk-do province in 2010 moved south, appearing in Okcheon-gun, Chungcheongbuk-do province in 2015 and 2020.

Comparing the distances of movement of the mean centers for three groups, the range for Korean-Chinese is very small, while the distance of movement for Chinese immigrants appears to be the widest among three groups. Korean-Chinese have been settled near the Seoul metropolitan area since the early immigration, where provides many employment opportunities based on their strength of linguistic and cultural similarities. While for Chinese immigrants, the accumulated social networks over time have had a great influence on the tendency of residential relocation, resulting in long-distance movement with a wide geographic range. Immigrants from Vietnam who are relatively low-educated and unskilled workers or marriage immigrants have only slightly moved with limited market opportunities after entering Korean society.
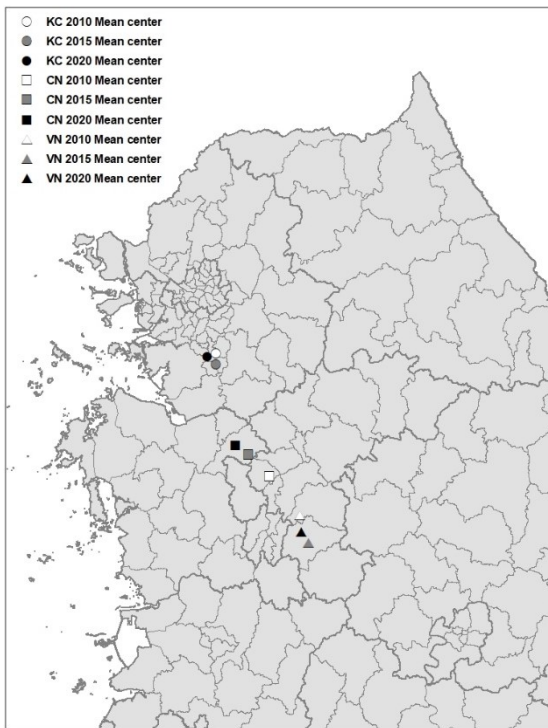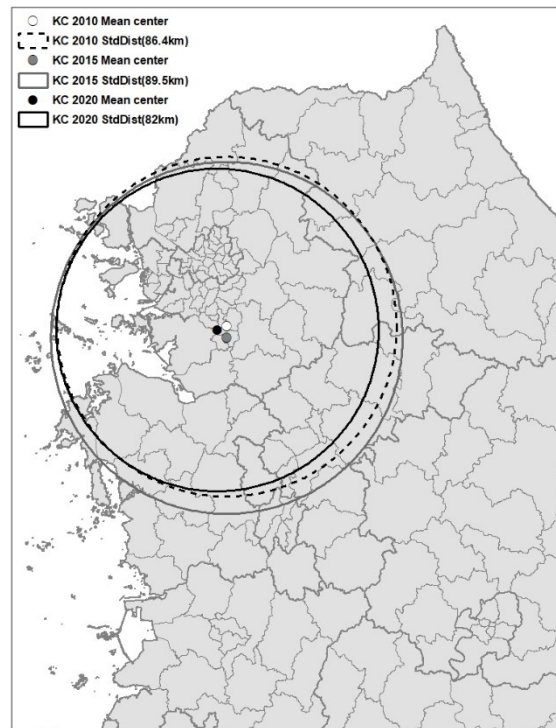
Figure 2. Mean Centers of Three Groups
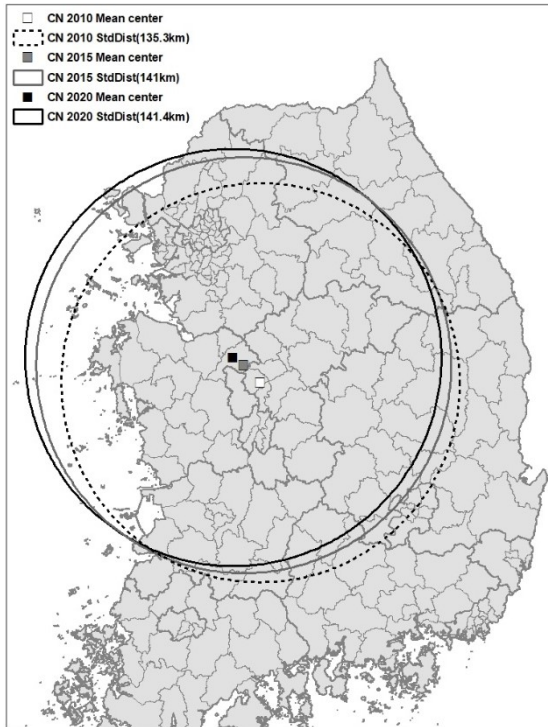

Figure 3. Standard Radius for KC

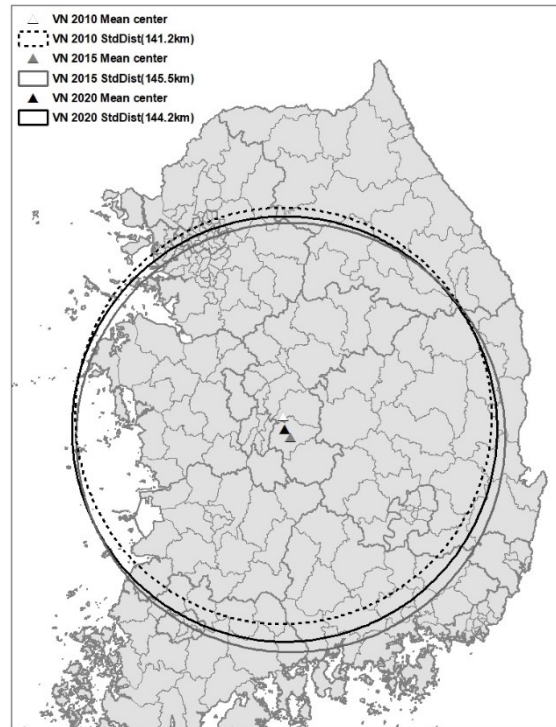**Figure 4. Standard Radius for Chinese**

Figure 5. Standard Radius for Vietnamese

Figure 3 above shows how the standard radius of Korean-Chinese has changed over the past decade from 2010 to the present. The standard radius of Korean-Chinese in 2010 was 86.4km, which means that about two-thirds of Korean-Chinese stayed within 86.4km of the mean center. Korean-Chinese have a comparatively congregated residential pattern. If the value is small, it is concentrated, while if the value is large, it is more dispersed. The residential distribution of Korean-Chinese completely surrounds the Seoul metropolitan area, where the employment opportunities and social networks are accumulated, showing a convergence of the standard radius according to the slight movement of the mean centers. However, considering the sharp drop in the number of foreign residents due to the spread of COVID-19 in 2020, the standard radius of 2019 also shows a similar pattern of 81.8km. As discussed earlier in the population trend, Korean-Chinese arrived in Korea have decreased since 2015, while appearing to be congregated in their residential distribution.

As shown in Figure 4 above, the standard radius of Chinese immigrants is very wide compared to that of Korean-Chinese, from which it is referred to be more dispersed, and has gradually moved northwest since 2010. The standard radius of Chinese population, 135.3 km in 2010 has been expanded to 141 km in 2015 and 2020 respectively, and the 2019 value shows a similar distribution scale of about 142.6 km. The fact that the standard radius of Chinese has gradually moved toward the northeast over time is in line with the directional bias of the mean centers.

The spatial distribution patters of Chinese and Vietnamese is quite similar in the location and the level of congregation, as both of them reveal a very low level of segregation/congregation (Figure 4 and 5). Their population dispersed through the nation and the centers for two are located in the middle of the country. The standard radiuses of Vietnamese immigrants have been dispersed since 2010, while the direction of radius tends to move south different from Korean-Chinese and Chinese. The standard radius of Vietnamese immigrants in 2010 was around 141.2 km, but it was expanded to 145.5 km in 2015 and 144.2 km in 2020 respectively, and is still similar compared to the 2019 value of 144.8 km. Comparing the standard radiuses of three groups, it can be referred that Korean-Chinese with the smallest circle are the most congregated, followed by Chinese and Vietnamese groups. Considering that the Korean-Chinese population is 63% and 56% higher than the Chinese and Vietnamese immigrants respectively in 2020, the Korean-Chinese community is very congregated. In other words, while Korean-Chinese reside close to the center of the Seoul metropolitan area and are neighbor on the employment opportunities and markets, Vietnamese immigrants' residences are rather dispersed across the country. Since the standard radius is centered on the location of population center of each ethnic group, the radius and mean center show similar patterns of direction. Meanwhile, the relative sizes of the standard radius show whether each group has been congregate or disperse over time. The residential distribution of Vietnamese shows a more dispersed pattern when compared to the population in other Asian groups, with low population rates in the Seoul metropolitan area and high rates of residence in the Yeongnam and Honam regions, especially Busan, Ulsan, and Gyeongnam regions [32]. This is contrary to the significant concentration of most foreign immigrants that gravitate towards the Seoul metropolitan area.

In general, past studies to find the elements of population movement of Koreans prove that highly educated work forces tend to have more employment opportunities and a wider geographic range in terms of social elements of population movement, resulting in higher mobility and long-distance movement. On the other hand, less-educated and unskilled workers have only limited scope of employment and market opportunities and tend to move little and short-distance only [33]. However, foreign immigrants show a different pattern, and Korean-Chinese with relatively superior cultural similarities and language proficiency tend to be more concentrated in the Seoul metropolitan area, while immigrants from China and Vietnam tend to more disperse over time. It shows that in addition to employment opportunities directly connected to communication and language skills in terms of motivation to promote relocation, there may be various directional bias such as social networks or transportation accessibility for immigrants.

4. MAIN FINDINGS AND CONCLUSIONS

This study focused on investigating the spatial distribution patterns of the top three origins of immigrants, Korean-Chinese, Chinese, and Vietnamese, and have drawn a general picture of ethnicity distribution and the level of congregation in Korea for the past decade. The centrographic method is capable of providing more information on the segregation or congregation for each ethnic community than the Index of Dissimilarity(ID) by showing the locations and spatial scale. This information enables to grasp the congregation and residential changes of three groups over time, which account for the majority of foreign residents in Korea, at the city, county, and district level across the country, and predict the patterns of distribution of immigrants in the future. The cultural background of individual immigrants and the country of origin tend to have great influence on the society and community of the destination. To further explore the reasons to such occurrence, a quantitative mapping analysis of how the concentrated residential patterns of the immigrant groups change over time must be preceded.

The mean centers of the Korean-Chinese population are located close to the south of the Seoul metropolitan area and remain relatively in the same place over time, while the mean centers of the Chinese have shifted the most toward the Seoul metropolitan area from 2010 until present. The mean centers of Vietnamese immigrants are distinct by shifting southward, opposite to the Seoul metropolitan area. Korean-Chinese had a lower level of language and cultural barriers from the beginning of entering into the Korean society, which contributed them to choose a desirable location close to the Seoul metropolitan area where sufficient employment opportunities are provided. Meanwhile, Chinese immigrants are believed that there are socio-economic elements that affect the distance and direction of residential distribution over time. As a result of comparing the standard radii of three groups examined along with the mean centers, Korean-Chinese, the largest ethnic group tend to be more concentrated than Chinese and Vietnamese populations. In particular, Korean-Chinese gravitate to the Seoul metropolitan area by completely surrounding the area and their standard radius has been decreased for the past decade. The standard radius of Chinese immigrants is very wide, indicating that they are rather dispersed and gradually moved northwest over time. In contrast, Vietnamese immigrants have gradually been dispersed to this day, but it is noteworthy that the direction of movement tends to be south, unlike Korean-Chinese and Chinese.

With these findings, the spatial distribution, concentration, and gradual relocation of immigrants mostly occurred in and around the Seoul metropolitan area or large cities can be identified. This study expanded and illuminated the scope of immigration to nationwide, which has shown rapid and extensive changes of spatial distribution over the past 20 years. There are clear distinctions in the level of concentration and their spatial distribution between different cultural backgrounds. The reasons for such tendencies need to be further explored. Closely associated with culture are other traits such as history and motivation of immigration, and length of stay. By exploring the ethnic congregation and residential changes over time, it will serve as the basis for the research on the differentiated residential distribution of immigrants in cities, counties, and districts across the country.

ACKNOWLEDGEMENT

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