

# GIS-Based Research on Location and Spatial Characteristics of the Slum in Daejeon

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**Abstract:** *This study performed GIS and statistical analyses on the location and spatial characteristics of the slum in Daejeon. Spatial data of 648 slum residents in Daejeon were collected and 131 residents among them were surveyed. The results showed the trends of higher rent, lower social exclusion and closer neighboring relations in slum center than the surrounding areas, which could be interpreted as the interrelated multilateral effects of the micro- (housing), meso- (relations), exo- (community) and macro- (government policy) systems. The strong bonds among neighbors and various supports from social service facilities elevated the slum area's rent and diminished residents' social exclusion more than housing conditions (for instance, poor hygiene and low safety). Slum tenants willingly paid a premium for their substandard housings and refused moving to governmentally provided modern housing units. In urban development, administrative authorities need to be cautious about slum uprooting. Much rather an alternative renewal approach is needed which protects the slum's intimate relations while improving its overall living standards.*

**Keywords:** slum in Daejeon; GIS; the rent of the substandard housing; social exclusion; neighboring effect

## 1. Introduction

Adequate housing ought to provide more than just four walls and a roof. For example, proper housing according to the UN involves sufficient space, adequate sanitation, protection from climate threats, and the affordable rent [1]. Also, location is important inasmuch housing-related factors should not lead to exclusion from employment opportunities, healthcare, schools, childcare centers, and other social facilities.

South Korean substandard housing is called “Chokbang,” which refers to a divided room that accommodates more tenants (Chok means slicing). They initially formed along railways of Seoul and other large cities such as Busan and Daejeon. Chokbangs are chosen by the poor with no other low-rent choices: They provide insufficient space, deficient sanitation and low privacy protection. Impoverished individuals in the city are attracted to slum living because of Chokbang's low rent, its convenient public transportation, and supportive social network among the old-timers [2].

Chokbang has been popular since the 1997 IMF crisis in South Korea. At that time, many workers had lost their jobs and been deprived of their homes and families. Since then, the middle-aged, single men in despair have gathered in Chokbangs. On the other hand, slums were once famous for prostitution for decades and as a result some residents are from the business. They are not leaving this area because they are not accepted by other parts of society. Some Chokbang residents have lived for over 30 years, and some have spent most of their 50s and 60s. Because of the long presence of Chokbangs, residents are also getting older. The mean age of residents is 63.9 year old and accordingly, they suffer various diseases and disability [3].

The dilapidated housings and filthy streets also make passers-by shun and effectively alienate the residents geographically and psychologically. Dilapidated housings have a negative impact on the residents' social adaptation and social networks, and such residents are denied various rights, opportunities, and resources that are normally available to other members of society. As a result of the isolation and alienation from the mainstream society, the slums are a representative example of social exclusion [4]. However, some voluntarily

choose to live in the slums. In other words, they pay higher rents for more inadequate housing. Thus, understanding the formation and sustainability of the poor requires a broader and more comprehensive view.

The slum area has a unique ecological system interconnected by the characteristics of residents, neighbors, welfare systems and government policies. This intricate system, the environment surrounding the slum, is considered important to understand the social exclusion. Human beings are not completely independent, but rather rely on the multidimensional and constant interconnectedness with the environment. A contextual approach is needed to understand the meaning of human behaviors in special environments such as the slums. Thus this study examines multiple dimensions of the slum residents: housing, neighborhood, community and government housing policies.

On the other hand, this study adopted Geographic Information System (GIS) to analyze the distribution of Chokbangs in that poverty has a spatial dimension. Poverty concentrates within a given locality, varies from place to place, and relates to local geographic factors [5]-[6]. GIS is a tool for analyzing and integrating physical, social, and environmental factors according to their geographical locations. The application of GIS would help understand the spatial variation and distribution of indicators in geographically disaggregate levels [7]. Thus, this study tries to reveal the relations between systems of a housing and slum residents' choice of housing with GIS analysis. The introduction should briefly place the study in a broad context and highlight why it is important. It should define the purpose of the work and its significance. The current state of the research field should be reviewed carefully and key publications cited. Please highlight controversial and diverging hypotheses when necessary. Finally, briefly mention the main aim of the work and highlight the principal conclusions.

## 2. Theoretical Background

Currently, the proliferation of slums and its related problems are little understood, and as a result, public interventions on the slum-more often than not-address the symptoms rather than its underlying causes [1]. This matter can partly be attributed to the absence of studies and data that empirically link the prevalence of slums with possible driving forces at either the city or national level [4]. Some studies on slums, instead, pay attention on multi-dimensional poverty in the region. The residents are deprived of proper space, sanitation, education, vocational opportunities, and other social infrastructure [8]. Half of the participants in the survey declared that they felt excluded from the rest of society because of their state of poverty [9]. Slums in the cities are no doubt the most vulnerable space on the viewpoint of social exclusion.

Social exclusion is a much broader concept than poverty and is often associated with discrimination [10]. Social exclusion is understood, following the European Commission's definition, as a process whereby certain individuals are pushed to the edge of society and prevented from participating fully in social life, by virtue of their poverty, their lack of basic competencies and lifelong learning opportunities, or as a result of discrimination [11].

Neighbors interfere during the vicious cycle being complimentary to social exclusion. They are alienated from the main stream of the society and instead being affected by who lives next door and being instilled dysfunctional norms, values, and behaviors, triggering a cycle of social pathology. People in this area accept the state of being poor and unemployed because their neighbors also show same life pattern. The living conditions of the neighborhood interact with individual's life events and deprive the poor of the motivation and effort to work or get out of the poverty. Also, the neighborhood effect is strengthened by disproportionate distribution of resources and policies that negatively affect the residents. Long-term migration of the social marginalities into the area, which had been already stricken by poverty, plays a part in less investment into the area's public infrastructure and services. There are chain reactions resulting in high crimes, depression, and increased illnesses and eventually social exclusion in this area [12]. Through this process, residents lose their trust in mainstream society; they reckon they are excluded from the society [13]. Interest in the influence of the neighborhood on the social exclusion of individuals' lives has been increasing. Data of British Household Panel Study analyzed to explore how far there is an evidence [14] neighborhood effect and social exclusion is two faces of lives in the slum.

Different to other western literatures, studies in South Korea reveal the positive effect in neighborhood in the slum [15, 16]. Notwithstanding bad conditions of housings, lack of social infrastructure and stigma, the fact that residents themselves don't want to move out to better areas demonstrates they are satisfied with the lives in the slum [3]. The reason they want to stay is that there is formal and informal support available in the area. The studies on the neighbor effect in the Korean slums (Chokbang areas) focus mainly on the strong bond and reciprocal support between residents. Furthermore, residents reveal antipathy towards outsider due to stigma

and discrimination by them. Instead, they make up for them with strong inner networks. They consider the slum as their shelter and feel being protected from the outside jungle. Besides, they have access to many supporting welfare facilities such as free meal centers, medical centers, and homeless support centers. So, these areas are preferred by residents though, their bond and familiarity are also considered superficial (instant console), not helpful for them to stand on their own. The characteristic of these neighborhoods is named the shadow of interdependency [17].

The geographical congregation of poor people evokes negative images and strengthens prejudices and negative attitudes of ordinary people towards the poor [18, 19]. Accordingly, the housing problems should be dealt not as a unilateral problem of housing vulnerability but as multilateral problems including segregation and alienation in the socio-cultural and psychological laterals. Thus, the perspective of person in the environment is appropriate to understand the complexity of individual's behavior which is adaptive and rational under his or her own specific circumstances.

This study uses the GIS, computer software programs designed to handle geographically referenced data. GIS has been often adopted as an empirical methodology to survey the geographical distribution or concentration of poverty. GIS is used to integrate information from very different sources (e.g. surveys, census, administrative data, satellite images, etc.) into a single platform, where each observation is matched with the identifier of the area it covers [20].

In general, GIS-based research incorporated with other resources and indices on poverty show dynamics in the regions which could not be caught through census and surveys. Transportation, medical and welfare services are often transferred into poverty indicator in the GIS-based studies [21-23].

The precedent GIS analysis on the same slum of this study revealed the feminization and aging trends in the center area of the slum. The study analyzed Chokbang residents' location for 9 years and showed the number of female had been decreasing, which means that females are more apt to get out of poverty. However, the same GIS analysis within the slum showed that remaining females tend to gather into the center of the slum. This discovery strengthens the strong neighboring effect hypothesis in this study because females are considered to make informal neighboring networks for reciprocal support. Also, the aging trend has been interpreted to be natural as the residents have aged. The slum residents tend not to be migrant but strongly rooted in the area [24].

### 3. Materials and Methods

#### 3.1 Study Area and Residents' Characteristics

This study was conducted for substandard housing in Daejeon, South Korea. The number of substandard housings in Daejeon was 648 as of 2017. They are scattered throughout the city, but most are in the slum. The slum, the collective body of the substandard housings had been once thriving and prosperous area of the city by locating in the central part of the city. Some of Chokbangs are dispersed throughout the dilapidated area adjacent to the slum. The rest of Chokbangs have a different style; government-provided long-term public rental (LTPR) housings which are located in the suburb of the city. Chokbangs, regardless of their location, are shabby, narrow, and lacking sanitation and housing functions.

The residents of the Daejeon Chokbang are mostly older people with the mean age of 62.0 year old. Half of the residents are over 60 year old. Many residents are living on government benefits: 69.4% of people are welfare beneficiaries. In Korea, the entitlements for benefits are given to those who have no means, no family to support them and lack the ability to work. 28.4% of the residents are disabled, and 87.2% are afflicted with at least two kinds of diseases or more [3].

#### 3.2 Data Collection and Analysis

The methodology of this study was a combination of spatial analysis and GIS mapping, interviewing, and statistical analysis. Poverty map was drawn for the understanding of the distribution of Chokbangs. Data of 648 residents living in the substandard housings were collected including location (address), gender, age, and rental expenses for the GIS analysis. First step of GIS mapping was to display the geocoded address data to the point of latitude and longitude on the map. Welfare organizations in the slum area were also geocoded and displayed in the map. Secondly, to show the distribution of rental expenses (high vs. low), categorizing function was adopted. Categorized rental expense of each housing was displayed with different color shades in the map. Thirdly, to understand the relations between rental expenses and distances of housings from the center of the

slum and welfare organizations, buffer and merger functions were utilized. Distances between housings and welfare organizations were displayed in the buffer zone with a radius of 150m from the center of the slum (calculated by GIS tool) and welfare organizations respectively. On the same map, rental expenses were also displayed in dotted form.

Three types of Chokbangs shown through mapping process were named as the CCA(Chokbang Concentrated Area), the CDA(Chokbang Dispersed Area) and the LTPR(Long-Term Public Rental). These types were grouped according to their locations and became the unit of statistical analysis in the further investigation, for which GIS results provide the necessary insight.

The framework for the understanding of the slum residents' behavior and their environment was comprised of multiple and interfering systems : micro-, meso-, exo-, and macro systems. In this study, micro system is associated with housing that directly affects the hygiene, privacy and security of residents. The meso system corresponds to the neighbors of the slums in this study and it includes resident relationships. The exo system is a community that includes neighbors and the environment and interacts with each resident by providing or excluding resources. Social exclusion has been incorporated in the meso system to show how they are integrated or excluded from society. And the macro system is related to the government's policies on poverty and housing for the poor.

For the understanding of multiple systems in the slum, interviews with residents and volunteers in this area were conducted and the qualitative understanding was supplemented by statistical analysis of the survey on sampled residents. 131 residents among 648 residents were surveyed about their personal characteristics, the state of housing, rent, relations with neighbors and outsider, social exclusion and so on.

Among residents' personal characteristics, the extent of participation of paid work and whether he or she is a beneficiary or not were also included into the analysis. Concerning the micro system, housing's dilapidation state and monthly rent were included. Housing's dilapidation state was measured with a self-devised five-point scale including its dilapidation, privacy and security. For the meso system, relations with both neighbors and outsider were measured separately. Each is also transformed into five-point scale for the comparative purpose. Community in the Exo system makes impact on the residents by assigning the resources, supporting them or stigmatizing and excluding the slum residents. Beneficial impact was measured with two questions: frequency of obtaining free meals and receiving help from the charity organizations. And malignant impact was measured in the dimension of stigma and social exclusion. Social exclusion indicator was devised with 14 items on the basis of European Commission indicator on social exclusion [11]. All the measuring scales were shown in Table 1.

The residents' individual characteristics, housing state and the rent (micro system), relations with neighbors and people outside (meso system), community factors such as free meal, help, stigma and the social exclusion (exo system) were analyzed to confirm the differentiations according to Chokbang's locations. With SPSS 23.0, the one-way analysis of variance (ANOVA) was used to determine whether there are any statistically significant differences of multiple systems and individual characteristics of residents. Lastly, government's policy on poverty and substandard housings were briefly reviewed for understanding macro system.

**Table 1.** Contents and measurements of systems

<b>Systems</b>	<b>Contents</b>	<b>Measurements</b>
Micro system (housing)	Housing' s state	Dilapidation, insanitation, privacy breaching and insecurity
	Monthly rent	Monthly rent(thousand won)
Meso system (relations)	Neighborhood satisfaction	Frequency of activities with neighbors, attitudes towards them, and reciprocal activities
	Relations with outsiders	Frequency of correspondence and receiving help from relatives and friends
Exo system (community)	Free meals	Frequency of taking free meals
	Getting help	Getting help from support facilities
	Stigma	The extent of prejudice and discrimination
	Social exclusion	14 items (economic state, education, unemployment, health, etc.) Cronbach alpha= .77
Macro system	Government's policy	Policy review

## 4. Results

### 4.1 GIS mapping and analysis on Daejeon Slum

Chokbangs, Korean style of substandard housings, are located disproportionately throughout Daejeon city. The Chokbang map by GIS shows the geographic distribution of poverty with the result of Chokbang clustered in the center of the city. The most of Chokbangs are concentrated in the city center, a traditional slum, and other Chokbangs are dispersed around the slums and in outskirts of the city. Those in the outlying areas are government-provided public rental housings.

The result of GIS mapping shows the high vs. low rent distribution (Figure 1). The color varies in the shades according to the 5 rent levels. Besides, GIS analysis with buffer and merger functions shows the location and distribution of the house with rent information. In the map, the closer the location is to the center of the area, the higher the rent is. Also, most of expensive Chokbangs are located in the radius of 150m. Of particular note is that housings in the center of slum are worse in the dilapidation state. Thus, the rent has a reverse relation with the state of housings: the worse the state of housing is, the higher the rent is.



**Figure 1.** high vs. low rent distribution in Daejeon Chokbang area

The map also shows the locations of the Chokbang Consulting Center (CCC), the government-funded organization for supporting residents and most visited site by them. Not surprisingly, the CCC is located within 100 meters of the central point of the slum shown in figure 1. The CCC has been found to be geographically close to residents as well as mentally. Also, most of the more expensive substandard housings are located within the 150m buffer zone of the CCC.

### 4.2 Analysis of Systems

#### 4.2.1 Micro System: Housing and Rent

The dilapidation state of Chokbangs depends on its location. The state of LTPR housings is much better than Chokbangs in the CDA and the CCA. Through the previous field study, housing was found to be just a room without kitchen and toilet in Chokbangs of the CCA, while rooms in the CDA are more spacious and included a proper kitchen and toilet. However, the housing states are not better than rooms in the CCA in terms of sanitation and appearance. Public rental housings are relatively new and have proper air conditioning, heating, kitchen and toilet indoors.

ANOVA analysis on rent was performed to confirm the result of GIS mapping in which Chokbangs with high rent were clustered in the center of the slum. The average monthly rent of Chokbangs in Daejeon stands at 113.2 thousand won as of 2017. The rent in the CCA stands at 131.1 thousand won, the CDA at 115 thousand won and the rented public housing at 51.2 thousand won, which is considerably lower due to government subsidies. Statistically, it can be seen that Chokbangs in the CCA are expensive than those in the CDA and the LTPR. This section may be divided by subheadings. It should provide a concise and precise description of the experimental results, their interpretation as well as the experimental conclusions that can be drawn.

**Table 2.** Differentiation of 4 systems according to the locations

	<b>Systems</b>	<b>Means(SD)</b>	<b>CCA</b>	<b>CDA</b>	<b>LTPR</b>	<b>F value</b>
Micro	Housings' state	2.91(.98)	2.68(.96)	2.76(.82)	3.53(.97)	9.130***
	Rent(thousand won)	113.2(5.52)	131.1(5.732)	115.0(5.117)	5.12(2.172)	14.728***
Meso	Neighbors satisfaction	3.68(.68)	3.98(.55)	3.40(.67)	3.44(.48)	11.813***
	Relations with outsiders	2.22(1.06)	2.42(.80)	2.16(.78)	3.00(.70)	1.857
Exo	Stigma	2.10(.67)	1.94(.35)	2.35(.47)	2.07(.38)	4.458*
	Free meals	1.84(.90)	2.22(.67)	1.71(.75)	1.50(1.10)	5.155**
	Getting help	2.51(.81)	2.34(.70)	2.47(.99)	2.78(.38)	2.045
	Social exclusion	2.67(.49)	2.51(.50)	2.72(.46)	2.83(.47)	3.31*

\*<.05 \*\*<.01, \*\*\*<.001

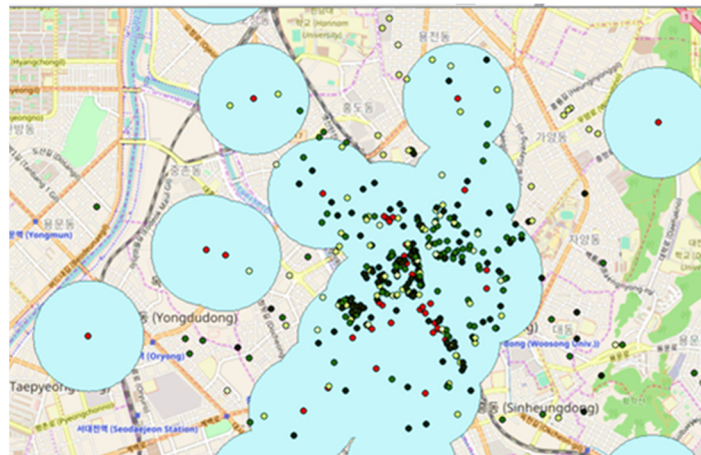
Every variables are based on 5 point scale or 4 point(stigma and social exclusion) except rent.

4.2.2 Meso System: Relations

Residents living in the slum area are said to have little contact with the outside world. Their relations with their parents, siblings and children living outside are cut off. Most of them are living alone because they didn't marry or divorced. Only eight out of 131 respondents (6.1%) said they lived with families. Slum residents do not get psychological or financial support from their families and people outside the slums, but instead build strong ties internally and interdependent with their neighbors. For that reason, the neighboring system is important in order to understand their lives.

Taken into account that most of the residents in the CCA have lived in the place for over 30~50 years, this strong interconnectedness in the CCA is not strange. Neighbors in the CCA are caretakers for each other in order to secure their safety; they drop on daily basis to confirm whether they have eaten meals or that they are not aching alone. Sometimes they share meals, help with chores, and entertain each other. However, they are not always on the good terms with neighbors. Some of them have strong distrust to neighbors saying that they are different from the lazy and immoral neighbors. The neighborhood satisfaction reflects their conflicting attitudes to neighbors. The average score of the neighborhood satisfaction was 3.68 out of 5 point-scale. On the contrary, the surveyed results show they have had very weak bonds with their kinship families living outside. Most of respondents rarely or never have met their families and got little or no help from their families. The average point of relations with outsiders stands at 2.22(1.06).

According to ANOVA analysis, the location of housing made significant differences on residents' relations with neighbors but not on their relations with outsiders. Residents in the CCA had higher neighboring relations followed by the LTPR housings while the CDA residents had the least neighboring relations.



**Figure 2.** Chokbangs' location and 500-meter buffer zone from social service facilities

#### 4.2.3 Exo System: Community

Exo system in this study, the outer layer encompassing the connection between substandard housings falls on the community. The community is geographical and metaphysical concept to include many public or NGO organizations and non-Chokbang residents in the area. The community influences the residents with direct or indirect support and discrimination. Total of 21 organizations including free meal providers, homeless shelters, and other supporting facilities are located within 1 km radius from the center of slum. As shown in Figure 2, most of houses are located within 500 meter from the Chokbang Consulting Center and other welfare facilities.

The welfare system has been argued to deprive recipients of their will to work. The recipients are entitled to benefits and medical services in case they are proven unable to work. Thus, if they work, they are deprived of the entitlement, which are considered the worst situation for most of recipients.

In the Exo system, we analyzed the extent to which people get social welfare and are excluded from society. Data were analyzed based on the frequency of free meals and the frequency of help which residents are getting from the Chokbang Consulting Center and other welfare facilities. Most Chokbang residents are registered in Chokbang Consulting Center to receive support from the government or private charity groups.

The results show that welfare dependency in the aspect of getting free meals is the highest in the CCA(2.22 out of 5) while the CDA(1.71 out of 5) and the LTPR housings area(1.50 out of 5) have significant differences. But there is no meaningful difference in the aspect of getting help from welfare organizations. High dependency on welfare and social support can be explained by the residents' characteristics and the proximity of welfare facilities.

In this study, the stigmatization is used to evaluate their exo system. There are standing signboards of 'access limit for adolescents' in the entrance of the slum area. This signboard is one of many stigmas on residents. Stigma is important factor to measure the residents' social exclusion and to decide rent because housing has implication of social status and makes impact on residents' pride, self-evaluation and their social activities. The average score of stigma was 2.10 out of 4-point scale. Stigma felt by the CCA residents is 1.94 out of 4, followed by 2.07 of the LTPR residents and 2.35 of the CDA residents. The difference is statistically significant. The higher the score is, the higher the extent of stigma is. The residents in the CCA are less stigmatized while the residents in the CDA are more stigmatized. The felt-stigma happens when they are exposed to others. Residents in the CCA have little chance to meet or be exposed the outsiders. However, people in the CDA are living and working with non-welfare recipients and more likely to perceive shame about their own condition.

Additionally, social exclusion is a significant indicator of the exo system. Many of recent researches of poverty incorporate aspects of social exclusion. The definition of 'overall poverty' adopted by the United Nations talks of 'social discrimination and exclusion' and 'lack of participation in decision-making civil, social and cultural life'. Poverty emphasizes social as well as material deprivation, while social exclusion includes a person or a group's ability to participate in social, economic, political and cultural life as well as in their relationships with others [25]. Poverty has a profound effect on some, though not all, of these aspects of social exclusion, this study needs to confirm how housing and environment affected the whole lives of the residents, which is social exclusion.

The results show that residents in the LTPR housing residents have the highest score of social exclusion (2.83 out of 4) while those in the CCA have the lowest(2.51 out of 4). Social exclusion felt by the LTPR residents is significantly higher than the CCA residents. With similar reason of being stigmatized, the LTPR residents feel excluded from the social participation. They have managed to get out of the slum but have not been part of main stream of society by failing to secure adequate job, cultural life and civic right. Differentiations of micro-, meso-, exo- systems according to locations are summarized in Table 2.

#### 4.2.4 Macro System: Government's Housing Policy

Due to its convenient location and mobility, the center of the metropolis, which once had attracted people and commerce, is now undergoing a process of decline. As urban functions and prosperity are moving to other areas, center of urban areas slowly have been depopulated and deteriorated.

The shift from a busy and prosperous street to a slum is related to government policies and interest of construction companies on urban development. Government officials, developers and property owners continue to cooperate or conflict in this process.



The formation and disappearance of slums is inseparable with Urban Development Plan. Urban development in this city is at a standstill before resuming its next development. Understanding this dynamics is not the primary objective of this study, but in the case of large-scale urban development in the region, this process constitutes the resident's macroeconomic system, as some residents are staying due to anticipated compensation.

This study investigates government policies dealing with substandard housing. Housing policies for the poor include two types of housing policies: cash benefits and access to long-term public rental housing. The poor can get into these LTPR housings with collateral money of 500 dollars or 1,000 dollars. The state of the housing is better than those in the Chokbang area. These have one or two rooms with separate kitchen and toilets, although they are shabby and decrepit compared to common housings in other areas. Another good thing that the LTPR housing provides is lower maintenance fee and much less electric and tap water expenses. Though it is a good condition, but it can't be said that this house is popular. The LTPR housing supply was implemented from 2012, but according to a survey by the Urban Environmental Research Center in 2015, only 10% of the policy goal was achieved. The reason why the LTPR housings are not popular is probably their location. When Chokbang residents move to LTPR housings, they get out of the community you've built for the rest of your life because the LTPR housing is located in the suburbs of the city, due to the price of the land. In addition, they not only have traffic problems for workplace access but also deprive of housing choice because the government allocates housing [26].

The survey in this study also showed respondents were not enthusiastic to move into the better housings with cheaper rent. 51.6% of respondents declined moving. For them, moving to the other places meant the disconnection with neighbors. They are willing to pay the extra money to get psychological support from neighbors and other materials like free meal, free medical services and informal provision. The area has premium of poverty to attract attention and support from both public and private service facilities.

According to the survey, respondents were not enthusiastic about moving to a better home with low rents. 51.6% of respondents refused to move. For them, moving to another place meant breaking the connection with their neighbors. They are willing to pay additional money to receive psychological support from their neighbors and other materials, such as free meals, free medical services and donations. The region enjoys a poverty premium to gain interest and support in public and private service facilities. Another barrier is the collateral money, which is a common ritual for housing borrowing in Korea. The amount of collateral money for public rental housing is 500~1,000 dollars. Though the government had set the amount to the minimum standard, the money is out of their reach. They live with about 500 dollars, government subsidy on rent, meals and other small pleasures such as alcohol and cigarettes. To save money, the recipients have to give up for long time the small pleasures or they have to cut off on meals. It takes months or years to save collateral money. However, they are sometimes hit by an unexpected accident like diseases or accidents when the money is almost accumulated. Money would then be blown away. They have to start all over again.

Based on the comprehensive understanding of ecological systems in the slum, authors argue that government provision of LTPR housings does not meet the slum residents' holistic needs and the situation which they are in.

Besides, city developers and property owners are also involved in the process of acceleration of slum. They wish to make the profit by demolishing the slum and constructing new districts. Waiting for the future development, property owners are not motivated to repair the dilapidated Chokbangs. Developers has same standpoint with property owners. The expenses for repair would inflate the total construction money, thus they wish the slum area to be status-quo. In conclusion, policy failure and interests on city development project reinforces the slum dilapidation.

## 5. Conclusions

The 1997 IMF and subsequent economic crisis had driven out the middle-aged salaried men from their workplaces, and further to the streets or Chokbangs. Chokbang, Korean substandard housing, epitomizes the new type of poverty with newly arrived-residents' characteristics. Most of the residents are aged over 60 year-old, living alone, unhealthy, uneducated, and unemployed. They have been deprived of social support and have no hope of getting out of poverty.

Against a backdrop of slum formation and residents' characteristics, the problems surrounding Chokbang are not shown just a matter of substandard housing and inadequate environments. Rather, it is the matter of



extreme poverty and further social exclusion. And it is the neighboring effect that reinforces poverty with a contagious attitude and culture. However, neighbors in the slum are not necessarily negative to residents' lives. On the contrary, the strong community and close networks in the area have been the important resources for residents. Thus, both negative and positive aspects of the slum should be considered.

Multiple systems of housing, neighborhood, welfare, and government's policy on this matter are interrelated and inseparable. In this study, location is an important factor throughout multilateral ecosystems. This study categorized Chokbangs by locations and residents' characteristics: the Chokbang Concentrated Area (CCA), the Chokbang Dispersed Area (CDA), and the Long-Term Public Rental (LTPR) housing. The perspective of person in environment study reveals individual characteristics, neighborhood relations, stigma, social exclusion, and dependency on welfare are all different according to the categorized locations. Chokbangs' difference in manners of residents' characteristics and the ecosystem was revealed by interviews and confirmed by statistical analysis in this study.

The residents in the CCA (the slum) felt less stigma and were most satisfied with their neighbors and the most dependent on welfare. They were very cohesive in the area as they helped each other and had no contact with outsiders. Living within the slum was very beneficiary for them because most of incoming help, from either public support or private charity, had focused on this area. Thus, they were more satisfied with their lives than those who were outside the slum. The residents in the dilapidated area (CDA) that surrounded the slum were found to have fewer contacts with neighbors, were less satisfied with their neighbors and were the least dependent upon welfare. And the smaller numbers of residents in CDA were welfare recipients and larger numbers were participating in economic activity than those in the CCA and the LTPR housings.

The residents in the Long-term public rental (LTPR) housing paid the lowest rent. Most of them had moved from the slum area, which meant their individual characteristics were similar to those living in the CCA. However, they received fewer free meals and less help from the social service facilities. And their neighborhood satisfaction was lower, which presumably resulted from more exchanges with outsider and thus being more stigmatized.

This study's result on satisfaction of residents coincides with other studies. The Korean literature on the slum consistently shows that those living in the slum area have higher satisfaction. Other studies on the slum residents' satisfaction showed that the residents of government-funded public housing who moved from the slum area were satisfied with the status-quo of the housing itself but not with neighborhood. They reported negative responses towards themselves and felt stigmatized by their neighbors. It's also confirmed by the viewpoint of the neighbors who think that the housing price has gone down since the poor people moved in [27].

Another finding of close relations between the housings' location and residents' characteristics also coincides with Ratna Naidu [9]'s work on Indian slums. Hyderabad's walled city in which most of substandard housings were located has two areas: the declared slum and the dilapidated area. The people who lived in these areas did not differ much in terms of median income, but they certainly differed in terms of education, type of occupation, and indeed, educational and occupational aspirations and lifestyles.

Places bring about various differences on residents' perceptions and adaptations. Of particular note is the result of GIS analysis showing that the rent of the CCA is the most expensive despite of its most derelict housing state out of the three. Geographical analysis visually verifies that the rent of Chokbang goes up as it is nearer to the center of slum and to welfare facilities. The most expensive housings, namely, 'penthouse in the slum' are located within 150 meters from the center point, which seems ironical but not strange judging from multilateral aspects of the residents' choice in the slum. GIS made this discovery possible in that data were visualized in the map rather than dealt by address and numbers.

Residents in the CCA pay higher for the psychological support from neighbors and resources provided by social service. The Chokbang area has double meanings to the residents: firstly as a shelter, free meal and medical services, and other support. Chokbangs are the safety zones or exits from the 'survivals get all' fight. Secondly, Chokbang is also a space segregated physically and symbolically from the outside world. They are protected geographically by outsider's judgement, stigma and prejudice. However, the slum in the center of Daejeon city will not provide permanently its properties to residents. The slums harm the beauty of the cities and sometimes cause social conflicts among the residents and property owners when areas are conducting development projects. In the case of the municipal government, the focus of the policy to eradicate poverty is aimed at the existence of slums and concentration of substandard housing. In general, administrative authorities have been swinging from lenient let-go policies to slum rooting and forcing residents to move to other places.

The government usually adopted the policy of dispersing squatters and residents in poor housing from the slum. Another policy is to improve the housing standards and incorporate them into the society's main stream. An example of the latter policy is the newly named Urban Renaissance project in Korea, which aims to improve existing housing and the environment. The authors believe that this policy is consistent with the implications of this study.

We accordingly suggest the government consider the strong connection and positive function of the neighborhood in the slum. And we also propose that the ecological systems theory adopted by this study will be useful perspective for not only the government's substandard housing measure but also poverty policy-making.

**Conflicts of Interest:** The authors declare no conflict of interest.

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