

# **The Seoul Institute Annual Research Digest & Abstracts 2021-2022**

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# The Seoul Institute Annual Research Digest 2021-2022



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## Editor's Note

Greetings from the Seoul Institute.

The Seoul Institute (SI) is a think-tank for the Seoul Metropolitan Government (SMG). Our institute produces policy proposals and recommend new programs for the SMG. More than 90 researchers with Ph.Ds in a variety of urban planning disciplines work tirelessly at the SI. The SI has now been about 30 years since the SI was established as the Seoul Development Institute in 1992. Seoul has been a dynamic city as the city has faced diverse challenges at different periods of time. The role of the SI has changed accordingly.

Seoul has come into spotlight as a city with innovative solutions to urban problems. Every year, officials from local governments in other countries or international organizations visit Seoul and the SI, interested in hands-on experience that Seoul can offer to cities around the world. They are also keen on original SI policy research studies. The SI has been active in sharing our research outcomes with other cities through international cities networks such as Megacity Think-Tank Alliance (MeTTA, <http://global.si.re.kr/metta>).

This book deals with a range of fields in urban policy. It is divided into two parts: Part One (The Seoul Institute Annual Research Digest 2021·2022) provides brief summaries of 15 major research studies conducted in 2020 and 2021. Part Two (The Seoul Institute Annual Research Abstracts 2021) contains the abstracts of 54 research reports published in 2021.

We hope this book provides a good reference to understand urban issues of Seoul and its innovative policy solutions with meaningful implications for cities around the world.

Miree Byun

## 01 Social Policy

### Analysis of the Current State of Issues pertaining to Social Conflicts in Seoul and Policy Implication

Kwonjoong Choh · Seonhae Baik · Jinha Kim

#### Key Message

The Seoul Metropolitan Government (SMG) needs to build administrative governance concerning management of social conflict, which is the result of social evolution.

**Whilst numerous scholars have pinpointed the need to pay attention to and delve into social conflict, COVID-19 situations have impacted Seoul.**

Plenty of scholars focusing on trends in Seoul have stressed the need for research into social discord. They have insisted that social conflict—including phenomena of conflict that are inexplicable using existing methods, challenges that will likely escalate into conflict, novel cultural phenomena and collisions of viewpoint—should be identified.

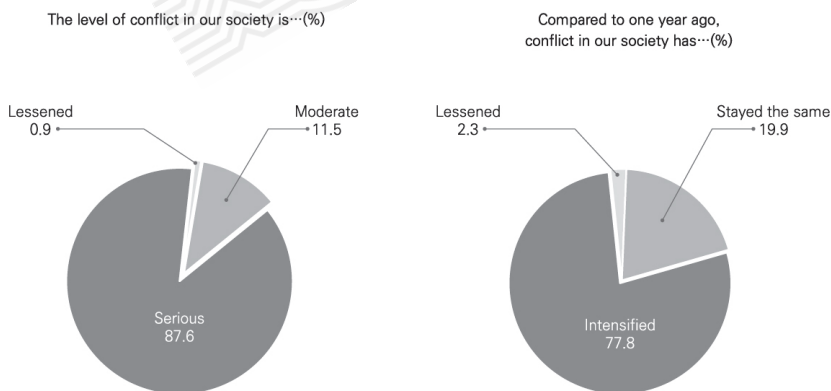
In 2020, the South Korean capital underwent drastic change. Following the arrival of COVID-19, or coronavirus disease, it has had to confront a global epidemic. In an effort to curb its spread, social distancing measures have been in place, which have become another driver of tension. This study examines citizen perceptions of social rifts as well as changes in daily life, new patterns of social conflict and their landscape in the face of the COVID crisis.

With an aim to understand social rifts and propose policy directions, the researchers

explored issues relating to social conflict in a comprehensive manner and performed an on-the-spot assessment. In terms of an all-inclusive approach, they looked at conflict issues through literary research and expert seminars. An online survey of 1,000 Seoulites on their perceptions and attitudes towards societal conflict was also conducted. Three cases on the topic of social conflict during COVID-19 were studied as part of the on-the-spot assessment.

**88 percent of Seoulites believe that “there is considerable and real tension in our society”. The antagonistic relationship between conservatives and liberals was the most-commonly identified source.**

Nine in ten citizens in Seoul view the level of social division in our society as serious. Of this number, a high percentage of respondents (26.5%) describe it as a very acute problem. Accordingly, the overall level of perceived conflict is fairly high.



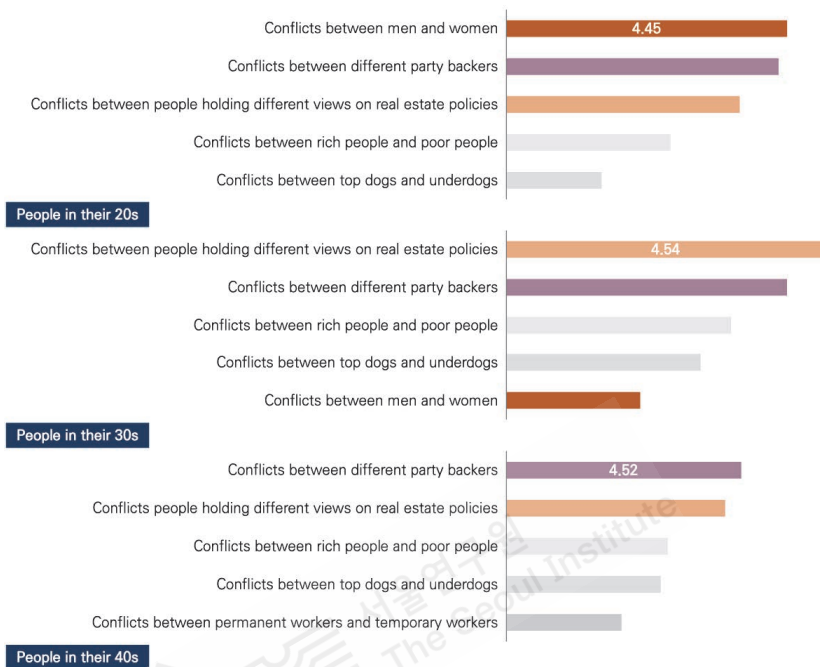
[Figure 1] Perception of Social Conflict among Residents of Seoul

Citizens say the strongest conflicts exist among those supporting different political parties, followed by those holding differing views on real estate policies, the rich and poor and regarding “top dogs” and “underdogs”. There is a general sense that the level of societal conflict is severe. People consider division between different party backers as the most salient reason, rating it an average of 4.49 on a five-point Likert scale. A total of 91.2% of citizens think that there is “very serious” or “serious” conflict between those leaning toward different political parties. The level of perceived division does not differ by gender but varies substantially by age group. Conflict between men and women is the most palpable for respondents in their 20s, who rate it an average of 4.45. In comparison, people in other age groups rate such tensions as not that serious. Seoulites in their 30s regard division between people with different views on real estate policies as the most serious driver of tension (4.54) while those in their 40s see the most serious as the split between supporters of different political parties (4.52).



Notes: Responses were according to a five-point Likert scale in which 1 represents “Not serious at all” and 5 represents “Very serious”

[Figure 2] Perceived Degree of Social Conflict, by type



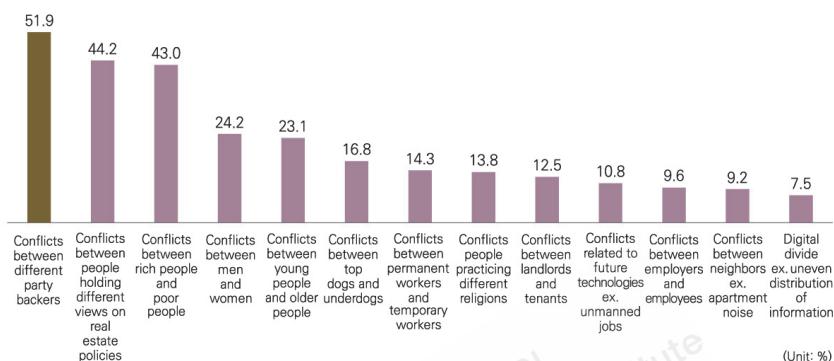
Notes: Responses were according to a five-point Likert scale in which 1 represents “Not serious at all” and 5 represents “Very serious”

[Figure 3] Perceived Level of Seriousness of Each Type of Conflict, by age group

**Divisions between supporters of different political parties are most likely to deepen, followed by tensions between people holding conflicting views on real estate policies and between the rich and the poor.**

Respondents believe that conflicts between different party backers have the strongest likelihood of escalating, followed by disagreements between those with contrasting views on real estate policies as well as divisions between rich people and poor people. This does not markedly differ from those issues perceived as “serious”. Other expectations include a widening of rifts over future technologies (destabilization

of labor markers linked to automation) (10.8%) while 7.5 percent project a widening of tensions over the digital divide (uneven distribution of information and digital exclusion).



[Figure 4] Conflicts Expected to Intensify (based on survey responses)

**A majority say that fostering a social climate where diverse values are respected and nurturing a culture of open communication are effective in managing conflict.**

Most survey respondents think that changes should be made in society as a whole. Effective conflict management methods cited include: Creating a social climate where various values are mutually accepted (4.13 on a five-point Likert scale), building a culture of open communication through talks, discussions and negotiations (4.12 on a five-point Likert scale) and refining incoherent systems that may cause rifts (4.09 on a five-point Likert scale). Most survey respondents are convinced that preventive measures are more effective than reactive measures when dealing with conflict.



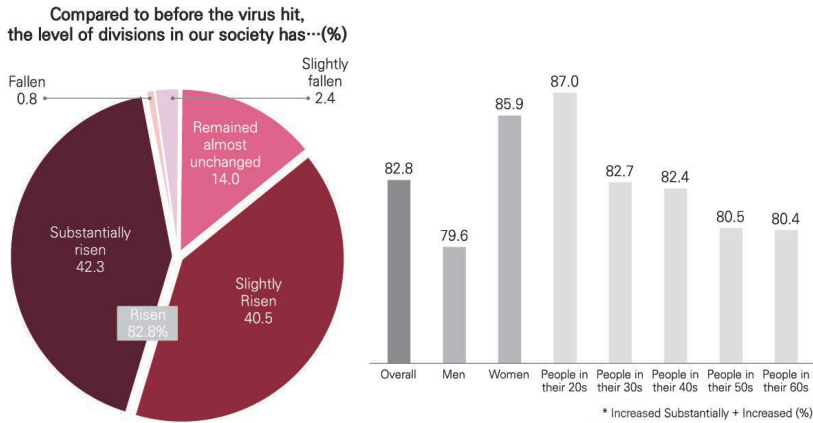
(Unit: mean score on five-point Likert scale)

Notes: Responses were obtained on a five-point Likert scale in which 1 represents “Not necessary at all” while 5 represents “Very necessary”

[Figure 5] Improving the Effectiveness of Conflict Management (based on survey responses)

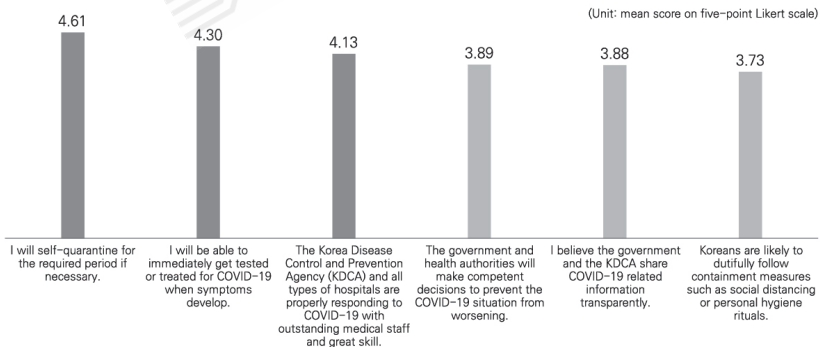
### **Eight in ten Seoulites say “the coronavirus pandemic has worsened divisions in our society”.**

Eighty percent of the people surveyed see our society as more divided than before the virus struck. The share of respondents who perceive divisions have significantly worsened is greater (42.3%) than those indicating they have moderately worsened (40.5%). When analyzing survey results by group segment, more women than men hold a view that the pandemic has increased social divisions. Moreover, younger people are more likely to feel that societal conflict has intensified.



[Figure 6] Changes in Perception of Social Discord Before and After the Coronavirus Outbreak

When it comes to the level of confidence Seoul residents have in specified sectors during COVID-19, trust in themselves and in the medical staff response is high. On the other hand, confidence in the government's handling of COVID-19, in the transparency of information shared and in other people is low.



Notes: Responses were obtained on a five-point Likert scale in which 1 represents "Strongly disagree" while 5 represents "Strongly agree"

[Figure 7] Levels of Trust in Each Sector of Society in the Midst of the Coronavirus Crisis

In terms of the psychological impact of COVID-19, people are worried about themselves or a family member being infected with COVID-19 and very wary of others. The virus is also shifting how people go about their day-to-day lives. For instance, people fear the risk of infection, a breakdown of social relations and difficulties faced when needing to go out or travel. They are enduring inconveniences in everyday life and seeing a drop in their incomes and spending as well. These changes result in intense anxiety and depression. At the same time, disagreements occur in the social domain, particularly in families but also with neighbors or colleagues. Tension also arises while on public transportation or in public spaces. Trust in the government's COVID-19 response, the transparency of information shared, the healthcare system and other people has changed. Against this backdrop, the pandemic has engendered feelings of reluctance, hatred and discrimination.

### **Social conflict during COVID-19: disrupted everyday lives, reduced availability of childcare services and growing disputes over apartment noise**

The labor market has been rocked by the coronavirus. Childcare centers, cram schools and other community facilities were closed for varying lengths of time. As returning to elementary school was delayed and classes transitioned to remote learning, children attended classes only occasionally. Working mothers lost their jobs or took time off of work due to prolonged difficulties tied to the COVID-19 pandemic, including employer financial struggles and a shortage of childcare services.

With the unstable circumstances that occurred during the COVID-19 pandemic, guardians had no choice but to care for family members themselves. More and more daycare centers closed and professional caregivers were restricted from visiting homes amid concerns over community spread of the virus. With the difficulties of receiving assistance from grandparents or siblings, families shouldered the entire burden of family care, with women taking on most of that burden. Disrupted social care services pushed more women back into the home to take care of family members.

The COVID-19 crisis has expanded the number of people working remotely and kids have spent more time at home since the beginning of the school year was postponed or schools switched to remote learning. Accordingly, the number of conflicts over apartment noise went up. Even when noise levels were not above a certain decibel level, many people filed complaints or argued with their neighbors. With more time spent indoors and increased rates of depression and loneliness, the frequency of neighborhood conflicts about apartment noise picked up.

### **Social conflict during COVID-19: Questioning fairness and trust at schools and workplaces at a time of contactless interactions.**

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Our society has quickly had to embrace a contactless era due to the COVID-19 crisis. Hence, businesses have moved to their employees working remotely and schools have moved to remote learning, both on an unprecedented scale. This had to be done despite the lack of preparation for such a transition. Due to the pace of establishing operating systems or varying levels of adaptability to non-face-to-face work, new problems such as competing interests and conflicts among individual members have cropped up.

The high degree of sensitivity to fairness in the current generation of college students is reflected in the controversy over tuition refunds. Such requests were made owing to the lower quality of online instruction, unfair grading systems and frustrations over a loss of the opportunities and support a college campus offers. It was found that conflicts in remote work situations can be mainly attributed to distrust between employees and employers regarding time and attendance management as well as performance measurement. In remote work environments, workers worry about job security, whereas companies worry about productivity. The root cause of tensions related to remote work and remote learning is distrust in the workforce, rather than the challenges that arise in a “zero-contact environment” during the transition period.

### **Social conflict during COVID-19: Distrust of multicultural families “with different cultures and backgrounds”**

COVID-19 has strengthened democratic citizenship while sowing the seeds of suspicion towards strangers. Or to put it differently, local communities have seen both trust and distrust, two contradictory feelings, become more visible in all corners. Before the onset of COVID-19, as people of different cultures and backgrounds lived together, there were disagreements in everyday life. However, news outlets reported that the coronavirus was first detected in the Chinese city of Wuhan as the total number of confirmed cases of COVID-19 grew. Rifts stemming from hatred and bigotry gradually emerged. This type of conflict was especially common in schools and workplaces.

At schools, local students and parents voiced concerns and discontent about sharing classrooms, assembly halls and cafeterias with Korean Chinese students. A lot of Korean Chinese—paid caregivers, domestic workers, restaurant employees—lost their jobs on the grounds of their ethnicity, or were suddenly dismissed. Immigrants expressed dissatisfaction over being excluded from policy.

### **The SMG should offer comprehensive solutions, including drawing attention to social conflict and building a monitoring framework.**

Looking back on the division that has plagued our society these days, the researchers put forward several suggestions for better governance by the municipality.

First, there is a need to drum up interest in the awareness of social discord. Second, it is crucial to recognize the social conflicts surrounding the COVID-19 pandemic, whose effects have certainly not been limited to 2020—the year it began. Rather, social discord has originated from the crises around the globe fueled by globalization in the midst of climate change. Third, on-the-spot interviews should be carried out so as to better comprehend conflicts occurring in everyday life. Fourth, it is advisable to

research social strife through case studies. Social conflict is complex, with each case being potentially unique in terms of cause, type and patterns. The SMG can improve its abilities to defuse tensions through the continued collection of data on cases and conflict resolution experiences. Fifth, it is pivotal to ensure the autonomy of civil society. What is important about the governance of conflict is that citizens themselves cause strife, but at the same time, they are the ones who can end it. The public sector starts getting involved in resolving social disagreements by facilitating citizens coming up with solutions themselves. Lastly, a framework for monitoring social disagreements is required. It is paramount to amass and systemically manage such data in an attempt to emphasize sites and cases and improve the ability to settle the conflicts prevailing in society.

A more desirable society can be brought about by endeavoring to overcome social division and enhancing the ability to de-escalate disagreements among citizens.

Dynamic balance, not static balance, is a prerequisite for social integration in an ever-changing society.

Social discord is a key driver of social change. Moreover, we can integrate the different segments of society through efforts to ease social tensions. Social conflict sets a foundation for social integration in an inclusive cultural environment.

## Effects of Heatwaves on the Lives of Seoulites

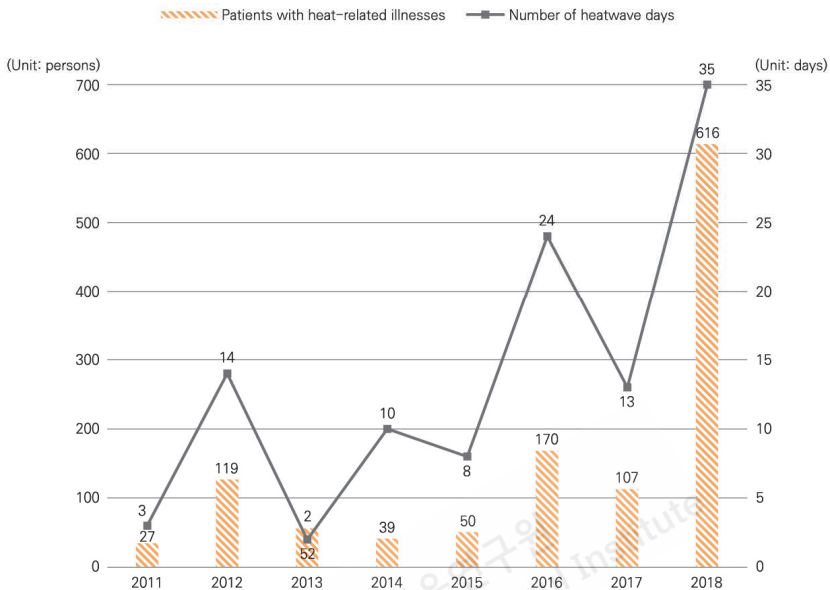
Hyunchan Ahn · Changwoo Shon · Incheol Shin · Ikhyun Jang · Hyunchan Pakk  
Hangmoon Cho · Jungah Kim · Junghyun Lee · Hyerim Lee · Jiwon Choi

### Key Message

There is a need to accommodate shifts in the lives of Seoulites and provide assistance tailored to the characteristics of the heatwave-vulnerable through policy measures.

**For the sake of instituting countermeasures against heatwaves, a preliminary study of socio-cultural impacts should be carried out.**

As the Earth's climate is changing at an accelerating pace, the frequency and intensity of heatwaves and resulting damage have increased worldwide. All indicators—including average temperature, maximum air temperature, total heatwave days, people suffering from heat illnesses and death toll from heat—have hit record highs in South Korea since summer 2018. Seoul had the second highest number of people with heat-related illnesses among the nation's 17 special cities and provinces. Groups and geographical areas particularly more susceptible to safety hazards are largely affected by excessively hot weather. Heatwaves have impacted every facet of our lives, altering how we work, consume, communicate with one another and spend our free time. Therefore, there is growing consensus among Koreans about the need to examine the social impacts of heatwaves and take appropriate action against them.



[Figure 8] Number of People Suffering from Heat Illnesses and Number of Heatwave Days in Seoul, 2011—2018

But the central government and the Seoul Metropolitan Government (SMG) have still devised heatwave response plans, following the Framework Act On the Management of Disasters and Safety that presuppose the occurrence of natural disasters. In 2019, the comprehensive heatwave plan of the central government and the SMG was composed of 65 policies in 8 areas. Social policies in welfare and labor account for the highest share of all policies (at 22) but they principally focus on providing emergency relief to vulnerable populations. One rationale behind this is that there is a dearth of data about how heatwaves affect society.

The SMG needs to take comprehensive and fundamental steps to address heatwave events. To that end, it is paramount to conduct a preliminary study examining socio-demographic data amassed during extended periods of hot weather on the adverse effects heatwaves have on Seoulites' lives. In this context, we conducted

in-depth interviews with the heat-vulnerable and a panel survey on people's lives in Seoul. The main findings are as follows.

**Each vulnerable population group encounters different difficulties in everyday life during heatwaves, depending on their characteristics; these difficulties include reduced frequency of eating and heat-related illnesses.**

Given physical/social/environmental factors of national and international standards, we designated the following eight population segments as at-risk groups:

- Older people
- Children
- Outdoor workers
- The housing vulnerable
- Pet owners
- Single-person households
- Low-income households
- People with chronic medical conditions

Extensive interviews with a low-income senior citizen, a member of a household with multiple children, an apartment security guard, a food delivery driver and a member of a single-person household with a pet were held. The reason for this choice of interviewees is that each one had more than one characteristic of at-risk groups. Through the interview process, we derived socio-demographic information and asked questions about thermal environments of dwellings/work areas and everyday life, their experiences with heat illness (and any treatment) as well as policy needs.

The interviews revealed challenges unique to each vulnerable group. They covered an array of difficulties when heatwaves strike, beyond simply heat-related illnesses. For instance, elderly persons have difficulty performing household chores and eating. Physical and economic pressures placed on households with multiple children and

those with pets intensify. Delivery persons use personal protective equipment which can hinder the dissipation of body heat while working and an extended period of hot weather leads to a spike in the number of orders. Thus, they are at higher risk of heat-related incidents.

As a solution to these problems, social policies associated with diverse areas that engage members of the community are proposed. For households with young children and those with pets, some venues have a “No kids/no pets allowed” policy. Social perceptions of kids and pets should change so such households can have freer use of public, air-conditioned facilities. Subsidizing electricity bills for cooling is also required. Cooperation from residents is important to ensure apartment security guards will run the air conditioners as necessary and avoid working outside for an extended amount of time on summer days. For food delivery drivers, it is critical to minimize the risk of accidents and protect them from heat exposure. This may involve increasing delivery fees in a bid to enhance their work environment safety. Such fees should be jointly covered by third-party food delivery services, restaurants, and consumers as well.

### **A panel survey identified Seoulites’ lifestyle habits including sleep, eating and leisure activity throughout the prolonged period of hot weather in 2019.**

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Through a panel survey, we understood how Seoulites went about their lives and the extent to which extreme heat contributed to changes in lifestyle habits during an extended spell of hot weather in 2019. Data about sleep habits, eating behaviors, free time activities, social interaction and health and behaviors were collected through three phases of the survey, conducted in early summer, midsummer, and early autumn. The survey undertaken in midsummer dealt with experiences with and responses to heat illness as well as perceptions of and demand for government action on heatwaves.

[Table 1] Details of the Panel Survey on the Lives of Seoulites during an Extended Period of Extreme Heat

Number of times	Item	Question details	
Once (independent)	S. Basic information	Individuals	<ul style="list-style-type: none"> <li>• Sex</li> <li>• Age</li> <li>• Educational attainment</li> <li>• Occupation</li> <li>• Work setting (indoor or outdoor)</li> </ul>
		Households	<ul style="list-style-type: none"> <li>• Household composition</li> <li>• Pet/no pet</li> <li>• Household income</li> </ul>
		Thermal environment	<ul style="list-style-type: none"> <li>• Housing type</li> <li>• Location</li> <li>• House size</li> <li>• Existence and use of air conditioning system</li> </ul>
		Chosen days to recall	<ul style="list-style-type: none"> <li>• Choose one day from each week and weekend to recall for responding to questions</li> </ul>
Panel (dependent)	A. Sleep	Quality and quantity	<ul style="list-style-type: none"> <li>• Time going to bed and waking up</li> <li>• Sleep quality</li> </ul>
	B. Eating habits	Meals	<ul style="list-style-type: none"> <li>• Meals eaten/skipped</li> <li>• With whom meals were shared</li> </ul>
		Purchasing and consuming food	<ul style="list-style-type: none"> <li>• Intake of summer favorites ranging from frozen treats to iced coffee</li> <li>• Purchase of fresh food and Methods used to purchase groceries</li> </ul>
	C. Free time	Ordinary leisure time	<ul style="list-style-type: none"> <li>• Leisure activities?</li> <li>• Sedentary/active?</li> <li>• Venue (indoor/outdoor)</li> </ul>
		Summer vacations	<ul style="list-style-type: none"> <li>• Summer vacation in 2019?</li> <li>• Vacation type (once)</li> </ul>
	D. Movement	Transport modes	<ul style="list-style-type: none"> <li>• Main transportation mode used during work commute</li> </ul>
	E. Social interaction	Social groups	<ul style="list-style-type: none"> <li>• Parents living in another household</li> <li>• Friends</li> <li>• Neighbors</li> </ul>
		Methods	<ul style="list-style-type: none"> <li>• Interaction with others?</li> <li>• Ways to make social contact (face-to-face/contactless)</li> <li>• Venue</li> </ul>

Number of times	Item	Question details	
	F. Health and behaviors	Health	<ul style="list-style-type: none"> <li>• Interviewee's opinion of own health</li> <li>• Existence of chronic health condition</li> <li>• Mental health</li> </ul>
		Health behaviors	<ul style="list-style-type: none"> <li>• Walking</li> <li>• Moderate physical activity</li> </ul>
	G. Experience with symptoms of heat-related illness	Experience	<ul style="list-style-type: none"> <li>• Existence of heat illness symptoms?</li> <li>• Frequency</li> <li>• Venue</li> <li>• Treatment</li> </ul>
		Response	<ul style="list-style-type: none"> <li>• Heatwave advice followed?</li> <li>• Effectiveness</li> </ul>
Once (independent)	H. Perception of and public demand for policies on heatwaves	Policy directions	<ul style="list-style-type: none"> <li>• Who should be in charge of responding to extreme heat?</li> <li>• Priorities</li> <li>• Willingness to support policies</li> </ul>
		Policy assessment	<ul style="list-style-type: none"> <li>• Are you aware of heatwave policies?</li> <li>• Communication channels</li> <li>• Policy credibility</li> <li>• Effectiveness</li> </ul>
		Policy demand	<ul style="list-style-type: none"> <li>• Use of heat-relief shelter or sun umbrella</li> <li>• Preference for and effectiveness of the right to refuse work under conditions that may jeopardize one's own health or safety</li> </ul>

Details of the responses to the survey on Seoulites' lives during heatwaves in 2019 are presented in [Table 2]. Findings of existing surveys or information delivered through news articles show only fragments of the impact on people. In contrast, the panel survey results demonstrate, with specific data, day-to-day impacts on life for those expected to be most affected by extreme heat. Of particular note is that data on the percentage of people who experienced symptoms of heat illness indicates the reality of mild heat illness missed by the monitoring framework for heat-related illness. Data on eating habits, leisure activities and travel patterns can be used as basic information for relevant policies related to food, culture, sports and transportation. It can also be

utilized in designing healthcare services to be provided during prolonged periods of hot weather.

Two features of the heatwaves in 2019 and their impact on residents of Seoul are as follows:

- 1) There are few distinct differences in results of surveys performed in early summer and in early fall. The summer of 2019 was cooler and there were fewer heatwaves and so may not have drastically altered Seoulites' way of living. But this may simply be a statistical artifact. We compared and analyzed data collected on three occasions to sort out groups of individuals influenced by extreme heat in an attempt to correct the statistical error.
- 2) The life impacts from heatwaves vary according to the individual characteristics of vulnerable population groups. For example, outdoor workers reported the poorest sleep quality while households with young children most frequently ordered in and ate out for dinner. Low-income households and housing vulnerable groups reported the lowest frequency of interaction with parents not living in the same household.

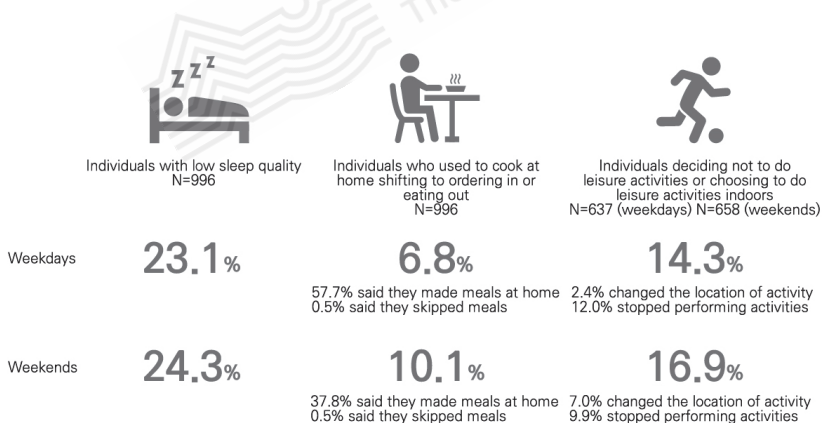
[Table 2] Details of the Findings of Survey on Seoulites during an Extended Period of Hot Weather in 2019

Item		Details
Heat illness	Whether experienced/ Number of times	<ul style="list-style-type: none"> <li>• Individuals who suffered from heat-related illness during a week of heatwave: 12.8%</li> <li>• On average 2.1 times</li> </ul>
	Time and place of occurrence	<ul style="list-style-type: none"> <li>• 1 to 3 p.m. 42.8%</li> <li>• At home 26.1%</li> </ul>
	Treatment	<ul style="list-style-type: none"> <li>• Rehydration or Rest 74.3%</li> <li>• Doing nothing 11.8%</li> </ul>
Cooling appliances	Electric fans	<ul style="list-style-type: none"> <li>• Percentage of individuals possessing electric fans: 95.5%</li> <li>• Weekdays: average daily use for 6.59 hours/day</li> <li>• Weekends: average daily use for of 8.44 hours/day</li> </ul>
	Air conditioners	<ul style="list-style-type: none"> <li>• Percentage of individuals possessing air conditioners 92.7%</li> <li>• Weekdays: average daily use for 4.84 hours/day</li> <li>• Weekends: average daily use for 6.63 hours/day</li> </ul>

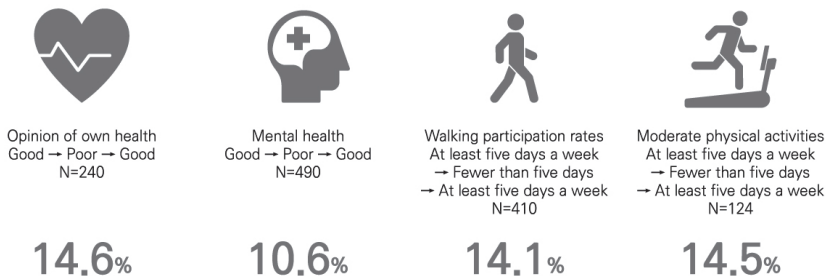
Item		Details
Sleep	Quality of sleep	<ul style="list-style-type: none"> <li>• Weekdays: 4.38 out of 7 points</li> <li>• Weekends: 4.62 out of 7 points</li> </ul>
Eating	Eating habits concerning evening meal	<ul style="list-style-type: none"> <li>• Home-cooked meals 74.6%</li> <li>• Ordering in or eating out 22.4%</li> </ul>
	Intake of summer favorites (average weekly)	<ul style="list-style-type: none"> <li>• Home-meal replacement: 1.61 times</li> <li>• Iced coffee: 3.84 cups</li> <li>• Shaved ice/frozen treats: 2.13 times</li> <li>• Beer: 1.99 cans</li> </ul>
Free time	Summer vacations	<ul style="list-style-type: none"> <li>• Travelling domestically or abroad 64.2%</li> <li>• “Staycation” (at hotel) 22.6%</li> <li>• Didn’t go anywhere 43.8%</li> </ul>
	Ordinary leisure activities	<ul style="list-style-type: none"> <li>• Indoor activities 45.7%</li> <li>• Outdoor activities 10.5%</li> <li>• Did nothing 43.8%</li> </ul>
Travel	Transport modes for work commute	<ul style="list-style-type: none"> <li>• Mass transit 58.8%</li> <li>• Private vehicles 25.8%</li> <li>• On foot/by bike 14.9%</li> </ul>
Social contact	Parents (not living in same household)	<ul style="list-style-type: none"> <li>• Face-to-face communication 18.0%</li> <li>• Contactless communication 33.9%</li> <li>• No communication at all + Other 48.1%</li> </ul>
	Friends	<ul style="list-style-type: none"> <li>• Face-to-face communication 38.5%</li> <li>• Contactless communication 45.0%</li> <li>• No communication at all + Other 16.6%</li> </ul>
	Neighbors	<ul style="list-style-type: none"> <li>• Face-to-face communication 38.5%</li> <li>• Contactless communication 45.0%</li> <li>• No communication at all + Other 62.6%</li> </ul>
Health and behaviors	Health	<ul style="list-style-type: none"> <li>• Opinion of own health (Good) 21.2%</li> <li>• Mental health (Good) 47.9%</li> </ul>
	Healthy behaviors	<ul style="list-style-type: none"> <li>• Walking 35.1%</li> <li>• Moderate physical activity 11.4%</li> </ul>

**5 to 24 percent of citizens in Seoul say heatwaves affect them in far-reaching ways. A decline in sleep quality and health as well as changes in dietary habits along with leisure activities were cited.**

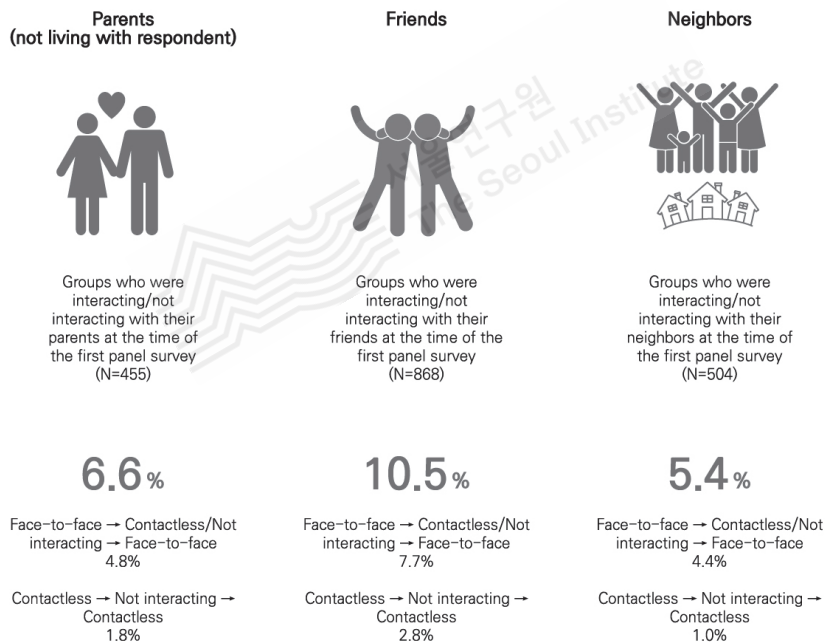
By daily life impacts, the percentage of those who experienced a deterioration of sleep quality was 23.1 to 25.3 percent. Respondents who decided against cooking at home and ordered in or ate out constituted 6.8 to 10.1 percent, while 14.3 percent skipped activities and 16.9 percent moved their leisure activities from outdoors to indoors. Seoulites who felt their own health had worsened and those whose mental health deteriorated constituted 14.6 percent and 10.6 percent, respectively. Respondents who walked less and participated less in moderate physical activity stood at 14.1 percent and 14.5 percent, respectively. Those who had reduced social contact (altering communication methods from face-to-face to contactless or no interaction) with parents not sharing the same household, friends, and neighbors represent 6.6 percent, 10.5 percent, and 5.4 percent, respectively.



[Figure 9] Percentages of Respondents whose Sleep, Eating Habits, and Leisure Activities were Negatively Affected by Heatwaves

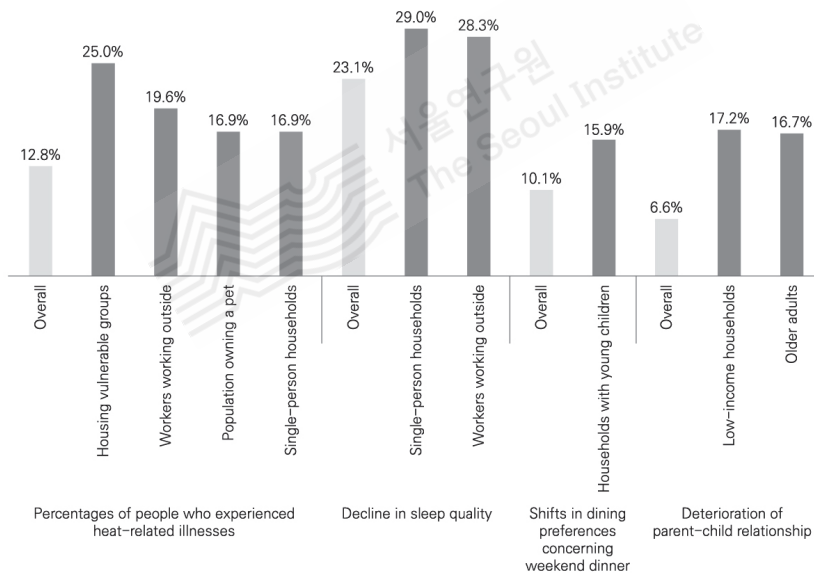


[Figure 10] Percentages of Respondents whose Health and Behaviors were Negatively Affected by Heatwaves



[Figure 11] Percentages of Respondents whose Social Networks were Negatively Affected by Heatwaves

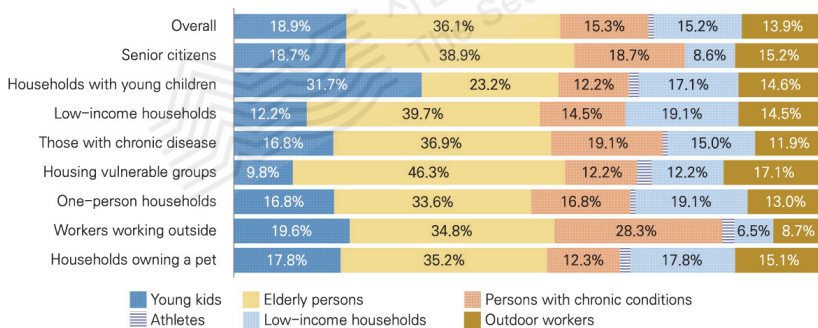
Lifestyle changes differ widely among at-risk groups according to their varied attributes. The percentages of outdoor workers, housing vulnerable groups, single-person households, and pet owners who experienced heat-related illness are greater than their share of the overall population in Seoul. The prevalence rates of poor sleep quality are highest among one-person households and workers working outside. A substantial share of households with young children switched from eating in to dining out for dinner. Low-income households and the elderly most rarely interacted with parents not living with them. Preventive measures against heat illness and emergency relief are essential. Furthermore, we could reaffirm the significance of rendering assistance customized to each group's individual needs.



[Figure 12] Those most Vulnerable to the Effects of a Prolonged Heatwave, compared to the Others Living in the South Korean Capital

**As extreme heat is a severe threat, national action is absolutely required. The role of local governments and civic engagement are also significant.**

In spite of the fact that Seoulites regard heatwaves as a serious problem, they believe that protecting the health vulnerable should be the focus of policy, as is the case for the current policy direction. Major natural/societal risks include cold waves, extreme heat events, fine particles, hazardous chemicals in everyday produce, and infectious diseases like MERS. Heatwaves ranked second in terms of the intensity of impacts on human life and health, with average ratings of 5.40 and 5.26, respectively, on a 7-point rating scale. Targeted or selective disaster assistance is more appropriate than general assistance, according to 46.1 percent of respondents, while 36.1% believe seniors are most in need of aid, followed by young children (18.9%), and individuals with long-term medical conditions (15.3%).



[Figure 13] Population Groups that Require Special Consideration in terms of Planned Heatwave Response

The government's response is deemed central to protecting people from extreme heat, but respondents feel that the role of local governments and engaging citizens are also pivotal. About half of those surveyed consider the central government as chiefly responsible for coping with heatwaves (45.6%). Individuals, the SMG, autonomous

*gu*-districts,<sup>1</sup> and neighborhoods came next at 26.0 percent, 16.9 percent, 7.0 percent, and 3.5 percent, respectively. Forty-one percent of respondents are willing to join efforts to help those adversely affected. It is fair to say that the perceptions of extreme heat response efforts are changing among citizens in Seoul. They support government-led efforts targeting socially vulnerable groups. At the same time, they feel the need for social solidarity such as through public-private partnerships and civic involvement.

**Using policy measures to offer assistance tailored to the needs of each vulnerable population group is desirable, as for responding to life impacts for residents of Seoul.**

There are several improvements the SMG should make to draw up further comprehensive and key coping strategies considering the impact of heatwaves on our society.

First, it is important to broaden the scope of vulnerable groups and personalize support according to each population group's needs with a specific focus on the troubles that they have in daily life. The SMG has to take into account not just physical/economic factors, but social and environmental ones when designating at-risk groups. Then, the circumstances surrounding citizens exposed to extreme heat will be readily identified. Moreover, it is advisable to deal with difficulties unique to each vulnerable population group in a delicate manner. Assistance can then be individualized to help them lead healthy lives.

Second, the SMG's role should be expanded from providing emergency relief to responding to social changes. Heatwaves can alter all aspects of life such as labor, consumption habits, leisure activities, transportation, and social contact and health.

<sup>1</sup> "Gu-district" is an administrative unit in Korea. There are 25 autonomous *gu*-districts in Seoul, divided into 426 administrative "dong" districts.

This can result in gradual and lasting damage. Accordingly, administrative bodies should endeavor to review a range of social policies around predicting such long-term shifts. In enforcing social policies which have a direct and daily impact on residents, public-private partnerships and civic participation are more effective than active intervention by public bodies. Workers can exercise the right to refuse work under conditions that may jeopardize their health or safety in France, while the US city of New York runs a Community Preparedness program. These examples show that building the understanding of the public, transforming public perceptions, sharing resources and responsibilities and cooperation and support are prerequisites for building urban resilience to extreme heat.

Lastly, there is a need to regularly administer surveys to gather reliable data towards monitoring heatwave-induced changes in people's lives. It would be ideal for the SMG to work together with government authorities in executing heatwave plans when carrying out such surveys. Along with these joint surveys, we also suggest that the SMG conduct its own examination so as to identify the unique attributes of Seoul, where there are fewer workers in primary industries and a higher urbanization rate compared to other areas across the country.

## A Study on the Current Status of Social Loneliness and Isolation of Single-person Households in Seoul, and Interventions

Seongah Kim · Minjin Park · Jungah Kim

### Key Message

It is critical to specifically identify the forms and characteristics of loneliness and social isolation faced by single-person households and provide appropriate solutions.

**With the increase in numbers of those living alone, loneliness and social isolation have become major social concerns.**

Rapid population ageing, marrying late, low fertility rates and climbing divorce rates have fueled the dramatic growth in single-person households. Loneliness and social isolation on an epidemic scale, increasingly recognized as the newest social afflictions, are not merely individual troubles, but problems for all of society. Thus, there is a need for action and effective prevention. In 2021, the Seoul Metropolitan Government (SMG) created a Single-person Household Policy-framing Taskforce in a bid to combat loneliness and social isolation among adults living alone. However, failure to evaluate the prevalence of loneliness and social isolation in single-person households and understand policy demands has made it difficult for the SMG to pursue relevant strategies. A number of programs for those living alone exist. The issue is that there is a lack of programs specific to each type of loneliness and isolation so the SMG has limited ability to implement policies in an effective way. The objective of this study is to present preliminary data which will be useful in formulating effective measures in this area. This study categorizes different types of loneliness and social isolation among single-person households and analyzes each one in depth.

**Single-person Support Centers play a central role in running programs aimed at reducing loneliness and social isolation. Due to a dearth of standard tools for measuring emotions, it is hard to deliver programs that reflect the unique needs and lifestyles of those living alone.**

The Single-person Household Support Center in each *gu*-district currently provides services concerning interventions into loneliness and social isolation among single-person households in Seoul. Programs they administer include assessing mental health and consulting, strengthening social connections, preventing lonely deaths, and coordinating with other programs. Yet a lack of standard tools for gauging the feelings of loneliness and social isolation hinders accurate diagnosis of the problems. In the absence of baseline data on the nature of loneliness and social isolation among single-person households, solutions are not detailed nor customized enough to effectively tackle the public health issues.

**A recent survey revealed that 62.1 percent of Seoulites living alone experience loneliness and 13.5 percent feel socially isolated.**

Survey results show that 62.1 percent and 13.6 percent of single-person households feel lonely and socially isolated, respectively, and those who experience both feelings constitute 12.8 percent. Men are more likely than women to be classified as facing loneliness and social isolation (13.3%). People in early and late middle age (14.4 %) and those with a monthly income of less than KRW 1 million (18.1%) are more likely to suffer from both feelings. When looking at gender, age, and marital status, the two conditions are most prevalent among widowed men in their early and late middle age (17.1 %) and divorced or separated men in their early and late middle age (17.0 %).

We explored the links between loneliness, social isolation, and mental health among adults living alone. Most socially isolated persons feel lonely (loneliness > social isolation) and all individuals with depression, suicidal thoughts and other mental

health conditions have feelings of loneliness (loneliness > depression, depression > suicidal thoughts). To sum up, it is reasonable to conclude that loneliness is a necessary and predisposing factor leading to higher risk of social isolation, depressive symptoms, and suicidal thoughts.

**There are four types of social and mental health problems among single-person households. Coping strategies should differ according to type.**

The researchers categorized social and mental health concerns in adults living alone: people living with loneliness, people living with isolation, people living with loneliness and depression, and people living with isolation and depression. People experiencing only the feelings of loneliness—without social isolation or other mental health challenges—make up 45 percent of all single-person households in Seoul. Ten percent of lonely people feel isolated from society. Individuals suffering from loneliness and mental difficulties such as depression and suicidal thoughts represent 5 percent. Those suffering from loneliness, isolation, and mental health issues constitute 3 percent of all single-person households. Broadening social networks needs to be included in coping strategies for groups beset with social health problems including people with loneliness and those with isolation. As groups dogged by both social and mental health issues see a need for and intend to use mental health care/counseling services, treatment and counseling should be part of the strategies. As most people suffering from loneliness are financially vulnerable, it is important to help them, in a variety of ways, to achieve financial independence, such as through job matching. Those suffering from isolation are not passionate about making social connections or willing to take care of themselves. Therefore, health- and safety-related policies should be embedded in strategies.

[Table 3] People in Single-person Households in Seoul Suffering from Different Types of Social and Mental Health Issues, and Policy Demands

	People suffering from loneliness	People suffering from isolation	People suffering from loneliness & depression	People suffering from isolation & depression
Type	Social health	Social health	Social & mental health	Social & mental health
Percent of households surveyed	45%	10%	5%	3%
Occupation	Economically inactive/unemployed	Blue collar jobs	Unemployed & Management or professional jobs	White collar jobs & Management or professional workers
Income level	Low ▽ ▽ High	Low ▽ Middle	Low ▽ ▽ Middle	Middle and high
Summary of attributes	<ul style="list-style-type: none"> <li>• Financially vulnerable</li> <li>• Considerable need for social connection</li> </ul>	<ul style="list-style-type: none"> <li>• Less need for social ties</li> <li>• Intense desire for healthcare</li> </ul>	<ul style="list-style-type: none"> <li>• Financially vulnerable</li> <li>• Physically and mentally vulnerable</li> <li>• Demand for shared housing</li> </ul>	<ul style="list-style-type: none"> <li>• High incomes</li> <li>• Enthusiastically participating in recreational activities</li> <li>• Demand for mental health assessment and consulting</li> <li>• Need to prevent lonely deaths</li> <li>• Desire to ensure safety</li> </ul>
	<ul style="list-style-type: none"> <li>• Willing to be with others but insufficient opportunities to make social contacts</li> <li>• Endeavoring to deal with loneliness in a proactive manner</li> <li>• Great demand for policies on social connection → Can help with cultivating social relationships and gaining financial independence</li> </ul>	<ul style="list-style-type: none"> <li>• A high proportion of adults in early and late middle age</li> <li>• Managing loneliness passively</li> <li>• Passively taking part in recreational activities</li> <li>• People in early and late middle age wishing to take control of their own lives → Can help with cultivating social relationships and access to healthcare services</li> </ul>	<ul style="list-style-type: none"> <li>• A high proportion of older adults</li> <li>• Very willing to live in shared housing</li> <li>• Facing critical financial struggles</li> <li>• Subjective physical/mental health status: poor → Can provide financial support and healthcare services</li> </ul>	<ul style="list-style-type: none"> <li>• Those with relatively higher incomes</li> <li>• A large share of management/professional workers and white collar workers</li> <li>• Subjective health status: good</li> <li>• A substantial proportion of women with needs for security → Can furnish opportunities for professional counseling, ensuring safety and preventing lonely deaths with smart technology</li> </ul>

	People suffering from loneliness	People suffering from isolation	People suffering from loneliness & depression	People suffering from isolation & depression
Intervention strategies	<ul style="list-style-type: none"> <li>• <b>Foster greater social connection</b> Using ① the Single-person Support Center and ② leisure and cultural programs run by public facilities</li> <li>• <b>Render financial assistance</b> Offer job placement services in tandem</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Foster greater social connection</b> Using ① the Single-person Support Center and ② leisure and cultural programs run by public facilities</li> <li>• <b>Deliver healthcare</b> Encourage healthy aging</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Offer mental health assessments/ counseling services</b> (SMG's Life-sustaining Stethoscope program)</li> <li>• <b>Render housing assistance</b> Provide shared housing opportunities</li> <li>• <b>Render financial assistance</b> Offer job placement services in tandem</li> <li>• <b>Deliver healthcare</b> Maintain physical and mental health</li> </ul>	<ul style="list-style-type: none"> <li>• <b>Offer mental health assessments/ counseling services</b> (SMG's Life-sustaining Stethoscope program)</li> <li>• <b>Bolster safety and stop lonely deaths from happening</b> Harness smart technology</li> </ul>

**When it comes to vulnerable single-person households, interventions involving local private resources and communities are more effective than public ones.**

The researchers conducted interviews with 20 people at risk of housing/financial vulnerability and lacking social interaction and staying in gosichon—residences for civil service examinees—located in Daehak-Dong, Gwanak-Gu, Seoul. Their experience with loneliness and social isolation differs from that of ordinary single-person households. Only 30 percent of the interviewees said they felt lonely, whereas 62.1 percent of all single-person households in Seoul reported loneliness. However, vulnerability to feeling isolated from society among these 20 interviewees stood at 65 percent, or approximately five times higher than among all adults living alone in Seoul. Sixty percent of vulnerable single-person households require medical treatment and 84.6 percent, classified as socially isolated, have symptoms of depression. The majority of single-person households living in gosichon have relatively little in-person social contact. Despite that, they are somewhat reluctant to

build social connections. They also encounter formidable psychological barriers to leaving their residence. Relevant policies and programs are dimly perceived because they have a tendency not to make use of services/programs operated by autonomous *gu*-district offices and Single-person Support Centers. Accordingly, it is crucial to utilize local private resources and communities as means of benefiting passive and involuntarily single-person households through policies targeting those living alone. Fostering an environment where relations and closer rapport can be established through local community groups is essential. There is a need to offer spaces for local communities so that adults who live alone can naturally get together as well.

**It is pivotal to divide single-person households in Seoul into three groups: general, vulnerable, and confined. Organizations responsible for delivering services and programs should vary their services and programs for each group.**

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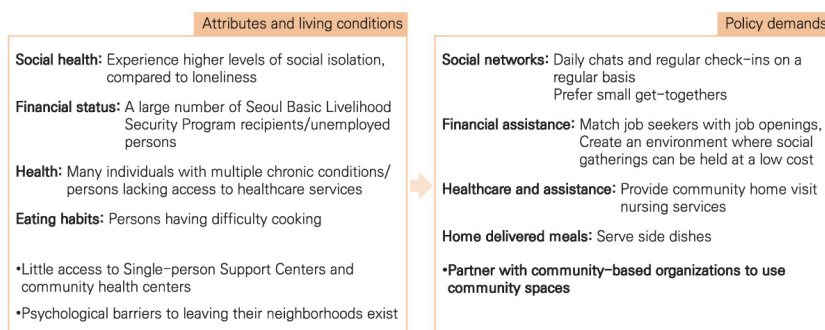
It is advisable to execute different strategies across different single-person household groups—general, vulnerable, and confined—to address loneliness and social isolation in those living alone. The details are as follows:

First, there is a need to tackle loneliness and social isolation among general single-person households using the Single-person Support Centers in autonomous *gu*-districts. It is desirable to correctly detect and diagnose loneliness, social isolation, and other psychological challenges and give suitable social prescriptions on the basis of the category of mental health issue/risk factor in conjunction with other support services. In helping those confronting problems linked to social context, including loneliness and social isolation, creating new connections is vital. As for persons with both issues associated with social factors and mental health challenges like depression, it is paramount to tailor support to suit their policy needs in view of their demographic/socio-economic situations, with a focus on examination of mental health and professional consulting services.

[Table 4] Types of Social/Mental Health Issues among Single-person Households in Seoul and Customized Treatment Plans

	People suffering from loneliness	People suffering from isolation	People suffering from loneliness and depression	People suffering from isolation and depression
Type	Social health	Social health	Social & mental health	Social & mental health
<b>Social support and services in light of the characteristics of living alone and risk factors</b>	<b>Weave the webs of social connections</b>	<b>Weave the webs of social connections</b>	<b>Diagnose mental health issues &amp; Provide counseling services</b>	<b>Diagnose mental health issues &amp; Provide counseling services</b>
	Adults in their early and late middle age and older:  Women:  The financially vulnerable (unemployed or low-income):  Housing vulnerable & people willing to reside in shared housing:  People willing to engage in recreational activities:  High-risk groups for lonely deaths:		Provide healthcare services  Render safety assistance using smart technology (technological resources)  Lend financial support in concert with connecting job-seekers to job openings  Combine with shared housing support programs  Offer leisure and cultural programs at public facilities  Prevent lonely deaths through monitoring that leverages smart technology (technological resources)	

Second, in terms of vulnerable single-person households isolated from society, it is advisable to engage private sector institutions utilizing private resources, such as private local community organizations, and turn underused spaces into new destinations for local communities which can be offered free of charge. In this way, the target households will be given the chance to naturally socialize with others. As there is demand for small social groups where regular check-ins and one-to-one chats can take place on a daily basis, there is a need to set up an environment where they can enjoy such interactions at a low cost.



[Figure 14] Features and policy demands of vulnerable single-person households in Daehak-Dong, Gwanak-Gu, Seoul

Lastly, Reaching-out Community Service Centers and Our Community Care Teams should be involved in spotting single-person households at high risk of lonely deaths or seeking extreme degrees of confinement on a constant basis. It is possible to prevent lonely deaths by distributing AI-powered devices like smart plugs to individuals with multiple chronic conditions and senior citizens. The features of confined single-person households have yet to be specified, making it difficult to frame policies or programs targeting such households. More research should be done on the status of confined adults living alone (geographical distribution and socio-demographic characteristics) and their policy demands.



[Figure 15] Coping Strategies designed to Alleviate Loneliness and Social Isolation among Single-person Households in Seoul

## 02 Urban Planning

### A Study on the Changes to Urban Lifestyle and Urban Space in Seoul following the Digital Transformation

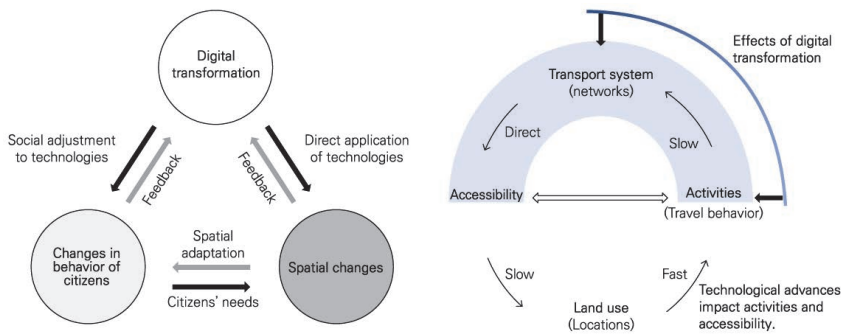
Seoyeon Yoon

#### Key Message

When designing urban space, it is essential to be responsive to abrupt shifts in citizen needs and market movements that take place during digital transformation.

**Digital transformation will lead to changes in the spaces in Seoul, the Korean metropolis. The researchers predict how urban spaces will evolve, with a focus on shifts in mobility methods.**

Digital transformation begins with digitization, which refers to the process of converting information into digital data. Then it penetrates into every industry, and ultimately all of society. Simply put, digital transformation is the extension of the influence of digitization across all segments of society. This phenomenon, first described by and emerging mostly in business, has resulted in the digitization of business processes ranging from production to distribution. Such transformation is already in progress across not only industries but various sectors of society. Digital transformation has brought about changes in different corners of the city. The researchers assume that the trend will continue in the midst of a period of massive societal change. The objective of this study is to forecast the alterations, caused by digital transformation, in spaces of the largest metropolis in South Korea.



The researchers paid particular attention to the fact the ongoing shifts in urban spaces tend to differ from those that occurred during the First, Second and Third industrial revolutions. Unlike these first three industrial revolutions, largely driven by railroads and automobiles, both transportation and industry produce shifts in urban spaces throughout the Fourth Industrial Revolution (4IR). According to conventional transportation and land use theories, changes in activity (generation of travel demand) lead to shifts in ways of movement, accessibility and land use. Taking note of alterations in movement, the researchers intend to project how urban spaces will change. To that end, they garnered opinions on current and future trends of spatial change through a research of the literature as well as expert interviews and a survey involving professors of city planning and workers in related industries.

**The major topic of discussion on the key driver of change in urban spaces has switched from “informatization to digital transformation”. Land use patterns have always been at the center.**

At the beginning of the study, the researchers observed changes in cities during times of digitization, which became a discussion topic in the 1970s. The focus of research into the early digital society and spaces was to examine how digitization would affect

the concept of distance and the subsequent shifts in travel behavior. There were deeply divergent views on dispersion and concentration of urban spaces among researchers. Having said that, they reached a conclusion that dispersion and concentration would happen concurrently. The discussion centering on changes in ways of movement brought by advances in communication, beyond transportation, is still underway in the age of digital transformation, but no major progress has been made in that discussion. Based on the findings of some studies covering urban spaces done up to the early 2000s, the influence of specific technologies over urban spaces—classified into spatial changes and shifts in land use—was foreseen. As mentioned earlier, it was pointed out that the key driver of change in urban spaces has altered from transportation to industry. The researchers found that the pace and implications of industry-driven shifts surpass those of transportation-driven shifts. The research subject has switched from the effects of development in information technologies on people's lives and spaces to digital transformation and spaces. This study aims to forecast spatial changes, like alterations in the spatial structure of cities and ways of movement within cities, combination of two or more types of land use and the expansion of virtual spaces.

### **Artificial Intelligence (AI) and other 4IR technologies have caused digital transformation and the emergence of platform business models.**

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After the late modern period, the industrial structure consisted of manufacturing, production and service industries, between whom were vertical and dependent relationships. Digital transformation, driven by 4IR technologies, has begun to alter this structure. Technology-based firms, a central player in digital transformation, have driven shifts in production methods, products and value chain activities and facilitated the convergence of services. As an integrated set of core technologies, online platforms easily collect data on consumers' Internet searches and payment history which reflect searcher preferences along with data on location and surrounding areas via mobile networks or multiple sensing technologies. These platforms create a massive

collection of data, or big data, for analysis, then use it to systemize information on consumption patterns. They enable online transactions of goods and services and deliver tailored information to sellers and consumers utilizing the compiled information. Citizens embrace societal and economic changes and digital transformation. Throughout the process, online platforms also serve as impetus for digital transformation and platform businesses to be pervasive in everyday life. Digital transformation and the online platform industry have prompted changes to day-to-day life by concentrating on how leading-edge technologies can transform the way we live and render a wide range of services online.

**Changes in the concept of distance and movement are an integral part of shifts in daily life resulting from digital transformation and online platforms.**

Adoption of flexible work practices, spread of the culture of “smart work” as well as trends among firms to downsize and achieve freedom of location derived from expansion of smart industry have together enabled work-related activities to be less influenced by the constraints of time and space. With the diversification of dwelling functions together with the ascent of a subscription economy and region-based communities, more and more day-to-day activities are carried out near residential areas. The popularity of online commerce, intellectualization of markets and varied last-mile delivery options have increasingly connected businesses with consumers. These factors are also regarded as the primary cause of alterations in ways of movement. 4IR technologies, represented by online platforms, have allowed humans to move quickly towards a post-work society. The value of leisure activities in cities—ways to use increased spare time, live in a contactless leisure culture and ensure a healthy urban life for all—has been underscored. A myriad of transport options will transform the concept of movement in urban areas attributable to remarkably improved convenience of travel, 3D transportation systems associated with vertical and horizontal axes and shared transport services. Online platforms and new transport

modes, the results of digital transformation, are expected to reframe the concept of distance for existing cities. They in turn will propel massive shifts in urban life.

**Regarding alterations in urban spaces, it is obvious that mixed land-use will be promoted and the importance of neighborhood units will increase.**

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Case studies and a survey indicated that experts consider trends in urban space changes that have taken place over the past 20 years are similar to those predicted in the early 2000s. Trends in urban space shifts in Seoul following digital transformation, as of 2020, parallel those in other countries. Let's take a closer look at land use in cities, which has steadily changed. Such changes can be summed up in four points: (1) rising new demands for land use, (2) changing land use demands in commercial districts, (3) shifting demand for and role of public infrastructure, (4) a mixing of different functions and uses of land within neighborhood units. It turns out that the findings are reasonably consistent with the prediction in relation to mixed land use. With respect to the mixed land use concept, the researchers demonstrate that urban spaces have changed into various forms at a varied pace. The private sector has taken the lead in modifying spaces in cities by varying size, function and location. The public sector has responded to shifts by developing solutions and ways to adapt to them including designing plans and testbeds.

With this tendency in mind, the researchers anticipate shifts in urban spaces that will happen over the next 20 years. The significance of neighborhood units is expected to grow substantially on account of increasing non-face-to-face activities and area changes where activities are performed in the vicinity of residential areas. It is predicted that city spaces and structures will alter, owing to shifts in traffic and logistics flow—a revamped transport system/increased importance of logistics—along with the uptake of new transport technologies such as drones and small aircraft.

**A spatial planning system is vital to promptly deal with citizen demands and market movements during times of digital transformation.**

The original goal of this study was to detect and predict shifts in lives and spaces in an era of digital transformation. However, throughout the research process, we also came to understand diverse viewpoints and challenges that will be triggered with changes in urban spaces. The following are several points mentioned by numerous experts:

- Concerns about widening gaps between classes and regions
- Consideration of constructing infrastructure for digital transformation harnessing investment from the private sector and duplicated investment
- Deliberations about the feature of planning which reacts slowly to spatial changes

The digital transformation in which the world is engaged creates immense complexity and uncertainty. At this point in time, the public sector needs to be flexible in its policy decisions to reflect already rapidly-advancing technologies and market needs in a timely manner. It is essential to respond to changes with multidimensional scenarios, rather than a choice between predictability and unpredictability, to adapt to explosively evolving technologies. If spatial polarization deepens in the wake of digital transformation, roads, public parks, green spaces and other public infrastructure will need to be reorganized with regard to deteriorating residential and old downtown areas. Moreover, it is crucial to bridge information divide through deliberate management efforts.

The Internet of Things (IoT), cloud computing, big data, mobile, AI and other 4IR technologies accelerate the convergence of sectors. Such change transforms the market and creates citizen needs. The market responds quickly to such fast-changing needs. Now is the time to set up a spatial planning system allowing for such attribute. Hence, interdisciplinary research is imperative to ensure spatial policies mirror our industrial structure, citizen behavior and urban space alterations.

## Socio-spatial Characteristics of Elderly Concentrated Areas and Improving the Environment of Age-friendly Neighborhoods in Seoul

Jaeseob Yang · Suyoun Seong

### Key Message

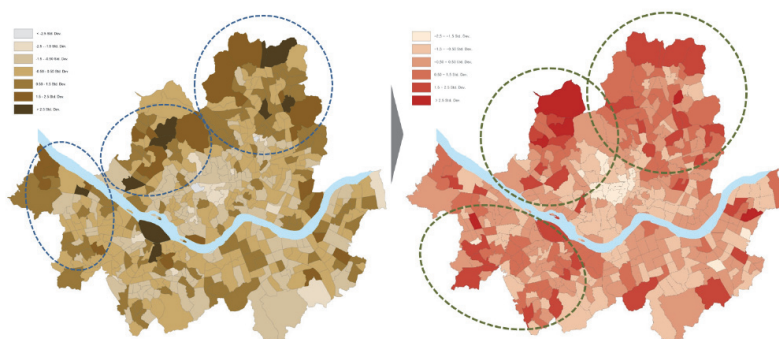
In preparation for becoming a “super-aged” society,<sup>2</sup> there is a need to coordinate with community care services to enhance the built environment of areas with a high concentration of older adults.

**In 2020, 14.5 percent of Seoul’s population was comprised of seniors. South Korea is expected to become a super-aged society by 2025.**

The number of elderly people in the South Korean capital increased 2.5-fold between 2000 and 2018, from 540,000 to 1,360,000. According to Korea Statistics (KOSTAT), the share of people aged 65 years or older of the total population was 15.7 percent for South Korea and 14.5 percent for Seoul in 2020. South Korea is likely to become a super-aged society by 2025. Since 2000, there has been a tendency for senior citizens to cluster in several neighborhoods in northeastern, northwestern, and southwestern Seoul<sup>3</sup> or stay there for a long time. The researchers have learned that Dobong 1-Dong, Dobong 2-Dong, and Sanggye 1-Dong in the northeastern part, Bulgwang 1-Dong, Bukgajwa 1-Dong, Bukgajwa 2-Dong, and Nokbeon-Dong in the northwestern part, and Yeoui-Dong and Deungchon-3 Dong in the southwestern part have higher numbers of people aged 65 and over.

<sup>2</sup> According to UN standards, a “super-aged society” refers to one where at least 20% of its total population is 65 years and above.

<sup>3</sup> Seoul is divided into five areas: Downtown, Northeast, Northwest, Southwest and Southeast.



Notes: The elderly population of administrative dong-district units was derived from 2018 census data at the output area

Source: Statistics Korea (KOSTAT), 2000 and 2018, Population Census

[Figure 16] Comparison of 2000 (left) and 2018 (right):  
Geographic Distribution of Seniors in Seoul, by administrative dong-district

### **The effectiveness of current age-friendly policies which center on delivering separate healthcare and welfare services is somewhat limited.**

In 2010, towards making Seoul a city whose citizens enjoy healthy and active lives of up to 100 years of age, the Seoul Metropolitan Government (SMG) hatched the “2020 Master Plan for an Aged Society”. The SMG also created an institutional basis to become an age-friendly city with its “Framework Ordinance on Senior Welfare” in 2011. It even joined the WHO Global Network for Age-friendly Cities and Communities in 2013. Notwithstanding, SMG policies and initiatives pertaining to age-friendly cities have focused on providing medical/welfare services and certain facility types, namely social welfare facilities and public rental housing.

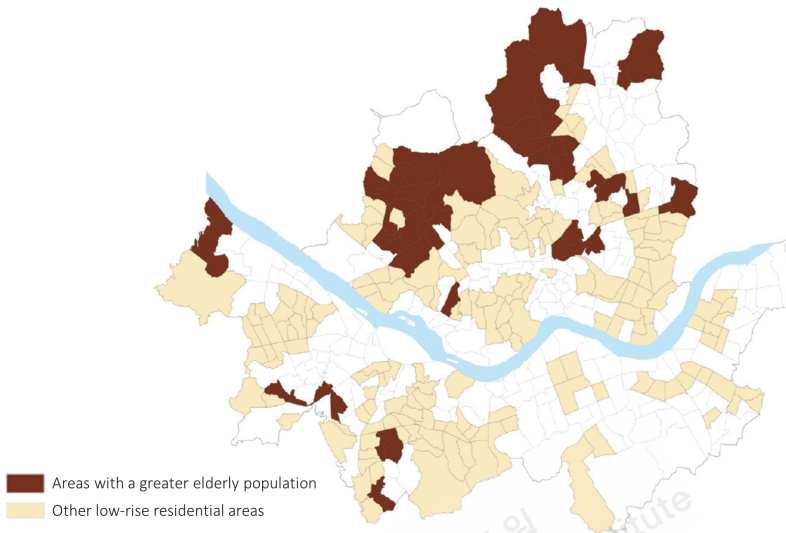
The SMG’s Senior Citizens’ Welfare division, responsible for the SMG’s age-friendly city schemes, carried out in 2017 a pilot project on creating age-friendly spaces in communities and in 2018 a project concerning community-level senior care services. These projects have mainly been about care services, an integral part of the social welfare system, including improving indoor air quality and recreation programs.

As such programs are fragmented, they have been limited in their effectiveness. In an attempt to improve the quality of life for elderly residents, not only is assistance with healthcare/welfare services and jobs needed, but also programs and projects designed to create a better neighborhood environment for those living in areas with a dense senior population.

**The average share of older persons of the total population dwelling in areas with a higher proportion of senior citizens is 15.4 percent, many of whom are situated in the northeastern and northwestern part of Seoul.**

Areas with a high concentration of the elderly refer to neighborhoods where a relatively larger number of seniors make up a large proportion of the total population. The researchers identified areas with a high senior population using data from the 2015 population census of administrative dong-districts. With particular attention on low-rise residential areas with greater need for revamping of the neighborhood environment and policy backing, we categorized 46 dong-districts as areas with high senior populations.

On average, the number of seniors residing in each of these 46 dong-districts is 4,315 - approximately 1.5 times higher than the Seoul-wide average of 2,880. The 65-and-older age group's average share of the total population is 15.4 percent. By region, neighborhoods with a higher proportion of elderly citizens are mostly clustered in northeastern Seoul (23 dong-districts), followed by the Northwest area (16 dong-districts), the Southwest area (6 dong-districts), and the downtown core (1 dong-district). By autonomous *gu*-district, 10 of these areas are in Gangbuk-*Gu*, eight in Eunpyeong-*Gu*, and seven in Seodaemun-*Gu*. Insu-Dong in Gangbuk-*Gu* is home to the largest number of senior citizens (5,558 persons) and the highest proportion (17.5%) of the population consisting of persons aged 65 and over, followed by Sanggye 3-Dong and 4-Dong in Nowon-*Gu* (5,787 persons and 17.2%), Songcheon-Dong in Gangbuk-*Gu* (4,821 persons and 16.6 %), and Jegi-Dong in Dongdaemun-*Gu* (4,606 persons and 16.9%).



Source: Statistics Korea (KOSTAT), 2015, Population and Housing Census

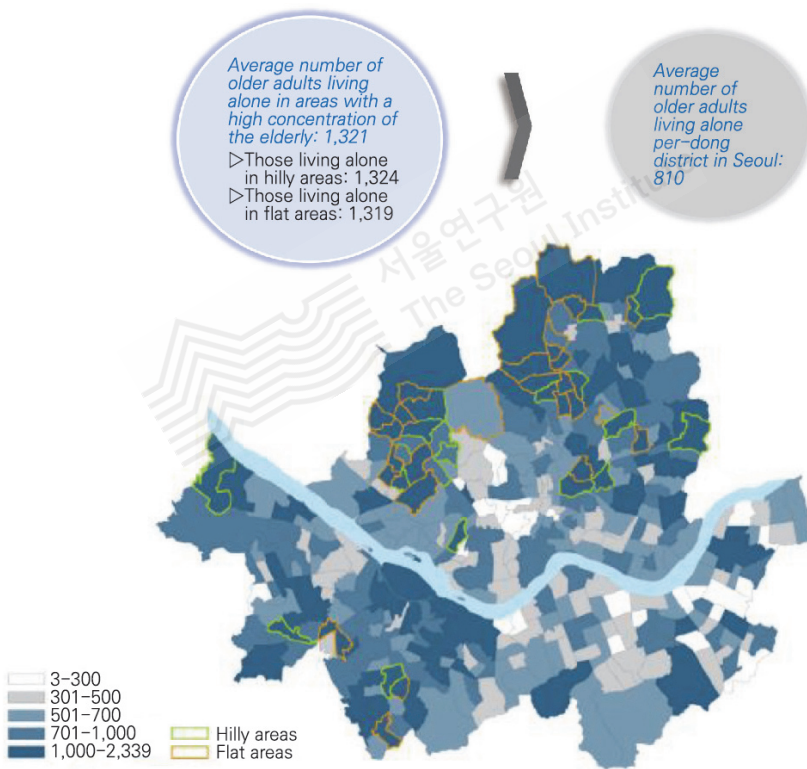
[Figure 17] Areas in Seoul with a High Concentration of Older Adults (2015)

**Adults aged 65 and older tend to concentrate in “low-rise residential areas”, where a great number of older adults with low levels of education or living alone reside.**

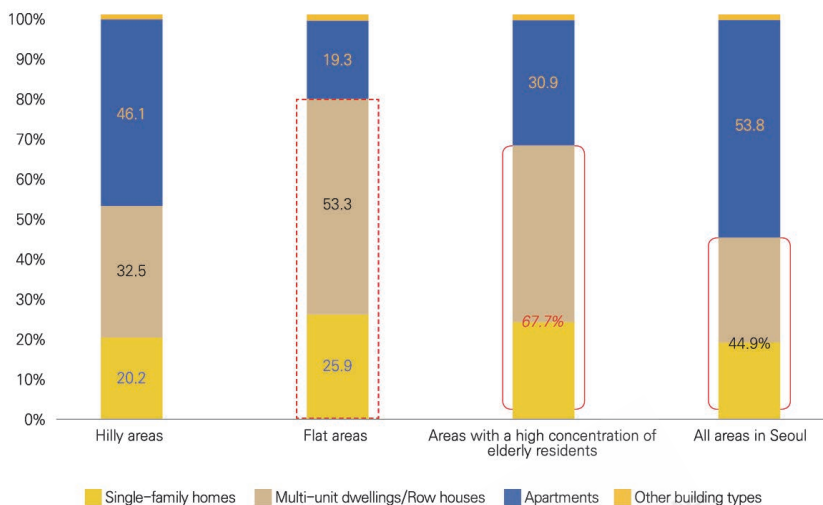
For their analysis, the researchers classified socio-spatial attributes of neighborhoods with a large concentration of persons aged 65 and over into two types: hilly areas and flat areas. The analysis revealed the following:

- (1) Older adults living in such areas have relatively lower education levels (57.2%) and tend to reside more in single-person households (1,321 persons) than the average for Seoul;
- (2) Areas with a greater elderly population have an average slope of 4.3 degrees - relatively steeper than the city-wide average of 3.3 degrees. The average slope of those located on hills amounts to 5.2 degrees;
- (3) The average lot size in such areas is 225  $\text{m}^2$ , or 2,422 square feet - smaller than that for the city-wide average of 1,650  $\text{m}^2$ , or 17,760 square feet.

Low-rise residential buildings such as detached and multi-unit dwellings are the most common housing in areas with a high concentration of seniors. About 67.7 percent of occupied housing in the areas are in stand-alone, multi-unit, and row homes, except apartment houses - almost 20 percentage points larger than the average of 44.9 percent for dong-districts in Seoul. Of particular note is that dilapidated housing constructed more than 30 years ago represents 20.8 percent of all housing in areas with a larger number of older individuals.



[Figure 18] Number of Elderly Citizens Living Alone, by administrative dong-district (2019)



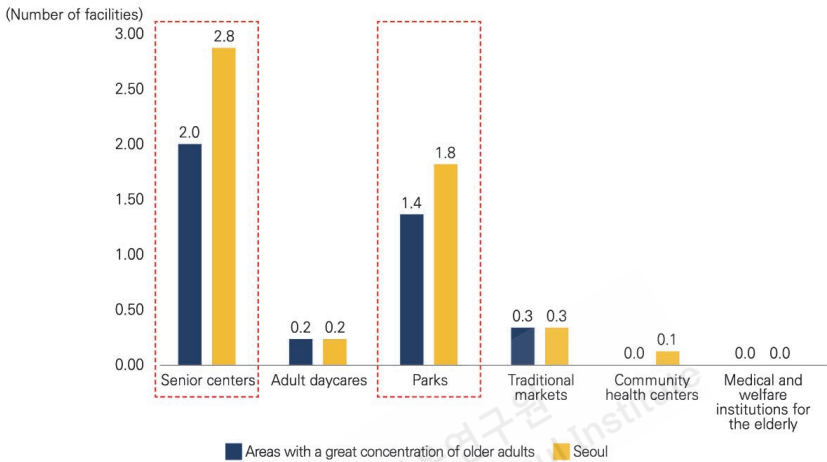
[Figure 19] Areas with a Large Concentration of Older Residents, by style of housing:  
Proportion of Stand-alone Units, Multi-unit Dwellings, and Row Housing

### **There is a shortage of senior centers, parks, day-care centers and other community facilities in areas with a dense elderly population.**

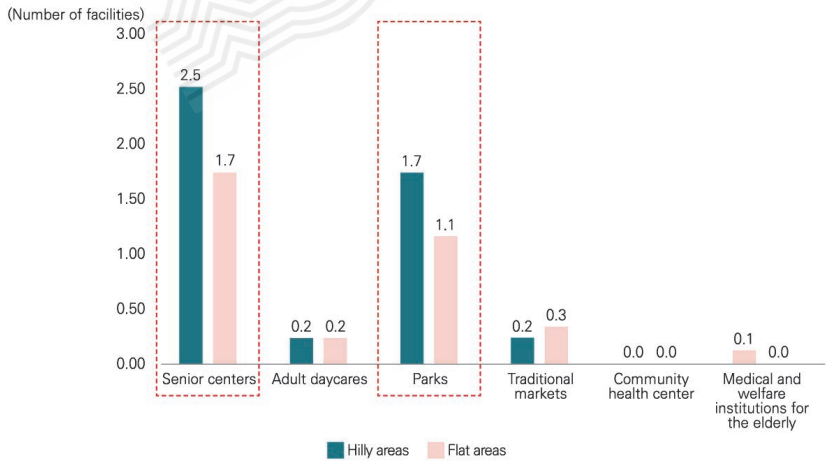
We assessed the availability of recreation facilities that older adults frequent (senior centers, leisure/wellness facilities, parks) and healthcare/welfare institutions (adult daycare centers, medical/welfare facilities, community health centers) in communities. The population coverage of relevant services ratio was reviewed as well.

Areas with a high concentration of senior citizens have a rather limited supply of senior centers and parks per 1,000 older adults, compared to the average for Seoul. Those on flat terrain are more likely to lack community facilities, such as senior centers, parks, and adult daycare facilities, than those on hilly terrain. There is relatively adequate provision of community services to and population coverage in areas with a higher share of older residents dwelling in areas on hilly terrain. Having said that, due to many steep hills, the elderly's perceived accessibility of such services is rated as likely low. There is a need to evaluate the perceived accessibility to neighborhood

facilities among the population aged 65 and over considering socio-demographic characteristics and each type of facility by area.



[Figure 20] Number of Community Facilities per 1,000 people, by administrative dong-district (neighborhoods with a high concentration of residents age 65+ and average for all of Seoul)



[Figure 21] Number of Community Facilities per 1,000 people, by administrative dong-district and terrain type (neighborhoods with a high concentration of residents age 65+)

**Numerous steep stairs and inclines are the main reason for poor walkability in areas on hilly terrain, whereas mixed use zones shared by cars and pedestrians deter people from walking around neighborhoods.**

The researchers grouped areas with a large concentration of the senior population into hilly (Hongjae 3-Dong, Seodaemun-Gu) and flat (Songjung-Dong, Gangbuk-Gu). We then undertook an in-depth study of several communities to measure their age-friendliness in terms of safety, accessibility, and convenience.

The findings of the study demonstrate two commonalities between them:

- (1) a lack of seating areas in pedestrian zones and bus stops where older adults can catch their breath
- (2) illegally stopped or parked cars and other objects that block pedestrian paths.

Those on hilly terrain have a lot of steep inclines or damaged pavement that requires maintenance. On the other hand, those on flat terrain face issues like a scarcity of parks and the presence of many roads which pedestrians must share with vehicles.

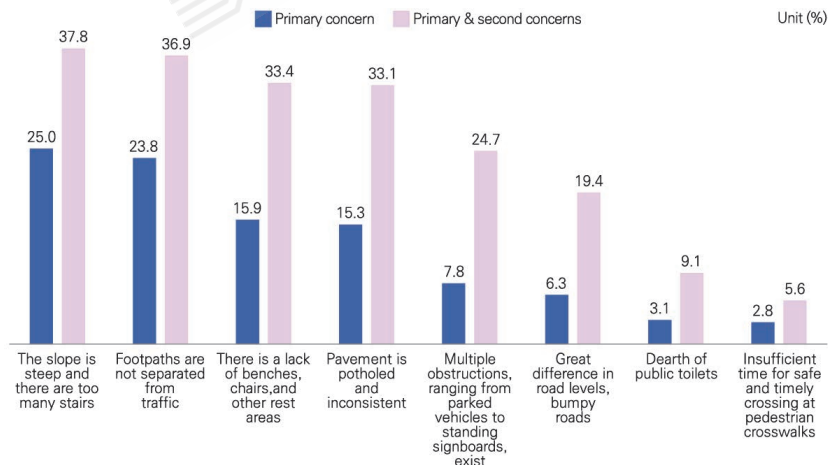
[Table 5] Key Challenges in Walking Conditions in Hongjae 3-Dong

Steep stairs & inclines	Uneven pavement needing repair	Mixing of vehicles and pedestrians
		

**Survey results show that a large majority of older adults feel “the need for pavement maintenance as well as welfare facilities for the elderly and cultural/sports facilities”.**

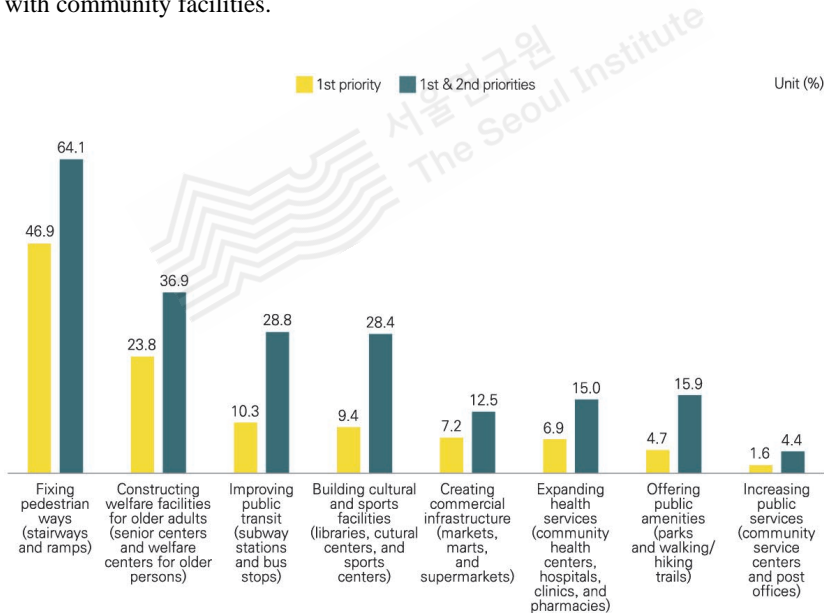
The researchers surveyed 320 older adults aged 65 and over residing in four administrative dong-districts with a higher proportion of senior citizens, including Hongjae 3-Dong and Songjung-Dong. Most respondents said they were willing to continue living in the neighborhoods in which they live. Forty-nine percent have lived in the same location for 20 years and longer and over half of those polled engage in community meetings or neighborhood activities.

Almost all of them (94%) reported that they go to hospitals/clinics, stores, and parks in their neighborhoods more than once or twice a week, 79 percent of whom use sidewalks. They reported having trouble walking up slopes or stairs outside and walking on shared streets. By age group, persons in their 60s cited a dearth of rest places as their main source of inconvenience while those in their 70s pointed out failing pavement as their main concern. A substantial number of respondents living in flat areas complained about the irregularity of the roads. In contrast, many of those residing in hilly areas said they have difficulty climbing up slopes and stairs.



[Figure 22] Problems Hindering Older People from Walking in Their Neighborhoods

As for physical neighborhood environment, senior citizens see a need to repair/improve pavement and welfare facilities for older persons, along with cultural/sports facilities. There is a high demand for community facilities in Songjung-Dong, while a relatively larger percentage of those dwelling in Hongjae 3-Dong expressed the need to maintain pedestrian pathways, including stairs and slopes, and improvements in access to public transport. It is critical to understand and assess the physical and social conditions of each region and issues affecting its residents. There is a need to take into account each area's unique features when improving the built environment. It is also desirable to combine neighborhood enhancement projects with the Seoul Urban Regeneration Project and life Social Overhead Capital (SOC) projects so as to boost older people's level of satisfaction with community facilities.



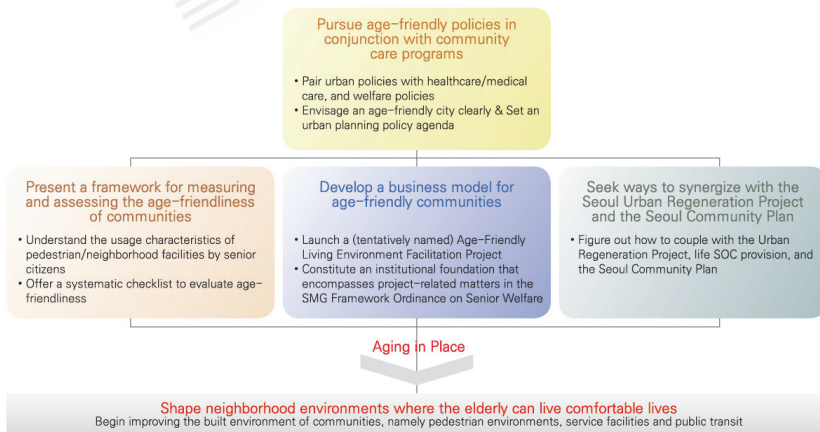
[Figure 23] Surveyed Top Priorities for Environmental Improvements

**There are 4 policy directions on “promoting an elderly-friendly environment”, including linking with community care services.**

The World Health Organization (WHO) published *Global Age-friendly Cities: A Guide* in 2006. In 2020, South Korea’s Ministry of Health and Welfare unveiled the 4th Plan for the Ageing Society and Population. Aligning with their primary goals, the SMG needs to revamp the built environment of neighborhoods, like pedestrian areas, transportation, and service facilities, in a comprehensive manner. It is essential to help older people go about their daily lives safely and comfortably through such efforts.

The policy directions we propose to assist Seoul in becoming more age-friendly are summarized as follows:

- (1) Formulate age-friendly policies that combine local community care;
- (2) Set a framework to measure the age-friendliness of communities;
- (3) Build a business model for age-friendly community programs;
- (4) Explore ways to couple efforts with the Seoul Community Plan and other related projects.



[Figure 24] Basic Directions for Increasing the Age-friendliness of Communities

**To foster a supportive environment for seniors, it is crucial to harmonize the policies of various sectors, ranging from health/medical/welfare to urban/transportation/housing. A coordinated system through which relevant divisions can work together needs to be set up.**

For the sake of supporting communities in becoming more age-friendly, it is of paramount importance to integrate health, medical, welfare, urban, transportation, and housing policies. To put it differently, concerted policy action is imperative. A collaborative framework involving diverse relevant divisions in charge of health, medical, and care services, life SOC, pavement management, transportation, housing, and regeneration/support should be established.

For that reason, it is advisable to embed “age-friendly city” in the 2040 Seoul Plan (Seoul’s urban master plan) as a core theme. There is a need to offer guidelines on creating age-friendly social/physical environments and articulate Seoul’s vision of becoming an age-friendly city.

Existing age-friendly schemes tend to be solely administered by the competent division (Senior Citizen Support Division). Projects concerning pedestrian environment, life SOC, Reaching-Out Community Services, and the Seoul Community Plan are separately executed by different divisions. Thus, it is quite difficult to deal with population ageing issues in an integrated way. As South Korea is progressing towards becoming a super-aged society, there is a need to respond to emerging issues associated with the growth of the older population in a comprehensive manner. Against this backdrop, we recommend that the SMG form a tentatively-named “Age-friendly Living Environment Promotion Team” which will be tasked with consolidating and pairing policies pertaining to age-friendly planning devised by each division.

**There is a need to outline a framework to evaluate the age-friendliness of communities with a large concentration of senior citizens. This framework would be split into two parts: autonomous *gu*-district level and administrative *dong*-district level.**

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It is essential to comprehend the attributes and the current state of older adults living in each neighborhood in Seoul and identify areas that need special attention. This necessitates a coherent framework for measuring and analyzing how age-friendly each one is. There is also a need to prepare a detailed checklist to assess the age-friendliness of communities with a higher proportion of older individuals or target areas for age-friendly schemes. Moreover, safety, accessibility, and convenience of the walking environment, mass transit, neighborhood facilities, and parks of relevant areas should be determined as well.

Seoul's age-friendliness checklist ought to be divided into two parts: autonomous *gu*-district-level and administrative *dong*-district-level. Through autonomous *gu*-district-level evaluation, it will be significant to grasp the overall status of physical environments and define priorities for policy support. The focus of administrative *dong*-district-level assessment should be on spotting problems existing in areas and appreciating elderly people's concerns. It is suggested that evaluation results be used as basic information when coming up with follow-up measures and improvement initiatives.

**Setting up a tentatively-named “Age-friendly Living Environment Facilitation Project” intended to deliver social welfare and care services in a comprehensive manner is pivotal.**

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It is crucial to choose and focus on developing age-friendly environments in deteriorated and blighted areas with a large concentration of senior citizens. To do so, there is a need to embark on a tentatively-named Age-friendly Living Environment

Facilitation Project aimed at rendering social welfare/care services in an integrated way and improving living environments in areas with a higher proportion of older individuals.

It is critical to selectively choose, for the project, communities with poor living environments or environments otherwise needing improvement from those with a large concentration of elderly residents. The SMG needs to fully understand the status and conditions of selected neighborhoods with respect to safety, accessibility, and convenience, and identify areas that need enhancement.

The following actions should be taken in a way that reflects the overall evaluation of living environments.

- 1) Renovate or repair homes for older adults (install insulation and heating/AC systems)
- 2) Improve the walking environment (roads/stairs, ramps, and public seating)
- 3) Increase the number of facilities for senior citizens
- 4) Offer healthcare, medical care, and adult daycare programs

The first thing to do is to build an institutional basis for the Age-friendly Living Environment Facilitation Project that reflects matters related to operation of the project in the SMG Framework Ordinance on Senior Welfare.

**It is vital to implement initiatives targeting the creation of a more age-friendly environment in line with the Seoul Urban Regeneration Project, life Social Overhead Capital (SOC) projects, and the Seoul Community Plan.**

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To that end, it is advisable for the Seoul Metropolitan Government to take the following measures.

Firstly, the SMG needs to incorporate age-friendliness when revitalizing communities with a large percentage of elderly population. Constructing or refurbishing facilities that seniors use most often should be the first priority. It is

integral that age-friendly design principles be applied to communities with the intention of bringing a better living environment for senior citizens. Rewarding or incentivizing individual entities for planning age-friendly urban regeneration projects in areas with a higher proportion of older adults is particularly worth considering.

Secondly, it is important to construct community facilities for elderly people by partnering with myriad life SOC expansion plans first. So far, the SMG has provided different essential facilities across areas through mixed-use life SOC projects and other life SOC projects. There is a need to put priority on recreational and cultural amenities and welfare facilities for the elderly when developing community facilities in areas with a large concentration of older persons by synergizing with such projects.

Lastly, we suggest the SMG include an “age-friendly community development” section in its community plan. It will prove significant to clearly set goals and strategies which support creating an age-friendly environment in communities with a higher percentage of senior residents. It is also advisable to adopt schemes designed to foster age-friendly living environments or installing health, medical and welfare facilities for older people through mixed-use developments.

## Planning Public Facilities for the Following Generations

Jayun Heo · Dami Maeng · Gain Lee

### Key Message

There is a need to diversify types of and set multi-dimensional criteria for selecting locations of public facilities considering changes in lifestyle and the varying needs of future generations.

**In the face of a demographic cliff, it is critical to direct attention to the characteristics of future generations for the sake of promoting urban sustainability.**

It is projected that Seoul's population will shrink to 8.45 million by 2045. Falling fertility rates and population ageing have fundamentally altered the demographic structure. Moreover, urban planning based on the premise that cities are likely to expand approaches a watershed moment. Now is the time for urban planners to concentrate on a residential environment for the people of the future with an aim of making Seoul sustainable.

Future generations<sup>4</sup> have experienced the financial crisis of 2007 - 2008, the period of low economic growth, climate change, and the COVID-19 pandemic. They expect Seoul to be transformed into a whole new city. In an era of population decline, population size-centered urban planning has reached its limits. It is the right time to shift the focus of planning for public facilities to users. This study examines the features of the next generations, who tend to embrace different ways of living from their

<sup>4</sup> In this study, "future generations" encompass various generations in all age groups living a daily life today that differs significantly from the past.

predecessors and alterations in the facilities used in everyday life. The current provision of such facilities is assessed as well.

**Gen Alpha spends an average of more than nine hours each weekday with their caregivers and rely heavily on facilities.**

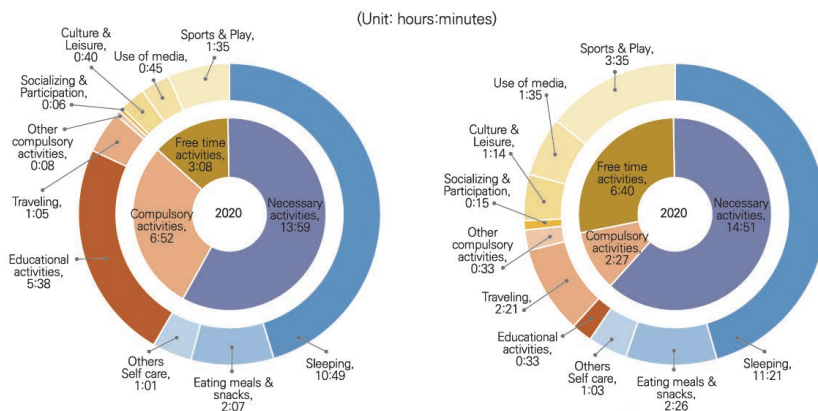
Generation Alpha<sup>5</sup> tends to spend one-and-a-half hours alone each day and the rest of the day with caregivers, siblings, and friends. On weekdays, more than nine hours are devoted to activities with parents, grandparents and other caregivers, excluding time spent sleeping.

Children born between 2010 and 2025 spend a substantial part of their day learning and playing. They are more likely to invest more time in personal care activities including sleep, compared to adults, and for 86.4 percent of their waking day they are involved in learning and play activities, most of which is spent in educational/childcare institutions and play/experience facilities. A survey on time use of preschoolers has identified that 98.2 percent and 95.8 percent of Gen Alpha make use of childcare/educational institutions and play facilities, respectively.

The children of millennials spend a major amount of time in childcare/educational institutions on weekdays, whereas the largest portion of time on weekends is allocated to sports/play activities.

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<sup>5</sup> The researchers focus on Generation Alpha aged 9 or younger whose ways of life have been profoundly transformed on account of changing circumstances. “Generation Alpha”, the demographic born between 2010 and 2025, refers to the children of millennials.



[Figure 25] Time Use on an Average Weekday (left) and Weekend Day (right) for Generation Alpha

### Diverse types of facilities for Gen Alpha have emerged because of shifts in society and temperatures, as well as demand from parents.

A decrease in average household size has led to a drop in the number of family members who can share childcare responsibilities. As the predominant accommodation type has altered from detached to multi-dwelling housing, the culture of communal child-rearing has become obsolete. Amid growing exposure to risks like child abuse and car accidents, the burden of childcare upon parents has increased sharply. While millennial moms<sup>6</sup> are willing to dedicate more time to unwinding and personal development, their kids have become more in need of their care and attention.

The children of millennials spend most of the day in learning and play activities. However, 73.8 percent and 59.1 percent of their parents' generation feel their children do not have enough playtime and study time, respectively.

Caregivers' demand to have time for themselves and away from their caregiving is met through the use of nannies and facilities. There has also been a spike in the number

<sup>6</sup> Millennial mothers refer to young moms born between 1978 and 1994.

of half-day options, ranging from paid indoor play facilities to international kindergartens. Those responsible for care of Gen Alpha increasingly tend to prefer areas in proximity to facilities that both children born between 2010 and 2025 and their caregivers utilize like play cafes for kids, a hybrid of dining and shopping. They also show a preference for areas close to clusters of heterogeneous facilities such as cram schools and supermarkets. Climatic and environmental alterations play a part as well. Due to a surge in levels of fine particulate matter (PM<sub>2.5</sub>), children have moved from outdoor to indoor play spaces. Since onset of the COVID-19 pandemic in 2020, outdoor play and sports venues have seen a rise in popularity again.

**A good number of children’s play facilities are offered by non-governmental entities. There is an imbalance across areas in provision of the facilities.**

Those situated near residential areas and on private property of childcare/educational institutions make up 58.86 percent and 15.19 percent of all play facilities for kids, respectively. This means that a majority of such facilities are either private or club goods. Of particular note is that the number of privately run indoor play facilities is overwhelmingly higher than those operated by public organizations. On average, the former’s admission prices are at least twice as high as the latter. Thus, there is concern that some children will be excluded. The difference in physical environment and service between the two should also be taken into consideration when planning for supply of public facilities.

The spatial distribution of play spaces across administrative dong<sup>7</sup>-districts is uneven and does not quite match the population spread of children aged 0-9. In other words, an imbalance exists between play facility demand and play facility supply. There are areas that do not meet minimum standards regarding travel distance for

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<sup>7</sup> A “dong” or “neighborhood” is the smallest urban-area division to have its own government office and staff in Korea. There are two types of dong: legal-status and administrative.

children. Many administrative dong-districts do not have even a single kids' library. Owing to their distinctive characteristics, museums and forest education centers are concentrated in city centers and areas with mountains.

**Types of public facilities must be broadened and ways identified on how to install them so as to better meet the needs of Gen Alpha.**

With an increasing burden of childcare and heightened expectations for places of learning/play, new types of facilities for Gen Alpha have been created. Since they are mainly offered by the private sector, public entities need to get involved in an effort to narrow the gap between areas and social classes. There is also a need to deliberate over identifying facility types that can serve the new needs of future generations and running them as public facilities or employing existing facilities.

The children of millennials depend greatly on their caregivers in daily life, which is not adequately reflected in the current criteria for offering facilities, causing concerns about facility undersupply or oversupply. Thus, addressing the mismatch between needs and available facilities through novel provision methods is of paramount importance. It will be difficult to relocate some facilities used by Gen Alpha due to their attributes and role. In areas lacking certain facility types because of the difficulty in providing them, the pertinent facility types should be operated as affiliates or associated organizations of other facilities. Hence, it is advisable to adjust the types and geographic locations of facilities that can fulfill parents' demand in a flexible manner and review the criteria for installing public facilities aimed at utilizing existing idle facilities owned by the public or private sectors. For this purpose, the following tasks need to be performed in advance:

- (1) Streamline the planning process that requires collaboration and expertise of administrative organizations;
- (2) Build a database of present facilities;
- (3) Comprehend user needs.

**There is a need to lay out multi-dimensional locational criteria for facilities utilized by the children of millennials in view of features unique to each facility type and methods of travel.**

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The daily average travel time for Gen Alpha on foot and by car does not exceed 10 minutes and 17 minutes, respectively. The time spent in a car going to play/experience facilities which they visit infrequently is less than 40 minutes. This is the very reason locational criteria for facilities they use are of utmost importance. It is critical to establish multi-faceted locational criteria in an attempt to balance the demand for such facilities and their supply in a spatial manner and put public facilities within accessible distance for kids. By applying such criteria, local governments can formulate supply plans or integrate various functions into one facility.

When it comes to facilities that cannot be moved like forest education centers and museums, the public sector should be enabled to adjust their size, make improvements in their accessibility, or use similar facilities that can be constructed in neighborhood areas to adapt to shifting demand. It is essential to acquire land for public facilities that are too small. Allowing for the best use of land, the public sector should make adjustments to construction standards so that the general public can utilize private facilities normally reserved for the exclusive use of particular individuals. Existing residents-only facilities can be opened to the public by incentivizing residential communities to agree to do so.

**To facilitate demand-driven urban planning, the lifestyle of each generation living in Seoul needs to be understood.**

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Altered patterns in time use for Seoulites means that their ways of life have changed, leading to shifts in demand for specific facilities. As changes in time use differ by generation, it is possible to set policy target groups and estimate future demand for public facilities using relevant data.

Let's take a look at how the “more mobile generation”<sup>8</sup> use their time. The daily average time spent on mobile devices is on an upward trajectory. The time dedicated to attending classes (educational activities) has decreased, whereas that for extracurricular activities has gone up. As for Generation MZ,<sup>9</sup> the average marriage age and the proportion of never-married (single) population have both increased. Individuals in their 30s spend more time managing their households and caring for infants, toddlers and other family or household members than those in their 20s. Middle-aged adults tend to spend less time working and more time caring for children and parents. Newly senior adults (baby boomers born between 1946 and 1964) are no longer powerless “old people”. Rather, they are a more active age group than previous generations of seniors, proactively engaging in economic and leisure activities, such as socializing, instead of spending as much time managing their households.

Some qualities are common to all generations. Notwithstanding, the lifestyles, pressing issues and values shared by each one are different and so are the needed facilities. The focus of urban planning needs to deftly switch from supply to demand. To that end, it is truly meaningful to observe the changes in ways of life for each generation residing in Seoul—the users of urban planning.

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<sup>8</sup> In this study, the “more mobile generation” refers to people in their teens.

<sup>9</sup> “Generation MZ” refers to Millennials born between 1981 and 1995 and Generation Z born between 1996 and 2005.

## Technological Innovation Strategies for Social Ventures in Seoul

Jaeuk Ju · Jongjin Yun

### Key Message

In a bid to promote technological innovation and extend the ecosystem of social ventures in Korea, it is vital to bolster corporate social responsibility (CSR) and strengthen public-private partnerships.

**A certain category of business exists, including social ventures and social enterprises, that has the potential to contribute to mitigating social problems.**

According to a 2019 survey of the state of social ventures, 80 percent are in the technology-based sector, such as manufacturing and IT. Ventures in this sector seek to maximize benefits to society through the sale of goods and services to the vulnerable with relatively limited technology, manpower and financial resources. Thus, the importance of innovativeness is particularly highlighted. The objective of this study is to encourage social ventures in Seoul to advance in technological innovation. Current social ventures, tech startups, social enterprises and small and medium-sized businesses (SMEs) were identified as having the potential to become social ventures leading technological innovation. The researchers explored ways to foster collaboration between them and existing social ventures and spur them on to greater activity in tackling social problems with the use of their technologies.

Social enterprises, social ventures and for-profit startups are aware of the

importance of technological innovation. But whether they view it as a business strategy varies. Technical innovation means improving the function and performance of products employing the latest technologies to for-profit firms. On the other hand, social enterprises' technological innovation lays more emphasis on cutting costs using current technologies than applying modern technologies. Hence, an adequate level of technology - high-tech or low-tech - is necessary for social ventures to properly address social problems.

Howard Bowen's research (1953) is considered the foundation for the study of CSR. Despite diverse views and criticism, the concept of CSR has continued to evolve and has become a principle for business in numerous companies nowadays. Many earlier studies on the relationship between CSR and business performance found that the former has a positive effect on the latter in the long run. However, CSR's impact on financial performance of early-stage businesses has yet to be examined. There is a need for a firm to consider what growth stage it is at when making decisions about CSR initiatives.

### **Thirty-three percent of start-ups situated in Seoul believe that “CSR can add value to firms and enhance corporate culture”.**

In an effort to assess the likelihood of social ventures growing, the researchers carried out a poll of start-ups in Seoul on their perceptions of CSR. Of the 168 responses, 28.7 percent are doing business activities in light of CSR. Half of the 28.7 percent say their business models are directly linked to the management concept. Their views on their social responsibility are somewhat negative with regard to performance and management compared to those of social ventures. They believe it is more essential for medium and large enterprises, rather than startup firms, to initiate CSR programs. Approximately one in three reported that CSR can help businesses increase their value (38.7 percent) or enhance their corporate culture (30.5 percent). Just 28.7 percent said CSR can improve a firm's financial performance, whereas more than half (51.2

percent) of the start-ups responding noted that CSR is positively correlated with long-term financial performance. This is consistent with the research findings of Dong-pil Cheon and Chang-won Woo (2020) that a company needs to think carefully about its current growth stage when deciding to commit to CSR strategies. As many as 58.5 percent of respondents see social venture assistance as a new investment opportunity. This indicates that start-ups are willing to be engaged in supporting social ventures. A greater number of the businesses surveyed distinguish themselves from social ventures, with only 26.5 percent saying they are quite similar to social ventures. The start-ups polled also think social enterprises are not the same as social ventures.

**Technologically innovative social ventures implementing “intermediate technologies” are at an advantage in terms of business model sustainability.**

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The researchers established frameworks for analyzing the types of technological innovation by social ventures based on previous studies and expert advice. Then, the results of the survey concerning the state of social ventures done in 2019 was analyzed within the frameworks. Subjects included 131 social ventures in Seoul (2019 survey on the state of social ventures) and 13 start-ups conducting CSR activities revealed by the survey. Three frameworks were built. The first is related to business models for resolving social issues and bringing about technological innovation. The second is about technologies applied by social ventures and objectives for realizing social/economic values. The third is for changes in the market that social ventures aim to effect. Details are shown below:

[Table 6] Types of Social Venture Technological Innovation

Business model for overcoming social challenges	Technological innovation	Meaning
Provide social values through products/services	Technological Innovation (intermediate technology)	Offer goods/services to <b>consumers (vulnerable groups)</b> excluded from the traditional market by leveraging appropriate technologies to improve convenience and economic effectiveness
	Technological Innovation (new technology)	Offer goods/services to <b>consumers (vulnerable groups)</b> excluded from the traditional market by leveraging new technologies to improve convenience and economic effectiveness
	Value chain innovation	Embody social values in a value chain (producing goods/services) <b>*boosting employment and purchasing products</b>
Operate a platform	Closing the digital divide through innovation	Alter the market structure by bridging the digital divide between consumers and suppliers to <b>help participants (vulnerable groups)</b> actively engage in economic activities

[Table 7] Categories of Technologies Applied and Targets for Delivery of Values

Classification criteria	Category
Technologies applied (three categories)	<ul style="list-style-type: none"> <li>- High technology (knowledge in engineering at or above graduate level needed)</li> <li>- Intermediate technology (knowledge in engineering at or above undergraduate level needed)</li> <li>- Basic technology (knowledge easily acquired by lay persons)</li> </ul>
Targets for delivery of social economic values (three categories)	<ul style="list-style-type: none"> <li>- Ordinary consumers</li> <li>- Specific groups</li> <li>- Specific disadvantaged groups (persons with disabilities, persons with serious and incurable medical conditions)</li> </ul>

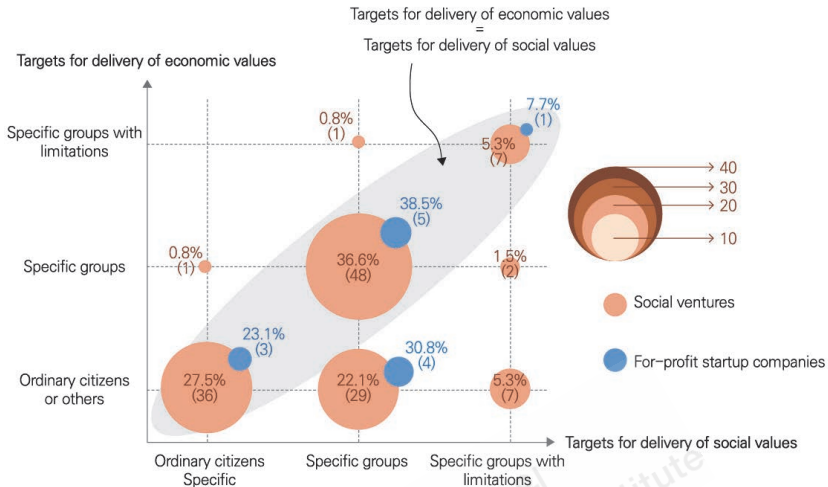
[Table 8] Social Venture-driven Shifts in the Market

Change in the market	Meaning
Development of new markets	Deliver goods/services unavailable in existing markets
Narrowing the digital divide (strengthening confidence in the market)	Ensure confidence and fairness through increased equitable access to market information that is unequally distributed among producers or between consumers and producers
Granting greater market access (expanding the market)	Induce market entry/participation by consumers/producers unable or choosing not to participate
Creating an eco-friendly marketplace	Make or provide goods/services in an eco-friendlier way
Ethical consumption	Provide consumers with a chance to indirectly discharge social responsibilities by instilling social values in goods/services
Developing the social venture ecosystem	Fortify the ecosystem of socio-economic organizations composed of founding, funding and scale-up
Rendering social services	Offer goods/services that have the features of public goods that cannot be provided by current markets
No change in markets	Not fit in the categories above

The results can be summarized as follows.

- (1) Forty technologically innovative social ventures responded to the survey, accounting for about one-third of all respondents. Those exploiting intermediate technologies hold the lion's share. Technological innovation and up-to-date technologies (AI/big data) represent 30.5 percent and 6.1 percent of all innovation introduced by social ventures, respectively. The majority of technologically innovative social ventures have adopted appropriate technologies including software and manufacturing that require knowledge in engineering at or above undergraduate level.
- (2) Social ventures whose objectives to deliver economic values match those to provide social values constitute 69.4 percent. The percentage of for-profit start-ups whose objectives to deliver economic values are the same as those to provide social values is 69.3 percent. [Figure 26] shows the distribution of social ventures situated in Seoul, with the x-axis representing objectives to offer social values and the y-axis representing objectives to provide economic

values.



[Figure 26] Map of Social Venture Objectives to Fulfill Social Economic Values

- (3) Business model sustainability-wise, technologically innovative social ventures applying intermediate technologies are in a more favorable position than other types of businesses for their targets to which to deliver social values are identical to those to which they wish to bring economic values. More specifically, social ventures can set specific groups with limitations as their targets for social values. Value chain innovation which does not exist in for-profit startup firms can still happen when targets for social values are different from those for economic values. Both social ventures and for-profit startups can bridge the digital divide through innovation. Due to the nature of the platform business model, companies can yield profits when the two targets differ.

**Assistive technology, also known as “able-tech” in Korea, is a sector where technological innovation of social ventures situated in the South Korean capital occurs and aids socially disadvantaged groups.**

Assistive technology is a sector of technological innovation for social ventures in Seoul. It is used to minimize inconvenience to the socially disadvantaged (individuals with disabilities and the elderly/weak) and enables every member of society to share everyday life experiences. It can be classified into four technology categories, as seen in [Table 9] below. Of these four, the SMG should focus its supportive efforts on fields like assistive technology devices, IT & services and IT. Details of the business carried out by each type of assistive technology social venture are also in [Table 9].

[Table 9] Types of Assistive Technology Social Ventures

Category of technology	Targets of social values	Main areas of business
Assistive technology devices + IT (7)	<ul style="list-style-type: none"> <li>• Persons with visual impairments</li> <li>• Persons with physical disabilities</li> </ul>	<ul style="list-style-type: none"> <li>• Technology devices allowing users to take notes in braille</li> <li>• Real-time screen magnifiers for individuals with low vision</li> <li>• Smart watches and smart pads for the visually impaired</li> <li>• Devices for braille literacy education</li> <li>• Wearable smart assistive devices (transforming visual information into sounds)</li> <li>• Apps controlling prosthetic legs</li> <li>• Electric wheelchairs</li> <li>• 3D-printed electric prosthetic limbs</li> </ul>
Services + IT (11)	<ul style="list-style-type: none"> <li>• Persons with disabilities</li> <li>• Persons with visual impairments</li> <li>• Persons with hearing impairments</li> <li>• Persons with mobility issues</li> <li>• The elderly and infirm</li> </ul>	<ul style="list-style-type: none"> <li>• Assistive mobility technologies helping individuals with hearing impairments drive</li> <li>• Customized on-call mobility options</li> <li>• Cognitive skills training programs</li> <li>• Personalized nutrition services such as for low-salt diets</li> <li>• Setting up of database on barrier-free facilities</li> <li>• Services that translate sign language into audible speech using smart rings or bands</li> <li>• Navigation systems for individuals with visual impairments</li> <li>• Real-time speech-to-text converters</li> </ul>

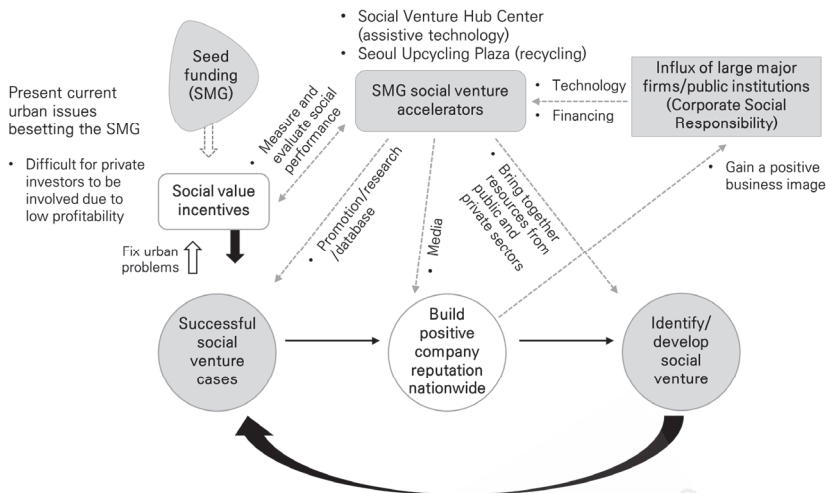
Category of technology	Targets of social values	Main areas of business
Healthcare (3)	<ul style="list-style-type: none"> <li>• The infirm</li> <li>• Adults</li> </ul>	<ul style="list-style-type: none"> <li>• Smart medicine boxes (pill bottles and etc.)</li> <li>• Adult diapers</li> </ul>
Universal design·Content (3)	<ul style="list-style-type: none"> <li>• The elderly and infirm</li> <li>• Persons with mobility issues</li> <li>• The vulnerable</li> </ul>	<ul style="list-style-type: none"> <li>• Fonts that individuals with low vision can easily read</li> <li>• Content like transfer maps for individuals with mobility issues</li> <li>• Content for persons with visual impairments</li> <li>• Games for recovery after stroke</li> </ul>

### **The Seoul Metropolitan Government (SMG) needs to broaden the social venture ecosystem by reinforcing CSR and introducing social value incentives.**

The researchers present the following policy recommendations with an aim to encourage the spread of social ventures across Seoul.

First, the SMG needs to broaden the social venture ecosystem by strengthening the role of companies in discharging their responsibilities to society through its policies designed to support SMEs and other businesses. With that goal, it is desirable to assist social ventures primarily utilizing appropriate technologies in pursuing business models that can be operationalized with assistive and other intermediate technologies. As for social challenges that necessitate the use of AI and other advanced technologies, there is a need to promote CSR to attract tech startups to the social venture ecosystem.

Second, the SMG will need to lead in introducing a social value incentive program. Through such a program, it will be able to induce tech startups to join efforts to iron out “technical urban issues”. Business opportunities and social values can be shown to companies who intend to undertake CSR activities as well. When it comes to urban issues with limited private participation, constructing an ecosystem through penetration and entry/exit of for-profit enterprises can be difficult. In this case, “social value incentive programs” are needed, such as basing incentives on social performance<sup>10</sup> and social impact bonds (SIBs). The SMG would serve as seed investor.



[Figure 27] Flow Chart Outlining the Proliferation of Tech-based Social Ventures Working towards Solutions to Urban Issues Facing the SMG

Third, it is critical to support the development of social venture technologies by mobilizing public and private resources. The SMG's objective of social venture policies should be to diffuse the culture of social venture ecosystem, not to expand their number. Its primary tasks would include measuring/evaluating social performance, publishing impact reports, maintaining a record of successful cases, carrying out media marketing campaigns and connecting resources. The SMG needs to create a virtuous circle for recognizing and accelerating the growth of social ventures within the ecosystem by using policy to get large businesses and other resource-rich entities involved.

<sup>10</sup> An incentive scheme based on social performance, a form of pay-for-social-performance, pays investors cash incentives and interest on investment out of public funds upon attainment of performance goals after completion of public projects with investment from private actors.

## Development of the Webtoon Industry in Seoul during the Digital Economy and Pertinent Policy Agendas

Eunjoo Oh · Sujin Kim · Taesoo Song

### Key Message

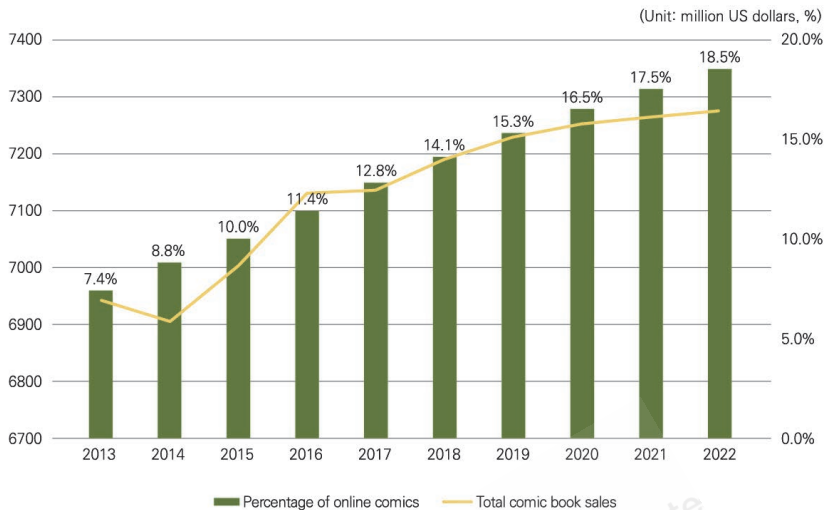
The Seoul Metropolitan Government (SMG) needs to strategically boost the value of content by forming a sound foundation for webtoon<sup>11</sup> creation and further enabling monetization of content.

### Webcomics have emerged as the next engine for growth in the comic book market during the digital economy.

With inception of the digital economy, the content industry has undergone waves of change. Cultural content used to be consumed through offline stores or isolated types of media, whereas now consumers can freely access it via mobile devices and the Internet. In other words, they can view such content wherever they are and whenever they want. Due to the rise of the “homeconomy”, a combination of home and economy, during the COVID-19 pandemic, the digital content market has boomed. The growth of web-based cartoons has been particularly noticeable.

A time series analysis of alterations in the global comic book market reveals that it has expanded steadily in total size since 2013 (valued at USD 6.942 billion in 2013 and USD 7.274 billion in 2022). The proportion of the global comic book market held by digital comics has soared with each passing year (7.4 percent in 2013, 12.8 percent in 2017, and 18.5 percent in 2022). It is fair to say that webcomics will have a dominant presence in the future comics market.

<sup>11</sup> Originating in South Korea, “webtoons” refer to a type of digital comic which are published online. Webcomics, online comics, web-based cartoons, and Internet comics are used as synonyms.



Source: Based on data from the Korea Creative Content Agency (2021)

[Figure 28] Increasing Share of the Global Comic Book Market Held by Web-based Comics, 2013—2022

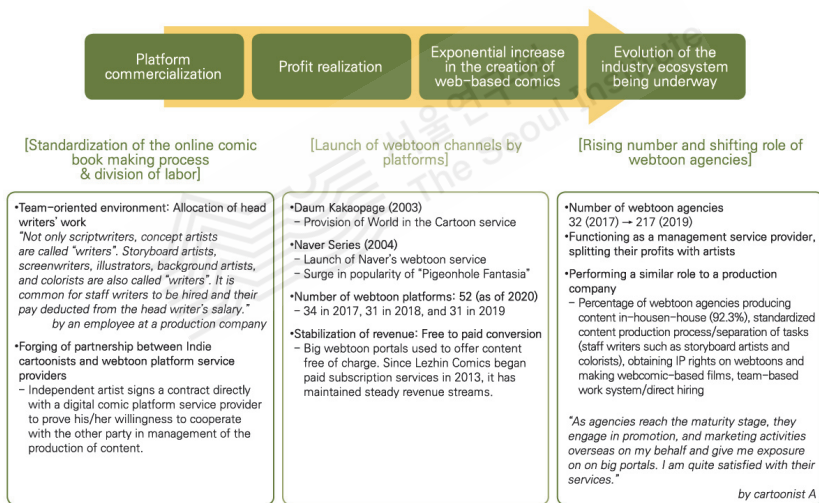
**The industry ecosystem has witnessed transformations resulting from setting up of the production process and numerous platforms, the separation of tasks, and a steep increase in the number of agencies.**

As a business model of monetizing content has been fully implemented, the process of industrializing Internet comics has reached its zenith. Following the success of content monetization, new practices and players have begun to appear in the ecosystem. More specifically, there has been a huge spike in the amount of content and the number of webtoon artists, competition, and specialization of production.

First, competition in the webtoon content market has led to the establishment of its production process and the segmentation of tasks. With workloads expanding because of the fierce rivalry, the digital comic book production process has become multi-layered - moving from a structure based on the individual to one based on the team. Diverse relationships are being formed within creators' groups.

Secondly, South Korean leading online platform providers Kakao and Naver have created their own web-based comic book platforms. These large platforms and webtoon portals, including Lezhin Comics, Bomtoon, and Toptoon coexist in the market.

Thirdly, there have been noticeable changes in the roles of traditional agencies. Such shifts are attributable to the elaborate online comic book production process as well as the building of relationships between webtoon content producers and platform service providers. The number of agencies jumped seven-fold—from 32 to 217—between 2017 and 2019. Furthermore, they have entered the competition for content production by starting to produce digital comics and manage and aid cartoonists.



[Figure 29] Major Shifts in the Ecosystem of the Webtoon Industry

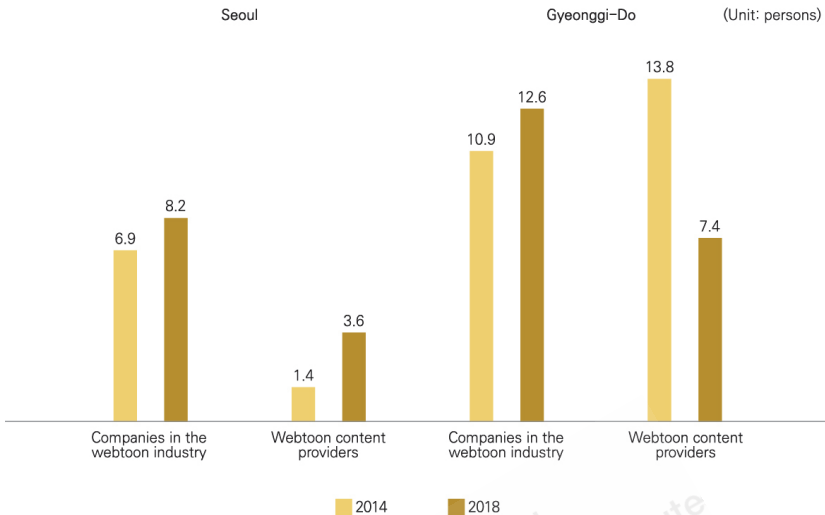
**At least 60 percent of all businesses and workers in the webtoon industry across South Korea are clustered in Seoul. But the average size of firms in the South Korean capital is smaller than those in Gyeonggi-Do.**

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The Internet comic book industry is predominantly concentrated in Seoul. As of 2018, webtoon-related enterprises and employees based in the capital accounted for 60.5 percent and 61.6 percent of the total nationwide, respectively. In Gyeonggi-Do, they represented 21.9 percent and 34.1 percent, respectively. This indicates that the number of businesses and workers in webtoon clusters in Seoul is two to three times higher than those situated in Gyeonggi-Do, the province which surrounds it.

Recently, webtoon companies in Seoul have grown in size, but remain smaller than those in Gyeonggi-Do. To be more specific, the size of webtoon firms had risen by about 1.3 workers - from 6.9 workers in 2014 to 8.2 workers in 2018. However, the average size of relevant businesses in Gyeonggi-Do was greater over the same time period, with 10.9 employees in 2014 and 12.6 employees in 2018. This is largely because medium-sized enterprises tend to be located in proximity to dominant Internet platform service providers like Kakao and Naver, headquartered in Pangyo and other areas in Gyeonggi-Do.

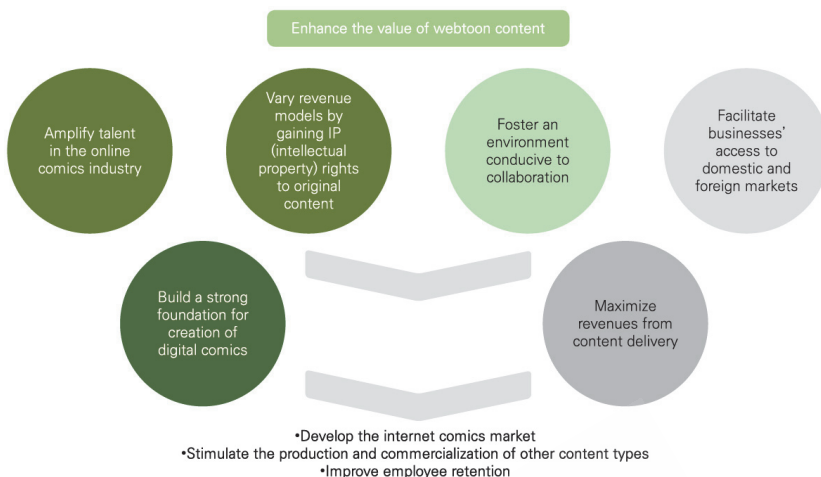
Seoul holds historical significance for and been home to the heaviest concentration of establishments in the Internet comics industry. Despite that, the firms there are smaller on average than those in the province surrounding it. Accordingly, it is likely that Seoul's web-based comic book industry will be susceptible to changes in the industrial ecosystem.



[Figure 30] Average Number of Employees per Establishment Located in Seoul and Gyeonggi-Do (2014, 2018)

**There is a need to adopt four strategies designed to catalyze the production of a diversity of webtoon content and the maximization of its value in Seoul.**

It is critical for the SMG to facilitate the creation of multifarious Internet comic content and enhancement of its value using a wide range of channels. In an attempt to attain these goals, policy objectives should be to solidify the basis for creation of content and increase revenue from content. The researchers present the following four strategies: (1) Widen the pool of talent in the webtoon industry; (2) Ensure the circulation of numerous intellectual property rights; (3) Build an environment for collaboration; (4) Help corporations enter foreign markets.



[Figure 31] Policy Directions for Seoul's Webtoon Industry

**① Cultivate a pool of next-generation talent in the webcomics industry by running training programs for aspiring cartoonists as well as current writers and producers**

It has been identified that three groups—prospective webtoon artists, current writers, and webtoon producers—need training on Internet comics. Unlike graduates of web-based comic-related high schools and webtoon majors, it is essential for would-be webtoon creators with other backgrounds to be able to hone their technical and soft skills like storytelling and planning at the same time. There is also a need to support professional cartoonists in refreshing their technical skills.

Of particular note is that there is a dearth of webtoon producers who play a coordinating role in the online comic book industry. They connect artists, platform service providers, and ultimately users. In spite of the growth in their importance, the demand for them in the rapidly expanding market has outpaced their numbers. Hence, it would be helpful to lend them assistance in developing their craft through initial and on-the-job-training so they can quickly adapt to the job.

[Table 10] Details of Training Courses Aimed at Developing Talent in the Webtoon Sector

Course	Details
Prospective cartoonists	<ul style="list-style-type: none"> <li>• Digital painting tools (Adobe Photoshop, Clip Studio Paint, etc.)</li> <li>• Coloring</li> <li>• Planning content and plotting out storylines</li> </ul>
Current digital comic artists	<ul style="list-style-type: none"> <li>• Digital painting tools</li> <li>• Coloring</li> </ul>
Introductory course for webtoon producers	<ul style="list-style-type: none"> <li>• Lessons on management skills, communications skills, PR/marketing skills, and contract drafting</li> <li>• Understanding the characteristics of platforms and methods for negotiating on proposals</li> <li>• Searching for and discovering various IP content</li> </ul>

## ② Gain IP rights associated with original content and roll out myriad revenue models making use of those IP rights

Creation of Internet comic content and revenue depends on whether IP rights over original content can be exploited. Because of a massive purchase of IP rights to original content by webtoon agencies and platform companies, small and medium-sized production firms' access to the type of content has tended to be limited in recent years. For the sake of resolving this monopolization issue, there is a need to strengthen communication between creatives of other content types including web novels/web dramas and web-based comic artists. It is desirable to help creators actively exchange ideas, explore new genres, and identify the latest trends in content creation and consumption together. Affording interaction opportunities to creatives can contribute to reducing their dependence on platform service providers, publishers and other distributors.

## ③ Cultivate an environment conducive to cooperation with producers and other key players, starting with construction of the tentatively-named Webtoon Anitown cluster

Geographical proximity is indispensable in fostering interaction and coordination between webtoon producers, producers and agencies/platform service providers,

producers and investors as well as the webtoon and other content industries. There is a need for the SMG to make a space for exclusive use by firms in the digital comics industry and a shared space for all industries in the Anitown cluster which is being created. It is also worth considering changing the name of the industry cluster to either Imagination Town (tentative) or Webtoon Anitown (tentative) in lieu of Anitown to associate it directly with webtoons.



[Figure 32] Design of a Space Dedicated to Webtoons in the Plan for the Anitown Cluster (provisional name)

#### ④ Assist businesses in delivering content to markets at home and abroad by developing the content market and leveraging hubs for spreading Hallyu<sup>12</sup>

In an effort to generate more revenue from the sale of web-based comic content, the SMG needs to consider supporting businesses engaged in domestic marketing and exporting to overseas markets.

To that end, the following tasks should be undertaken:

First, expand the webtoon segment of the Seoul Promotion Plan (SPP),<sup>13</sup> Seoul's

<sup>12</sup> Hallyu means "Korean wave", and describes the rising worldwide popularity of Korean culture over the last two decades.

- Sarah Kuta, "How Korean Pop Culture Took the World by Storm", Smithsonian Magazine, Aug. 23, 2022, <https://www.smithsonianmag.com/smart-news/how-korean-pop-culture-took-the-world-by-storm-180980449/>

<sup>13</sup> SPP (Seoul Promotion Plan) is a market specializing in animation, characters, webtoons, and game content, and is the largest market in Korea for a variety of content-related business, such as purchasing copyrights, co-producing, and attracting investment.

largest content market. It is also necessary to increase the section dedicated to online comics and encourage South Korean and foreign drama production firms to participate in the SPP as sellers.

Secondly, the SMG should carry out projects to grow the customer base of webcomic-related establishments in Seoul to foreign markets in tandem with the central government. Put differently, the two need to cooperate with one another to showcase webtoons at Korean Cultural Centers, King Sejong Institutes, K-Hallyu experience halls, and other hubs designed to further the spread of Hallyu in other countries.

Thirdly, hold content contests on subjects that reflect different cultural tastes of consumers in other countries and offer specialized translation services related to them.



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- "International Content Market SPP 2021 to Be Held Online from July 12 to 30", Business Wire, Aug. 23, 2022, <https://www.businesswire.com/news/home/20210708005402/en/International-Content-Market-SPP-2021-to-Be-Held-Online-from-July-12-to-30>

## Ways to Render Assistance to Users and Workers in Changed Conditions in the Post-pandemic Household Services Market

Jinha Kim · Minyoung Hwang

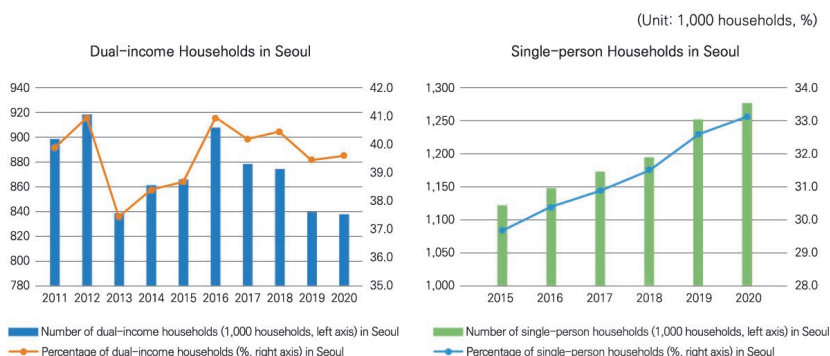
### Key Message

The Seoul Metropolitan Government (SMG) needs to offer household services to provide Seoul residents with a better work-life balance. A framework is needed where domestic service workers can further their careers as well.

### **Shifts in demographics and household composition have transformed the demand for domestic services and their resulting supply.**

The increase in women's labor force participation has led to altered demographic and household structures, including the rise in dual-income households and rapid population ageing. Consequently, consumption patterns have altered and household spending on domestic help to perform household services has gone up. Up to the 1990s, upper-income households with a child younger than six years of age were the largest users of domestic services. Since the 2000s, changes in household composition and a rise in the proportion of the elderly population have encouraged greater spending on domestic services by every household, regardless of income. Such changing expenditure patterns have resulted in a growth of employment in the low-value-added services industry, such as household services. In the past, employment agencies or brokers acted as middlemen connecting households looking for local home services and domestic helpers. As digital technology has integrated into the services industry, hiring methods have evolved and diversified in recent years. Traditional methods encompass nonprofit organizations and paid job placement services which source candidates for employment. Customers can also use the apps provided by intermediary

digital platforms for domestic services or directly hire those household workers themselves.



Source: Statistics Korea (KOSTAT), Data from the Regional Employment Survey

[Figure 33] Trend in Dual-income Households and Single-person Households in Seoul, 2011–2020

### **The household services market has grown in line with the related platform market. High labor intensity and persisting occupational gender segregation are problematic.**

An analysis of data from Statistics Korea (KOSTAT) finds household spending on domestic services reached KRW 7.5 trillion in 2017 and grew by 214% between 2017 and 2019. As of 2019, the estimated number of domestic service workers in formal and informal employment totaled 600,000, of which 200,000 to 400,000 were formal workers. KOSTAT estimates, based on its regional employment survey for the second half of 2020, put the number of persons employed as domestic workers nationwide at 105,000 and in Seoul at 38,000. The number of transactions performed in the conventional domestic services market is falling and people are increasingly turning to digital platforms. The existing labor market, where employment agencies match workers to demand, has seen a rise in the average age of domestic helpers. The lack of manpower is another challenge. The platform-based household services market, together with the Online to Offline (O2O) market, has expanded. Services have been

segmented so that both users and laborers can choose their preferred time slots or desired options. As a result of technological advancement and the occurrence of economies of scale, companies have begun to render on-demand domestic services to households and the importance emphasized of user assessment of the services provided. Against this backdrop, household workers tend to do extra, leading to an increase in labor intensity, in an effort to obtain favorable feedback. What's more, gender-based occupational segregation, fueled by user preference for female domestic helpers, remains pervasive.

**Only informal workers, not platform workers, are covered by the Act on the Employment Improvement of Domestic Workers (shortened to the Act on Domestic Workers).**

In this study, a “domestic worker” refers to a person working within the scope of a residence who performs diverse household services, including cleaning, laundry, and caring for children. Household assistants, babysitters, and postpartum caregivers are examples of domestic services workers. In the case of babysitting and postpartum care services, financial assistance, or vouchers, is being given. This means baby and postpartum caregivers are classified as formal workers, unlike housekeepers who are being treated as informal workers. That is to say, formal and informal workers coexist in the domestic services market. The Act on Domestic Workers aims to include the informal workforce, up to now excluded from other laws. In spite of that, as the bill which was put forward by the 18th National Assembly, took 10 years to pass, it could not take into account the emergence of a domestic services platform market. Subsequently, unionized domestic service workers have no one to bargain with. Standard terms and conditions are also needed for domestic helpers who provide paid services via online matching platforms.

**Domestic workers demand social protection benefits ranging from job security to severance pay and desire their services to be recognized as a form of work.**

Upon enforcement of the law on domestic services, domestic workers have been qualified as “actual” employees. In a bid to bring their services into the formal economy, it is indispensable their work be accepted as a profession. The findings of a survey on the status of domestic services have underscored the need for stable employment and social safety net programs for domestic helpers, including severance pay, legally-mandated paid holiday hours, paid leave, and the four major social insurances.<sup>14</sup> When it comes to personal development, domestic workers want training in the services they provide and certificates for related qualifications. They also voiced the need to transform public perception of their services. According to previous studies and expert advice, some domestic services workers do not wish to subscribe to the four major social insurances, as they are already covered as dependents of their family members or are opposed to sharing income information so as not to lose their low-income status. Types of employment as well as desired work modes and contract types vary from person to person, similar to workers in special types of employment. Thus, it is hard to accommodate all of their demands through direct hiring and outline career paths on the basis of their experiences and skills. Since most of their work is conducted in private homes, there is a need to work on ways to approach the domestic services market. For the sake of bringing the informal market into the formal system, it is pivotal to define in-home attendants for people with disabilities, personal care assistants for seniors, nannies, and other domestic service providers in a more specific way. Competence-based career frameworks should be set, too.

<sup>14</sup> The four major social insurances are employment insurance, industrial accident compensation insurance, national pension, and national health insurance.

**The financial burden, entailed by the passing of the Act on Domestic Workers, will inevitably fall on clients of domestic services. Understandably, they call for ways to guarantee trust in domestic services and conflict resolution.**

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The main purpose of the Act on Domestic Workers is to enhance employment practices. The issue here is that too much focus on the overhauling of employment practices is likely to bring about an increase in the average hourly wage for domestic help. The survey of current domestic service users has highlighted concerns around escalating costs as a result of the enactment of law relating to domestic helpers and wider use of direct hiring. There is also high demand for assuring the credibility of domestic service workers and managing conflict. The following measures need to be implemented to raise the level of customer trust and satisfaction:

- 1) Verify applicants' personal and professional details
- 2) Observe the work of certified organizations
- 3) Produce standard guidelines to cope with changes in circumstances or options

The demand for domestic services among dual-income households and households who require care services is projected to grow once the COVID-19 situation improves or ends. Therefore, ways to expand service delivery are vital.

**It is crucial to imitate the Construction Skills Certification Scheme when setting wage rates for domestic services workers and explicitly establish the goal of direct employment.**

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The National Competency Standards (NCS) standardize skills required to fulfill tasks at various industrial sites. Domestic helper training courses based on the NCS are currently available but have not yet been reflected either in the domestic services market system or wage rates. It is advisable to specify standard rates for each skill level by employing a system similar to the Construction Skills Certification Scheme. The use of certificates or awards can be limited to in-home care services. Hence, creating

a career development program pertaining to domestic workers is essential. Direct hiring-wise, it is worth considering employing domestic workers through the Seoul Public Agency for Social Service. Having said that, it is desirable to boost confidence in the public sector first, rather than engage in wide deployment of direct hiring. There is a need to ensure the effectiveness of employment stability through direct hiring and raising the level of service quality through careful selection and training of qualified workers—even in small numbers.

**The SMG needs to offer domestic services with an aim to helping Seoulites maintain a good work-life balance. Support centers and identity verification service providers should be managed as well.**

The government of Gyeonggi-Do<sup>15</sup> has lent domestic services assistance to residents of Gyeonggi to ensure a healthy work-life balance. The SMG's existing welfare programs should be extended to include domestic services support in a bid to keep people's work and personal life on an even keel. The following can be considered as targets of the domestic services support scheme: (1) households with dual-income earners working for firms with high female employment rates and other reputable small and medium-sized enterprises; (2) families with multiple children/young children or single-person households who require care and attention from family members irrespective of income. It is critical for the SMG to institute practical policy measures regarding vouching for candidates' identity, career building, and improving working conditions. To that end, there is a need to set up a support center dedicated to distributing a standardized form of contract to job placement agencies as well as promoting policies, offering guidance on employment insurance and training, and mediating conflict. It is suggested the SMG divide the roles as follows:

<sup>15</sup> "Do" is an administrative unit (similar to a province) in Korea. There are eight Do in South Korea, such as Gyeonggi-Do and Gangwon-Do.

- Certified agencies: guarantee domestic helpers' identity and create a decent working environment
- SMG: supervise agencies

## 04 Transportation Planning

### Strategies for Successful Provision of Autonomous Vehicle Services in Seoul

Youngjun Han · Sehyun Park

#### Key Message

It is advisable for the Seoul Metropolitan Government (SMG) to launch self-driving services in stages by gradually creating a further favorable environment for autonomous driving.

**Central governments and municipalities in each country have pushed forward with myriad support policies, including enacting related laws, to brace for the age of autonomous vehicles.**

Self-driving technology is expected to emerge as “the next smartphone” due to its derivative industries and the resulting astronomical benefits. A number of global firms have moved into the market and made hefty capital investments in a bid to lead the industry. Both central and local governments in many countries have instituted a diversity of support policies in an effort to prepare for a time of robotic cars. They have implemented or amended associated legislation to enable companies to test driverless vehicles on public roads. Along with this, a variety of permit systems have been set up towards preventing accidents and ensuring safety. Plans on a variety of public services are being worked out, such as on reorganizing existing public transport systems with the use of autonomous driving technologies.

In Korea, a legal framework for self-driving vehicles was established and private

enterprises given permission to pilot-test their robotic vehicles. The SMG has run a self-driving test bed in Sangam Digital Media City (DMC) in conjunction with the Cooperative Intelligent Transportation System (C-ITS) since 2019. Since November 2020, it has operated pilot autonomous driving zones which encompass a broadened testbed area, in which smart roads, V2X (Vehicle to Everything) communication networks, road markings and other infrastructure were created. The SMG built facilities like car repair shops and electric vehicle charging stations as well. A range of companies, research centers and universities have been demonstrating autonomous shuttles/shared vehicles and other manned services and unmanned services such as robot delivery.

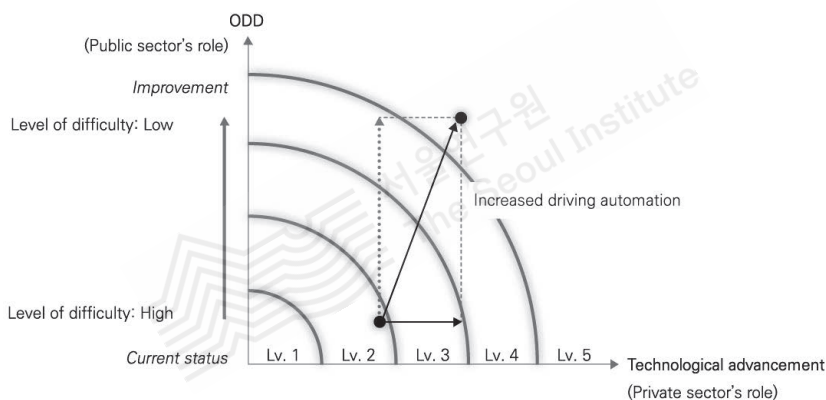
**In spite of significant investment, policy assistance and tech development, uncertainty surrounding the commercialization of driverless vehicles has deepened.**

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Notwithstanding the large-scale investment from enterprises and policy backing from national and local governments, commercializing complete driving automation remains far away. Google's Waymo and Tesla—two self-driving technology leaders—have rendered a wide range of autonomous driving-based services. The issue here is the constraints. To be more specific, staff are required for constant monitoring of the driving environment and high-definition road maps. Moreover, robo-vehicles are limited to specific circumstances, such as where there are low traffic volumes and simple road conditions. Multiple global corporations have forecasted that fully automated cars would hit the market by 2020, which proved to be incorrect. The daunting challenges that face autonomous driving, range from poor weather to mixing with driver-controlled vehicles, have yet to be resolved. Amid the ongoing barriers to social acceptability, including determination of liability in the event of an accident, it has become increasingly uncertain when fully driverless cars will be available on the mass market.

**It is integral for the SMG to take a proactive part in making Seoul a highly welcoming environment for autonomous vehicles.**

With increasing uncertainty and the technical constraints of autonomous vehicles, the public sector is being called on to serve a new role in the advancement of self-driving technology. The focus of policies on robotic vehicles has been on providing spaces for demonstrating the technologies of private operators so far. From now on, the public sector needs to be more proactive in boosting the maturity of autonomous driving through improvements to the operational design domain (ODD)<sup>16</sup> in Seoul.



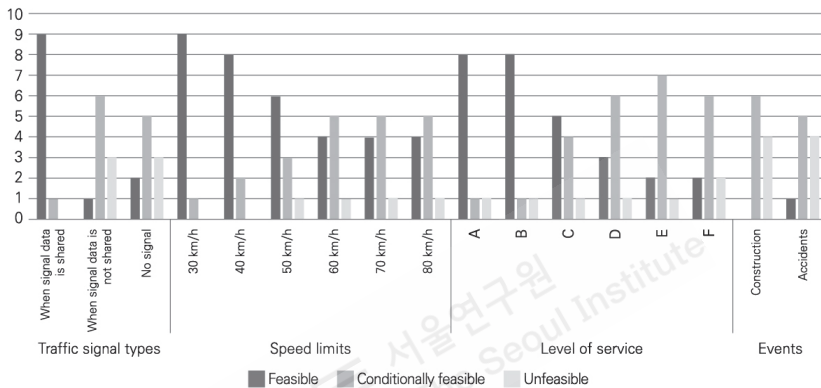
[Figure 34] Levels of Driving Automation in light of Technical Advances and Enhancement of ODD

This study identifies roadway environment factors that hamper the operation of self-driving vehicles through a survey of autonomous driving technology development companies and experts.

It suggests the need to design an evaluation system for the ODD in Seoul utilizing information on infrastructure (collected via T-GIS, Seoul's traffic facility

<sup>16</sup> The “operational design domain” (ODD) refers to the conditions under which an autonomous driving system can safely operate.

management system), level of service (gathered via TOPIS, Seoul's Transport Operation and Information Service) and a high-definition map (HDmap) that is being built. Through this evaluation system, the SMG will be able to identify road factors that hinder it from beginning autonomous vehicle services and revamp the driving environment in Seoul. Then, surroundings conducive to robotic cars will be created.



[Figure 35] Results: Investigation of the Feasibility of Autonomous Driving under Interrupted Flow Conditions

**It is desirable to launch manned autonomous vehicle services using big parks, late-night roadways and other available ODD elements.**

Manned autonomous vehicle services involve a vehicle with a person on board and numerous elements should be taken into account when offering them, including the stability of self-driving systems, ride quality and service punctuality. Accordingly, such services have been considered difficult in mega-cities like Seoul.

The SMG is expected to launch manned autonomous vehicle services as early as possible if it can eliminate road factors that impede their operation and finds areas and time slots for service provision using the evaluation system for ODD proposed in this study. Based on an understanding of the current state of autonomous vehicle

technologies and ODD in Seoul, the researchers present several points for consideration regarding the introduction of manned autonomous vehicle services.

First, service accessibility must be improved even when the level of mobility is low. Robotic vehicles will ultimately be capable of rectifying human error so they can run at high speed. Having said that, there are significant limitations for high-speed driving using existing technologies. Accordingly, the SMG should focus on spatiotemporal expansion of autonomous vehicle services instead of mobility in the beginning.

Second, there is a need to minimize the chances of traffic conflict involving robo-cars and human-driven vehicles. The findings of a survey on ODD in Seoul indicate that self-driving technologies are bound to be limited in performance when colliding with conventional human-controlled vehicles. Manned self-driving services should be offered in separate lanes and areas other than roadways in the initial phase.

Lastly, it is crucial to select ODD that fulfills the two requirements above and start delivering the services therein. That is to say, the researchers recommend that the SMG launch autonomous vehicle services in practicable areas and at certain times, rather than all areas across the South Korean capital or throughout the day. From this point of view, this study proposes the following plans: (1) render mobility assistance services through the use of self-driving vehicles, (2) provide late-night autonomous public transit services exploiting late-night bus lanes and access roads.

### **Urban infrastructure and legal framework should be enhanced to roll out viable uncrewed robotic vehicle services.**

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Driverless freight delivery services are relatively free from technical constraints. Thus, there is a real likelihood that they will be realized with present technologies. Against this backdrop, solid institutional support, including revamping urban infrastructure and legal systems, is a prerequisite for offering unmanned autonomous vehicle services. Legal liability and benefits associated with driverless vehicle services should be clarified by amending legislation to incorporate delivery robots whose legal

status has not been determined. It is also necessary to improve urban infrastructure so that travel lanes for unmanned autonomous vehicle services can be made. The rise in the number of smartphone and shared-ride users has led to growth in the popularity of bicycles, electric scooters and other personal mobility devices in recent years. The features of new transport modes differ from those of motorcars and pedestrians, so local authorities have ramped up efforts, including creating exclusive travel lanes, to separate them from traditional modes of transportation. We expect that a travel lane for unmanned autonomous vehicle services can be designated in line with such efforts. As most unstaffed self-driving service businesses are run by private operators, their use of public infrastructure requires justification to be accepted by the public. It is vital to identify public services to gain this public acceptance and maximize the social impact of uncrewed autonomous vehicle services.

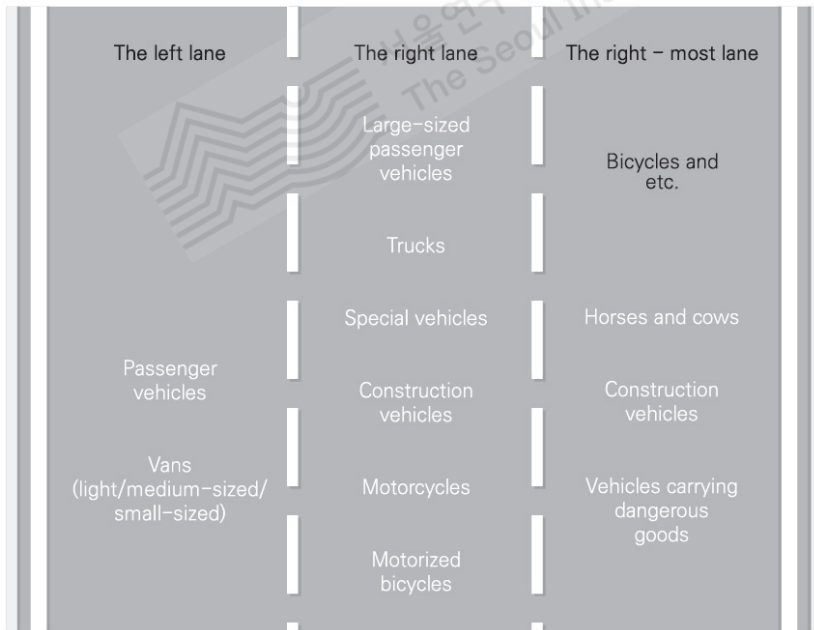


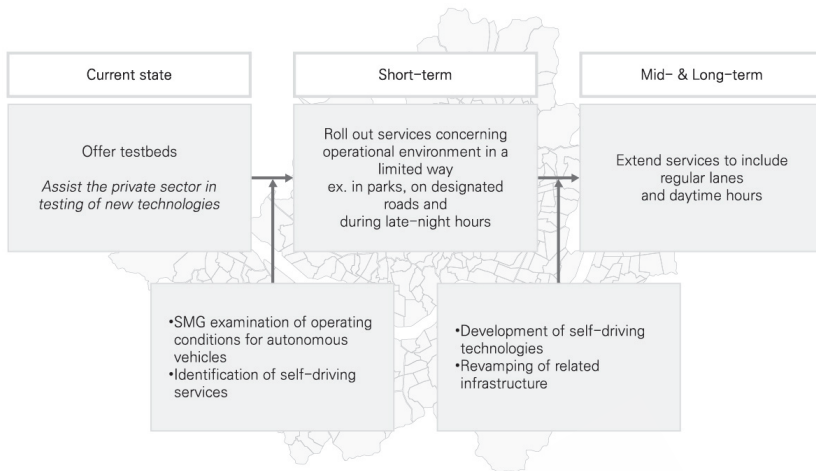
Image courtesy of SMG's communication platform  
(<https://mediahub.seoul.go.kr/archives/1301766>)

[Figure 36] SMG Plans on How to Operate Designated-Use Lanes

**The SMG should phase in more autonomous vehicle testing sites considering Seoulites' positive attitudes toward self-driving cars.**

The researchers surveyed public perceptions and preferences regarding robotic car policies. The responses revealed a high awareness of autonomous driving technology among residents of Seoul. Active testing of vehicles with automated and autonomous driving functions and introduction of related services are viewed positively. Respondents display a low degree of aversion to the operation of testbeds for self-driving cars using public roads and plans on expanding autonomous driving pilot zones to areas in which they reside. Seoulites' favorable attitudes toward autonomous driving are expected to be of help to the SMG in increasing the number of testing sites and vigorously offering services for robotic cars.

Self-driving vehicles are now being piloted and linked services provided in some areas. This study recommends assessing the ODD elements for autonomous vehicles in Seoul and removing obstacles that make them undrivable. The SMG could broaden service areas in a gradual way by doing so. In the short run, it will be able to deliver autonomous driving services in limited operating conditions like those at large parks, in exclusive lanes or during late-night hours. There is a need to continuously develop autonomous driving technologies and improve the driving environment. Then, in the long run, urban transportation services based on self-driving vehicles can be rendered on publicly accessible roads during daytime hours.



[Figure 37] Conceptual Diagram of the Extension of Autonomous Vehicle Service Coverage

## A Study on Plans to Apply the Internet of Things in Seoul

Sangyeon Hong · Hyeongyun Ki

### Key Message

There is a need to increase adoption of the Internet of Things, commonly abbreviated as IoT. To that end, the Seoul Metropolitan Government (SMG) needs to rectify issues in ongoing projects and build a data governance framework and a digital twin<sup>17</sup> for the long haul.

**IoT has been identified as one of the top 10 strategic technologies every year. Domestic and global IoT markets have constantly grown in size.**

The term “Internet of Things (IoT)” was coined in 1999 by British technology pioneer Kevin Ashton, an executive director of Auto-ID center at the Massachusetts Institute of Technology (MIT), and refers to the network of intelligent devices connected to each other over communication networks capable of gathering, processing, and utilizing data. It can be defined as a collective term for devices, communication networks, data platforms, and service technologies.

IoT has been listed on Gartner’s Top 10 strategic technologies consecutively from 2012 to the present. It is predicted that IoT paired with Artificial Intelligence (AI) technology will become increasingly intelligent and evolve into autonomous things (AuT).

<sup>17</sup> A digital twin is a virtual representation of an object or system that spans its lifecycle, is updated from real-time data, and uses simulation, machine learning and reasoning to help decision-making.

- “What is a Digital Twin?” IBM, Aug. 26, 2022, <https://www.ibm.com/topics/what-is-a-digital-twin>

For these reasons, the IoT market has gradually increased in size. This is also true of the South Korean IoT market, which has grown from KRW 3.76 trillion in 2014 to KRW 7.163 trillion in 2017, or a whopping compound annual growth rate (CAGR) of 24%. By 2024, it is forecast to be valued at approximately USD 32.236 trillion. The global IoT market size has continued expanding as well. According to McKinsey, IoT is estimated to have a total economic impact of USD 3.9 trillion to USD 11.1 trillion a year by 2025.

**Major cities in South Korea and other countries have deployed IoT technology for traffic/parking/energy management and monitoring of air pollution.**

Key cities, such as Barcelona and Santander in Spain, Copenhagen in Denmark, Hangzhou in China, and Sejong City and Busan in South Korea, have actively sought ways to address a range of urban problems with the use of IoT devices. IoT applications include smart traffic management systems, smart parking solutions, air pollution control, and efficient energy management.

They have also focused on standardizing and integrating existing data and data generated by IoT sensors, pushing ahead with projects concerning constructing digital twins.

**In 2014, the SMG finalized its Master Plan for Building the Internet of Things. Construction of its smart IoT platform is underway.**

Upon execution of its Master Plan for Building the Internet of Things in 2014, the SMG has annually formulated plans to turn the South Korean capital into an IoT city, or smart city. By amassing a host of data pursuant to such plans as a way of handling urban issues, it has rendered IoT services.

Here are the details of SMG's Internet of Things projects. After offering IoT-based

public services in Bukchon Hanok Village, Yangcheon-*Gu*,<sup>18</sup> and Seongdong-*Gu* on a trial basis, the SMG intends to improve and extend these services. It has also worked to set up a smart platform using IoT. As part of this particular project, the SMG has produced a 3D virtual map of Seoul, installed a fleet of smart sensors, and integrated or connected control rooms. The goal of the project is to ensure a linkage between IoT devices and data. The SMG has continued to spur development of the IoT industry through operation of an IoT Incubation Center and the Seoul IoT Center. Towards facilitating Seoul's seamless transition into a "hyper-connected society" leveraging IoT, big data, and AI, the Smart Seoul Platform,<sup>19</sup> (6S) projects have been implemented. Notwithstanding such efforts, the SMG still faces limitations when it comes to modes of data gathering and data input. Unclear purposes for data collection, an absence of integrated data management systems among services in the service sector as well as low rates of civic participation are problematic, too.

**Existing services in the welfare, safety, and transportation sectors need improvement. Engaging citizens is also a necessity.**

The researchers observed changes in circumstances in each field concerning the adoption of IoT. With increasing numbers of elderly and single-person households, multiple vulnerable groups are expected to emerge. Furthermore, a trend toward deinstitutionalization of persons with disabilities will spark demand for services that assist them with safety and health at home. As for the safety sector, the necessity of maintaining and rehabilitating fast-decaying infrastructure and underground facilities

<sup>18</sup> "*Gu*-district" is an administrative unit in Korea. There are 25 autonomous *gu*-districts in Seoul, divided into 426 administrative "*dong*" districts.

<sup>19</sup> The "Smart Seoul Platform" is SMG's core smart digital infrastructure which encompasses six services: S-Net (Smart Seoul Network), S-DoT (Smart Seoul Data of Things), S-Data (Smart Seoul Data), S-Brain (Smart Seoul Brain), S-Map (Smart Seoul Map), and S-Security (Smart Seoul Security).

has arisen. Following the uptake of self-driving cars, electric vehicles, and other new transport modes, it is pivotal for the SMG to set up infrastructure and relevant schemes for their operation.

Given these shifts in conditions, the following are some of the needed strategies to accelerate the utilization of IoT technology in each field:

[Welfare]

- Conduct a regular survey of older adults on the availability of wired or wireless infrastructure, their ability to use IoT devices/smartphones, and demand for related devices/new services;
- Upgrade current services;
- Amplify the effects of associated projects by combining with the Smart Seoul Platform (6S) projects;
- Identify ways to handle data in an ethical manner allowing for the characteristics of medical/welfare data.

[Environment & Energy]

- Demonstrate an array of newly released sensors;
- Install additional IoT devices;
- Execute the standardization of data (e.g. energy data) in an attempt to establish a data platform enabling data analysis in an effective way;
- Encourage the use of data derived from the S-DoT project by citizens/the private sector.

[Transportation]

- Enhance services in place;
- Install more sensors to capture data on floating population and traffic volume of bicycles/personal mobility devices/vehicles;
- Construct IoT infrastructure;
- Couple the Smart Seoul Platform (6S) with transportation services.

Civic engagement is critical to ensuring efficient use of the Internet of Things. There is a need to commence the SMG Living Lab project to bring Seoulites together to determine what urban issues to work on and what data to collect to settle such problems. A citizen participation platform is a tool to which people can upload data or information about incidents/accidents happening in a city directly from their smartphones, which serve as sensors. We recommend the SMG stage a hackathon. The event is of particular significance in that the SMG can provide varied participants with an occasion to share insights by helping them turn their ideas into technical plans through preliminary workshops and expert mentorship programs.

**To improve the sustainability of projects, it is integral that the SMG establish the ex-post evaluation process. Geocoding<sup>20</sup> data collected from sensors and platformization is essential.**

We present the following recommendations aimed at promoting the adoption of IoT services.

First, it is important for the SMG to introduce an ex-post assessment procedure to maximize project sustainability. There is a need to compile information on ongoing projects by making it compulsory for civil servants involved to draw up a document stating the aims of service delivery, sensors used, and policy objectives and submit it when instituting an IoT policy. This is similar to a real-name system. Then, the SMG should evaluate whether the aims of service provision and policy goals are achieved and choose services that need to be extended in view of the assessment results. It is vital that the SMG play a supporting role in widening the provision of selected services as well.

<sup>20</sup> Geocoding is a process of converting addresses into spatial data and associating the exact geographical coordinates for that address.

- Shilpi Chakravarty, "What is geocoding; how can it help sell products", Geospatial World, Sept. 12, 2018, <https://www.geospatialworld.net/blogs/what-is-geocoding-and-how-can-it-help-sell-products/>

Second, it is imperative that the SMG act as a rule maker responsible for laying down regulations in relation to service expansion. When moving from pilot projects to full-scale implementation, many challenges with respect to methods/modes of data collection, personal data processing, service coverage areas, as well as staff supplementation are likely to occur. As the body in charge of drawing up rules, the SMG is supposed to supervise the execution of projects, especially when a slew of issues are handled, the extent of data collection and use are defined, and action plans prepared. It is desirable to closely cooperate with relevant divisions in deciding service coverage areas, related organizations for the delivery of services, and increases in budget and personnel.

Third, there is a need to geocode data and create a platform. The growth in adoption of IoT services will lead to an explosion in the amount of data transmitted by multifarious sensors. In a bid to more fully utilize data, geocoding should be done. With that goal, making a digital twin is indispensable and should include spatial data about urban information/IoT visualized on S-Map, a 3D map of Seoul, so as to cultivate an environment where the public body can make the best use of data when framing policies. Aggregating all necessary data into a platform is of fundamental importance. The SMG is currently devising an IoT-based system for urban data, as a dissemination channel that private, public, academic, and research organizations can use. It will be helpful in shaping policies designed to diagnose/iron out problems facing Seoul and stimulating the public data industry. The SMG has been forming plans on ways to gather a variety of data and make it available to the private and academic sectors through this urban data hub as well. Such data infrastructure is a centralized system supporting the collection/processing of data and distribution of information.

Lastly, the SMG needs to run a data governance committee which consists of specialists in different areas for the purpose of solving legal, ethical, and security challenges regarding data gathering and usage.

## 05 Environmental Planning

### Energy Consumption and Energy-Saving Scheme for Single-person Households in Seoul

Min Kyeong Kim

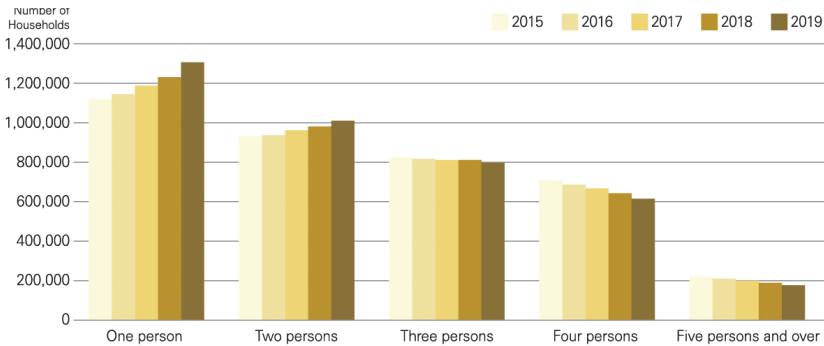
#### Key Message

It is crucial to induce single-person households to use energy in an efficient manner through tailored energy-reduction strategies which consider their age-specific characteristics and lifestyles.

**Ongoing growth in the number of single-person households who “tend to use power inefficiently” is expected to lead to a rise in energy usage.**

The number of single-person households has gone up more than fivefold over the last 30 years. To be more specific, Korea has seen an increase in the proportion of single-person households of all households, from approximately 30 percent in 2015 to 33.4 percent (around 180,000 households) in 2019. According to Statistics Korea, by 2035, 68 percent of Seoul’s population is projected to be small (one- or two-person) households.

It is predicted that small households will account for a significant portion of total energy consumption. Although the largest amount of electric power is used by single-person households, there is a dearth of policies targeting that demographic in comparison to those targeting multi-person households. The main consumers of household appliances have shifted from “families” to “individuals”. As all electric devices such as TVs and air conditioners necessary in daily life are purchased for only one person in such households, energy is likely to be consumed inefficiently. Simply put, the growth in single-person households will result in an increase in energy consumption.



Data courtesy of the Korea Statistical Information Service (KOSIS)

[Figure 38] Changes in the Number of Households in Seoul from 2015 to 2019, by household size

**When it comes to electricity and carbon consumption per person in Seoul, single-person households use at least three times more electricity and carbon than five-person households in per-capita terms.**

We analyzed energy consumption of single-person households who are members of the Eco-Mileage program.<sup>21</sup> Those living in homes with fewer occupants have a tendency to report lower energy usage than those living with more occupants (energy consumption per household). Households of five or more persons use around 1.3 times more electricity than households of one person. Likewise, households with five or more persons consume about 1.5 times, 2.3 times and 2.9 times more gas, water and district heating, respectively, than households with one person.

As for per-capita consumption of energy, not energy use per household, the carbon footprint of single-person households is more than three times higher than that of five-person households. Gas and district heating consumption of households with one

<sup>21</sup> The Eco-Mileage program, part of the One Less Nuclear Power Plant (OLNPP) scheme, was launched by incumbent Seoul Mayor Oh Se-hoon in 2009 with an aim to reduce GHG emissions. Households and businesses in Seoul who signed up for the program receive incentives for cutting back on their electricity, water, gas or district heating consumption by at least 10% compared to the previous two years.

person nearly double the per-capita use of households with five persons. This means that with expansion of household size, energy use per person diminishes due to the occurrence of economies of scale. In the end, the rise in single-person households will push up energy demand.

[Table 11] Energy Consumption of Eco-Mileage Members, by household size

Number of household members		One person	Two persons	Three persons	Four persons	Five persons
Number of cases		45,201	95,956	182,431	279,516	61,962
Electricity (M <sub>coal</sub> )	Annual	6117	7138	7280	7839	8175
	Monthly average	511	595	607	653	680
	Per household member	511	298	202	163	136
Gas (M <sub>coal</sub> )	Annual	3797	4126	4270	4651	5629
	Monthly average	319	340	360	391	473
	Per household member	319	170	170	98	95
Water (m <sup>3</sup> )	Annual	95	118	118	172	219
	Monthly average	8	10	10	14	18
	Per household member	8	5	5	4	4
District heating (M <sub>coal</sub> )	Annual	515	617	1070	1461	1523
	Monthly average	41	51	93	123	123
	Per household member	41	26	31	31	25
Carbon footprint (kg/CO <sub>2</sub> )	Annual	1943	2131	2213	2370	2669
	Monthly average	162	178	184	197	222
	Per household member	162	89	61	49	44

**4,886 households, designated as “exemplary”, use an average of 95.27 Mcal of electricity per month, which is 45 percent lower than the average monthly consumption of typical households.**

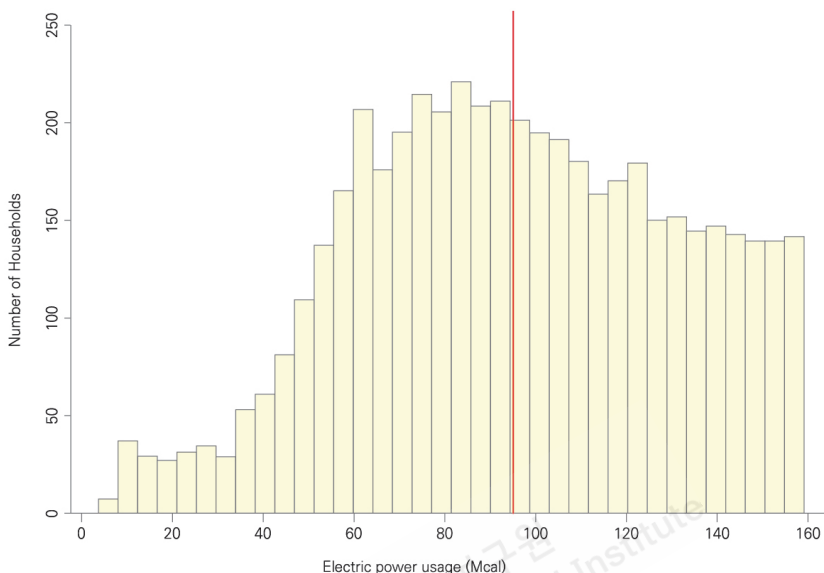
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Of the 45,201 single-person households that participated in the Eco-Mileage program in 2019, the effective sample size was 29,514. Households who reduced their use of electric power by 10 percent or more compared to the previous year and consumed less energy than the standard usage<sup>22</sup> were designated as “exemplary” households. Seventeen percent of that number, or 4,886 exemplary households, were extracted. As of 2019, the average monthly electricity consumption for “exemplary” households was 95.27 Mcal. The household that consumed the least electricity of these “exemplary” households used 4.01 Mcal in a month.

On average, “exemplary” households and typical households used around 95.27 Mcal and 171.81 Mcal in a month, respectively - the former consumed 45% less electric energy than the latter. Among typical households, apartments were the most common housing type, followed by multi-family homes and single-family homes. Interestingly, the majority (roughly 43%) of “exemplary” households resided in multi-unit dwellings, followed by apartments.

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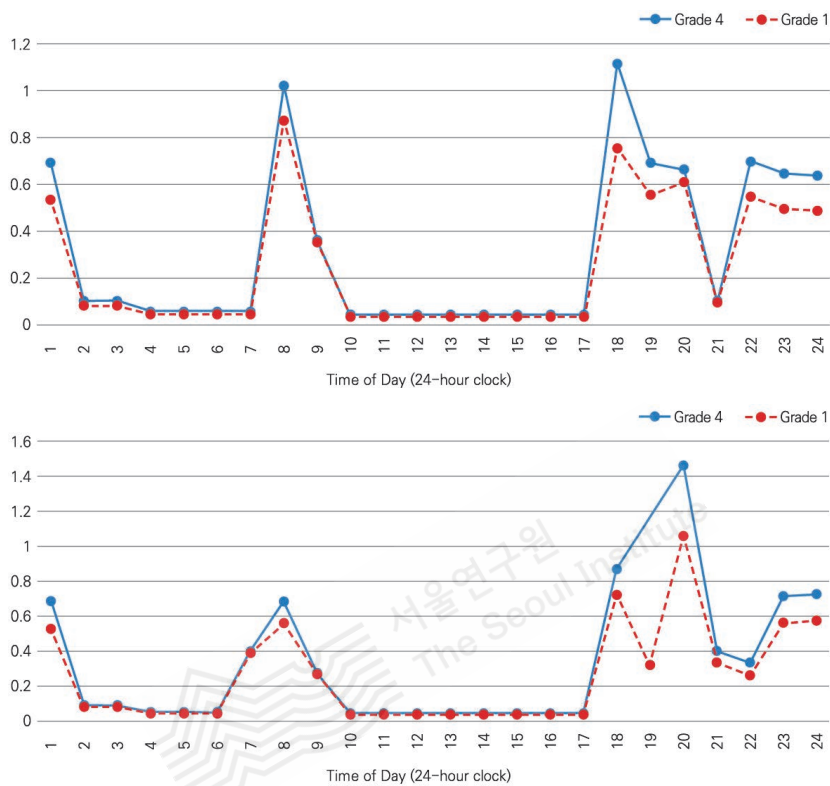
<sup>22</sup> The standard energy use is the average monthly electricity consumption for a single-person household that signed up for the Eco-Mileage program. As of 2019, its rough estimate was 159.13 Mcal.



[Figure 39] Average Monthly Electric Power Usage among Exemplary Households (2019)

**Single-person households can be encouraged to reduce their energy consumption by 19 to 25 percent through use of energy-efficient home appliances.**

We examined the patterns of daily life for university students in their 20s, office workers in their 30s and 40s and elderly persons in their 60s and 70s to construct scenarios for each group. Then, the total amount of energy used by each group was calculated using the power consumption of household appliances based upon each scenario. In the case of single-person households made up of students or office workers, most energy-consuming home appliances account for a large proportion of total energy use. The power consumption of washing machines, vacuum cleaners and air conditioners that need to be operated every time they are used varies by energy efficiency rating. In particular, as refrigerators run 24 hours a day, monthly and annual cumulative electricity usage can be cut by utilizing more energy-efficient equivalents.



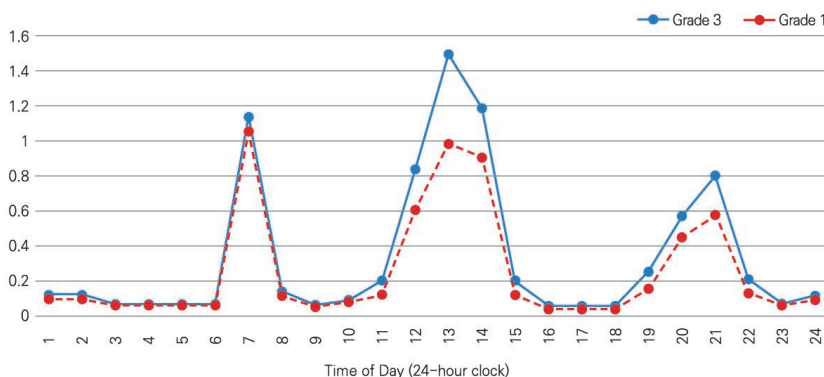
[Figure 40] Power Consumption Patterns related to Home Appliances of Single-person Households Made up of Students (above) & Office Workers (below), by energy efficiency rating

There is an upward trend in the number of single-person student/office worker households living in housing with built-in home appliances. Therefore, air conditioning, fridges and washing machines that consume significant amounts of energy are likely to be built-in domestic appliances. If built-in appliances with a low energy efficiency rating are provided in rental homes by rental property owners, renters have no choice but to employ them. Consequently, it will be impossible to drastically curtail total power usage of one-person households unless landlords become aware of the need to save energy and adopt conservation practices.

By replacing grade 3 devices with grade 1 devices, the daily electric power consumption will decrease by 18.5 to 19.6 percent. When it comes to high energy-consuming appliances like refrigerators and washing machines, there is vast potential for energy savings through the use of more efficient products.

As the majority of heavy power consuming appliances are already provided in dwellings, single-person households are limited in choices for devices assisting in household functions. Cooperation from lessors is integral to lowering energy use in households of one person living alone. The SMG needs to impose measures to incentivize homeowners to offer energy-efficient built-in appliances when renting out their properties and lay out institutional criteria.

The figure below on daily usage of domestic appliances per elderly single-person household shows that the electricity load rises often since seniors spend long hours at home. Their energy demand peaks between 1 and 2 p.m. when housework is done - largely because of a spike in the use of washing machines, vacuum cleaners and air conditioning. They use air conditioning equipment for shorter time periods than other age groups. Contrary to office workers living alone, those owning landline phones and kimchi refrigerators and other electric appliances make up a greater share of all older adults. There is a tendency in this demographic to leave TVs or radios on throughout the day while at home.



[Figure 41] Power Consumption Pattern related to Home Appliances of Elderly Single-person Households, by energy efficiency rating

If single-person households headed by older adults upgrade all of their domestic appliances to more efficient ones (Grade 3 to Grade 1), energy usage can decrease by about 25 percent. Unlike one-person households composed of students or office workers, older adults tend to stay at home in the afternoon and watch TV for extended hours. As many of them are likely to be owner-occupants, there is a good chance they are using the electric products they bought themselves, not those equipped in homes. Furthermore, the findings of scenario-analysis indicate that making the switch from appliances with poor energy efficiency to power-efficient devices will result in the greatest energy savings.

**There is a need for customized energy saving plans that reflect age-specific attributes and lifestyles.**

Home appliance usage patterns and lifestyles of single-person households differ across age groups. Accordingly, it is essential to come up with energy conservation strategies that consider age group features rather general strategies. Students living alone tend to primarily utilize heavy power consuming appliances installed in houses whereas the use of TVs and landline phones has plummeted. That is to say, there has been a change in their energy usage patterns. Analysis is vital of the power usage patterns of single-person households of younger adults with relatively lower incomes. Plans on how to enable single-person student households with lower earnings to make use of high-efficiency appliances are also required.

Single-person households of office workers and students are similar in that most of the high electricity consuming appliances both use are built-in. But single-person office worker households have a keen interest in new home appliances with the means to purchase them. There is a need to understand how their electricity usage patterns have changed and formulate customized plans to save energy. Senior citizens living alone have a tendency to make use of domestic appliances for a long time so there is strong likelihood that they may use outdated models with low efficiency ratings. For

this reason, it is worth considering recommending that they swap out old appliances for newer, reasonably-priced and more efficient. There will be a striking difference in usage patterns of household appliances between elderly single-person households at present and 10 years from now.

The same holds true for single-person student households. It is desirable to investigate home appliance use patterns by birth cohort to cope with future shifts in each age group's energy demand patterns. The SMG may urge people to change their electricity-related behaviors at certain times of the day when electricity demand is high, which may lead to a reduction in their energy use. For single-person households consisting of students or office workers, there were higher levels of electric power consumption in the morning and evening hours when they are at home. Particularly, the SMG can persuade them to use less electricity in the evening hours by making habit changes. Elderly single-person households use a sizeable portion of their electricity to watch TV or listen to the radio during morning and evening hours when at home. It is advisable to develop community activity programs for seniors designed to encourage them to engage in outdoor activities and minimize energy use at home during the day.

## A Study on the Community Participatory Air Pollution Control Program

Yu-Jin Choi · Min-Chul Shin · Hye-Jin Lee · Sung-Soo Kim ·  
Boram Kim · So-Hee Moon · Hee-Jeong Park

### Key Message

It is essential that the Seoul Metropolitan Government (SMG) reduce air pollution at the community level. With that goal, citizen involvement in plan formulation, execution and evaluation is needed.

**Air pollution should be addressed not only at the metropolitan level, but at the community level, such as local autonomous entities.**

The average concentrations of PM<sub>2.5</sub>, or fine particles, in a specific area are determined by the amount of pollutant emissions and the degree of atmospheric pollutant inflow discharged from various neighboring areas. Anthropogenic<sup>23</sup> and natural sources,<sup>24</sup> long-range transboundary air pollution, and pollutants transported from other locations in the same country contribute to average PM<sub>2.5</sub> concentrations throughout a particular city. Even within a single city, PM<sub>2.5</sub> levels in areas adjacent to pollutant sources can be higher than the average for the whole city. In urban areas, near-road sites which are greatly influenced by traffic-generated emissions generally have higher PM<sub>2.5</sub> values than the average for the entire city. Contaminants released from sources situated in myriad regions affect ambient air pollution levels in a certain area. Hence, it is most desirable that multifarious regions make a concerted effort to

<sup>23</sup> Anthropogenic sources include vehicle emissions, heating, construction activities, air pollution-emitting facilities.

<sup>24</sup> Natural sources include windblown dust and sea-salt spray.

curtail the emission of air pollutants for the sake of ameliorating air quality in a specific area. Outdoor air is polluted by a mixture of contaminants discharged from diverse locations. Accordingly, while there continues to be a need for national and metropolitan air pollution control plans, community-level plans are needed as well that reflect the attributes of each community.

**When it comes to fighting air pollution at the community level, a bottom-up approach that involves participation from local residents is vital.**

A study on local contributors affecting PM<sub>2.5</sub> levels in the city of Seoul was carried out by the SMG in 2019. Its findings have demonstrated that 31 percent of fine particles comes from stationary sources such as boilers and industrial facilities, 44 percent originates from mobile sources including motor vehicles and construction equipment, and 22 percent stems from sources of fugitive dust such as roads and construction sites. This implies that the SMG needs to broaden the focus of its mitigation measures beyond mobile sources and include stationary and fugitive dust sources. Of particular note is that targeted policy measures in which regional characteristics are reflected are more effective than whole-city metropolitan policies in regulating fixed emitters of air pollutants and fugitive dust. A substantial portion of ambient PM<sub>2.5</sub> is related to everyday activities and routines (vehicle emissions, fuel-burning space heaters, cooking, and laundry rooms), not just power plants. Given this, it is crucial to engage citizens in efforts to raise air quality by spurring them to cut down on particulate matter emissions created from daily activities. A top-down, or government-led (e.g., central or metropolitan governments), approach has usually been used to deal with air pollution, which has limitations with regard to policy acceptance and level of civic participation. At the community level, activities performed by citizens (residents) are the largest contributor to PM<sub>2.5</sub> concentrations in ambient air. Now is the time to adopt a bottom-up approach that allows local residents to take part in the development of policies/projects as well as creation and implementation of initiatives.

**Gangdong-Gu,<sup>25</sup> Seocho-Gu, and Eunpyeong-Gu were involved in policy experimentation for mapping out community-level air quality management strategies designed to engage the citizenry.**

The researchers hypothesized that the control of air pollution is the primary responsibility of autonomous *gu*-districts, each of which is a basic local government unit. Considering the meaning of community-unit, it might be ideal to suppose administrative dong-districts, smaller units than autonomous *gu*-districts, are the key players. However, in a more practical sense, autonomous *gu*-district offices should serve a central role in tackling air pollution with their own budgets and administration. Local Autonomy Research Groups<sup>26</sup> in Gangdong-Gu, Seocho-Gu, and Eunpyeong-Gu took part in policy experimentation which is part of this research project.

The following are the aims of our experimentation:

- to think of measures aiming at protecting air quality that are tailored to different autonomous *gu*-districts by providing the residents of each autonomous *gu*-district with a forum for deliberation;
- to identify ways to increase engagement at community level by pinpointing problems and limitations in participatory processes.

The experimentation consisted of three major parts: understanding the current status of air pollution in autonomous *gu*-districts, running public meetings for deliberation involving fewer than 10 residents, and administering a survey of 350 locals in autonomous *gu*-districts. The levels of air pollution vary from *gu*-district to *gu*-district,

<sup>25</sup> “*Gu*-district” is an administrative unit in Korea. There are 25 autonomous *gu*-districts in Seoul, divided into 426 administrative “dong”-districts.

<sup>26</sup> “Local Autonomy Research Groups” were formed within each *gu*-district office by a Memorandum of Understanding between the mayor of Seoul, the president of the Seoul Institute and mayors of *gu*-district offices in Seoul to undertake research into autonomous *gu*-districts and frame relevant policies. At present, there are 25 Local Autonomy Research Groups running—one for each autonomous *gu*-district in Seoul.

depending on each *gu*-district's properties and circumstances such as topographical/geographical features, size/spatial distribution of sources, distribution of vulnerable populations, and *gu*-district offices' main projects which are directly/indirectly related to atmospheric contamination. Consequently, primary targets and priorities of projects can differ among autonomous *gu*-districts. Local Autonomy Research Groups in Gangdong-*Gu*, Seocho-*Gu*, and Eunpyeong-*Gu* assessed the state of the air quality in each *gu*-district before hosting the public sphere discussion. They used evaluation results when defining the goals of organizing public meetings and developing training/education materials to be disseminated during the events. They also planned public fora, allowing for the unique conditions of respective districts. In view of the maximum number of discussion participants (10), the researchers polled a total of 1,050 residents in the three areas (350 persons per *gu*-district).

**Residents who took part in the public sphere deliberation were satisfied with it. There is a need to offer sufficient training and subdivide topics to allow greater participation through discussions.**

Gangdong-*Gu*'s district office set the goal of its public meeting to figure out ways to improve air quality in the entire district. Meanwhile, district offices of Eunpyeong-*Gu* and Seocho-*Gu* aimed at spotting problems and working out solutions concerning areas subject to intensive management of fine dust<sup>27</sup> and surroundings through the fora.

Under COVID-19 circumstances, a mix of face-to-face (offline) and non-face-to-face (online) methods were employed in the public sphere discussions. Forum group sizes were limited to 10 people and five rounds of discussions

<sup>27</sup> Special Act on the Reduction and Management of Fine Dust, Art. 22, Para. 1 (Republic of Korea).

(approximately two hours per round) were held. Residents involved were content with these sessions in general, especially training and site visits. Having said that, many respondents complained about having insufficient time for discussion/deliberation. Issues stemming from varying levels of understanding of air pollution and experience with forum meetings were cited as well. Such problems can be ironed out by ensuring ample time for the districts to share related information and for residents to have time to read it. Basic education/information was rendered and discussions about myriad topics had to take place within 10 hours, which is a relatively short period of time. For this reason, some participants found it difficult to remain focused and discuss topics on a deeper level. It is advisable to arrange discussion meetings in a phased manner by subdividing topics into smaller parts and allowing enough time for in-depth conversations on chosen topics and careful thought. A number of respondents requested feedback from relevant divisions of the autonomous *gu*-district offices on the effectiveness of public sphere discussions and future plans on ways to apply their outcomes.

There are advantages and disadvantages to both online and offline means. A number of citizens mentioned time and space constraints as the main reasons for not participating in discussions in a public sphere. Considering this, appropriate use of a combination of on- and offline channels would be pivotal when designing public meetings. To be specific, if possible, there is a need to ensure the discussions and deliberations happen through face-to-face or virtual meetings. Furthermore, it is desirable to offer information and training with the use of online tools in an effort to eliminate time and space constraints.

**Only 13.5 percent of respondents said “they are well aware of air pollution control policies”. 67 percent view “public involvement as an effective tool for management of air quality”.**

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We surveyed 1,050 dwellers residing in three autonomous *gu*-districts (350 persons

per district) participating in the policy experimentation. The results reveal that 76 percent took a keen interest in air pollution, but just 13.5 percent said they were fairly knowledgeable about SMG or autonomous *gu*-district actions to drive down air pollution. An overwhelming 79 percent of respondents felt that the public body has formulated policies and plans for minimizing atmospheric pollution completely on its own. Despite that, the survey finds that the percentage of respondents who agree that the public sector and citizens should work hand-in-hand to curtail air pollution increased to 54 percent. On the other hand, there was a drastic decline in the proportion of respondents - at 42 percent - who believe the government should continue leading the efforts to resolve air pollution. About two-thirds (67%) of those polled responded positively when asked how effective a local resident participatory approach is, while 6.1 percent said it is not at all effective. This can be interpreted as a clear signal that citizens have high expectations about public participation in air pollution control.

The survey sought views on the need for a community participatory program which would be divided into four stages: brainstorming & idea selection, plan formation, plan execution, and result assessment. A majority (64% ~ 86%) favored and only 3 percent to 8 percent opposed this. Of those who held a positive view of it, 86 percent said local residents should engage in the evaluation process in particular.

**In a bid to make citizen participation an ongoing and sustainable process, rather than a single event, organizational and institutional support is required.**

The survey findings indicate that citizens identify “giving continuous training and a chance to engage” and “providing feedback on opinions” as major elements to be considered in operation of the community participatory air pollution mitigation program. During the policy experimentation in three autonomous *gu*-districts, the need for public meetings where thorough discussions on detailed topics can be held and planning/support for follow-up activities arose. The experiment was carried out at the ideation and project planning stages. By breaking the air pollution control process

engaging citizens into three phases - ideation & plan formation, plan execution, and result assessment - we suggest a resident participation approach, as shown in [Figure 42].

We recommend running discussion meetings in stages at the brainstorming and planning stage. That is to say, it is desirable to achieve a common understanding and consensus amongst residents through sufficient training and discussions and have them engaged in careful consideration. We found there was a considerable need for information exchange and education during the survey and the public sphere discussions involving three autonomous *gu*-districts. Taking this into account, the aim of the first phase forum meeting should be to build the capacity of community members and spot issues by offering extensive training. The purpose of the second phase forum meeting shall be to come up with provisional solutions/plans by encouraging partakers to talk seriously about topics for more thorough discussions chosen during the first phase.

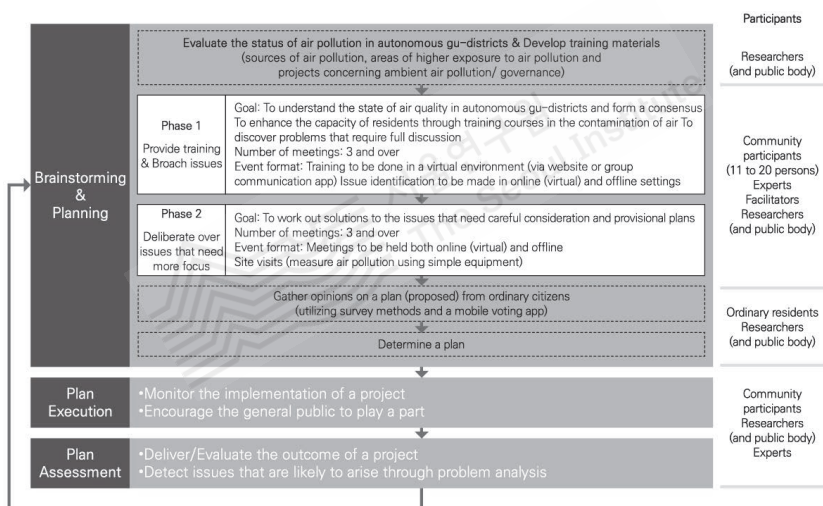
It is suggested that residents, specialists, public officials, and facilitators attend public meetings for deliberation and the number of local residents be set to 11 to 20 in light of survey results. Facilitators are needed to take part in the planning and training phases to help all participants stay on track and reach productive outcomes during deliberation. It is desirable for air pollution experts to provide guidance in a bid to make training/Q&A sessions and discussions worthwhile. There is a need for the public sector to engage in public sphere discussions by giving feedback on the topics covered during meetings and discussion results.

To overcome the time and space constraints, it is imperative that discussion and Q&A sessions which require free communication and mutual exchange of ideas take place in either online or offline mode, enabling people to interact with one another in real time. When disseminating information or offering feedback, it is recommended to leverage a slew of online tools that allow participants to access content anytime, anywhere, in lieu of gathering in one place at one time.

Community activists should be tasked with publicizing projects in an attempt to urge local residents to join efforts to keep air clean and monitor the execution of projects as part of the stage of plan implementation. There is a compelling need to figure out

ways to inspire people across varied generations, including children, adolescents, and youths, to participate in the projects. In the plan assessment phase, motivating citizens to review project results, design improvement plans, and capture issues together with public officials appears to be essential.

Organizational and institutional support is also critical to continued engagement of community members. Most autonomous *gu*-district offices in Seoul have forged and refined frameworks as well as systems for public-private partnerships. Thus, it is important to make full use of and advertise existing public-private partnership frameworks to ensure and increase resident participation.



[Figure 42] Direction for the Community Participatory Air Pollution Mitigation Program

## 06 City Diplomacy

### Seoul's Improvement Strategy based on Diagnosis of Urban Competitiveness in Seoul, Tokyo, Beijing and Shanghai

Miree Byun · Mingyu Lee · Minjin Park · Eunhyun Park

#### Key Message

Seoul needs to expand its economic capabilities and devise ways to increase its current diagnosed competitiveness as a sustainable future city.

**Plans are needed that seek to boost Seoul's competitiveness by comparing the urban competitiveness of Seoul, Tokyo, Beijing and Shanghai.**

The concept of competitiveness has evolved from competition between nations to that in multiple layers of “cities”. Thus, a number of studies have been undertaken and an increasing number of indicator frameworks have been set that are used to assess urban competitiveness. The levels of uncertainty in the external environment and internal conditions surrounding the capital of South Korea have soared. There is a need to predict the effects of the global COVID-19 pandemic as well as social changes in the post-COVID-19 era and identify the new impetus for urban growth. These are the reasons why the Seoul Metropolitan Government (SMG) should institute measures intended to beef up its urban competitiveness amid ongoing shifts. The SMG's main goals should be to transform the South Korean capital into a global city and elevate the quality of life for its residents. It is crucial to define its mission and draw up strategies to bolster the city's competitiveness. Now is the time to evaluate Seoul's capabilities and work out tactics that reflect the results of assessment. It is necessary for the SMG

to decide which of the environmental factors that have dramatically changed in recent years will remain the same and which will not. Shifts in the urban structure brought about by the more contactless nature of daily life in a post-pandemic world should be explored as well. Simply put, the South Korean capital faces a multitude of challenges.

This study measures and compares the urban competitiveness of Seoul and the other major Asian cities of Tokyo, Beijing and Shanghai. The researchers propose plans on how to improve the urban competitiveness of Seoul on the basis of the findings.

**Research centers on global cities and private consulting firms including the Mori Memorial Foundation measuring the competitiveness of and quality of life in cities around the globe.**

The Chinese Academy of Social Sciences (CASS)' Global Urban Competitiveness Index (GUGI), the Mori Memorial Foundation (MMF)'s Global Power City Index (GPCI) and A.T. Kearney's Global Cities Index (GCI) assess cities of the world by their urban competitiveness. The CASS National Academy of Economic Strategy and UN-Habitat have jointly published GUGI, an index system that gauges the economic and sustainable competitiveness of 1,000 or more cities.

Japan's Institute for Urban Strategies at the MMF has issued the GPCI report since 2008. As of 2020, the GPCI measured the 6 functions of Economy, Research & development, Cultural interaction, Livability, Environment, and Accessibility in 48 cities.

A.T. Kearney announced the Global Cities Index (GCI), first released in 2008, so as to evaluate the degree of globalization of 150 key cities around the globe. It consists of 29 metrics divided into 5 dimensions - Business activity, Human capital, Information exchange, Cultural experience, and Political engagement.

Mercer's Quality of Living Index is a representative system for measuring quality of life. Since 1997, Mercer, a global consulting firm, has provided it in a bid to use

data obtained therein to help multinational companies set hardship allowances for their internationally mobile workforces. The quality of life and living conditions in 450 cities around the world are rated on 39 criteria in 10 sectors - Consumer goods, Economic environment, Housing, Medical/health considerations, Natural environment, Political/social environment, Public services/transportation, Recreation, Schools & education, and Socio-cultural environment. The company did not announce the index in 2020 due to the drastic changes in the living environment of cities around the globe triggered by COVID-19.

The Global Liveability Index, prepared by the Economist Intelligence Unit (EIU), ranks 140 cities worldwide. Cities are biannually scored on 30 factors across five categories - Stability, Healthcare, Culture & environment, Education and Infrastructure.

**When it comes to economic capabilities, China's impact on the world economy has grown. Seoul ranks ahead of Tokyo, Beijing and Shanghai for technological capabilities.**

The pace of urbanization<sup>28</sup> is two to three times faster in leading Asian cities - such as Beijing, Seoul and Tokyo - than in the U.S. and Europe. As of 2020, 81.4 percent, 91.8 percent and 51.4 percent of the total population of South Korea, Japan and China, respectively, lived in urban areas. With population concentrated in cities following rapid urbanization, businesses move to urban areas, thus making major cities home to the headquarters of global corporations. As a result, the economic competencies of cities tend to be strengthened.

China stands out among Asian countries. Its economic clout in the global marketplace has grown according to the Fortune Global 500 list. In 2000, Chinese companies overtook their American peers in the Fortune Global 500 for the first time

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<sup>28</sup> Urbanization is the mass movement of human populations from rural to urban settings.

in the list's history. The number of China-based enterprises jumped from 10 in 2000 to 124 in 2020, whilst the number of firms based in the United States featured in the list was 121 in 2020.

There has been a decline in the number of headquarters of Fortune Global 500 companies hosted by the Republic of Korea (ROK) over the last five years. As of 2020, a total of 14 firms headquartered in the country. Technical capability-wise, it outshines Tokyo, Beijing and Shanghai. South Korea beat out China (#14) and Japan (#16) by taking the 10th position in the Global Innovation Index (GII) 2020. It was the new entrant into the top 10 cities.

The following are the GII pillar ranks for the ROK:

#### Innovation Input

- Human capital and Research: 1st
- Business sophistication: 7th

#### Innovation Output

- Knowledge and technology outputs: 11th
- Creative outputs: 14th

Tokyo-Yokohama landed at the top, followed by Shenzhen-Hong Kong-Guangzhou, Seoul and Beijing in the global science and technology (S&T) clusters ranking.

**The urban competitiveness of Beijing and Shanghai has substantially increased. Tokyo retains its leading position.**

According to the GPCI results, the strengths of Tokyo can be summarized as follows: (1) benefits arising from infrastructure that has been systematically overhauled and (2) the “Japanese style” which formed during the high growth period. These two elements have added a competitive edge to the capital of Japan. This, the largest city in Japan, still maintains its standing as an Asian leader in urban competitiveness. In

spite of that, it faces a shortage of talent. Existing firms remain active but startups—one of the key indicators of economic dynamism—are lacking.

A.T. Kearney's 2020 GCI finds China's rise in global influence. Of particular note is that Beijing broke into the top five for the first time thanks to its aggressive investments in human capital. While Beijing and Shanghai marched into the global economy, their role as global hub cities as well as competencies as centers for science and technological innovation expanded. Diverse indicators of urban competitiveness suggest that their status and competitiveness has increased significantly.

[Table 12] Comparison: Global Urban Competitive Rankings (2020)

City	Chinese Academy of Social Sciences	Mori Memorial Foundation	A.T. Kearney	GaWC
	<i>Global Urban Competitiveness Index (GUGI)</i>	<i>Global Power City Index (GPCI)</i>	<i>Global Cities Index (GCI)</i>	<i>City classification</i>
Beijing	17	15	5	Alpha+
Shanghai	10	10	12	Alpha+
Seoul	15	8	17	Alpha-
Tokyo	6	3	4	Alpha+

Beijing made it into the top five global cities in A.T. Kearney's 2020 GCI report owing to its strong human capital investments. Shanghai's dramatic improvement in urban competitiveness is attributable to high scores on entrepreneurship and innovation (unicorns) it earned. However, they still get low scores on high concentration of population/real estate prices, limited transport accessibility and poor public service capacity.

**It is desirable for the SMG to map out strategies towards improving its competitiveness as a sustainable future city.**

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Seoul has fallen in the past 10 years in rankings on the Global Urban

Competitiveness Index and the Global Power City Index (GCPI) in terms of “economy”. It did make limited progress in quality of life.

Let’s take a look at the strengths of Seoul as revealed by the analysis of urban competitiveness.

### **1. Advanced research and technical capabilities**

Concerning the GII, the capital of South Korea ranks 1st worldwide in Human capital and research. It also moved up the rankings in Knowledge and technology outputs alongside Creative outputs. With a ranking of #6, it also was among the top performers in GCPI’s Research and development category.

### **2. Accessibility to public transport and charm as a Korean pop culture hub**

Seoul has a superb mass transit system and urban safety levels. Having said that, there are several weaknesses, suggested by numerous indicators of urban competitiveness.

#### **1. Faltering economic competitiveness**

South Korea’s capital dropped considerably in the Economy field in Mori Memorial Foundation’s GPCI, from #8 in 2015 to #20 in 2020. Similarly, it took the 15th spot for economic competitiveness in the Chinese Academy of Social Sciences’ Global Urban Competitiveness Index (GUGI).

#### **2. Lackluster human capital performance**

It also slipped from #9-#10 in 2015 to #28-#29 in 2020 on the GPCI in availability of global CEOs and skilled human resources.

#### **3. Low level of livability**

Seoul was in the underperforming group, claiming the 39th spot in the GPCI’s livability field.

Economic competence is the greatest factor affecting the competitiveness of a global city. Given this, policies are essential that focus on the strengths possessed by the capital of South Korea for the sake of boosting its economic competitiveness.

Policy measures to enhance the capital’s competitiveness as a sustainable future

city should be designed too. The strong points of Seoul include its R&D capabilities, urban accessibility, safety and natural resources. To turn these strengths into sustainable future competencies, there is a need to further develop capabilities necessary to transition to a smart city and soft power. Ways on how to address social disparity and inequality which are likely to attenuate competencies fundamental to the sustainable future of Seoul are required. It is also critical to introduce measures to extend the city's innovation capabilities that are relatively weaker than other major Asian cities.



## Diagnosis of the 30 Years of Relations between South Korea and China and the SMG's City Diplomacy toward China in the Transition Period

Mingyu Lee · Eunhyun Park

### Key Message

The Seoul Metropolitan Government (SMG) needs to adopt multilateral diplomacy-based approaches to resolve issues and move towards a relationship with China that is oriented towards problem-solving.

**Before becoming strengthened, South Korea-China relations have entered into a fragile phase due to changes in external environment, the North Korean nuclear threat and other variables.**

Undeterred by different political and security systems, South Korea and China have become economically and socially interdependent in a short period of time. While maintaining its security policy around its alliance with the US, South Korea has opted to hedge its bets, actively engaging China economically while attempting to find the optimal balance in its relations with the United States and with China. Regardless of vocal opposition from North Korea, China has also sought to improve its diplomatic relations with South Korea to the level of comprehensive partnership. The rationale behind this is that their needs for short- and mid-term economic growth are in line with the objectives of their mid- and long-range security policies towards neighboring countries.

However, the nuclear activities of North Korea and other shifts in external conditions and variables have soured the relations between South Korea and China and caused them to remain in a state of flux. What's more, since the establishment of diplomatic ties, the two nations have intentionally left out a string of strategic, ideological, and emotional issues. These issues have arisen again recently and

produced a ripple of tensions. Many have expressed concerns that South Korea-China relations largely depend on US-China relations. These worries are now reality.

**Notwithstanding dramatically enhanced interaction and cooperation, South Korea and China have not been successful in deepening political trust between them.**

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Since South Korea and China opened diplomatic relations in 1992, their collaboration and exchanges have exponentially increased. Bilateral trade, one of the main drivers of diplomatic ties between the two countries, grew roughly 38-fold between 1992 and 2020 (to approximately USD 241.5 billion). In 2016, the two-way tourist flow between them hit a record high of 12.84 million persons, representing an approximately 34-fold increase over 1994. South Korea's government interacted with China's government on a regular basis. As of November 2021, they had held 47 bilateral summits, including 12 state visits, before the arrival of the COVID-19 pandemic. Working-level officials from the two neighbors also actively communicated with one another through 129 foreign ministers' meetings.

Their strategic intent to enhance political trust through development of social and economic interdependence underlies the increase in exchanges. With an aim to clear away the hostile relationship formed and intensified during the Cold War period and normalize their relations, the two nations inevitably took a liberal approach. Still, as evidenced by a series of diplomatic and security issues which have surfaced since 2010, they have not entirely succeeded in bringing about tangible results. South Korea has attempted to establish economic ties with China while maintaining its strong security alliance with the United States amidst criticism for its strategic ambiguity. Wishful thinking has gradually come to naught. South Korea expected China would take a forward-looking attitude towards issues surrounding DPRK (North Korea, or the Democratic Republic of Korea) provocations like the sinking of the ROKS Cheonan and the shelling of Yeonpyeong Island, both of which occurred in 2010. But these

expectations have been shattered. North Korea's fourth nuclear test and the subsequent Chinese failure to respond to calls on its hotline in 2016 plainly showed a strategic perception gap between South Korea and China over North Korea's nuclear weapons program. The two aforementioned events provided a snapshot of the conflicting views about the bilateral relationship. Having said that, the US installation of the THAAD (Terminal High Altitude Area Defense) system in South Korea in 2016 turned the latter's concerns over its strategic dilemma amid the hegemonic rivalry between the US and China into reality. Following South Korea's announcement that the THAAD system would be deployed in July 2016, most official channels of communication were closed for about six months, laying bare the reality of South Korea-China relations.

**China's economic sanctions against South Korea and the conflict for technological hegemony between the US and China have overshadowed the economic relationship between South Korea and the PRC (People's Republic of China).**

It was thought that economic cooperation was the main motivator and the pillar behind South Korea-China relations, but these relations have been under significant strain with China's economic retaliation and the technological rivalry between the US and China, greatly pressuring the great level of economic interdependence between the two Asian neighbors. There have been concerns that South Korea could become the target of aggressive Chinese foreign policy, irrespective of their close economic ties, over deployment of the THAAD system. This has been borne out. Despite denials from the Chinese government otherwise, its economic measures, which include a ban on South Korean cultural content,<sup>29</sup> have indeed been significant and retaliatory in nature. The Chinese government intended to exert pressure on the ROK by targeting several industries that are particularly vulnerable to political and psychological

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<sup>29</sup> Hallyu, or the "Korean Wave"

influence—albeit limited—through a variety of measures ranging from refusal to issue visas and banning the imports of Hallyu products to a massive tax investigation into South Korean companies. The problem is that such economic coercion from Chinese government measures can recur at any time. These are not one-off events but are a result of a change in the direction of China's grand strategy around foreign policy.

This deep economic interdependence, the economic retaliation from China and the US-China strategic rivalry for global economic hegemony, particularly in the high-tech sector, are major reasons for today's strained South Korea-China relations. The US government implicitly asked Korean firms to suspend business with and submit information on a certain Chinese firm on national security grounds. As the ROK bases its foreign and security policy on its alliance with the US, such a request was quite onerous. The ROK has relied on the US for its security and on China for its continued economic growth. Under the circumstances, the South Korean government's decision to prioritize security over economic development could bring harm to the economy as well as fresh economic retaliation.

**China's history research project, dubbed the Northeast Project (NEP), is turning historical and cultural similarities between Korea and China into sources of dispute, rather than catalysts for collaboration.**

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Economic cooperation is not alone in undergirding the development of South Korea-China ties: social and cultural exchanges are just as supportive. As the two countries belong to the Chinese cultural sphere, they have a long shared history, embracing and furthering traditional Chinese philosophies, represented by Confucianism and Taoism. Thus, it was envisaged that socio-cultural factors would have a positive impact on their relationship.

Social and cultural exchanges between the two neighbors, happening within an institutional framework, were helpful in strengthening their ties and balancing their mutual perceptions of each other. The craze for studying Chinese in South Korea and

the Korean Wave in China are prime examples of these exchanges. As disputes over the NEP erupted in 2004 and 2006, historical and cultural issues emerged as a key source of diplomatic friction. At the time, numerous Korean scholars raised concerns that the five-year national research project was basically China's way of reviving the Sino-centric world order, characterized by a tribute system. Regrettably, despite a range of bilateral negotiations and actions, the controversy surrounding history and culture, triggered by the research project, has persisted. Of particular concern is that the dissension between the two governments is spreading across the private sector on account of strong nationalistic sentiments among South Koreans and Chinese.

**Owing to a lack of mid- and long-range city diplomacy strategies, the SMG has remained focused solely on bilateral ties with Beijing, the capital of China.**

Upon signing a sister-city agreement with Beijing in 1993, one year after the two countries opened diplomatic relations, the SMG began its engagement with China. From 2008 to 2012, the Seoul city government, which had focused on capital diplomacy until 2007, worked on fostering its relations with China's east coast cities, economically advanced and geographically adjacent as they are to South Korea. Since 2013, it has worked to create a mechanism for sustainable cooperation using its extensive experience gained over the previous 20 years. Meanwhile, it has further deepened its connections to China through a diversification of its partnerships to include landlocked cities there. SMG-China relations took a step forward with implementation of the SMG Master Plan for City Diplomacy in 2017, transitioning from interactions and collaboration to city diplomacy.

The SMG's diplomatic ties with China have similar limitations to ROK-PRC relations.

First, contrary to its plans to build more links with other cities in China, its exchanges and cooperation have occurred in an asymmetric manner. That is to say it has concentrated its attention on capital diplomacy. To be specific, after signing twinning

agreements, high-ranking SMG officials have paid official visits to China less frequently than Chinese officials have visited South Korea. That said, Beijing received the highest proportion of its official visits (69.2%) from Seoul. Such tendency is salient in mayoral diplomacy. Mayoral and vice-mayoral visits to Beijing that have been made since 1993 constitute 50 percent of all of ROK visits to China, evidence of the mayoral visit-centered capital-to-capital diplomacy.

Second, the SMG became aware of the need to institutionalize exchange and cooperation for the sake of substantive and sustainable city diplomacy through its previous experience of engaging with Beijing. Yet exchanges and collaboration with friendship cities have remained uninstitutionalized. The Seoul-Beijing Joint Committee, SMG's representative institutionalization model, has made tangible achievements, but the group has limited ability to accelerate the process of institutionalization both internally and externally or scale up. Regular cultural and administrative exchange programs tend to focus not on institutionalization grounded in partnerships but on interactions.

Lastly, a master plan designed to stimulate exchange between the SMG and China unveiled in 2014 has yet to be put into action due to a lack of execution strategy and administrative capability. This can be seen as a limitation in some way. It is quite disappointing that the failure was directly and indirectly related to the halting of translation into policy of the SMG City Diplomacy Master Plan (2017-2020) launched in 2017.

**The objective of SMG relations with China should shift from building relationship to solving problems. The SMG is advised to seek comprehensive diplomacy.**

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As South Korea's ties with China have become increasingly frayed, the SMG's diplomacy towards China is affected by myriad internal and external challenges. Externally, the Seoul city government has to navigate uncertainty in the international situation, exacerbated by the pandemic and the ongoing struggle for power between

the US and China. Internally, it has no choice but to prevent its diplomatic relationship with China from deteriorating, regressing to short-term exchanges focusing only on protocol. South Korea-China relations are now at a critical juncture. The challenge the two nations face is to embark on a path towards cooperation in a sound manner. That is where the SMG should lead as the nation's capital.

Marking thirty years of diplomatic links, South Korea and China are currently gearing up for another three decades of relations. Against this backdrop, we suggest that the SMG, as the representative of the capital of the Republic of Korea, consider executing the following strategies in its city diplomacy.

### **① Shift to multilateral diplomacy towards ironing out problems**

There is a need to bolster city diplomacy using city networks as vehicles for pursuing agenda in lieu of maintaining bilateral exchanges and cooperation with sister/friendship cities. This will be helpful in changing the nature of ROK-PRC relations from a focus on relationship development to problem-solving and overcoming the limitations of short-term exchanges emphasizing protocol. The lack of platform where exchange activities involving friendship cities can be performed can be addressed as well. Chinese cities are members of 18 of the 23 international organizations for cities in which the SMG holds membership. It is worth noting that an environment conducive to bilateral and minilateral diplomacy is already in place.

### **② Switch the focus of strategy from cities to individual regions of China**

Drawing up an agenda that allows for the distinct characteristics of each region in China and promoting exchange activities with sister/friendship cities in an all-round way is essential. The Chinese government has sought to foster spatial development and integration of regions through its policy measures, which is the principal reason why regionalization strategies should be embedded throughout the SMG's city diplomacy towards China. It is essential to view the region, not the city, as the basic unit of regional economic development and urbanization and assign different roles to different cities. Development trajectories of cities can diverge from one another

according to each region's major projects and responsibilities. The outcomes can also vary widely between regions depending on which sectors and regions of China the SMG places its limited diplomatic resources.

### ③ Encourage platform-based exchange activities and collaboration

It is essential to move away from city-to-city exchanges and cooperation. The SMG needs to establish a tentatively-named "Seoul-China Sister and Friendship City Diplomatic Meetings" to liaise and work with its sister and friendship cities in China. It is worth referring to the "Chungcheongnam-Do Province and Chinese Local Governments Exchange Meetings" which have been hosted by Chungcheongnam-Do Provincial Office since 2018.

### ④ Set up a multi-layered governance system and engage with Chinese counterparts across both on- and offline channels

The primary goal of this strategy is to reflect the changing character of diplomacy and keep up with the times by conducting city diplomacy and boosting capacity.



# The Seoul Institute Annual Research Abstracts 2021



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## 01 Social Policy

### Strategies for Supporting the Social Advancement of People with Brain Lesions in Seoul

Minsuk Yoon · Sangwook Lim · Youngjoo Lee

The purpose of this study is to examine the social advancement of people with brain lesions in Seoul and to establish necessary support plans for them.

In general, social advancement refers to the number of occupations an individual performs throughout his or her lifetime, but the term social advancement traditionally is used in referring to the corresponding characteristic of the disabled. In this study, the scope of social advancement was expanded to include educational, economic, and social-participation activities in investigating the lives of people with brain lesions.

As of the end of December 2019, the number of registered people with disabilities in Seoul was 394,843, of which 41,304 (10.5%) were people with brain lesions. More than half (56.4%) were 65 or older, 25.7% were 50-64, 13.2% were 20-49, and 4.7% were under 19.

The university enrollment rate of people with brain lesions in Seoul is 12.7% and only 1.9% in the country participate in lifelong education. Facilities dedicated to people with brain lesions in Seoul include two welfare centers, six daycare facilities, and thirteen residential resources including one short-term shelter, three communal households, and one vocational- rehabilitation facility.

There are 108 programs for the disabled at the central-government level. them, 102 programs are applicable to people with brain lesions, and 26 directly or indirectly provide support for their social advancement.

The Seoul Metropolitan Government also supports seriously disabled people's

integration into society by providing special transportation, taxi vouchers, and an integrated job-placement-support center and assistive- device center for the disabled. In 2018, the Seoul Metropolitan Government established and is currently implementing the Master Plan for Supporting Brain-Lesion Disorders, the first time a welfare safety-net has been established in the country to provide health and welfare services for people with the most severe brain lesions and their families.

In some foreign countries, brain lesions are classified as developmental disabilities, and social support is provided for each life cycle. The United States and Japan, for example, provide systematic life-cycle support to people with cerebral palsy.

Integration of people with brain lesions into society, involves reinforcing customised support according to the life cycle, establishing a support system for the transition period, and providing individual support for those with severe disabilities. Because certain conditions, such as cerebral palsy, make socialization difficult in the developmental years, possibly leading to difficulties in interpersonal relationships and adapting to society. Therefore, prior to full-fledged social advancement, an incubator process, such as the Career Experiment Center (tentative name), is necessary. A support system for social rehabilitation of people with severe brain lesions who suffer strokes in middle or old age also should be established.

Professional support personnel are essential in the advancement of people with brain lesions, providing not only basic care, but also sensitive advice and counseling and concrete help with workplace adaptation and daily life support. In the long term, investing in and cultivating an experienced professional staff is necessary to ensure a better way of life for these people.

Brain lesions are associated with a wide variety of disabilities and needs, so individualised and customised support must be available.

A quota system should be instituted to guarantee- that companies hire a certain percentage of people with brain lesions in public-job programs. Incentives also should be offered to businesses that employ people with brain lesions. In the short term, ordinances must be established to ensure the continuity of Seoul's Master Plan for Supporting Brain Lesion Disabilities, and the central government needs to reorganise

the related laws.

To satisfy the diverse needs of people with brain lesions, it is necessary to revitalise and continue to support related research. Awareness education should be provided to help the public understand the characteristics and challenges of people with disabilities in general and brain lesions in specific. Finally, people with brain lesions should receive focused training in participating in social situations as well as expanded job opportunities and improved working environments.



## Society with Class Barriers, Characteristics and Problems of the Youth and Inequalities

Seungyeon Kim · Kwangeun Choi · Minjin Park

This study, on the one hand, integrated the results of the research on inequalities that the youth are facing; on the other hand, extensively explored the inequality issues of today's young people, which have multi-dimensional characteristics, from the perspectives of both objective realities and subjective perceptions. The analysis of the multi-dimensional inequalities found the close and consolidated relationships among the dimensions of inequality in space, while the analysis of the hereditary succession and persistence of inequalities helped understand the dynamic features of inequalities in the youth by looking at the multiple disparities on a temporal axis. These analyses enabled us to have a bird's eye view of a place where the multi-dimensional inequalities are being structured and changed over time. Moreover, how young people perceive inequalities was analyzed with the Seoul Youth Inequalities Survey, which was conducted by the Seoul Institute in July this year, in addition to the re-analysis of the existing surveys.

Today, much attention has been paid to the hereditary succession of inequalities that the youth experience. Passing down inequalities to the next generation is to stop moving up or down the social ladder. There is a huge difference between a society where young people have a hope that they can catch up with someone ahead of them if they do their best and a society where such a hope does not exist. Where is Korean society close to? According to the Seoul Youth Inequalities Survey, 9 out of 10 young people in Seoul supported the statement that an inheritance of a social position from one's parents is widespread. When looking at the Social Survey by the Korea National Statistical Office, during the past decade, the prospects of upward mobility of those in their twenties as well as their future generation steadily declined. 5 out of 10 young

people in their twenties ten years ago expected that they can move up the social ladder; however, only 2 or 3 out of 10 people born in the 1990s currently think so. In other words, Korean society seems to be a place where there is no hope, at least, in terms of perception.

Nevertheless, it is required to examine objective situations since there might be a gulf between realities and perceptions. Are there, in reality, vast social disparities in Korea that cannot be narrowed by individual efforts? Judging from various statistics and research, there are real grounds for a dramatic increase of a pessimistic view among the youth of today, in particular, those in their twenties. Since the 2000s, those holding a university degree have continuously increased. But the employment rate of the youth has declined or stagnated, and their unemployment rate has steadily risen. The quality of employment has also significantly deteriorated. Full-time regular jobs have disappeared to a great extent, and the proportion of the employed in their twenties in large enterprises has drastically reduced. An increase in the proportion of men in their twenties with less education in insecure jobs is noticeable. There is a growing tendency of having less social mobility among those born in the 1990s. The prospects for a rise in income and an improvement in employment status have gradually become faint since the 2000s. To summarize, recent developments in the labor market have driven those in their twenties into fierce competition and have made their socio-economic conditions worse. This, in turn, has motivated more spending in education to be more successful. Different family backgrounds make a difference in the size and diversity of resources, thereby increasing inequality in education.

In order to reduce inequalities that the youth go through, it is important to raise the effectiveness of respective policies for the youth and address the problem that current social welfare schemes do not sufficiently help the youth who are socio-economically vulnerable. In the field of platform work, which has recently emerged as accessible jobs for the youth under the circumstances of a chronic shortage of jobs, there exist widespread blind spots that existing welfare systems cannot fully cover and several factors that make the work insecure. In addition to dealing with a variety of policy issues that the youth are confronted with, it is urgent to pay attention to securing decent

jobs for the youth. This is coupled with the structural transformation of the economy that focuses on dismantling the polarized labor market and promoting the potentiality of industrial growth, thus creating jobs. Therefore, it is necessary to build a road map of innovative and comprehensive policies that should be based on, first, a firm strategy for a structural reform alleviating inequalities, second, a social security system eliminating every blind spot, and third, effective and efficient policy arrangements for the youth.



## Analysis of the Current State of Issues pertaining to Social Conflicts in Seoul and Policy Implication

Kwonjoong Choh · Seonhae Baik · Jinha Kim

Several scholars paying attention to the trends of Korean society and especially Seoul have raised the need for research on social conflict. It is suggested to look at social conflicts in general, including conflicting phenomena that are difficult to explain in the existing way, social problems expected to be expressed as social conflicts in the future, and conflicts of values along with new cultural phenomena.

However, in 2020, Seoul's urban society is in the midst of rapid change. With the start of COVID-19 we are facing a global pandemic. As the infectious disease situation spreads and social distancing measures are implemented, social conflict issues require a new approach. In addition to citizens' awareness of the conflict, the study should pay attention to the changes in the conflict landscape caused by the Corona incident, the changed appearance of everyday life in the face of the Corona incident, and the new aspect of social conflict. In recognition of changes and various aspects of social conflict, a new search is required for conflict governance for social integration. The explanation of social conflict can be approached in general, but each conflict should be approached more specifically as an instance of conflict. Social conflicts must be resolved in concrete cases. The context of conflict and resolution is unique to each case, and the competence of conflict resolution is accumulated from the experience of the case.

Accumulation of information and systematic management are important in emphasizing the field and case. In addition to the monitoring necessary to manage social conflicts, conflict management is needed to find solutions by sharing information with citizens. The resolution ability of society can be found in empowerment of citizens.

## A Study of the Conditions and Possible Improvements of Local Organizations and Projects for Senior Employment by the Autonomous Districts (*Gu*) of Seoul

Minsuk Yoon · Minchul Shin · Jinyoung Moon · Youngjoo Lee · Sungsu Kim · Angie Byun

The city of Seoul is soon to enter into Super-aged society in 2026. As the lifespan of the population continues to lengthen, the number of healthy elderly individuals is also increasing. Along with work environment changes caused by the Fourth Industrial Revolution, the period of retirement from major jobs is also accelerating. According to Korea's Economically Active Population Survey, 67.4% (962 million) of the elderly want to work in the future. When survey respondents were asked to give the main reasons for their desire to continue working, 58.8% mentioned the desire to add to their cost of living, and 33.8% cited the pleasure of working. In fact, the participation rate in economic activity for those aged between 55 and 64 years old measured at 69.7%, and the participation rate for economic activity for those aged between 65 and 79 years old measured at 31.6% (as of May 2020). The number of elderly people who want to work for various purposes, such as income security and social participation, is continuing to increase, and as the baby boomers enter the first stage of elderly life, the types of jobs they desire are also diversifying. Within this era of low birthrates and greater numbers of aging individuals, creating a situation where the elderly population can stay longer in the labor market is a global phenomenon which reduces social costs while securing a larger workforce that is capable of production. As a result, Korea has also been establishing and implementing job policies for seniors. In addition to the elderly job program operated by the central government, the Seoul City Government is running a rewarding jobs program for retirees over the age of 55 (called "Boram Work"). Nevertheless, there is a limit to providing quality jobs, due to the dual structure between similar projects and a standardized job policy which

focuses on a top-down method. In Seoul, detailed data on the current status of senior jobs by autonomous districts remains unreliable, the information on institutions that can provide senior jobs is insufficient, and cooperation between related organizations remains filled with bureaucratic challenges. Therefore, this study aims to discover how autonomous districts(*Gu*) currently address senior employment by analyzing regional surveys related to senior jobs, thereby establishing basic data which can be used to create strategies that will revitalize regional-based senior jobs. To this end, we conducted a survey on the basic status of autonomous districts, a survey on the operation of senior job support organizations and networks, FGI for senior job support agencies, and held expert advisory meetings in order to gather more reliable and useful data.



## Effects of Heatwaves on the Lives of Seoulites

Hyunchan Ahn · Changwoo Shon · Incheol Shin · Ikhyun Jang · Hyunchan Park · Hangmoon Cho

Jungah Kim · Junghyun Lee · Hyerim Lee · Jiwon Choi

Recently, the heat wave has been recognized as a new normal and social disaster. It means that the heatwave not only concentrates damage on vulnerable people and districts, but also causes a wide sociocultural changes. However, public policies against the heat wave in Seoul are still focused on eco-technical measures and emergency relief. This study aims to understand the social impact of the heat wave on Seoulites to propose that how Seoul Metropolitan Government(SMG) can better deal with the heatwave.

First, the in-depth interviews with 5 types of heat vulnerable people reveal that they have daily difficulties according to their characteristics, except for heat illness. Second, a panel survey of 1,000 Seoulites shows that not only how they lived in summer, such as sleep, eat, leisure, social exchange, and health behavior, but also how their lifestyle was changed by the heat wave.

Based on the interviews and the panel survey, this study suggests as follows: 1) expanding policy targets to the whole citizen group to alleviate their lethargy by the heat wave, 2) Providing customized support for the heat vulnerable by their characteristic, and 3) adding social agenda such as labor, culture, local community to SMG's heat wave response policy and system (the regional Disaster and Safety Countermeasures Headquarters/CDSCHQ).

## The Discourse Surrounding ‘Fairness’ and the Fair City Index for Seoul

Kwonjoong Choh · Jiwon Choi

The discourse on fairness has emerged periodically during times of increasing social inequality and has become a major policy concern. Fairness-enforcing policies have been steadily studied over the years, but more recently, societal values related to social inequality are being more closely re-examined. In particular, there has been increased attention on the large differences in the perceptions of fairness between those of different genders and generations. Overall, differences in values and views surrounding fairness are a source of social conflict.

The discourse on fairness is pluralistic and exhibits multi-layered characteristics, emphasizing how the concept of fairness is often not easily agreed upon. In most situations, a specific definition of fairness is influenced by the time period, and also tends to be link with or overlap with other public values. In many areas of public policy, the meaning of fairness is often raised in relation to opportunities, preconditions, processes, performances, and evaluations. The concept of fairness is linked to or used interchangeably with other values of public policy, such as trust, openness, transparency, accountability, in addition to equality, equity, justice, and fairness. In the everyday field, the negative expression of ‘unfairness,’ rather than the definition of fairness itself is becoming the standard for the normative evaluation of a system’s operation and results. It is used as a weapon of criticism and indicates an expression of injustice.

This study aims to identify the framing characteristics of the fairness discourse, where the concept of fairness has become a topic of social conflict once again, and to examine the state of urban society in Seoul from the perspective of its manifestation of fairness. Specifically, I would like to propose an indicator of fairness in Seoul and

clarify the reality of Seoul citizens' current perceptions of fairness.

Fairness is becoming a core value of government policy and urban society despite the gaps in equality which continue to persist due to changes in times and the perception gaps of citizens. From the concept of fairness, the direction of urban development in Seoul should be thoroughly evaluated and adjusted.

Now, the urban policy framework of a "Fair Seoul", which citizens entrust the city government to implement, must be emphasized.



## Seoul Youth Policy Vision and Strategy 2025

Geumsun Byun · Seungyun Kim · Minjin Park · Hyerim Lee

This study aims to suggest a new vision and strategy of Seoul Youth Policy for 2025, which will be the foundation of the five-year scheme “2025 Seoul Youth Master Plan”. First, we examine the impact of socio-economic changes in the past five years on the livelihoods of youth in Seoul. Lots of youth in Seoul have faced with bad job market situation, labor market instability, increased social inequality and higher risk of poverty associated with health issue. It turns out that as more and more youth moved to metropolitan area, they also suffered from housing problem which leads to difficulties to lead an independent life. In the current COVID-19 pandemic, young people are one of the worst-affected group, therefore social support is even more vital to protect youth who are already at a higher economic and social risk.

By collecting expert advices and conducting ‘Youth Demand Survey’, under the vision of the “Future Seoul, Autonomous Young Citizen”, this report suggests 5 policy areas including ‘work’, ‘equal opportunity’, ‘housing’, ‘future for next generation’, ‘participation’. According to this 5 policy areas framework, we derive 8 policy agenda-31 detailed policies including newly proposed ‘job guarantee’, ‘safe housing scheme’, and ‘youth mental health care project’. At the conclusion, this report highlights the importance of the policy implement systems by proposing building policy delivery system and youth infrastructure as well as strengthening youth policy governance.

## A Study on the COVID 19 Outbreaks in Long-term Care Facilities of Seoul and Related Issues

Changwoo Shon · Minsuk Yoon · Seongah Kim · Yunjung Cho

Of the 3,595 long-term care facilities in Korea, 46 long-term care facilities (1.3%) had COVID-19 outbreaks, and a total of 1,139 people were confirmed with COVID-19 in relation to long-term care facilities. In Seoul, 13 out of 205 long-term care facilities (6.3%) had COVID-19 confirmed cases, and the number of confirmed cases in the long-term care facilities was 185 (65 workers, 120 residents).

Because elderly people with underlying diseases live in groups in long-term care facilities, once COVID-19 has been introduced into a long-term care facility, it has the potential to result in high death rates among residents. Of the 981 deaths of COVID-19 in Korea, the number of deaths from long-term care facilities was 105 (10.7%), accounting for relatively high proportion (as of January 4, 2021).

Several problems were diagnosed as a result of focus group interviews with Seoul city officials and directors of long-term care facilities including ① lack of timeliness and practicality of the COVID-19 prevention and control guidelines, ② absence of risk communication system and channels, ③ lack of infection prevention education system for care workers in long-term care facilities, ④ document-based formal and passive infection monitoring, ⑤ lack of comprehensive supports for elderly, ⑥ lack of manpower for care workers for emergency and increased work of care workers in long-term care facilities, multiple occupancy rooms ⑦ structure, and so on.

Future tasks to strengthen response capacity for COVID-19 of long-term care facilities in Seoul should include ① reinforcement of standards for nursing staffing for long-term care facilities, ② expansion of visiting care workers, ③ establishment of infection prevention education system for care workers in long-term care facilities, ④ establishment of risk communication system and channels, ⑤ normalization of

the operation of long-term care facilities, ⑥ support for economic losses due to the operational restrictions of long-term care facilities, and ⑦ conversion of monitoring method for long-term care facilities. In addition, there should be consideration for institutional improvement related to the operation of long-term care facilities such as ① strengthening cooperation between long-term care facilities and local medical institutions and introduction of telemedicine, ② structural transformation to reduce population density in long-term care facilities, and ③ redefining the function of long-term care through the establishment of community care.



## Strategies for Improvement of Welfare Service Applying High-tech Assistive Devices in Seoul

Minsuk Yoon · Hyejung Yoon · Sangwook Lim

The assistive devices that applies advanced technology such as artificial intelligence (AI), internet of things (IoT), and robot, are expected to support the independent life of the elderly and disabled people, and to lower the physical burden of caregivers. The COVID-19 pandemic has accelerated the transition to contactless welfare service delivery. Thus, this research aims to develop proper strategies for welfare service applying high-tech assistive devices in Seoul. The high-tech assistive devices were developed at various levels from prototype to commercial products, and the degree of commercialization was different according to the institutional context by the countries. IoT sensors for monitoring and AI robot for emotional support and monitoring were provided the most to the elderly people living alone in the form of pilot project in Seoul. This research suggests four directions to develop advanced welfare service applying high-tech assistive devices in Seoul. Firstly, the development and provision of welfare services using high-tech assistive devices should be user-centered. Legal and institutional foundation for utilization of high-tech assistive devices should be established, and short- and long-term strategy for digital transition of welfare services in Seoul should be made. Based on the strategic plan, the assistive device delivery system should be integrated. Lastly, it will be necessary to expand the digital education program for the elderly, the disabled, and the caregivers.

## A Study on the Activation of Seoul Metropolitan Government Culture Impact Assessment

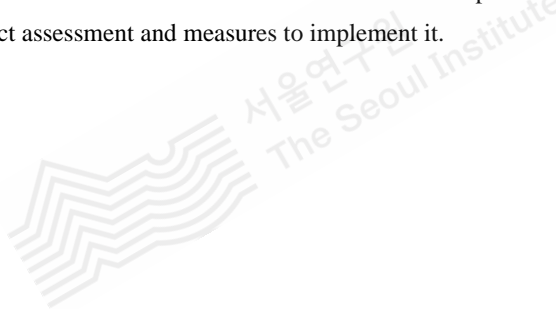
Seonhae Baik · Dosam Na · Junghyun Lee

The culture impact assessment introduced in 2013 by framework act on culture. The cultural impact assessment system refers to a system in which the government and local governments identify and consider the impact on the quality of life of the people in terms of culture when they formulate plans or policies. The purpose of system enhances the social value by culture. Central and local governments have to conduct the cultural impact assessment before establishing the policy.

Government operated pilot assessment period from 2014 and to 2015. The official assessment began in 2016. The Seoul Metropolitan Government has a same issue. The Seoul Metropolitan Government developed the index for cultural impact assessment in 2015. The Seoul Metropolitan Government passed the city ordinance about cultural city and conducting the assessment, independently. The Seoul Metropolitan Government is not actively utilizing the policy. The Seoul Metropolitan Government conducted two evaluations in 2018 and 2019, respectively.

The Seoul Metropolitan Government stand at the crossroads to activate the assessment. One is to use and fit the framework of central government. And the other is to create the Seoul Metropolitan Government's own style. The Seoul Metropolitan Government does not need to prepare the method, independently, as the Seoul Metropolitan Government follows the central government. Since most of the cultural impact assessments are based on cultural city projects, it is difficult for the Seoul Metropolitan Government, which does not carry out the cultural impact assessment. If the Seoul Metropolitan Government establish the Seoul Metropolitan Government's own plan or policy by the law, the Seoul Metropolitan Government should create a pre-assessment frame.

The Seoul Metropolitan Government need to improve purpose of assessment and index for creating the own system. Unlike the central government, which aims to spread cultural values, the Seoul Metropolitan Government should adjust its cultural aspects to assess the impact on citizens' quality of life and cultural diversity. The Seoul Metropolitan Government should adjust to a system that measures daily life, community, diversity, etc. based on the original cultural concepts. The evaluation targets shall be based on the quality of life of citizens and their impact on the community. In addition, it is necessary to ensure that evaluations are made when various plans and policies are implemented. In addition, cultural impact assessment should be naturally spread to general policies by providing incentives for continuous education of civil servants and policies that implement the assessment. Based on the above information, the report presents the actual conditions of the Seoul Metropolitan Government's cultural impact assessment and measures to implement it.



## Issues and Tasks of Homeless Policy in Seoul

Minsuk Yoon · Wonsuk Nam · JinHa Kim · Minjin Park · Youngjoo Lee

Although the number of homeless people in Seoul is gradually decreasing, there are still problems with the revolving door phenomenon that repeats entering and leaving facilities with a chronicity. Characteristics of people experiencing homelessness are also becoming more diverse. In addition, it is urgent to prepare measures to prevent the homeless and the risk of infection in the context of an infectious disease such as COVID-19. Therefore, it is necessary to review existing policies to the homeless and welfare services, housing, and employment areas to provide an overall direction such as Seoul's Homeless policy development, including new policy subjects.

The purpose of this study was to establish a comprehensive support plan for homeless people by reflecting changed policy environmental conditions at the Seoul Metropolitan Government level. To this end, through literature research and secondary data analysis, we examined the status and support policies of homeless people at home and abroad. We conducted several meetings and expert surveys targeting working-level workers and academic experts to evaluate the importance of Seoul's homeless policy and investigate major issues and necessary policies. Based on these results, we proposed development plans for each sector of homeless support policies.

## A Study of Youth Multidimensional Poverty in Seoul

Geumsun Byun · Hyerim Lee

Traditional efforts to reduce poverty have mainly focused on the lack of financial resources among the elderly and children who has restricted capabilities of earning market income. However, the unprecedented COVID-19 crisis has aggravated youth vulnerability to risks in one or more life domains such as employment, education, mental health and relationships. This study aims to develop multidimensional poverty indicators capturing youth poverty and measuring scale and depth of multiple deprivations faced by Youth in Seoul. Following a literature review and Delphi survey, this study derives 17 indicators covering 7 dimensions: economy, education and skills, employment, housing, health, social capital, and well-being. Analysis result of ‘2020 Seoul Youth Survey’ shows that, 86% of youth in Seoul are facing deprivation at least of one dimension of poverty and 42.5% suffering overlapping deprivations in more than three dimensions. Deprivation of basic capabilities and risk of overlapping poverty were higher than nonmonetary dimensions rather than monetary dimensions. This study suggests that traditional concept of material deprivation could underestimate the actual level of social exclusion of Youth in transition. Under the broader definition of poverty, many more youth would be taken into account as a new policy target group. Given this concept of multidimensional poverty, local governments need to take more responsibility for providing integrated youth supports beyond monetary deprivations.

## 02 Urban Planning

### The Forum of Urban Planning in Seoul: The Issues and Projects of Urban Planning in the 10 Years later

Sunwung Kim · Jaesub Yang · Enjung Yang · Gain Lee

‘Committee of the Establishment of 2040 Seoul Plan (a new urban master plan)’ hold the meetings and seminars with the renowned experts about Seoul in various fields of urban planning, discussing the issues in the changes of the circumstances toward the establishment of ‘2040 Seoul Plan’.

The present study also aims to identify the issues and to suggest the possible projects in the fields of urban planning. The forum was formed to present and discuss the ideas on the issues with many experts in and out of the Seoul Institute. And then, it is surveyed the detailed ideas and possible projects to be performed in the Seoul Institute.

The fields are selected as the changes in lifestyles and population migration patterns through the appearance of the millennial generation, and the changes in the urban spaces for the future and the improvement of urban competitiveness, at first. In addition, the fields are added as issues on the metropolitanization pattern and spatial structure, the post urban regeneration, those plans of sub-regional areas, detailed area plans and landscapes management, and green new deals and urban policies of the Seoul metropolitan areas among many fields.

In the forum, the eight seminars were held with 17 presenters and 23 discussants. The possible sample projects in the fields are shown in the reports.

## Socio-spatial Characteristics of Elderly Concentrated Areas and Improving the Environment of Age-friendly Neighborhoods in Seoul

Jaeseob Yang · Suyoun Seong

In response to the entry into a super-aged society, the study aims to identify the socio-spatial characteristics of the Elderly Concentrated Area in Seoul and suggest ways to improve the neighbourhood environment so that the elderly can “continue to live where they used to live (Aging in Place)”.

To the end, the distribution and socio-spatial characteristics of the Elderly Concentrated Area in Seoul were identified, and the case areas were selected to diagnose the age-friendliness of the neighbourhood environment. In addition, the survey on the elderly (320 cases) examined the elderly's use of neighbourhood facilities, and reviewed the abroad cases in New York and Tokyo to suggest a direction for improving the neighbourhood environment for the age-friendly community. The main findings from this study are as follows.

First, Seoul's the Elderly Concentrated Area (46 dong) are mainly distributed in the northeast and northwest regions, which can be divided into the ‘hill type’ and the ‘flatland type’. The Elderly Concentrated Area shows the characteristics of low-rise residential areas where the low-educated elderly and the elderly living alone live.

Second, the supply of senior citizen centers and parks per 1,000 elderly people in the Elderly Concentrated Area is lower than the average in Seoul. In addition, the case areas showed that the hill type had steep stairs and ramps or poor maintenance, and the flat type had many complementary roads and lack of parks, which required improvement.

Third, according to the survey results (320 cases), 49% of the elderly have lived in the area for more than 20 years, with the majority participating in community gatherings or activities. Most of the elderly (91%) responded that they wanted to

continue living in the neighbourhood where they live.

Fourth, the following policy directions are needed to create an age-friendly neighbourhood environment for the elderly in Seoul.

- 1) implementing an Age-friendly City policy combined with a community-integrated care system,
- 2) establishment of a system to diagnose the community's age-friendly level,
- 3) development of an age-friendly community project model,
- 4) linkage with individual projects and the Community Plan.



## A Study on the Conditions and Reorganisation Directions of the Autonomous District Urban Master Plan in Seoul

Jaeseob Yang · Suyoun Seong

In response to the entry into a super-aged society, the study aims to identify the socio-spatial characteristics of the Elderly Concentrated Area in Seoul and suggest ways to improve the neighbourhood environment so that the elderly can “continue to live where they used to live (Aging in Place)”.

To the end, the distribution and socio-spatial characteristics of the Elderly Concentrated Area in Seoul were identified, and the case areas were selected to diagnose the age-friendliness of the neighbourhood environment. In addition, the survey on the elderly (320 cases) examined the elderly's use of neighbourhood facilities, and reviewed the abroad cases in New York and Tokyo to suggest a direction for improving the neighbourhood environment for the age-friendly community.

The main findings from this study are as follows:

First, Seoul's the Elderly Concentrated Area (46 dong) are mainly distributed in the northeast and northwest regions, which can be divided into the ‘hill type’ and the ‘flatland type’. The Elderly Concentrated Area shows the characteristics of low-rise residential areas where the low-educated elderly and the elderly living alone live.

Second, the supply of senior citizen centers and parks per 1,000 elderly people in the Elderly Concentrated Area is lower than the average in Seoul. In addition, the case areas showed that the hill type had steep stairs and ramps or poor maintenance, and the flat type had many complementary roads and lack of parks, which required improvement.

Third, according to the survey results (320 cases), 49% of the elderly have lived in the area for more than 20 years, with the majority participating in community gatherings or activities. Most of the elderly (91%) responded that they wanted to

continue living in the neighbourhood where they live.

Fourth, the following policy directions are needed to create an age-friendly neighbourhood environment for the elderly in Seoul. 1) implementing an Age-friendly City policy combined with a community-integrated care system, 2) establishment of a system to diagnose the community's age-friendly level, 3) development of an age-friendly community project model, 4) linkage with individual projects and the Community Plan.



## Changes of Commercial Spaces in Seoul: Analysis of Demand and Supply Trends and Locational Characteristics

Jayun Heo · Mookhan Kim · Sangil Kim · Heeseok Park · Gain Lee

Recently, retail businesses in Seoul have experienced unprecedented business crises. A combination of factors, including increased share of online market and the advent of new commercial places are threatening the mom-and-pop stores, causing vacancy rates to rise. Therefore, it is important to understand whether the supply and demand of commercial spaces in Seoul is either balanced or oversupplied based on the demand.

This study analyzes the adequacy of existing commercial building stock and forecasts demand of commercial facilities in Seoul to determine the need of management in urban planning. It also reviews whether the changes of market conditions and commercial areas supplied are due to inconsistencies with urban planning laws and policies.

The area of commercial facility stocks has continuously increased and is expected to reach 30 million square meters for 20 years since 2000. Even now, it is still growing, although dramatic increase in commercial floor area has eased since around 2010. Nonetheless, retail stores, which are expected to be significantly impacted by the online market, are still increasing. However, demand for commercial facilities is rapidly decreasing. In 2014, 2015, and 2016, the commercial floor area has decreased by about 8.8%, 15.1%, and 14.8% annually, respectively and this trend is estimated to continue until 2045 due to changes in the population, economy and market. Choice of location of new retail stores varies according to land use. Except for supermarket and department stores, most stores are located in type 2 residential zone rather than commercial zone, and the ratio of commercial floor area to the total floor area in non-commercial zones is higher than in commercial zones. This implies that the

changes in residential areas, which include the opening of considerable number of new retail stores, results to drastic changes compared to the size of parcels developed in commercial areas.

The analysis of Concentration Index (CI) shows that the commercial district in the residential area expanded to the periphery, even though inner areas in the commercial district remained unchanged. It seems that horizontal expansion of stores is easier than vertical development because of the stores' tendency to be located on the lower floors and high premium on developed commercial districts.

Commercial building floor spaces are developed by not only new building construction, but also change the use of existing buildings. For example, from 2015 to 2019, 42.9% of commercial floor area was supplied as a result of change of use of buildings. These changes of building use reveal a crucial finding that the volume of commercial floor area converted from residential floor area and offices is larger than the opposite case the changes occur - in one direction. It is difficult to respond to changes in demand by changing the use of building due to several factors, including the number of parking lots legally required, taxes, and location choice of stores.

The demand for commercial space is expected to continue to decline. Furthermore, a consensus that shrinking demand for commercial space has already formed among central and local governments of Seoul. Based on this study, commercial area management policy alternatives should be considered and research about types and characteristics of commercial district for preparation of the demand changes of commercial areas should also be performed.

## Planning Public Facilities for the Following Generations

Jayun Heo · Dami Maeng · Gain Lee

Population in Seoul is expected to continue to decline to 8.45 million by 2045. For sustainable Seoul, it is necessary to pay attention to next generations who have experienced financial crisis, low growth, climate change, and pandemics. In addition, they pursue different lifestyles from the older generations. This study focuses on lifestyles and facilities used in daily life of next generations, especially the Alpha Generation, using Time Use Survey and examines supply-and-demand status of urban public facilities.

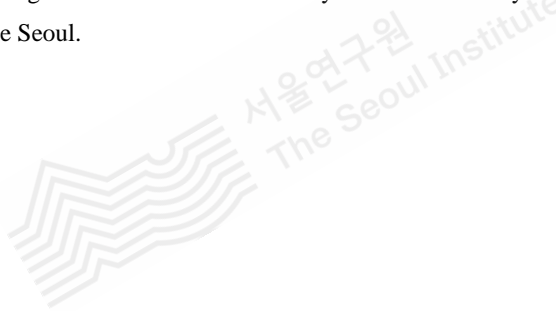
Learning and playing are absolute necessities in daily time use of Alpha generation. They spend 86.4% of their Activity Time on learning and playing in educational and child care institutions. During the day, 98.2% of Alpha generation use educational and child care institutions and 95.8% of them use amusement facilities. Nevertheless, the majority of their parents feel that they do not have enough time for learning and playing.

New types of facilities for kids are emerging due to increased burden of raising children and increased demands for learning and playing desired by parents. These demands have been supplied mainly by the private sector, resulting in alienation and disparity between regions or classes. Some of them are unevenly distributed because it is difficult to change locational conditions due to differences in forest experience center for children and a facility's own characteristics and roles. To resolve this discrepancy between places where consumers wish to be and real locations of facilities for kids, it is necessary to diversify the types of public facilities and the methods for supplying these facilities.

Current supply standards for public facilities do not fully take into account

characteristics of the Alpha generation's behavior of using public facilities, who exhibit parenting-dependent lifestyles. Their usual travel distance is no more than 10 minutes on foot or 17 minutes by car. This is why the location standards of facilities for kids are more important than anything else. Thus, multidimensional location standards for public facilities are needed to ensure that public facilities are within reach of children. In addition, they should be balanced based on demand. For facilities that are difficult to change their locations, they might need to flexibly adjust their sizes or utilize private facilities for the most effective use of existing properties.

Urgent issues and values of next generations have changed. Their lifestyle and desired public facilities are also different from those of the older generations. Therefore, it is very meaningful to consider the lives of Seoulites who are consumers of urban planning in order to react immediately to a new era led by next generations for sustainable Seoul.



## A Study on the Changes to Urban Lifestyle and Urban Space in Seoul following the Digital Transformation

Seoyeon Yoon

Digital transformation means that digitalized information extends in the industry over time and eventually spreads across society. This concept used to be defined and applied in the industry fields. Nowadays, the extended meaning could also be applied to the entire business process such as production and distribution of companies, and it is even changing our society not only in the industry but also in our everyday life. Spatial changes in cities that digital transformation brings are still underway everywhere. This study aimed to assess the changes that digital transformation could bring to the lifestyles of citizens and the spatial changes especially in metropolitan Seoul if this trend continues amid the huge social changes of digital transformation.

This study assumed that urban spatial changes caused by digital transformation are related to transportation and land use. Therefore, studies and literature on urban land use, transportation, and predicting future urban spatial changes as well as their interactions were reviewed. We could access and analyse how they predicted lifestyle and spatial changes in the future at that time. It was intended to see what was predicted and how much has been realized among them. To obtain information about the realization of forecasts, experts in the industrial sector, which are enormously affected by digital transformation, were consulted on current change and future development. We also met and interviewed academic experts to reflect their views. In addition, about 80 experts were asked for their opinions on the above topics and on changes in urban space due to digital transformation in the future.

Through digital transformation, new technologies, ordinary life, and urban space are driving convergence. These changes influenced the needs of citizens and brought an enormous change to the market. The key was flexibility. Seoul needs an urban

planning instrument that can quickly capture the needs of citizens and the market to adjust their changes into new planning concepts flexibly. In addition, our society should consider the underprivileged classes in digital transformation. For that Seoul needs interdisciplinary researches beyond fields. Within these researches, spatial policy could deal with future themes properly through monitoring three-stage such as industrial structure, lifestyle, and urban spatial change.



## A Study on Rent Subsidy Program of the Seoul Metropolitan Government

Euncheol Park · Hwayon Jin

Since 2002, the Seoul Metropolitan Government has implemented a program to subsidize the monthly rent of low-income households who are not paid under the jurisdiction of the National Basic Livelihood Security Law. The program complemented the shortcomings of the integrated benefit system with the use of the local government's own budget. Since its implementation, as the National Basic Livelihood Security System has been reorganized and eased, the number of Seoul rent subsidy program recipients has decreased over time, plunging from around 10,000 households between 2014 and 2017, to 4.8 million households in 2019. Although the housing cost subsidy is a representative housing welfare program that coexists alongside public rental housing, it is recognized in Korea as a program that complements public rental housing. In the case of the Seoul Metropolitan Government, where maintaining a large supply of large-scale public rental housing is difficult in practice, the expansion and increase of the rental subsidy system needs to be balanced between the need for public rental housing and housing benefits.

The public officers in charge of operating the Seoul rent subsidy program, including the heads and staff of the Housing Support Center and experts in related research fields, all, suggested the need to establish long-term policy goals, and the explains of policy targets by easing support standards. Additionally, they also suggested that it is necessary to improve the delivery system, discover the target through active promotion, and introduce new types of Seoul rent subsidy programs for the long-term future.

In order to balance public rental housing as the Seoul rent subsidy program establishes the status of a housing policy support program, improvement measures

were proposed which focused on dividing the system aspect and operation aspect.

In terms of the orientation of the system, it is necessary to ease the support criteria to 70% of the standard median income in the short and medium-term, and for the long-term, to secure the consistency of housing welfare policy by setting it to 85% of the standard median income or the same as the eligibility of national rental housing. As an alternative for the short- to mid-term, a plan was proposed to subsidize 80,000 won (Alternative 1) and 90,000 won (Alternative 2) for a single person household. Based on the annual support target of 10,000 households, the budget is expected to cost 103.8 billion won per year in the case of implementing Alternative 1 and 117.0 billion won in the case of Alternative 2.

In terms of operation, it is necessary to strengthen the delivery system, such as increasing the role of the Seoul Metropolitan Government and establishing a computerized system in order to focus on the intensive promotion and discovery of targets for housing poverty households and support needs. In addition, it is necessary to introduce a Seoul rent subsidy program linked to social housing and emergency transitional housing.

## 03 Economy

## Strategic Development Schemes for Community-based Collaborative Governance during the 7th Mayoral Term

Byeongsun Jeong · Eunyoung Han

One of the major policies of the 6th mayoral term, 'Building a Collaborative Governance Model for Local Communities' is being actively implemented in the 7th term. In the 7th mayoral term, the Seoul Metropolitan Government had set 'establishment of a support system based on community-based collaborative governance' as one of its priority projects and managed multiple collaborative governance projects such as 'the Local collaborative governance innovation plan', 'the ○ ○ borough collaborative governance committee', and 'the Platform for citizen cooperation'. These projects by the Seoul Metropolitan Government have created various possible results. Opportunities for civil society organizations and residents in the local community to participate in the policy-making process increased over all and democratic decision-making process was strengthened. Also positive partnerships between the public and private sector were formed through their participation.

However, despite these achievements, various challenges are also growing and expanding over time. These challenges are not only limiting in the operation of the system, but ultimately affecting the sustainability and effectiveness of the collaborative governance system. Accordingly, there is a need to improve the current community-based collaborative governance system along with a used for changes in the municipal administration environment in order to fully realize the democratic potential of municipal administration.

Above all, there is a strong demand for a rational reorganization of the relationship

between the operating system leading the collaborative governance in each autonomous district, and the plans related to public-private cooperation such as the Local Collaborative Governance Innovation Plan. In addition, it is necessary to improve the policy evaluation system to improve the performance of public-private cooperation policies. In this situation, analyzing the community-based collaborative governance system and finding a strategic plan to enhance it will be important for the successful settlement of democratic municipal administration in the future.

Based on the analysis of the current state of the system's operations and policies related to community-based collaborative governance and a survey on policy demands, new policy directions were created in order to advancement collaborative governance for local community 2.0. The study set a vision for community-led and resident-led sustainable collaborative governance and presents five policy directions. The five policy directions are outlined here:

- The re-establishment of the institutional framework of 'Local Collaborative Governance Innovation Plan'
- The establishment and settlement of the principle of autonomy before collaborative governance
- The revitalization of self-government-led public opinion and deliberation
- The building a decentralized and converged coordination system for self-government realization
- The creation of a policy outcome system based on results

In consideration of these policy directions, the study suggested 5 Strategic development schemes for community-based collaborative governance.

- Reestablishing the community-based collaborative governance system
- Reinforcing the community-based collaborative governance committee
- Vitalizing the community-based public sphere
- Introducing and expanding the autonomy and decentralized budget system
- Reorganizing the community based collaborative governance evaluation system

## Technological Innovation Strategies for Social Ventures in Seoul

Jaeuk Ju · Jongjin Yun

The purpose of this study is to present a policy plan for the spread of social ventures in Seoul. To this end, we first understood the desirable social values that Seoul should pursue and the meaning of social innovation and looked at the technological innovation fields of social ventures that the city will focus on. In addition, social innovation by identifying the current status and characteristics of technology-based social ventures in Seoul, seeking policies that enable them to grow and develop, and at the same time discovering examples of businesses in Seoul that meet the social values pursued by the city. In order to examine the possibility of expanding social ventures, 168 venture companies located in Seoul were surveyed on their perceptions of corporate social responsibility (CSR). Among the respondents, 28.7% of venture companies were found to engage in management activities that reflect CSR. Venture companies believe that CSR has a positive effect on management performance in the long term.

A framework for analyzing the type of social venture technology innovation was established, and the characteristics of social ventures in Seoul were analyzed. The analysis results are as follows. First, among the respondents, there were 40 technologically innovative social ventures, accounting for about a third of the total respondents, and of these, intermediate technologies accounted for the largest proportion. Among the innovations of social ventures, technological innovation accounted for 30.5%, and new technologies such as AI and big data accounted for 6.1%. Most of the technologically innovative social ventures used intermediate technologies such as software and manufacturing that required engineering knowledge beyond college. Second, the proportion of social ventures and general ventures where social and economic targets matched was 69.4% and 69.3%, respectively. Third,

technological innovation-type social ventures that use intermediate technologies are more advantageous than other companies in terms of the sustainability of business models.

Abletech can be divided into four types of technology such as assistive technology devices + IT, services + IT, healthcare, and universal design/content. Seoul City (Social Venture Hub) needs to intensively foster assistive technology devices + IT and services + IT.

Based on the research results, we propose the following policies to spread social ventures in Seoul. First, it is necessary to expand the social venture ecosystem by reinforcing the role of CSR in support policies for businesses in Seoul such as start-ups and SMEs. Second, it is necessary to introduce social value incentives led by Seoul city. Third, it is necessary to support social venture technology through public-private resource linkage and diffusion.



## Knowledge Production and Flows of Seoul Service Innovation based on the Analysis of Patent Application

Eunjoo Oh · Jongjin Yun

The purpose of this study is to understand of knowledge production and flows related to service innovation in Seoul and to propose the policy orientations for Seoul service innovation. This study has performed a patent analysis in order to understand the characteristics of service innovation. Patents applied over the period between the year 2000 and 2018 are analysed. Patents are grouped into the following eight industrial fields: by Highest Ranking, Communications; Manufacturing- infusion Software; Information/Software; Contents; R&D/Engineering; Business-specialised Services; Distributions and Logistics; and Finances/Insurances. Throughout these 19 years, the constant top-tier technology was software technology, such as U-computing platform and software solutions, and Seoul manufacturing supporting technologies, such as textile-related IT technology. In addition, the newly emerging technologies in Seoul are human sensibility technology, bio software, robot-related software, and securities.

It is obvious that Seoul has been a top innovative region in Korea in terms of service patent applications. However, its dominance has decreased: the ratio of Seoul in total has decreased from 48.7 percent in 2000 to 32.4 percent in 2018. In spite of this, the network analysis of co-production and citations of patents show that Seoul has functioned as a knowledge inventor and main cooperator along with Gyeonggi-Do towards other regions.

## A Study on the Activation of Demonstration Project for the Realization of Test-bed City Seoul

Bong Choi · Hyunchul Jung

The study aims to understand the operation status of various demonstration support projects conducted at various places and to find ways to develop the Test-bed Seoul Demonstration Support Project, a representative demonstration support project.

In the public sector, testbeds utilized to achieve a wide range of goals such as industrial development, regional development, innovation-led growth, and improve public services. Recently, the creation of demonstrative social values has been emphasized, and the importance of demonstrating public sector evidence to provide benefits to citizens in line with this trend is gradually increasing.

The largest demonstration support project in Seoul is the Test-Bed Seoul Demonstration Support Project. Seoul Metropolitan Government, the Seoul Institute of Technology, and the Seoul Business Agency are participating in the Test-Bed Seoul Demonstration Support Project. The project to foster high-tech industries, including technologies related to the 4th Industrial Revolution, has achieved economic results worth 116.6 billion won over the past two years. The Test-bed Seoul Demonstration Support Project is characterized by efforts to commercialization of innovative products after the end of project. The big advantage of this project is that companies can show their own demonstration to buyers directly in Seoul. However, companies with experience in participate in the project said that it was regrettable that support after insufficient the project and difficulty in establishing continuous relationships with sources of demand.

In order for Seoul to become a test-bed city, it is necessary to establish the direction of the demonstration support project and advance the Test-bed Seoul Demonstration Support Project. In order to establish the direction of the project, short-, mid-, long-term

plans should be established and implemented, and the targets of support need to be clarified. It should also consider the scalability of the project and suggest ways to improve citizens' response. In order to upgrade the test bed Seoul demonstration support project, it is necessary to establish a solid status of the Test-bed Seoul Demonstration Support Project. And, it is necessary to divide the project stage into stages of three (selection, conduction, post-management and outcome utilization), and to find key tasks and derive improvement plans for the current project in consideration of key stakeholders.



## Development of the Webtoon Industry in Seoul during the Digital Economy and Pertinent Policy Agendas

Eunjoo Oh · Sujin Kim · Taesoo Song

The purpose of this study is to understand recent changes and dynamics in the Seoul webtoon Industry. The advent of the digital economy has reconstructed the production system of contents industry. Particularly, the digital comics, i.e., webtoon industry, have explosively grown substituting the traditional comic book markets. Korea and Seoul has been one of the most promising webtoon cluster regions. Korean webtoon is being recognized as one of K-Hallyu.

This research utilized explorative method to understand, through in-depth interview, the dynamics of webtoon industry that is undergoing significant transformation. Owing to the success of contents charging system through major platforms such as Naver and Kakao, webtoon contents started to make money. In consequence, all the tasks and jobs in all the value chains have specialized and demanded more sophisticated division of labor. In addition, new players such as agency between creators and platforms have emerged. These developments gave both opportunities and chances to the Seoul webtoon creators.

This research proposed the role of Seoul metropolitan government for value enhancement of Seoul webtoon contents. It suggests suggested creative talents training program, more access to original contents IP, collaborative environments through ‘town’ cluster, and domestic and overseas expansions.

## Establishing the Master Plan for Developing Civil Democracy in the Seoul Metropolitan Government

Byeongsun Jeong · Wonsill Hwang · Hyunhye Cho

The Seoul Metropolitan Government set the basis for the realization of civic democracy in the 7th civil election. Under this stance, the Seoul Metropolitan Government intends to establish and implement a basic plan for civic democracy. The basic plan aims to shape various strategies that can contribute to the realization of civil democracy based on fact-finding surveys and analysis of planning tasks. The study aims to come up with policy measures necessary for establishing these basic plans for civil democracy.

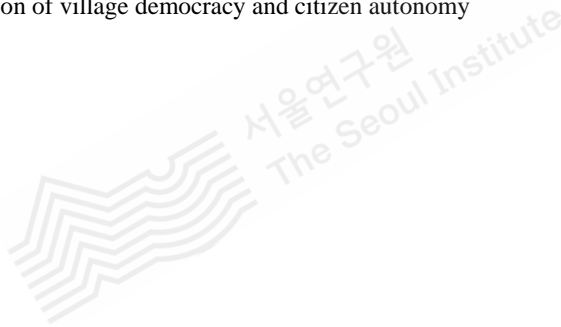
In this study, civic democracy was conceptualized in three dimensions based on the preceding theories. Each is decentralized governance, associational governance, and deliberative governance. Based on this concept of civic democracy, the nature of the plan was defined, a fact-finding survey was conducted, and a diagnosis of the planned task was also conducted. In addition, after a continuous public discussion process, 20 pending issues were drawn up in the study, focusing on three areas.

In this study, the direction of planning was set based on the survey of planning conditions and the diagnosis of planning tasks, and the vision of planning was set. The vision of the plan was set as 'realization of sustainable citizens' government with the community' in consideration of various factors. In order to realize this vision in the mid- to long-term, three goals and seven strategies were drawn.

The goals of the plan specified in this study are as follows: i) structural advancement toward sustainable governance, ii) the establishment of a citizen participation and deliberation-friendly civic administration system, iii) Realization of community decentralization and governance-based citizen autonomy. Various strategies are required to achieve these objectives. Therefore, this study proposes the following

seven strategies as a promotion strategy to be pursued in the 7th civil election. The study also presents conditions diagnosis, direction setting, and various measures to promote these seven strategies:

- Creating a civil society ecosystem and enhancing vitality
- Strengthening the foundation and structural innovation to drive governance-based metropolitan government
- Administrative innovation for participatory administration and implementation of digital democracy
- Establishment of a Seoul-type deliberation system and public sphere
- Realization of a wider and deeper fiscal democracy
- Upgrading the structure to Community Governance 2.0
- Realization of village democracy and citizen autonomy



## Development of Business Composite Index in Seoul

Heeseok Park · Yoonhyi Jang

The Seoul's GRDP has increased 1.9 times over the past 20 years from 213 trillion won in 1999 to 411 trillion won in 2019. However, the national share has decreasing by 3.4%P from 25.6% in 1999 to 22.2% in 2019. During the same period, the growth of Seoul's sub-industry has increased in five industries: 'Information and Communication', 'Financial and Insurance', 'Business Service', 'Health and Social Welfare Service' and 'Real Estate Industry', but its 'Construction Industry' has showed a declining trend.

The Seoul's business composite index (CI) is established in two stages. In step 1, a baseline model consisting of 4 variables is established by referring to other local government's cases. In step 2, an extended model reflecting the characteristics of Seoul's regional economy is established by adding the consumption and financial sectors to the baseline model. Finally, the Seoul CI is established by comparing the two models with the national CI using cross-correlation analysis and concurrency test. The extended model consists of six indicators based on employment, production, sales, foreign trade, consumption and finance sectors. In detail, the six indicators including 'the number of employed person', 'the manufacturing production index', 'the large-scale retail sales index', the amount of import, 'credit card usage', and 'deposit and bank loans' were used.

As a result of comparing the growth rate of the previous year for each indicator and the trend of the Seoul GRDP converted by month, the Seoul's CI reflects the changes in the Seoul economy well. However, among the six indicators, the 'large retail store sales index' and 'card usage' data are available from 2010. For this reason, there are difficulties in calculating the Seoul's CI of using long-term time series data. Seoul has a consumption-oriented economy. To be able to calculate Seoul's CI in the future, it is important to continuously generate these two data.

## Analysis of Relationship between Apartment Price and Household Consumption in Seoul

Youngjin Woo · Minyoung Hwang

Household consumption is determined by income and assets. People expect their future income to increase as asset value increases, which in turn results in increased consumption. This relation is called wealth effects, or asset effects. One of the most representative assets is housing which accounts for the largest portion of Koreans' wealth, particularly, in Seoul because of the very high prices in Seoul. Apartment sales index has been increasing steeply in Seoul than in other regions since the fourth quarter of 2017. Meanwhile, Seoul's ratio of household consumption to gross regional domestic product has been decreasing since 2006.

The purpose of this study is to analyze the impact of apartment price on household consumption in Seoul. In general, there are two types of data used to measure the wealth effects; aggregated data and micro data. The use of aggregated data has the advantage of using reliable national statistics and measuring dynamic effects while the use of micro data has the advantage of controlling the features of households such as age of householders, the number of household members, and whether or not they own a house. This study used aggregated data as there have been no studies on wealth effects in Seoul and then would like to analyze these effects by using micro data as a follow up study. We conduct two empirical analyzes: at city level and at county level in Korea.

In first analysis, the time range of this study is from 1995 to 2019, and the spatial range is the 7 cities such as Seoul, Incheon, Daejeon, Daegu, Busan, Ulsan, and Gwangju. Household consumption is the function of apartment prices, income, interest rates, stock prices, population, and the proportion of people aged between 30 and 64. This research uses the dynamic panel model to control the effect of time related observation. The result shows that apartment prices of Korea's metropolitan cities had

a positive effect on household consumption, but the coefficients are not statistically significant. However, as apartment prices increase in Seoul, household consumption would decrease compared to increase in household consumption in other regions.

In second analysis, the time range of this research is from 2010 to 2018, and the spatial range is the 25 counties of Seoul. Household consumption is the function of apartment prices, income, interest rates, stock prices, population, and the proportion of people aged between 30 and 64. As suggested by Mian et al., (2013), we use the car registration as a proxy for regional household consumption which is the dependent variable. Particularly, the variations in durable goods in Seoul were most similar to those of overall household consumption considering the correlation analysis results. We also analyze this empirical model by using dynamic panel model. As a result, apartment prices were a factor in reducing household consumption. The fact that households living in Seoul have a low proportion of home ownership explains as follows: many households would like to reduce their consumption in order to purchase housing in the future. Stock prices and interest rates had a positive and a negative effect on consumption, respectively. In addition, income and population do not influence on household consumption, showing statistical insignificance. When the proportion of people aged between 30 and 64 is high, household consumption in the county region has increased. This result can be interpreted as that they have their children to difficult to reduce their consumption.

This study supports that stabilizing the housing market in Seoul is necessary in terms of household's economy. Particularly, apartment prices are very high in Seoul and the proportion of home ownership is small. Many homeowners would purchase their homes financed by loans, reducing their consumption capacity. In addition, a decrease in household consumption explains that demand for housing purchases is valid in Seoul and neighboring regions. Before the supply expands on a large scale and household loan regulations are eased, policy program could be complementarily designed to increase residential stability for middle classes who considers home ownership as real asset as well as housing welfare.

## Impacts on Employment and Tasks due to the Influx of Foreign Workers in Seoul

Jinha Kim · Minyoung Hwang

The majority of foreign workers who are simple-skilled workers in Seoul are Korean-Chinese immigrants. In the case of Seoul, there is a trend where the number of professionals who have graduated with college degrees or higher has continued to decrease over time. The industries within which simple-skilled workers make up a large proportion of the workforce include the areas of construction, wholesale and retail, food service, accommodation, business service, and personal service. Professional manpower is mainly concentrated within the business service, personal service, and public service. Simple craftsmen mainly work as craftsmen, machine operators, assembly workers, and simple labor workers. There is a high number of managers, experts and related workers in Seoul's professional workforce.

This study conducted two empirical analyses on the employment of foreign workers. Firstly, it was analyzed whether there is an alternative type of relationship between foreign workers and domestic employees. Regardless of whether it is an employment-licensed business in Seoul or a business with a

large number of professionals, Korean workers had a substitutional relationship with foreign workers. Secondly, the effect of hiring foreign workers on the profitability of the companies was analyzed. In the employment-licensed industry, the more foreign workers that were employed, the higher the profitability of the company, but the higher the investment cost for the foreign workers, the less profitable the company's operations.

In order to give local governments the right to determine the quota of foreign workers, a right which is currently being exercised by the central government, governmental institutional reform is necessary. Seoul should also be able to play a role as a general manager through the establishment of a manpower utilization plan for each skill level, so that manpower can be more smoothly used and deployed on site.

04 Urban Administration

## The Innovative Commissioning Model in the Seoul Metropolitan Government

Joonyoung Yi · Jungyong Lee

This research aims to review two innovative commissioning models suggested by the Seoul Governance Group and come up with an appropriate commissioning model for delivering public policy of the Seoul Metropolitan Government (SMG). Two innovative models are based on Public-private cooperation and Social Impact Bond, respectively. The first model is ‘Commissioning model based on public-private cooperation’. The second model is ‘Commissioning model based on social impact bond’. This research reviews two models from theoretical and practical perspectives in order to check whether this model is appropriate to introduce to the SMG’s commissioning guideline. The review concludes that the first model is in line with the commissioning literature and the SMG is able to introduce this model without modifying related rules and regulations fundamentally.

In order to introduce the innovative commissioning model, two parties, i.e., SMG and civil society organizations have to has undertakings and establish reliable partnership based on trust and cooperation. This research also suggests the ways to run pilot projects to innovate a commissioning model of the SMG.

## The Present and Future of the Autonomous District Youth Council in Seoul

Minchul Shin · Jungyong Lee

Lately, youth social participation in social issues such as student human rights and climate change is increasing. It is time to come up with various action strategies so that “participation” can be realized in the overall youth life.

It is worth paying attention to the “Youth Council”, which induces youth participation in the formal decision-making process of the local community, which is the basis of youth living. The purpose of this study is to diagnose characteristics and problems through the analysis of the operation status of the autonomous district youth council, and to seek practical plans for the operation of the youth council. For effective research, we cooperated with 6 Local Autonomy Research Groups that are highly interested in revitalizing the Youth Council.

As a result of analyzing the autonomous district youth council, the following operational strengths and weaknesses were identified. The autonomous district youth council was choosing the best operation method suitable for the autonomous district situation. It was found that this creates a decision-making structure that respects the opinions of youth, and consequently contributes to the improvement of youth' political efficacy. On the other hand, the autonomous district youth council generally has a more dominant aspect in its educational function than community participation. In addition, there is a lack of democratic legitimacy and representativeness as various youths are not able to participate in the composition of the youth council and are elected by appointment method. It appears that cooperation between schools and district councils, which need a substantial role in the operation of the youth council, is low.

This study set the core values of the autonomous district youth council as social (regional) participation and civic (political) education. Accordingly, the following

policy directions were suggested. First, it is necessary to realize the unique values of the youth council, but to strengthen the diversity of each autonomous district. Second, it is necessary to expand the youth participation structure by securing the procedural legitimacy of the youth council composition. Third, the youth council should be operated as a space for daily participation of youth in connection with the school. Fourth, the youth council should reinforce the system for learning the structure of democracy through linkage between schools and local councils.



## 05 Transportation Planning

### Road Conditions in Seoul for the 3rd New City Traffic Improvement Measures

Sanghyun Hong · Jinhak Lee

As 140,000 vehicles enter Seoul at the peak hour, the metropolitan roads, as well as the inner roads and bus lanes in Seoul, are crowded. Moreover, the current government has not considered the road conditions in Seoul for traffic measures in accordance with the 3rd new city supply plan; therefore, a review is needed. A plan is under consideration to allow metropolitan passengers to access Seoul through a transfer at the city boundary, but in this case, a transit time of at least 24 minutes for one transfer is expected to be reduced to the 18% level. As the traffic volume of buses entering the city of Seoul is reduced, the travel time of buses in the city can be partially improved, but the overall travel time reduction will occur in Seoul in the coming time.

Therefore, it is necessary to plan to reduce the travel time centering on the Goyangpa main axis (Goyang Changneung) and the Incheon Bucheon axis (Incheon Gyeyang/Namyang Joo Wangsuk) with long travel time. In addition, due to the introduction of a dedicated lane, there is a need to improve the facilities for the ramp part in a situation where traffic congestion is inevitable due to the occurrence of a shift as a result of change in the bus lane.

## Rationalization of Bus Fares and Standard Cost of Transportation Based on Bus in Seoul

Kijung Ahn · Hyeongyun Ki

Buses have faced the limit of the increase in the number of bus transporters since 10 years after the public transport system was reorganized. Seoul's bus fare system is unified and cannot reflect the diverse needs of citizens. Due to the integrated fare system, the average fare per person for a bus is less than the transportation cost. For this reason, about 300 billion won is paid annually to subsidize. In this study, the introduction of various fare systems was reviewed. The flexible fare system was analyzed to have low social acceptance. It is necessary to consider introducing a commuter pass and a public transportation membership system in order to increase the use of public transportation. In terms of securing the safety of city buses, it was determined that the comprehensive cost system for each item would be appropriate. In addition, we seek ways to reduce the size of subsidy according to the scale of economy.

## Strategies for Successful Provision of Autonomous Vehicle Services in Seoul

Youngjun Han · Sehyun Park

Autonomous vehicles (AVs) are expected to innovate urban transportation system as well as creating huge economic effects on a global level. Leading companies such as Google and Tesla are investing heavily on AV technologies to dominate future AV markets, and many countries including US and EU are supporting the firms by improving legal systems and providing test-sites. However, uncertainty of AV technologies, especially for ‘Full Driving Automation (Level 5)’, is increasing recently, which requires new role of public sectors to support the AV technologies. Thus, this research aims to develop proper strategies for AV service in Seoul. To this end, firstly, this research identifies current status of AV technologies, and investigates AV related policies for other countries. Survey among Seoul citizens is also conducted to understand preference and concerns for AV technologies and service. Based on these works, this research suggests four directions to develop AV strategies in Seoul.

Firstly, operation design domain (ODD) for AVs in Seoul should be evaluated and improved systematically. This research derives specific road factors to limit AV operation by surveying AV companies, and finds the limited ODDs could be identified with dynamic characteristics with traffic conditions.

In addition, the manned service using AVs should focus on expanding accessibility rather than mobility with high speed, and minimizing conflict between other vehicles driven by humans. In this sense, this research proposes AV service on large park areas and separated bus lane at late-night.

For unmanned AV service such as delivery robot, on the other hand, the technology of AVs might not an issue but the legal system for AVs should be improved to define

the new mode on the road. Space provision is also required for the unmanned AV service.

Lastly, based on the citizens' opinion, the test site in Seoul should be expanded gradually. The available areas are quite limited currently, but they could be expanded along with the development of AV technologies and improvement of ODDs.



## The Future Vision of Seoul Urban Freeway Traffic Management System

Youngjun Han · Hyeongyun Ki

The transportation management system for urban freeway has been developed to improve road efficiency and safety by providing travel time information, traffic flow control, and managing traffic incidents. In early 2000s, Seoul Metropolitan Government established the traffic management system to manage urban freeways in Seoul. Since the system was installed, however, the facilities have become obsolete and traffic environments have changed as well. Especially, new technologies such as connected-automated vehicles are expected in the near future, and thus the time has come to review overall system including data collection and traffic information provision. In addition, the drivers' behavior for using traffic information on freeway has been changed at large. For example, the survey of Seoul citizens reveals that most drivers get traffic information, mainly estimated time of arrival and optimal route, through their smart phone rather than variable message (VMS) on the road.

Thus, this research aims to develop the future vision of Seoul urban freeway traffic management system. To this end, this research reviews the transport policy of city government and examines examples of traffic management systems of other cities both at home and abroad. Surveys of Seoul citizens was also conducted to obtain feedback and opinions of citizens. Based on these works, five major problems for current system are derived as: (i) enormous repair and maintenance cost due to outdated facilities, (ii) need to apply new technologies for data collection and processing, (iii) extremely low use of VMS, (iv) limitations on the provision of detailed transport data required by the citizens, and (v) lack of aggressive traffic management.

To resolve these issues, this research suggests a future vision of the system as “Fully Utilized Seoul Urban Freeway” with 3 major goals including new characteristics. To

make this happen, this research provides specific strategies to improve the existing systems in the short-term, reflect technological changes in the future and manage and control the upcoming traffic of the city in the mid and long-term, respectively.

This research also provides three policy recommendations as follows: First, improve the data collection system in line with technological changes and realign the role of VMS as information provision system; second, establish the new role of public transport management system; and third, provide measures to respond to the construction of underground highways in cities.



## Indicators for Traffic Management in Green Transport Areas

Gyeongsang Yoo · Youngjun Han · Sangmi Jeong

The purpose of this study was to select appropriate traffic management indicators for green transport areas, and propose achievement goals for the indicator. For this study, the transportation status and condition of the green transport area were analysed by utilizing vehicle enrolment data acquired from the vehicle plate detection system and the vehicle speed data obtained by processing taxi DTG (Digital Taco Graph). We also estimated the total amount of vehicle traffic in the green transport area using these data and analysed the performance of the road network using the MFD (Macroscopic Fundamental Diagram) model.

To set the indicators for traffic management in green transport areas, the sustainability indicators presented by MOLIT (Ministry of Land, Infrastructure and Transport) and the indicators presented in the Special Comprehensive Policies of Seoul were reviewed in detail. Based on this, using the 'average vehicle speed' of the road network in consideration of continuity, independence, transferability, and ease of calculation was proposed.

The target level of the traffic management indicator was set to 20km/h - 25km/h, considering the environment, safety, and social costs. In this target, the maximum vehicle passage and entry traffic volume capable of accommodation by the road network were presented. In addition, the recovery of the road network was also diagnosed using the average target vehicle speed.

## A Study on Accessibility Assessment for the Mobility Handicapped in Seoul Metro

Sinhae Lee · Chunghan Ryu

This study aimed to develop an accessibility assessment model for the mobility handicapped in Seoul Metro and verify its validity. Based on the result of ‘Developing an Accessibility Assessment Index for the Mobility Handicapped Using the Public Transportation of Seoul: A Focus on Metro Stations (2020),’ a preliminary multidimensional accessibility assessment model was developed and the final assessment model was confirmed through on-site verification at Seokchon Station. Basic principles of the final accessibility assessment model for the mobility handicapped in Seoul metro are inclusive design, cooperative relationships with the stakeholders, and application of system perspective. Furthermore, the model was designed to be analyzed in four dimensions: Space (a radius of 500m for a metro station), plane (assessment area), line (movement of getting on and off), and point (convenience facilities and services). The detailed manual of the assessment model consisted of 7 assessment locations, 40 assessment areas, and 463 objective assessment items with a 5-point rating system. The accessibility for the mobility handicapped was verified on-site at Express Bus Terminal Station and Seoul Station by applying the final assessment manual. The results of applying the assessment model are as follows. First, the accessibility for the mobility handicapped in the space dimension (a radius of 500m for a metro station) was B- for Express Bus Terminal Station and B0 for Seoul Station. In terms of the grade distribution of accessibility by the type of the mobility handicapped, Express Bus Terminal Station appeared as C0~C+ and Seoul station appeared as C0~B-. Based on the results, it is possible to not only comprehensively assess the accessibility for the mobility handicapped in the station (a radius of 500m) but also to perform a detailed assessment reflecting the characteristics of each type

of the mobility handicapped. Second, in the analysis of the plane dimension (assessment area) at Express Bus Terminal Station and Seoul Station, the accessibility ratings of ‘between the turnstile and platform (assessment area 4)’, ‘transfer passageway (assessment area 5)’, and ‘metro trains (assessment area 6)’ tended to be higher than those of other assessment areas while the ratings of ‘entrance from outside the station (assessment area 1)’, ‘waiting room from an entrance (assessment area 2)’, and ‘facilities (assessment area 3)’ tended to be low in both stations. The subjective ratings also indicated a similar tendency to objective ratings. These results suggested that this assessment manual could classify the accessibility for the mobility handicapped by plane dimension (assessment area) and make it easy to identify the priority of improvement in each assessment area. Third, based on analyzing the line dimension (movement of getting on and off) and point dimension (convenience facilities and services), it was possible to design the actual movement by checking the accessibility for the mobility handicapped. In addition, the subjective accessibility of the movement for each type of the mobility handicapped was identified. In order to improve visibility, the accessibility of actual movement for the mobility handicapped was marked with intuitive symbols and colors on the detailed map of the two stations. Finally, we propose the accessibility map of Seoul Metro for the mobility handicapped. This map can be the fundamental data for establishing a mid-to-long-term improvement plan for accessibility of the mobility handicapped in Seoul Metro and utilized as essential traffic information for the actual movement of the stakeholders.

## 06 Environmental Planning

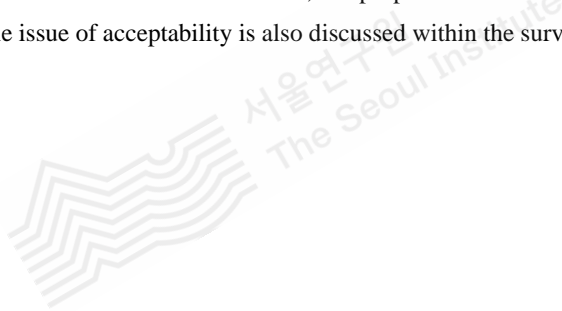
### Market Mechanisms for Addressing Climate Change and Air Pollution in Seoul

Inchang Hwang · Jongrak Baek

Climate change and air pollution are related to each other in multiple ways, though the relationship remains complex and evolving. The two environmental issues' most common factor stems from the fact that the main source of carbon emissions and air pollutants is the rising consumption of fossil fuels in the building and transport sector (including electricity consumption related to indirect emissions). The Seoul Metropolitan Government has implemented various measures for addressing climate change and air pollution, including the deployment of renewable sources, the improvement of energy efficiency, and demand control since the late 2000s. The approach of Seoul's policy, centering around mainly a 'command and control' style, was, to some extent, successful in reducing carbon emissions and air pollutants. However, the trend has reversed recently, and the level of emissions has slightly increased since the mid-2010s. External forces such as weather conditions (e.g., heat waves, cold snaps) remain the key factors for the recent increase in emissions. Additionally, the command and control approach has a limit for the further deep reduction of carbon emissions and air pollutants. Private sector actors, including corporations and the general public, are important players for the management of energy-related emissions. It is necessary to introduce flexible mechanisms which allow stakeholders and citizens to actively respond to a common future mission (e.g., carbon neutrality by 2050, sustainable development goals). Market mechanisms can assist in adjusting the actions of stakeholders and citizens, mainly through the

internalization of externalities through market price adjustments. As a result, well-designed market mechanisms can lead to a deep reduction of emissions, as these price adjustments can dramatically influence the decision-making process of both individual actors and corporations.

This report reviews market mechanisms implemented worldwide for the purpose of emissions reduction in the building and transport sector, and discusses the findings that were gathered over the course of the study's duration. Most significantly, we recommend a cap and trade scheme for the management of carbon emissions in the building sector. For the transport sector, we recommend the introduction of an emissions-based vehicle tax, with the tax rate being based on the level of carbon emissions and air pollutants. This report presents basic principles and strategies for the introduction of the two schemes in Seoul, and proposes a tentative road-map for the future. The issue of acceptability is also discussed within the survey results.



## A Study on Supply Strategy of Hydrothermal Energy in Seoul

Hangmun Cho · Chorong Yoon

Hydrothermal energy, which can be used for cooling and heating, is an underused energy source that can be widely applied in a city. Hydrothermal energy has to be produced in areas that fulfill certain geographical conditions, meaning it is mostly useful in areas that can avoid the cost of transporting hydrothermal energy. Various hydrothermal resources are distributed throughout Seoul, such as rivers, tap water lines, sewage, and ground water, and the places of demand are nearby, which is beneficial for its utilisation. The combined available energy of usable rivers, tap water, sewage, and ground water is about 2.3M TOE, which corresponds to about six times the current renewable energy production in Seoul. Specifically, sewage from apartments is the most useful hydrothermal resource. To expand the production of hydrothermal energy, fund and loan facilities are required, and policies such as reorganisation of the energy rate system are needed to save costs. To receive benefits associated with renewable energy such as subsidies, the scope of hydrothermal energy production should be expanded to include rivers, ground water, and tap water. To begin, hydrothermal energy should be applied in all buildings near hydrothermal resources. Then, in the long-term, hydrothermal energy stations should be connected and spread throughout the region to establish a large-scale energy supply system which is linked with district heating networks.

## Managing the Safety of Newtown-Redevelopment Cancelled Areas in Seoul

Sangyoung Shin · Sukmin Lee · Hyeonjung Nam

Over the past few years, the Seoul Metropolitan Government has cancelled numerous projects focused on ‘new town’ and redevelopment initiatives, with the number of such cancelled project sites totaling at 386 by the end of 2019. While 193 of these sites are under listing for alternative regeneration projects, the other remaining 193 sites are not listed for any future projects. As these areas with cancelled redevelopment are often older and neglected neighborhoods, with high levels of dilapidation and economic deprivation, they present an issue of safety for the inhabitants, and should be given additional special considerations in future planning policies.

This study uses geographic analysis to examine the level of safety of areas where ‘new town’ and redevelopment schemes were cancelled, and provides policy suggestions for future safety management strategies.

Firstly, the study looks at the current status of these existing ‘cancelled’ areas, and gives an overview of current existing safety measures governing these areas. Once these new town or redevelopment project schemes are abandoned by the planning entity, the area is often managed routinely, similar to other typically average, built-up areas. In some cases, safety management programs, such as the existence of building management or enhanced crime prevention regulation, are often implemented in these cancelled areas, due to their higher risk for disasters, accidents, and crime. Additionally, some of the aforementioned alternative regeneration projects newly-proposed by the government also include some safety measures, but overall, the current levels of safety measures in place remain insufficient for these cancelled areas.

Secondly, this study analyzes the safety conditions of the cancelled areas through a combination of data analysis, field survey, and questionnaires among current residents of these neighborhoods. As these cancelled areas are old and dilapidated when it comes to both their infrastructure and buildings, there is, as mentioned previously, higher levels of probability that sustained damage will occur from disasters, accidents, and crime. In particular, the presence of old or empty houses are at great risk for the occurrence of disaster and crime, partially to the narrow and steep roads, often less than 4 meters in width, which present a large barrier for emergency response. Additionally, these cancelled areas tend to hold a high proportion of vulnerable population, such as the elderly and single-person households.

Thirdly, this study proposes several strategies in order to improve safety of these cancelled areas, with these strategies relying on the classification of the cancelled areas into four types, and the recommendation of a customized safety management strategy for each of these types. Different area types should be prioritized differently when it comes to their need for safety management.

Specifically, safety management measures prior to alternative regeneration stages are suggested to go alongside physical improvement driven (H/W) and activity program driven (S/W), with both the public and the private spheres acting as major stakeholders. This study also suggests several considerations of safety during the process of preparing alternative regeneration projects.

## Energy Consumption and Energy-Saving Scheme for Single-person Households in Seoul

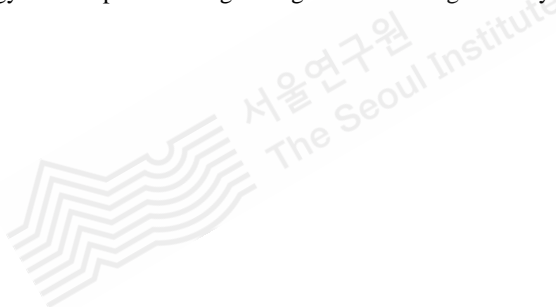
Minkyong Kim

For the last three decades, there has been a fivefold increase in the number of single-family houses in South Korea. In 2015, 30% of the total households were single-family houses, and the number of single- and two- family houses is projected to account for 68.0% of the total households by 2035. Consequently, the residential energy consumption by single-family houses is very likely to increase in the coming years. In addition, although residential energy consumption per capita is higher for single-family houses in South Korea, corresponding energy-efficiency measures are currently insufficient. As single-family houses, just as non-single-family houses, purchase and use home appliances and electronic devices, the growing number of single-family houses is likely to lead to their increasing residential energy consumption.

Generally, the larger the family size, the more residential energy is consumed. This report also shows that the residential energy consumption and carbon emission per household were 1.3 times higher in five-family houses than in single-family houses. However, single-family houses' per capita energy consumption and carbon emission were three times higher than in five-family houses. Per capita water consumption and house-heating by single-family houses also were two times higher than in five-family houses. These findings reflect that, as family size increases, per capita residential energy consumption decreases by the economy of scale.

This report further carries out a scenario-analysis in order to explore and compare patterns of residential energy consumption by household appliances and electronic devices in three types of single-family houses as student, middle-age, and elderly. It shows that the use of energy-efficient appliances could reduce energy consumption

by 18.5~25%. In particular, the use of common energy-efficient appliances, such as fridges/freezers and laundry appliances, could result in large energy savings. However, two common characteristics of single-family households in South Korea are, first they are rented and second they use built-in home appliances. Hence, their use of energy-efficient appliances is not fully determined by themselves, but is largely determined by the owners of the houses. In order to promote residential energy-saving in single-family houses in South Korea, both owners and tenants must support it, and institutional strategies such as incentives should be introduced to encourage owners to provide and tenants to use energy-efficient appliances. Even a one-size-fits-all solution to inefficient energy consumption in single-family houses may be insufficient. Instead, age- and lifestyle-specific policies should be instituted to achieve efficient energy consumption in the growing number of single-family households in South Korea.



## A Study on the Community Participatory Air Pollution Control Program

Yujin Choi · Minchul Shin · Hyejin Lee · Sungsoo Kim · Boram Kim · Sohee Moon · Heejeong Park

The concentration of air pollutants in a particular area is determined by the level of pollutants discharged from the area itself, as well as the degree of pollutant inflow discharged from various surrounding areas. Therefore, in order to improve the air pollution level in a specific area, various regions should collaboratively make efforts to reduce air pollutant emissions. In other words, air pollution management at the community level, as well as at the international, national, and regional levels is also needed. The purpose of this study is to suggest customized air pollution management plans at the community level which incorporate resident participation. Gangdong-*Gu*, Seocho-*Gu* and Eunpyeong-*Gu* took part in the policy experiments of this study. The key goal of the policy experiment was to draw out customized air pollution management ideas by operating a public forum where residents could participate in the policy-making process. By analyzing the process and results of the policy-making experiments conducted in the three *gu*-districts, we draw out suggestions to raise the level of resident participation in community air pollution management policy-making.

## How to Promote Evidence-based Reuse Policies in Seoul: Based on a Material Flow Analysis and a Questionnaire Survey

Koun Kim · Wonsam Kang · Hyejin Lee

This study is designed to suggest additional evidence-based reuse policy measures in Seoul by adopting two empirical methodologies: a material flow analysis and a questionnaire survey. The notion of a Circular City demands greater fundamental transition from recycling-focused policies towards systemic innovations which manifest source reduction and reused resource efficiency in a megacity such as Seoul. Despite its salient rationale, it is hard to find proper statistics and performance reports on the promotion of reuse policies in Seoul's public policies, let alone in South Korea. In order to adopt more evidence-oriented reuse policies, this study aims to provide an overview of the landscape of reuse policies in Seoul by collecting information from two sources, resource organisations and citizens. A questionnaire survey reveals how Seoulites have (or have not) participated in reuse strategies and why (or why not) they plan to do so in the future. Material Flow Analysis (MFA) shows how three types of reuse actors such as charity shops, borough recycling centres, and throw-away-clothes-bins collectors have played major roles in this sector. Case studies on reuse centres and urban policies in Berlin and

Helsinki add future possible policy solutions which can be introduced by the Seoul Metropolitan Government. The calculated contributions drawn from the MFA on resource reduction, climate change gas emission reduction, and employment maximization emphasize the importance of reuse policies in the future Seoul.

## Analysis and Diagnosis of the Linear Park Project through Urban Regeneration in Seoul

Wonju Kim · Jayun Heo · Wonsam Kang · Heeyeon Yoon

Park projects have been actively carried out through urban regeneration to regenerate aging urban facilities and turn them into parks with the surroundings in areas where the park green services are scarce. Some of the representative projects include the Cultural Axis Base, Gyeongui Line Forest Road, Gyeongchun Line Forest Road, and Seoul 7017, which were created during the 6th and 7th popular elections. Since its opening in 2017, Seoulo 7017 has been visited by 20 million tourists and used as a venue for cultural festivals, and the Yeonnam-Dong section of Gyeongui Line Forest Road has become a popular place like Central Park in the U.S. to obtain the formula “Yontral Park”, and the linear park is used as a new tourist attraction as well as a walking path for citizens. In addition, because of its linear space-based characteristics, urban linear parks have relatively high accessibility and link with the surrounding areas, affecting the formation of commercial districts, and regional revitalisation.

Unlike area parks, linear parks have a long formality in length compared to their width, and because of these characteristics, they represent a relatively high accessibility and can be provided as a space linked to the surrounding cities. If you look at the impact analysis study by the characteristics of linear parks and if you look at the impact factors of urban regeneration, most of the studies were based on the analysis of changes in the value of real estate, including land or housing prices, and the analyses of sales growth, changes in commercial facilities, and gentrification were mainly conducted. In addition, there are studies focusing on users, such as satisfaction surveys, perception surveys, changes in utilisation, walking patterns, and rare changes in crime or birth rates, and analysis of environmental changes, such as weather

conditions, noise, pollution, and wind paths around the park.

Among the representative park projects created through urban regeneration during the 6th and 7th popular elections, the Gyeongui Line Forest Road, Gyeongchun Line Forest Road, and Seouullo 7017 were selected as the sites for research, and the scope of the analysis included areas adjacent to the park. As parks are created in spaces with different regional characteristics, we would like to take a general look at the changes that occur around them. Since the three sites subject to the study are located at a time when the park is created and the use of the park has occurred to some extent, they can analyse the characteristics of architectural changes or regional values, diagnose the urban regeneration value of linear parks from an integrated perspective, such as citizens' feelings, and present the direction of utilisation and management.

In all the three target sites, the rate of visits was the highest in other areas rather than in the areas around the park, and visits using public transportation were the most common. The main places to visit on the Gyeongui Line Forest Road were Cheolgil Park, Gyeongchun Line Forest Road was Nowon Bulbit Garden, and Seouullo 7017 were public nature shelters, showing a high percentage of visits to facilities that are used as base facilities in the park. When it comes to the awareness of the park's construction, all three places had positive opinions at a rate of 83 percent or higher. After the formation, the users generally showed positive signs of change, and the Gyeongui Line Forest Road was the most positive about the revitalisation of the area around the park, followed by Gyeongchun Line Forest Road and Seouullo 7017. Merchant respondents also said that the Gyeongui Line Forest Road had the highest positive opinion on revitalising the area around the park, while the Gyeongchun Line Forest Road and Seouullo 7017 showed the highest positive opinion on improving the residential environment.

The satisfaction survey of the park's space and facilities consists of a combination of rest areas, walking environment, parking facilities, cultural spaces, landscaping facilities and trees, and facilities, and all three parks assess that the importance and satisfaction of "facility harmony" are high. The areas of major improvement, which are of high importance but low satisfaction, differed by the park, and in the case of

the Gyeongui Line Forest Road, the areas of major improvement did not appear, and the Gyeongchun Line Forest Road was found to be a parking facility and the Seoulo 7017 was found to be a cultural facility.

In terms of rent, sales, and profits in the surrounding commercial districts, there is a big difference between the feeling of rent increase and the feeling of sales and profits rise in all parks, and rent is expected to rise in the future, and sales and profits are expected to be similar. Parks are expected to be similar to the current number of visitors, while the Gyeongchun Line Forest Road is expected to rise. As for the reasons for the similar or falling, some say that there are not many visitors due to the influence of Coronavirus disease (COVID-19), which is expected to require preparation after COVID-19.

It is difficult to objectively diagnose the effects of the park, and although the rent of new construction around the Gyeongui Line Forest Road and Gyeongchun Line Forest Road has been decreasing recently, the surrounding landscape has been improved due to the active demolition and construction of old houses in the surrounding area at the time of completion of the park. After the park's construction, the new building behavior of facilities related to hobby or convenience of life as well as residential use is believed to have had some impact on the revitalisation of commercial districts. Accordingly, in order to maintain and improve the effects of linear parks along with the effects of policy directions and regulations occurring in the surrounding areas, the establishment and maintenance of surrounding networks can be carried out naturally in accordance with the needs of the residents.

All three sites had the highest rate of visits in other areas rather than visitors in the area around the park, while the main places to visit were the Gyeongui Line Forest Road-Rail Park, Gyeongchun Line Forest Road-Nowon Firelight Garden, and Seoulo 7017-Air nature Rest Area, which is used as a base space in the park. As such, the importance of the hub space in the linear space is significant, and it is necessary to characterise the space in the auxiliary hub space as a community place for nearby local residents or as a place for attracting visitors from other regions. The auxiliary stronghold is to be connected with cultural aspects, such as education, exhibition,

artistic activities, events, and festivals, so that a single space can be of importance. In the park, there are users with various speeds and power, including bicycles that speed up and walk with dogs, residents who walk with dogs, and the elderly and the weak who cannot move fast. As a result, safety considerations are needed as various users exist in the same space. In fact, the Gyeongui Line Forest Road and Gyeongchun Line Forest Road, which utilise railroad tracks, are valuable as cultural spaces, but there are also inconveniences in using them by bicycle and walking due to the width of the walkways. Therefore, it is necessary to ensure safety through the division of space and the division of routes of use, and to ensure a pleasant walk in the linear park.

With the arrival of the New Normal era due to the influence of COVID-19, a different multi-pronged approach needs to be sought than earlier. As shown in the survey results, COVID-19 acted as a constraint on park use, park operation, and surrounding commercial areas. However, COVID-19 is the first to experience, but the need for parks is greater and preferring non-face-to-face walks, which necessitates more use of shipping parks than area parks. While prioritising the safety of citizens in the operation of the park, it is necessary to continue to discover and propose alternatives that meet the needs of users.

## Cost-effective Reduction of Air Pollutants in Seoul

Inchang Hwang · Jongrak Baek · Eunmi Jeon · Mijin Ahn

Addressing air pollution is one of the main public policies in Seoul. The national authority and the city of Seoul have spent a huge amount of money for air pollution management to increase the quality of life and well-being of the general public. It is well known that the benefit of air pollution management is far higher than the cost. Moreover, mitigation of air pollution can contribute to reducing inequalities and promoting sustainable development. This research investigates the cost-effectiveness of air pollution policy measures in Seoul. We set up a database on air pollution measures in Seoul and calculated the cost and emission reduction of each measure. In addition, by applying random forest models, the effect of policy measures on nitrogen oxides (NO<sub>x</sub>) concentration was investigated. We classified the policy measures into 10 groups and assessed the cost-effectiveness. One of the main findings was that the demand control of transportation is most cost effective in emission reduction of air pollutants in Seoul, followed by management of vehicles in use and management of non-road mobile sources, such as construction vehicles. We also performed a multi-criteria analysis on the same policy measures and found that the policy priorities recommended from the two methods are generally consistent.

## A Study on the Conflict Management in Landholding of the Main Trails

Wonju Kim · Wonsam Kang · Gangmin Kim

Recently, as the interest in pedestrians' safety has increased, walking trails have been developed around the country.

Since Seoul's walking trail was constructed, the number of users has been steadily increasing as the usability and accessibility also increases. However, conflicts are frequently occurring between the local governments and landowners or users of walking trails, and are expected to increase after the implementation of the Abolition System in a Long-term unexecuted Urban Park in 2020. Efficient management methods are needed to proactively respond to complaints from landowners and users of trails. Therefore, this study focuses on the conflict cases that occurred in the trails of Seoul and analyzed the implications of the problems through similar internal and external cases, related systems and structures, and derived a solution for conflict management.

First, related systems and management structure were examined. This study examined the concept of walking trails, management plan and how policies at the national or local government level were operated through research literature and media. Seminars were held by specialists to derive solutions and implications for similar conflict cases in Japan.

Second, the location, cause of conflict, and level of conflict were examined. For the section with specific location information, the surrounding land distribution and facilities were reviewed through GIS data and field survey.

Third, each case was analyzed in terms of the cause of conflict and person(s) concerned. We summarized the characteristics of the site with conflict cases. The conflict management system was deduced in consideration of the implications from

the characteristics of conflict resolution. Conflict experts were reviewed and supplemented to make effective plans.

As a result, the conflict management methods were proposed based on compensation plan, conflict prevention management plan, and management system improvement plan. All conflict differs in nature because of different land characteristics and different surrounding conditions. Compensation should be made in consultation with landowners in consideration of regional characteristics, value in use and ecological environment. Therefore, the purchase cost and usage fee of the trail were calculated and the results used to select the criteria for consultation with landowner. In addition, 100% reduction of property tax was proposed to revitalize the green practical use contract. Conflict Impact Analysis is used to prevent conflict management to comprehend private land for major trails and the persons concerned, and predicted areas of conflict risk to enable local governments to respond in advance. Regarding management system improvement plan, manuals on walking trail use and conflict management should be prepared for safe use to prevent and systematically manage conflicts by sharing their management methods and procedures. Moreover, to efficiently manage conflict, we proposed ways to build conflict management cooperation system with citizens, corporations, organizations, and experts.

## A Study on the Establishment and Utilization of Cyber-physical System Supporting Smart Cities in Seoul

Sukmin Lee · Hyungmi Yoon

Since 2018, the Seoul Metropolitan Government has established a smart city Seoul strategic plan and has been pushing for smart projects to solve urban problems such as urban planning, transportation, safety, the environment, and the economy in various areas. In order to support these smart city projects, the Smart City Policy department started to conduct projects on the use of high-tech technologies such as the Internet of Things (IoT), big data, and three-dimensional spatial information.

Recently, the establishment of a cyber-physical system has emerged as a major issue for effectively supporting the smart city. Cyber-physical system is a new paradigm that seeks convergence between the real world and the virtual world, and it is a bi-directional system that interacts with various urban information such as IoT, CCTV, and various sensors.

In this study, the concept, role, composition of cyber-physical systems was examined. Through this, it was intended to explore the implementation tasks and utilization measures necessary for the establishment and operation of the cyber-physical system of Seoul Metropolitan Government. In addition, we reviewed the new features and roles of spatial information required in the construction of cyber-physical systems.

A cyber-physical system construction model was proposed as a result of this major research, linking major platforms and utilization departments in Seoul, improving organizations and legal systems, and building 3D spatial information data.

## Improving Management of Local Neighborhood Roads in Seoul

Sangyoung Shin · Jin Park · Hyeonjung Nam

Local neighborhood roads refer to narrow roads that are usually less than 12m in width. In late 2019, local neighborhood roads accounted for 76.8% in length and 41.3% in area of total roads in Seoul, Korea. While local neighborhood roads are closely connected to citizens' everyday life, they are inconvenient and dangerous to pedestrians because pedestrians and vehicles share road spaces. In addition, road facilities are poor. Moreover, local neighborhood roads are extensively distributed in old residential areas of Seoul, Korea.

So far, policies and programs related to local neighborhood roads are largely focused on transportation management for pedestrian's convenience and safety, while approaches of facility management are relatively insufficient for local neighborhood roads.

By focusing on facility management, this study proposed policy suggestions for local neighborhood roads by analyzing current status of road facilities and management practices and by determining citizens' perceptions and needs for facility environments of local neighborhood roads.

First, this study reviewed concepts of local neighborhood road based on institutional frameworks, existing studies, and foreign practices.

Second, this study examined existing policies and programs of local neighborhood road such as 'Pedestrian-friendly City', 'Safe Speed 5030', 'Road Pavement', Living SOC', 'Urban Regeneration', and so on.

Third, this study analyzed quantities and distributional characteristics of local neighborhood roads in Seoul using statistics and GIS data. This study also analyzes relationships of local neighborhood roads with financial capacity of district and traffic

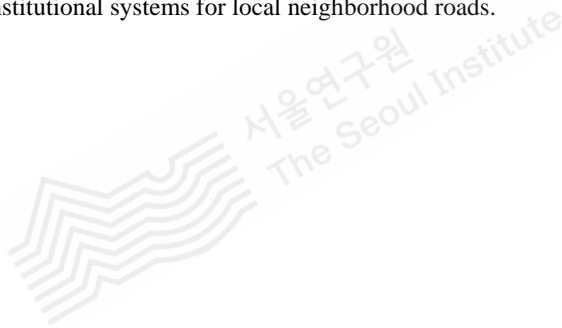
accidents in local neighborhood roads.

Fourth, this study surveyed facility conditions in local neighborhood roads through field surveys for five case study areas.

Fifth, this study surveyed citizens' perception and needs based on a 1,000-citizen questionnaire. This study also interviewed public officials related to various facilities in local neighborhood roads.

Sixth, this study reviewed foreign practices of local neighborhood road management focusing on major cities in Japan and United States.

Finally, this study proposed several strategies in order to improve facility management of local neighborhood roads for Seoul, Korea. After prioritizing road facilities and suggesting improvement measures, this study developed improvements project and institutional systems for local neighborhood roads.



## Analysis of the Deforestation Status of and Management Plan in Seoul

Inju Song · Chorong Yoon

Multiple factors including urban development projects, erosion control projects to prevent landslides, illegal cultivation, and natural disasters have led to the degradation of forests and forests adjacent areas. According to the Seoul Biotope Map, the Forest Biotope in Seoul decreased by approximately 5.54% in 2015 compared to 2010 and decreased by approximately 0.95% in 2020 compared to 2015, reducing the area by about 6.3% over 10 years. This corresponds to about 1.49% of the total Seoul area. Worse still, efficient forest management has been a challenge because the concept and contents of forest degradation are not clear; forest management laws are inconsistent. Therefore, there are no specific standards for protection and restoration of degraded areas.

Therefore, in this study, the causes of forests and adjacent areas degradation in Seoul were analyzed, and the types of forest degradation that Seoul city should manage were highlighted. In addition, based on the analysis results of the deforestation status in Seoul, the present study aimed to prepare guidelines for restoration and management of the degraded areas in consideration of the Seoul ecological characteristics, and to suggest ways to improve laws and management systems the degraded areas.

The present study covers the concept and policy trend analysis of deforested areas, analysis of the management status of deforested areas, analysis of the characteristics of deforested areas, and restoration and management plans of the degraded areas.

In the analysis of the deforestation intention concept and policy trends, related concepts such as forestry, degradation, and restoration were reviewed and grouped as domestic laws. In addition, prior research studies and policy trends related to deforestation were analyzed. The concept and scope of deforestation in this study is a product of a comprehensive reflection of analysis on the deforested areas characteristics, expert surveys, and field surveys.

For the analysis of the degraded areas management status, the legal system related to forest damage was reviewed. Based on the review, the management is mainly a responsibility of the government and the Seoul Metropolitan Government for forest damage and restoration. In the legislative review, the Ministry of Environment, Ministry of Land, Infrastructure, and Transport, and the Korea Forest Service laws related to forest damage and restoration were reviewed, and implications were drawn by comparing and analyzing the city planning ordinance and the natural environment conservation ordinance. In addition, the current status of the management and restoration projects was summarized through a review of each department project contents and interviews with the persons in charge.

To analyze the characteristics of the deforested areas in Seoul, the status of deforestation was evaluated through in-house field surveys and detailed field surveys with civic groups in the forest and adjacent areas. In addition, the types of forest degradation in Seoul were reviewed. An expert survey was conducted and the types, causes, characteristics, and management methods of forest damage in Seoul were highlighted. Further, the types of damage in Seoul were presented and characteristics of each type were analyzed by combining the results of the field survey. The concept of deforestation in Seoul was analyzed based on the spatial characteristics of the deforested areas, such as the location, and spatial distribution was identified using the GIS for all the deforested land.

For the restoration and management plans, the priority of restoration was suggested after comprehensively considering the types and characteristics of forest damage, the distribution of the degraded areas, and ownership of the degraded areas. In addition, restoration guidelines that reflect the urban spatial characteristics of Seoul were prepared. In the guidelines, the types and damage characteristics of forests in Seoul were summarized, and the basic directions and principles of restoration according to the characteristics and individual restoration methods were presented along with examples. In addition, through a comprehensive review of the existing laws and regulations, a proposal to improve the Seoul Metropolitan Government's ordinances and therefore efficient management of the deforested areas was developed.

## A Study on the Diagnosis of Governance and Improvement Plan of Civil Safety Governance in Seoul

Sukmin Lee · Hyungmi Yoon

Due to the nature of disaster management, the importance of the civil safety governance in which civil society participates has recently been emphasised, as all activities are determined not only by the role of the Seoul Metropolitan Government, but also by the efforts of various members of society. Participating organisations that make up Seoul's civic safety governance include the Seoul Volunteer Center, CAIND (Citizen-Corps-Active-In-Disaster), the Safety Sheriff, Seoul Citizen Safety Guard, and the Korean Red Cross. Looking at the roles and relationships of the Seoul Metropolitan Government and these participating organisations, while activities are being carried out according to the roles of each participating organisation, the establishment of a cooperative network through practical connection and operation with the Seoul Metropolitan Government is evaluated to be insufficient. Therefore, this study examines the current types of participation in civic safety governance in Seoul according to the disaster management stage, examines the current status and operational status of disaster management, and proposes policy measures to strengthen the role of disaster management activities.

To establish cooperative civil safety governance, it is necessary to clarify the roles played by participating organisations and improve guidance for activities during both normal times and disasters. Education and training should also be conducted to strengthen the expertise of each participating Civil Society Organisation. To support efficient field activities between participating Civil Society Organisation, an online platform should be established so that information can be shared. Finally, the legal system should be improved to increase the efficiency of civil safety governance operation.

## Achievements and Policy Improvements, and New Policy Directions of Seoul's Energy Transition Policy

Jungmin Yu · Chorong Yoon · Hyungmi Yoon

Our purpose in this research is to evaluate Seoul's energy-transition policy for the last nine years and to suggest some policy-improving measures. Given the evaluation and recent carbon neutrality discussions in many countries, we also offer proposals for Seoul's new energy vision and policy directions.

Seoul has played a pioneering role in energy transition in South Korea since its initiation of the One Less Nuclear Power Plant (OLNPP) in 2012. With innovative policies, citizens' support, and the strong leadership of Mayor Park, Seoul's OLNPP has largely been successful. It saved 6.87 MTOE of energy by means of active renewable energy, energy efficiency, and conservation policies. It also contributed to creating green jobs, increasing energy welfare, and broadening citizens' participation. Further, the city's diverse policies and programs were benchmarked by other local governments and influenced national energy policy. There is, however, several challenges that the city has to address to move towards more ambitious goals, such as carbon neutrality.

Seoul needs to strengthen the building retrofit project (BRP) by introducing some binding regulations, such as emission caps and building-energy performance certificates, as well as offering more favorable financial incentives.

Building stock is an important asset for installing PVs in urban spatial settings. The current subsidy scheme needs to be changed to provide substantial financial incentives for kW-scale rooftop PVs. Mandating PVs on new buildings, as in New York city and France, also needs to be considered.

Expansion of green industry is an indisputably effective way to create green jobs. In addition, it is also necessary to develop energy-business models in which people

take part, such as energy cooperatives and prosumers. Retrofitting of low-income houses needs to be continued as a welfare-policy priority.

In order to mainstream the climate policy to all the policy areas of the city, the Headquarter of Climate and Environment needs to play a more active role with enough power and personnel. It is also necessary to collect data and develop ways to evaluate the effects of project implementation.

The Seoul Energy Corporation, which currently is working on diverse business areas, ranging from renewable energy and district heating to smart energy and energy welfare, needs to strategically focus on priority business models and streamline the complex decision-making process.

Citizens' participation needs to be broadened by empowering the district governments and communities.

There are significant changes in the energy market and technology as distributed energy resources (DER) rapidly expand. In addition, the "Green New Deal" for 2050 carbon neutrality has become a new global norm for environmental policy. In this regard, Seoul's energy-transition policy needs to be upgraded to embrace those changes and challenges. The new vision and policy directions are suggested as follows:

Seoul's energy-transition policy needs to be restructured with a vision of 2050 carbon neutrality. To meet that bold target, stringent regulations, sufficient budget, and efficient organization should be prepared.

In order to make a locally driven Green New Deal effective, energy decentralization that includes reform of governmental regulations, empowerment, and budget autonomy needs to be continuously promoted.

Innovative and decentralized energy-market reform is required to accelerate the use of distributed energy resources and to foster new energy businesses.

Participatory governance is crucial to make the ambitious climate policy work.

It is necessary to prepare safety measures for the people working in so-called "stranded industries", such as for internal-combustion engines.

## Current Status and Improvements of Emergency Shelters in Seoul

Sangyoung Shin · Hyeonjung Nam · Sangkyun Kim

There are several types of emergency shelters in Seoul including civil defense evacuation facilities, temporary shelters for victims, outdoor evacuation places for earthquake, warming centers, and cooling centers; in late 2020, such emergency shelters were approximately 11,426.

Since emergency shelters are not frequently used facilities, currently, their conditions and accessibility are poor; while there are several legislative systems and departments in charge, they are distributed by shelters type, implying the possibility of inefficient administration and management.

This study proposes policies for improved management of emergency shelters in Seoul by analyzing distributions, locations, facility conditions, institutional management systems, and citizens' needs for emergency shelters.

First, the types of emergency shelters and management systems as well as a case study on Japanese emergency shelters were reviewed.

Second, the locations, spatial distributions, capacity, and facility conditions of various emergency shelter types in Seoul were analyzed. Further, detailed facility conditions were analyzed based on a field survey of emergency shelters.

Third, the accessibility of the emergency shelters and accessibility improvement through expanding the shelters were analyzed using the location-allocation model, a spatial optimization model.

Fourth, citizens' perception on emergency shelters was evaluated using a 1,000 citizens survey questionnaire to determine knowledge, and intention to use, and needs.

Finally, this study proposed several policies and measures to improve the

accessibility, facility conditions, and integrated management systems of the emergency shelters. Especially, the policies focus on the care for the disaster vulnerable groups such as the aged, the disabled, and women.



## 07 City Diplomacy

## A Study on the Joint Bid and Hosting of the Seoul-Pyongyang Summer Olympic Games

Inchul Mun

According to the theory of contact, which discussed reducing prejudice and building trust among conflict groups, co-hosting the 2032 Olympic Games is a very useful means to stop the conflict on the Korean Peninsula caused by the division of Korea. In addition, according to the functional theory that social and cultural exchanges and cooperation spread to political and military cooperation, co-hosting the 2032 Olympic Games increases the complex interdependence of the two Koreas. As such, the 2032 Seoul-Pyongyang Olympic Games will serve as a decisive opportunity to deepen the complex interdependence by increasing the amount and quality of inter-Korean contacts. The 2032 Olympic Games will be a large-scale conflict-changing contact platform that will transform the division of the Korean Peninsula into a reconciliation, integration and peace regime. In the short term, the 2032 Olympic Games will trigger infrastructure investment production in Seoul and Pyongyang, and even the two Koreas, and create direct and indirect employment. In the long term, a region will be formed in which neighboring areas will develop around Seoul and Pyongyang. The 2032 Olympic Games will accelerate the improvement and opening of North Korea's national image. Then Seoul will emerge as a major channel for North Korea's advancement and the centerpiece of the investment and development market on the Korean Peninsula. The 2032 Olympic Games will lead the development of tourism and sports industries in the two Koreas, with Seoul and Pyongyang at the center. Above all, the 2032 Olympic Games will reduce the cost of division and unification of the

Korean Peninsula, contributing to the economic development of the two Koreas and the improvement of the livelihood of residents. The 2032 Olympic Games need to be set as a mission to “restore peace to sports, realize peace to develop into sports” in line with the Olympic spirit of creating a peaceful and better world through sports. These missions are based on the 2032 Olympic Games vision of “peace that the world and the earth recover, spread of sustainable developmental peace”. Under this vision and mission, the 2032 Olympic Games should aim to realize the ‘Democratic Peace Olympics’, ‘Peace Economy Olympics’, ‘Unification Peace Olympics’, ‘Future Peace Olympics’, ‘Eco-Peace Olympics’ and ‘Human Security Olympics’. The 2032 Olympic Games will actually be an inter-Korean Games, given that Seoul and Pyongyang are the main players but were pushed by a consensus between the leaders. Currently, there are various political, military and diplomatic issues in the two Koreas. Furthermore, the North’s nuclear issue is currently under way. In order to secure international support for hosting the 2032 Olympic Games and resolve the issue of sanctions against North Korea, the governments of the two Koreas must closely cooperate. First of all, the South and North Korean governments should implement the meaningful agreements they have made as soon. It will also have to sign a separate inter-Korean agreement focusing on the 2032 Olympic Games and prepare for the hosting and hosting accordingly. The Olympic Games are a large-scale mega sports event that requires a lot of time and effort even if held alone.

## The Seoul Metropolitan Government's City Diplomacy Strategy and Policy for Peace Building

Mingyu Lee · Eunhyun Park

As 2018 Pyeongchang Winter Olympics triggered the momentum of improvement in inter-Korean relationships, Seoul Metropolitan Government (SMG) set out to promote ten projects in three areas in earnest which were identified in “Comprehensive Plans for a City-to-City Partnership between Seoul and Pyongyang” announced in November 2016. As part of their efforts, the SMG expanded its administrative capacity, promoted inter-Korean exchange and cooperation and set out to revise relevant laws and system.

As from 2020, SMG's inter-Korean exchange and cooperation has mainly focused on education on peace and reunification and support for domestic events. Among the three components of the plan, city infrastructure and economic cooperation are yet to be implemented, and socio-cultural interaction has just reached the level of the early 2000s.

The failure to expand inter-Korean exchange and cooperation, despite the organizational reform and amendments to relevant laws such as Acts on development of inter-Korean relationship and Acts on inter-Korean exchange and cooperation, is attributable to external factors. That is, the aggravation of the international political landscape represented by the breakdown of the 2nd US-North Korea Summit impeded the implementation of the plan. Specifically, the intensifying US-China conflict has rendered the Korean peninsula problem adversarial or non-negotiable. Furthermore, external driving forces of the projects was lost as the relationships between Korea and major Northeast Asian countries like China and Japan deteriorated. Most critically, the scope and level of the potential projects were restricted due to international community's sanction against North Korea.

Considering that the changes in international relations could negatively affect implementation of inter-Korean exchange and cooperation projects, the SMG should conduct city diplomacy for “peace building”. As one of the six agendas of city diplomacy, peace building has been promoted since the end of the Cold War. Local governments have worked to prevent international conflicts in advance and mediate disputes, and settle peace after conflicts, serving roles of lobbyists, peace-makers and peace-builders. Those three roles are interconnected but the purpose of specific activities can differ according to objective and period.

Taking into consideration the above-mentioned facts, SMG should conduct the city diplomacy for peace building based on the following three strategies in order to prevent potential conflicts between the two Koreas and settle down peace on the Korean peninsula.

First, multilateralism strategy. The SMG should carry out multilateral diplomacy centered on international organizations for peace building. Peace-building, in particular, should be set as a key agenda of the international organization cooperation team and the activities of international organizations centered on Mayor for Peace should be steadily expanded.

Second, institutionalization strategy. SMG should establish international multi-layered human networks through operating “Seoul Club” of international experts of Korean issues in connection with “Seoul Peace Initiative Consortium”, establishing “Northeast Asia Southeast Asia Capital Mayors Meeting” and fostering complementary cooperative relationship.

Third, policy strategy focusing on public diplomacy for peace and security. Under this strategy, public diplomacy of local council members with solidarity and persuasion as its core values, and exchange programs and education on peace and security for foreign nationals should be prioritized.

## Seoul-Pyongyang Health and Medical Cooperation Study

Inchul Mun

Seoul-Pyongyang health care cooperation is a health security issue that directly affects the lives and livelihood of North and South Koreans. Seoul, the world's leading city and capital, will experience explosive contact from many people at home and abroad during and after the unification process. This will increase the spread of infectious diseases and illness, threatening the health security of citizens. As can be seen in COVID-19 situation, the Seoul-Pyongyang health care the cooperation is a precautionary work for the health security of citizens of the Korean Peninsula. West and East Germany were the first to sign a health agreement to prevent social chaos and to promote integration after the reunification. Although West and East Germany had relatively smaller economic gap compared to the two Koreas at the time of the reunification, they still deal with social conflict today. The large health care gap between the two Koreas can potentially cause social conflict in the unified Korea. Sanctions against North Korea, COVID-19 and natural disasters are exacerbating North Korea's economic hardship. The severe economic hardship actually collapsed North Korea's health care system. Half of North Korea's population do not have access to basic sanitation facilities or quality health care services. Food shortages are also deteriorating the health of North Korean people due to various diseases. Thus, external health and medical support and cooperation are essential to resolve this situation. For Seoul-Pyongyang health care cooperation, the Seoul Metropolitan Government should set a clear goal considering the strengths, weaknesses, opportunities and threats. It also needs to accommodate the needs and acceptability of North Korea. With such consideration, we suggest that Seoul-Pyongyang Cooperation should work towards accomplishing the following four goals: 1) to treat and prevent diseases and

promote health of North Koreans; 2) to improve and enhance North Korean health and medical environment; 3) to establish a health and medical cooperation system between Seoul and Pyongyang; and 4) to realise a healthy community on the Korean Peninsula.

With these four goals, the Seoul Metropolitan Government should set a strategy in three directions: 1) strengthening disease treatment; 2) ensuring disease prevention and health enhancement; and 3) strengthening health care capabilities.

Short-term task for Seoul-Pyongyang cooperation should focus on supporting the treatment of infectious diseases and emergency nutrition. Detailed projects (programs) include: 1) Seoul-Pyongyang Joint Analysis and dispatch of experts to understand the status of health and medical care in North Korea; 2) Support treatment of infectious diseases; and 3) Aid emergency nutrition and hygiene products.

Mid- to long-term task should aim to improve the health care environment in North Korea for disease prevention and health enhancement. Projects could include: 1) support for non-infective disease treatment and improvement of such health care services; 2) improve natural and living conditions to prevent diseases and maintain health; and 3) expand and modernise health care infrastructure.

The long-term task should aim to normalise North Korea's basic health care system. Projects could include: 1) improve access to basic health care services; 2) exchange researchers and related workers in the health care field between Seoul and Pyongyang; and 3) establish a sustainable Seoul-Pyongyang health and medical cooperation governance.

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