

Co-Working in Seoul:
Integrating Public Infrastructure into the Metaverse

by

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B.A. History of Art and Architecture
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Submitted to the Department of Architecture and the Center for Real Estate

In Partial Fulfillment of the Requirements for the Degrees of
Master of Architecture and
Master of Science in Real Estate Development

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ABSTRACT

Hybrid working has now become the new normal. Besides working from home, there is an increasing demand for a space that is neither home nor the traditional office. While the home office has many benefits such as flexibility, work-life balance, and reduced transportation costs, employees still need a space that is detached from household chores and noise. Such demand is being met by various forms of working environment such as co-working office, dispersed office, satellite office and metaverse office. This societal demand for a new remote workspace is also happening in conjunction with digitization, rise of the metaverse, and the changing ways people engage with public infrastructure.

This project looks at Seoul, South Korea as an example of this societal shift, and finds opportunities in two types of public infrastructure: Post office and the welfare and administrative centers located at every administrative district in Seoul. With digitization, the number of post offices in Seoul is decreasing every year, and in some cases extra spaces are being leased to the private sector. With Seoul Metropolitan Government releasing a five-year plan to build an intricate metaverse platform, it is expected that more and more physical infrastructure within Seoul will be made available for alternative uses starting from year 2026 and beyond.

Matching societal demand for flexible remote working environment and a growing supply of public space for alternative use, this thesis explores ways of reappropriating portions of the existing public infrastructure in Seoul as remote work space. The proposed designs seek to provide public good that cater to the needs of the locals, at the same time creating a new revenue stream for the public sector.

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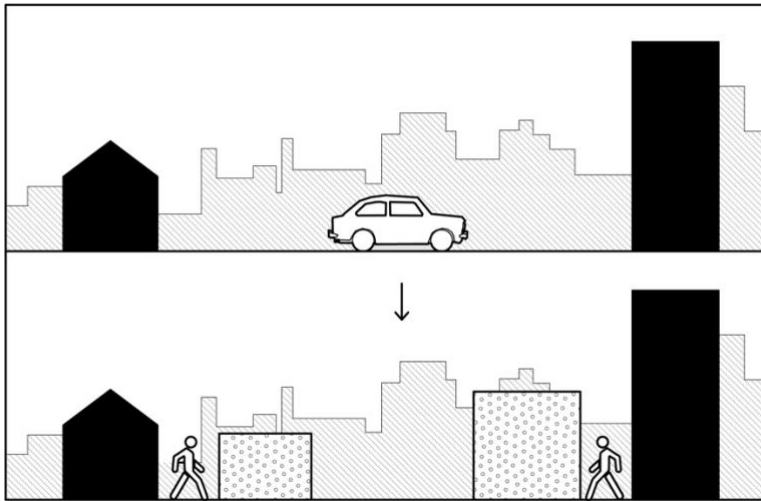
Siqi, for your insight and support in helping me articulate my ideas

Takehiko, for your support and thoughtful feedback

My family, for your continued support

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CHAPTER 1
RESEARCH

1-i) Thesis Question and Framework

This thesis considers an urban strategy that will mitigate two ways of working: The first is a traditional monocentric model in which everyone travels to the central business district (CBD) to work. The other is the metaverse model, in which each employee can log into the workplace virtually from their own home via a metaverse platform.

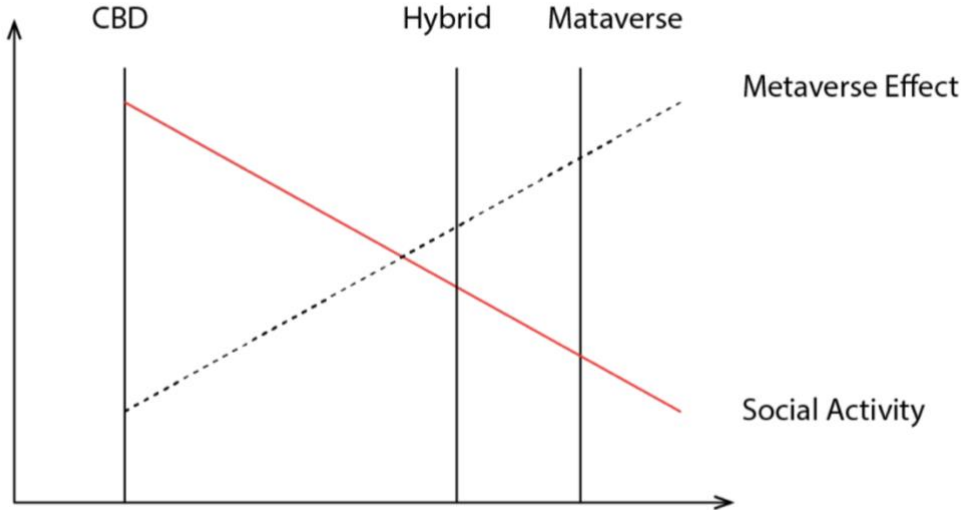


Fig 1. Balancing social activity with metaverse effect

As the graph illustrates, the two disparate models of working create a mismatch between demand for tangible benefits such as social interaction and teamwork, against metaverse effects such as efficiency, work-life balance, and reduced transportation costs.

This thesis is an attempt to navigate the differences in these two ways of working and to come up with a solution that combines the benefits of the two disparate commute and working models.

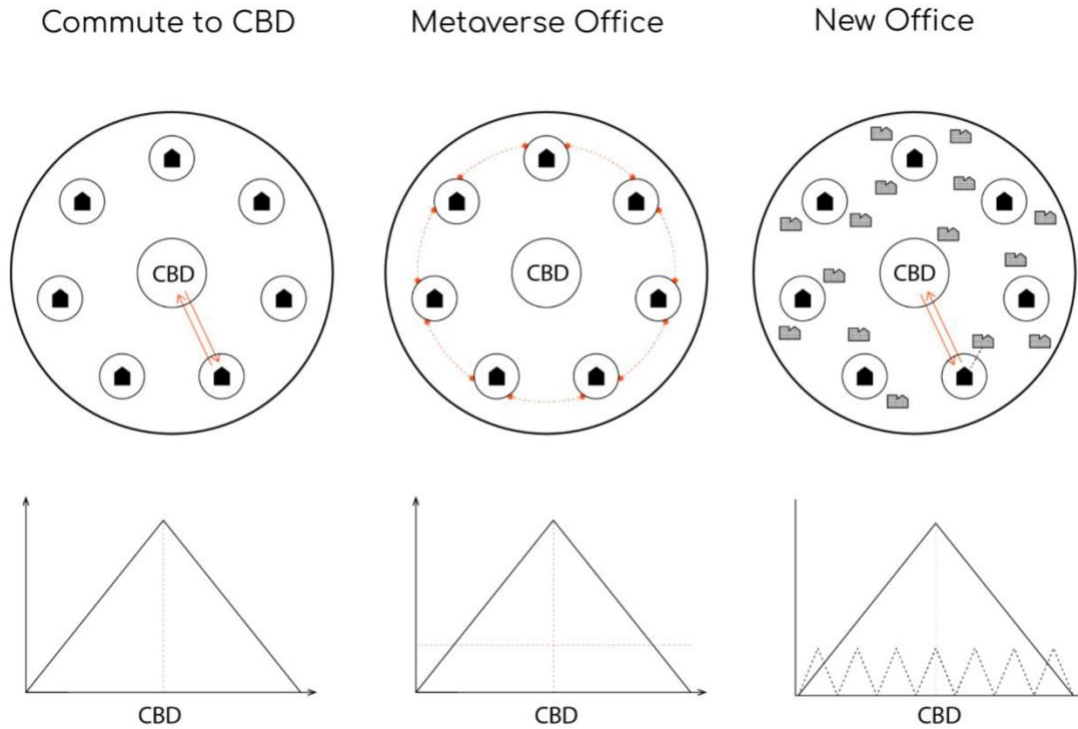


Fig 2. Different commute models

More specifically, the intention of this thesis is to suggest a middle ground between the two ways of working, thereby providing a more convenient remote working alternative for the employees. The diagram on the upper left shows the traditional model in which the employee commutes to the central business district for work. The middle diagram shows how the metaverse nullifies that travel time and costs that are associated with commute to the CBD. The diagram on the right shows how using already existing public infrastructure near the employee's home can be a new paradigm of remote work. While the employee can still commute to the CBD or the metaverse for a few days of the week, he or she will be able to commute to another office closer to their own residence. The end goal of the project is creating a new urban fabric that is filled with organic connection of new offices that will satisfy social needs of the employees while providing a comfortable and alternative work environment close to their own home.

1-ii) Hybrid Working Trends

Remote and hybrid forms of working are being established as long-term trends. If work-from-home had previously existed yet not as a mainstream practice, COVID-19 pandemic has expedited a global implementation of a hybrid working environment.



Fig 3. Remote Workforce Statistics (data source: Forbes)

According to a survey conducted by Forbes, 97% of the employees expect remote work to become standard, 74% do not want to return to the office full-time, while 61% prefer being fully remote.¹ While the first two figures are easily comprehensible, the last figure of 61% tells that employees have mixed feeling about having a completely remote working environment. This indicates that while employees generally enjoy working from home, spending the entire work time in a home office may not be so ideal to some.

¹ Ashira Prossack, 5 Statistics Employers Need to Know About The Remote Workforce, Forbes

In that perspective, another study sheds light on what the employees may need. According to a WeWork Report titled “The Future of Work is Hybrid,” 34% of the 1000 employees who took the survey answered that they would prefer to spend their work time in “other locations” that are neither home nor the office.² More specifically, while 36% of the employees prefer to work in the company HQ and another 30% prefer to work from home, 34% of the employees actually prefer to work in “other locations.” Other locations refer to spaces like co-working office, dispersed office, metaverse office, cafés, and other public spaces. Together, these alternatives would constitute “other” remote working environment that is neither home nor the traditional office headquarter.

² WeWork x Workplace Intelligence, The Future of Work is Hybrid

EMPLOYEES

After COVID-19, what percentage of your work time would you prefer to spend in the following environments?

TOTAL RESPONDENTS = 1000

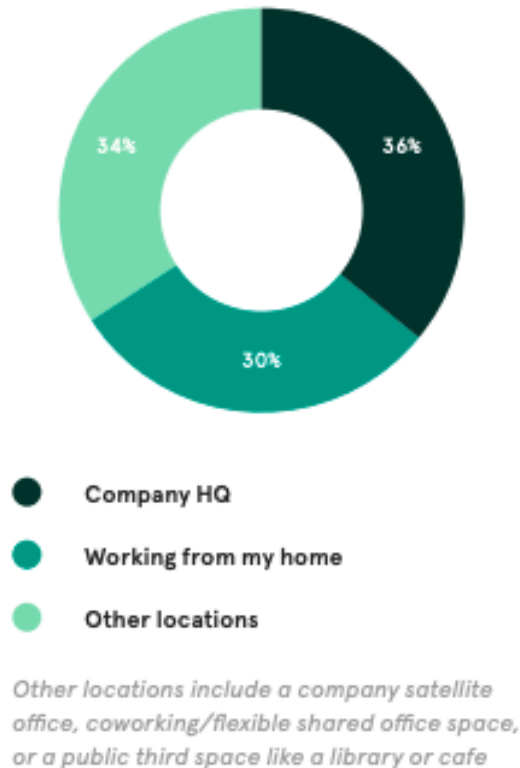


Fig 4. Work Environment Preference (illustration credit: WeWork)

Based on this finding, the report suggests that companies will have to adapt for this need for the third type of space in the long run, and concludes that this shift to hybrid will require companies to reconsider their office design and real estate strategies.³

This raises the following question: Why would the employees want to have a remote working space that are separate from the home office?

³ ibid

In fact, this question is easily answered by looking at the comparison between the traditional office and the home office.



	Advantages +	Disadvantages -
Home 	Work - Life Balance Flexibility and Control Reduced Commuting Costs More time with Family and Friends	Lack of Community and Teamwork Lack of Office Products / Technology Distraction
Office 	Ability to Focus Collaboration / Socialization Resources and Amenities	Commuting Costs Stress Lack of Flexibility

Fig 5. Advantages and disadvantages of home office and traditional office

While the home office provides advantages such as increased work-life balance, flexibility, more time with family and friends as well as reduced commuting costs, it entails negative effects such as lack of community and teamwork, lack of office products and technology, as well as added distractions. Then the question rises as to what the “other office” should look like, as a middle ground between the home office and the traditional office.



Fig 6. What should the “Other Office” look like?

As aforementioned in the previous part of this chapter, this thesis proposes reappropriating underused public infrastructure in providing a new paradigm of remote work alternatives for the employees.

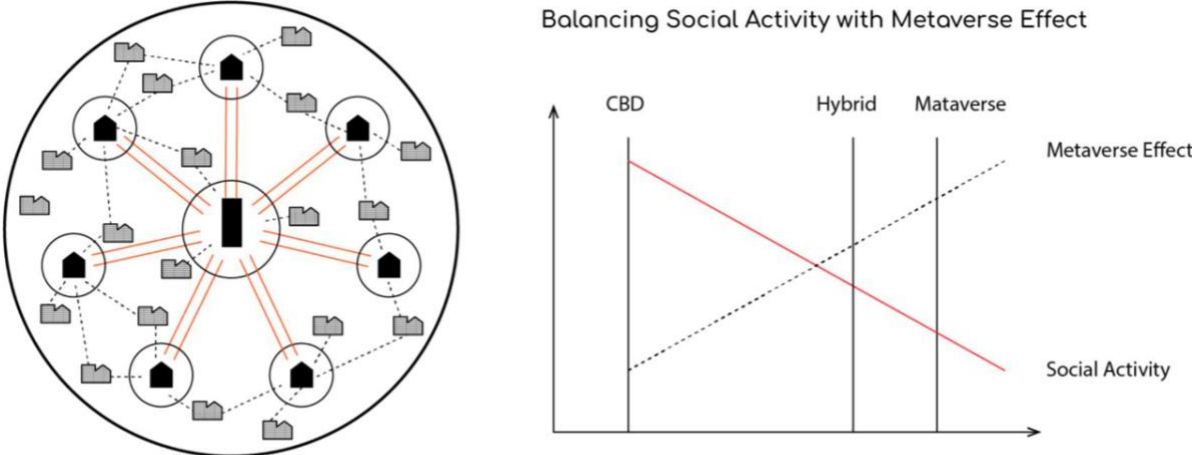


Fig 7. New paradigm for remote work

The new system of commute and work is intended to create a middle ground between the monocentric model in which every employee travels to the central business district to work, and the metaverse model in which every employee logs into the workplace virtually from his or her own home. While the employee can still commute to the CBD or the metaverse for a few days of the week, he or she will be able to benefit from having another office closer to their own residence. The new paradigm of remote work is based on creating a new urban fabric that is filled with organic connection of new offices that will satisfy social needs of the employees while providing alternative work environment near their own residences. The following part of this chapter will discuss and analyze the site for this project.

1-iii) Seoul: Office Market

Seoul, South Korea is chosen as the site for this project based on the city’s high demand for decentralized local offices as well as its unique administrative public infrastructure system that could create supply for that demand.

Prior to discussing the relationship between supply and demand for alternative office space, this part will be prefaced by a summary of the current office market in Seoul.

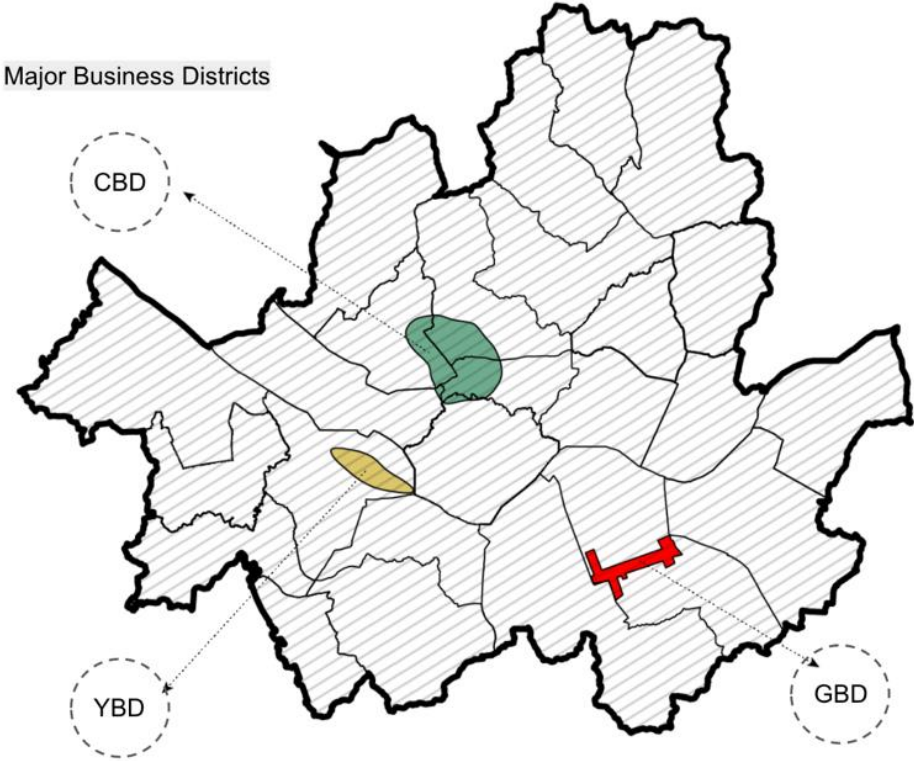
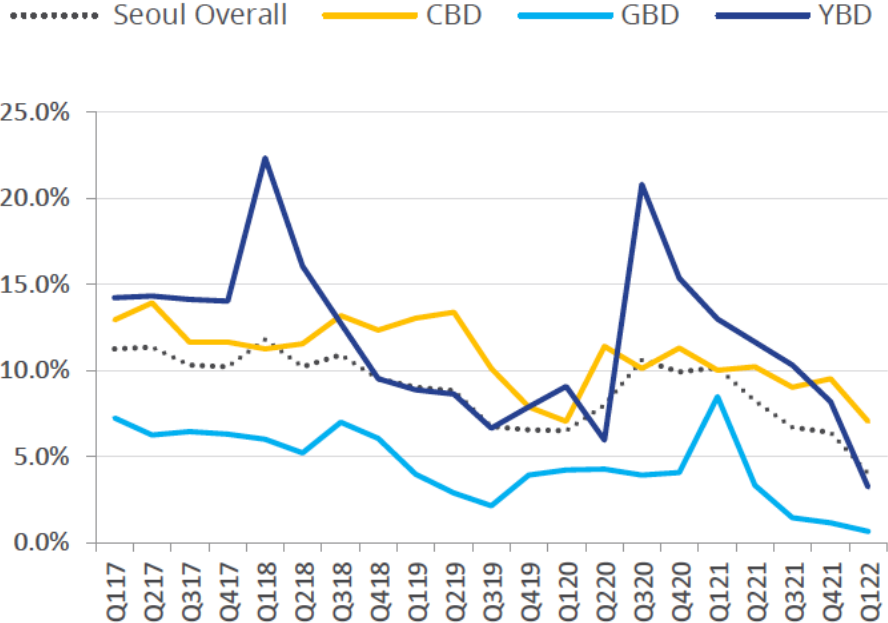


Fig 8. Business districts in Seoul

As seen on the map above, Seoul has three core business districts. The CBD, short for the Central Business District, is located in the historic district of Seoul and is the oldest business district with high density of corporate headquarters and international embassies. YBD, short for

the Yeouido Business District, is a finance hub that houses the Korea Stock Exchange as well as Korea’s major investment banking, asset management, as well as securities firms. It is often referred to as the Wall Street of South Korea. The GBD, short for the Gangnam Business District, has a high density of IT and media companies.



Source: Colliers

Fig 9. 2022 Q1 Grade A Office Building Vacancy Rates in Seoul (illustration credit: Colliers)

Based on Seoul’s office market report published by Colliers, the overall vacancy of Seoul’s Grade A Office market fell to 4% for the first quarter of 2022, which is even lower than the general vacancy rate before the global pandemic of COVID-19.⁴ In particular, the GBD area hit a record low of 0.6% in vacancy, which is classified as “ultra low.” Rapid growth of IT companies is leading to a high demand for class-A offices in the GBD, which is spilling over to

⁴ Colliers, Quarterly Report | Seoul Office Market: Q1 2022

the other districts as well. There has been a 3.5% rent increase compared to the last quarter of 2021, and it is projected that increasing demand will be a long-term trend. While another batch of office supply is scheduled for the CBD area in 2026, it is expected that the demand for office space will continue at least until 2023. Overall, Seoul's current office market is landlord-favorable for the foreseeable future.

Co-Working Offices in Seoul

Co-Working market grew tremendously within the last five years in South Korea, from a 60 billion Korean Won market economy in 2017 to 770 billion Korean Won in 2022.

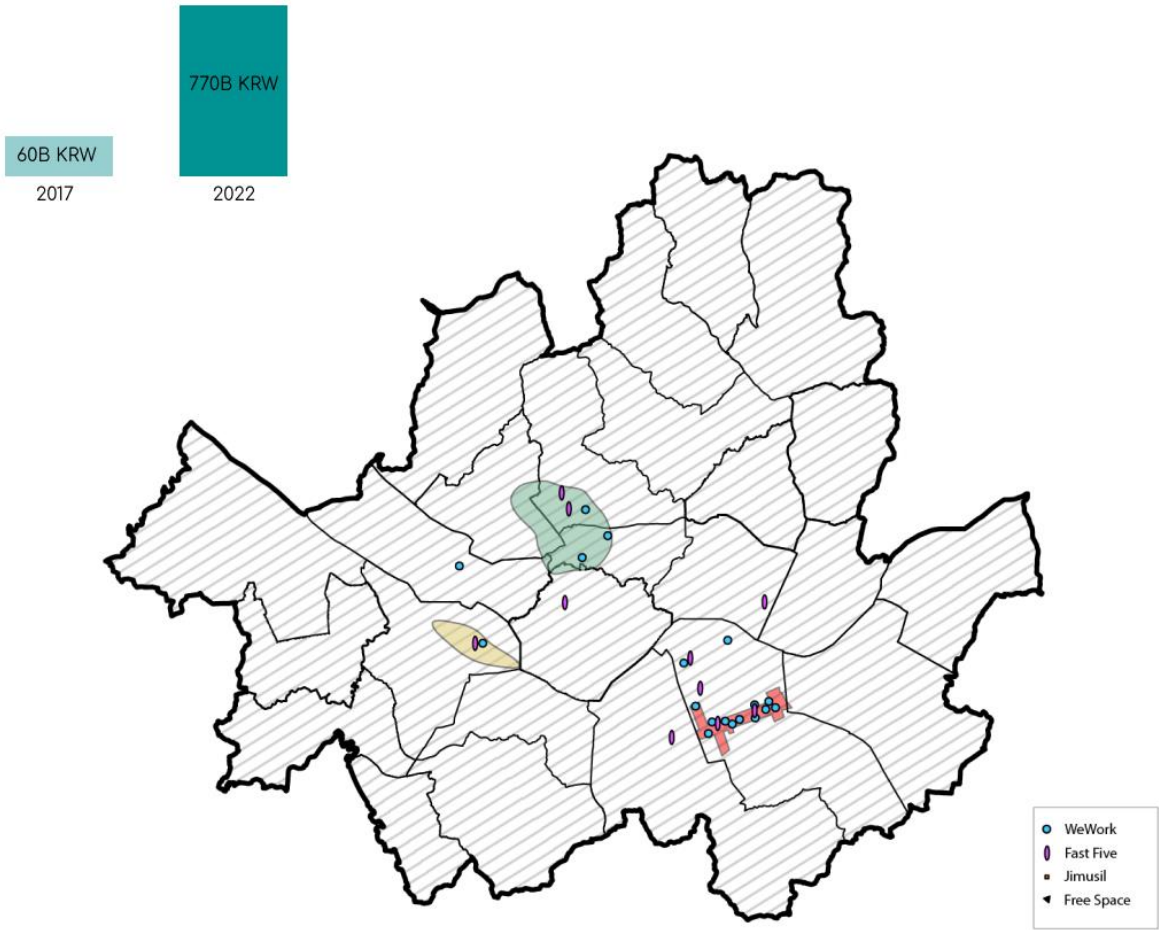


Fig 10. Co-working office growth and locations

A location analysis of the most prominent co-working companies like WeWork and Fast Five shows that they are indeed centered around the three business districts. The map shows that the GBD area has a particularly high concentration of co-working offices.

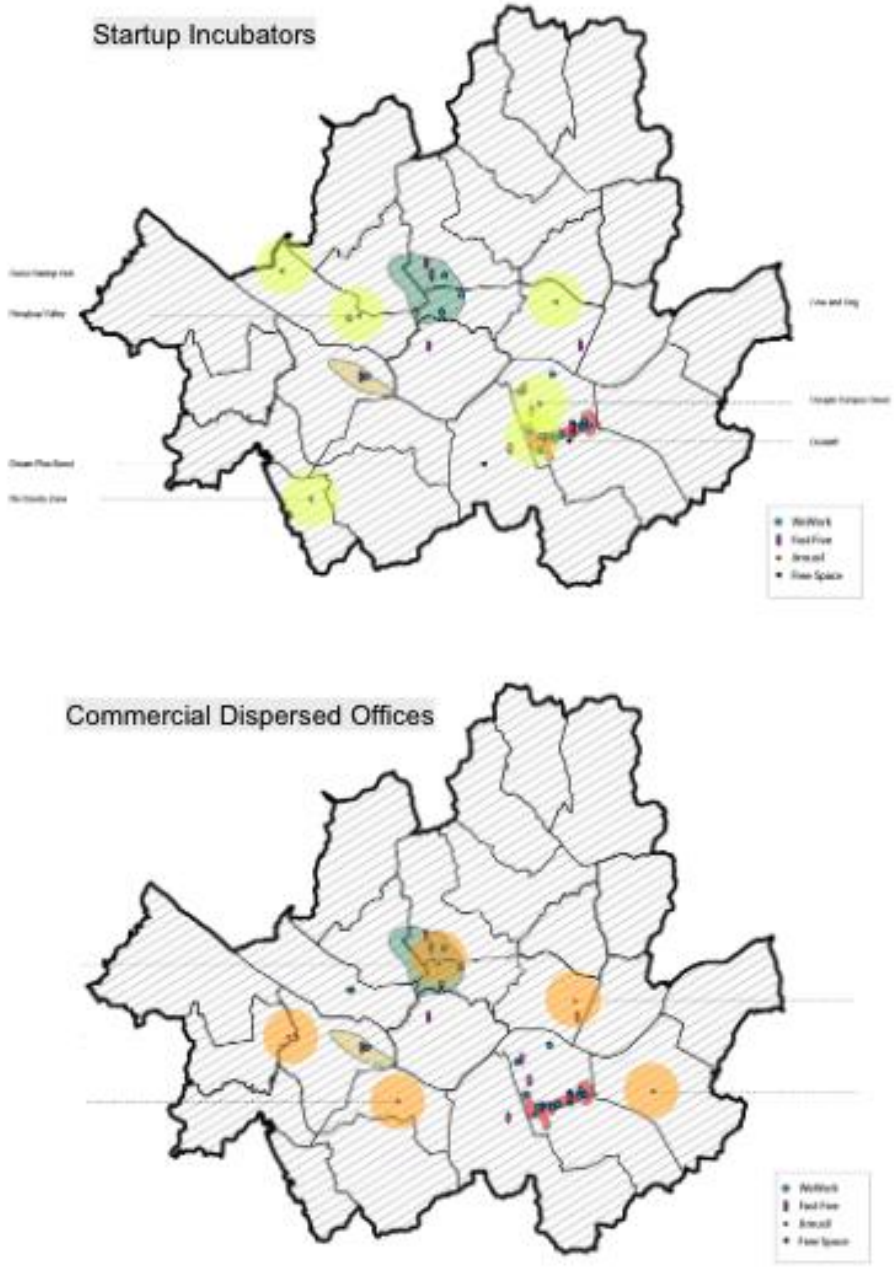


Fig 11. Start-up incubators and commercial dispersed office locations in Seoul

However, analyses of start-up incubators and commercially dispersed offices such as Jibmusil tell a slightly different story. New kinds of shared offices are starting to appear in less centralized areas, which could be seen as responding to a popular demand for remote and hybrid working environment brought on and precipitated by the COVID-19 pandemic. Prominent start-up incubators and accelerators are also beginning to branch out from the usual GBD location, and are starting to look towards Western part of Seoul near Hongdae and Seongsu as their new nesting ground.

The strategy of office dispersion away from the city center also similar roots with companies that are taking decisions to eradicate their physical offices entirely. For example, all the employees for a Korean proptech unicorn called Zig Bang now work on the company's own metaverse platform called the Metapolis. While its corporate headquarter was located in the GBD district, as of July 2021 the company removed its physical headquarter to turn every employee into remote working via its own metaverse platform called the Metapolis. Instead, the company opened 50 dispersed offices throughout the Seoul Metropolitan Area to provide alternative working spaces for the employees. This new office strategy also presents a new paradigm to the shift away from the traditional HQ model based in a business district. Such example speaks about the real and imminent move away from the business centers.

1-iv) Traffic Congestion Costs in Seoul

This project also addresses one of Seoul's chronic problems, which is its high commuting costs. Seoul is a megacity with just under 10 million inhabitants in the main city and 25 million in the wider metropolitan area. According to the Open Data Plaza run by Seoul City Hall, the average one-way commute time for Seoul is 53 minutes, 44.7 minutes for people commuting within Seoul, and 72.1 minutes for people commuting from outside of Seoul.⁵ This leads to social costs that include time costs and pollution costs, not withstanding transportation costs.

Commute time is one of the factors that contribute to the high traffic congestions costs of Seoul. According to a study published by the Korea Transport Institute (KOTI), Traffic Congestion Cost is defined as social costs that are incurred due to increase in traffic demand, along with environmental pollution costs and traffic accident costs. Traffic congestion cost is calculated as the sum of vehicle operation cost and time value cost. Vehicle operating costs include fixed costs such as labor costs, depreciation costs, insurance premium, taxes, and public charges as well as variable costs such as fuel consumption costs, maintenance costs, and engine oil replacement costs. Time value cost is determined according to the vehicle type and purpose of the travel. According to KOTI, the cost of traffic congestion continues to increase every year, and has a significant impact on South Korea's national economic activity, taking up 3.57% of the national GDP in 2018.⁶ Congestion costs amounted to 55.68 trillion won in 2016, and rose to 59.62 trillion won in 2017. The figure increased to 67.6 trillion won in 2018, accounting for 3.2 to 3.5% of the national GDP. Among all the provinces, Seoul Metropolitan City has the highest traffic congestion cost per kilometer at 4.71 billion won/km, which compares to the national

⁵ Seoul Open Data Portal, What is Seoul's Mobile Population?

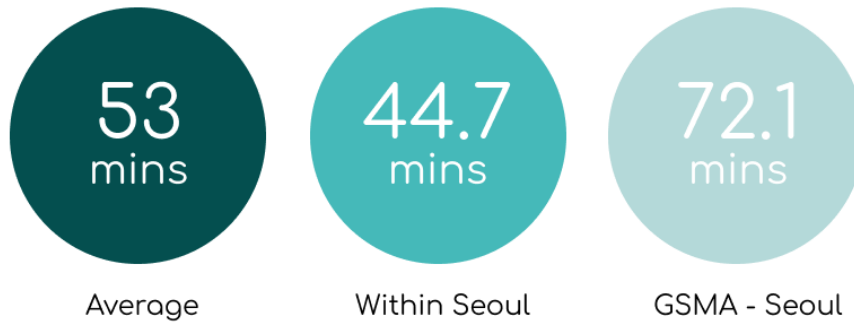
⁶ E-Country Indicators, Road Traffic Congestion Cost

average of 660 million won/km. This sheds light on how much congestion costs Seoul is both producing and suffering from at the same time.

Another significant finding by KOTI is that time costs alone accounted for 53.1 trillion won, or 78% of the total traffic congestion costs. In 2018, there was a 7% increase in traffic congestion cost for cars and 6% increase for buses and trucks. As seen from this data, time cost is the most pressing issue to be addressed among the factors that contribute to traffic congestions cost.

Commute Time

According to the Open Data Plaza run by Seoul City, the daily average of mobile population in Seoul amounts to 16,300,000 people. Mobile population is tracked based on any movement that causes administrative demand, such as commuting, school, shopping, and leisure that requires moving within Seoul or to and from outside of Seoul.



- The average commute time for Seoul amounts to 53 minutes / day, for one-way travel
- The figure is even bigger for people commuting from outside of Seoul, averaging 72.1 minutes / day

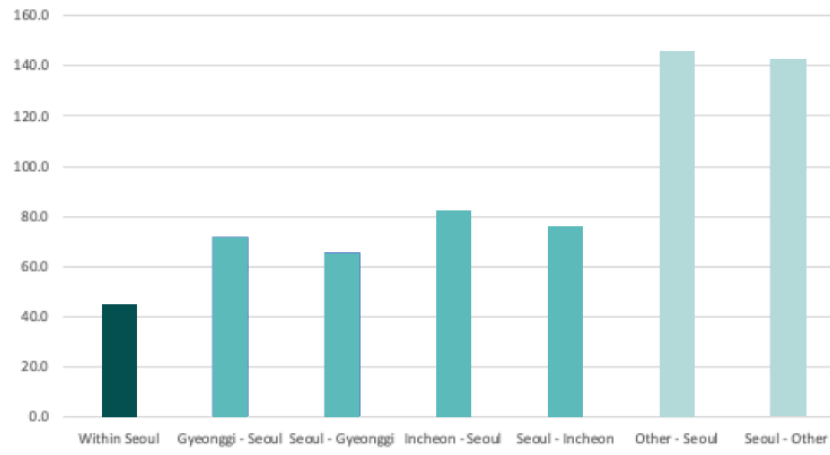


Fig 12. One-way commute time statistics in Seoul (data source: Seoul Open Data Portal)

Based on the same data source, the average commute time for people commuting to and from Seoul is 53 minutes. For people commuting within Seoul it is 44.7 minutes, and 72.1 minutes for people commuting from the Greater Seoul Metropolitan Area to Seoul, and 65.4 minutes for people commuting from Seoul to the Greater Seoul Metropolitan Area.⁷

Among the 426 administrative donges within Seoul, the dong, or neighborhood, with the longest average commute time is Goduk 2-dong located in Gangdong-gu with an average of 58 minutes,

⁷ Seoul Open Data Portal, What is Seoul's Mobile Population?

whereas the dong with the shortest average commute time is Yeoksam 1-dong located in Gangnam-gu with an average of 36 minutes. The same data source also reveals that the average daily commute has decreased to 18,670,000 cases, which is 18% lower compared to pre-COVID 19 figure of 22,750,000.⁸

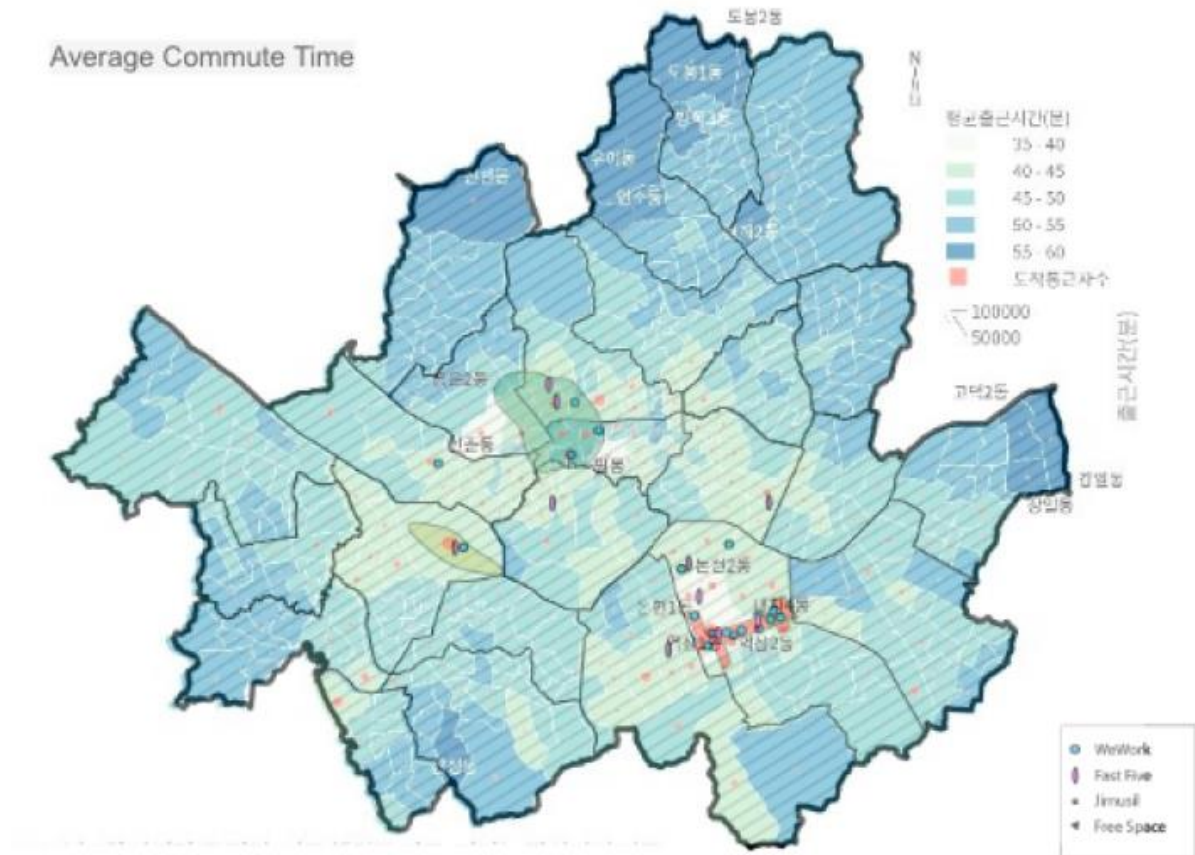


Fig 13. Average commute time in Seoul (illustration credit: Seoul Open Data Portal)

⁸ibid

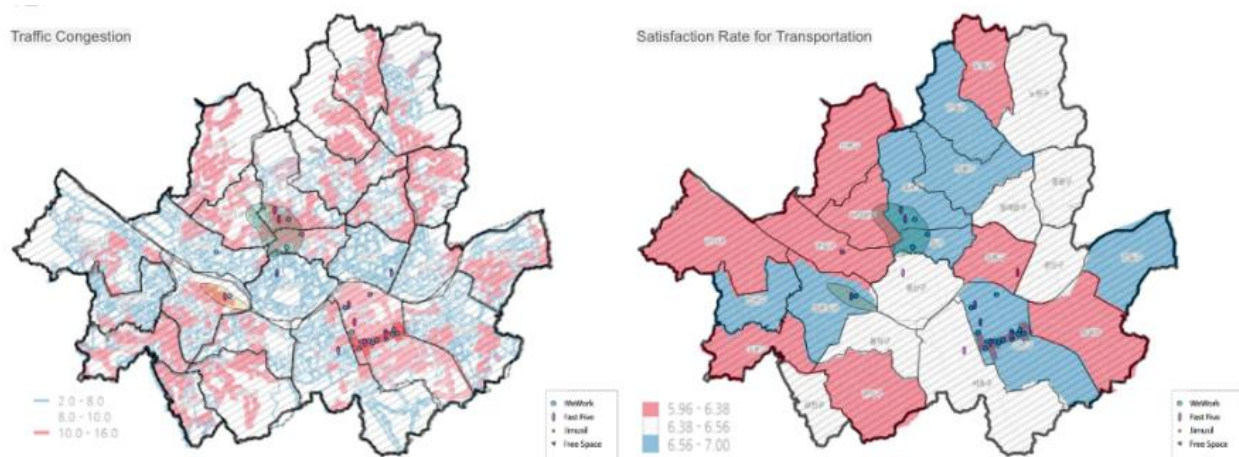


Fig 14. Traffic congestion (left) and transportation satisfaction in Seoul by district (illustration credit: Ji Young Park, Analysis of Analysis of Traffic Environment and Satisfaction in Seoul through Structured and Unstructured Traffic Data)

The bigger map on the top shows areas with longest commute time, while the maps below each shows traffic congestion and transport satisfaction of each region. Together, these data can be used to construe which areas of Seoul suffer the most from traffic congestion costs as well as lack of adequate transportation infrastructure. In particular, studies by Ji Young Park on the two lower maps⁹ show that areas with traffic congestion does not necessarily correlate with transportation satisfaction level. Together with commute time, these elements are used to determine priority in area selection for this project, which will be further discussed in the next chapter.

⁹ Ji Young Park, Analysis of Traffic Environment and Satisfaction in Seoul through Structured and Unstructured Traffic Data

1-v) Seoul: Public Infrastructure

Among Seoul’s public infrastructure, there are two types of spaces that could provide tangible answers to the city’s high demand for office space, trends in office dispersion, as well as high commuting costs.

This opportunity also coincides with the city’s initiative to promote its own metaverse platform for administrative work. In November of 2021 the Seoul Metropolitan Government established a comprehensive five-year plan to build its own metaverse platform, which includes a metaverse administrative platform called the Metaverse 120 Center. The government is planning to move a variety of interactive public services to the metaverse, and expect the platform to provide additional services in tax consulting and various local affairs by year 2026.¹⁰

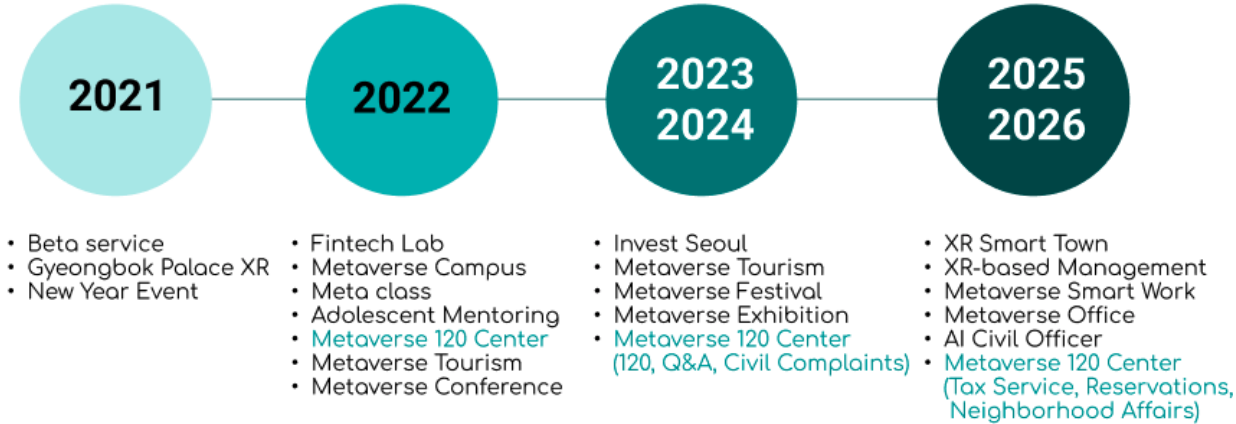


Fig 15. Timeline for Metaverse Seoul Basic Plan '22-'26 (data source: Seoul Metropolitan Government)

Introduction of the metaverse platform is seen as a long-term planning of the city to build a sustainable administrative infrastructure that will provide a resilient services even when the

¹⁰ Seoul Metropolitan Government, “Metaverse Seoul Basic Plan ('22-'26)”

number of public officials decrease with the dwindling birth rate of South Korea. For reference, the national fertility rate hit 0.81 in 2021, which decreased from 0.84 in 2020.¹¹

This governmental move to the metaverse will particularly impact welfare and administrative centers, which exist at every smallest administrative district in Seoul. There are 417 welfare and administrative centers in Seoul, which are strategically located in close proximity to public transport for accessibility reasons.

Another venue that has high potential for alternative use is the post office. There are 408 post offices in Seoul, as well as ten high-rise Class-A office buildings that are owned by Korea Postal Services.

Welfare and Administrative Center

Both the welfare and administrative centers and post offices will have increasingly available space with the governmental move to the metaverse and accelerating digitization.

As for the welfare and administrative center, increasing application of the city's new metaverse platform will enable most of its services to relocate online. Currently, welfare and administrative centers offer comprehensive social services to local population in areas of social welfare, various ID registrations, certificate services, tax services, election preparation, civil defense education, as well as education administration for elementary school students. Except for social welfare and registration services that require high level of in-person interaction, the other services possess high potentials of being relocated to the metaverse. The South Korean government has been running an online administrative website called gov.kr. While the primary function of the website is to issue various certificates and documents, it has also expanded to include other

¹¹ Korea Statistics, Total Fertility Rate

benefits such as education and counseling services for domestic and foreign nationals residing in Korea. The new metaverse platform will enhance the interactive nature of such existing online infrastructure, and will not severely deter quality of services that are normally offered at the welfare and administrative center.

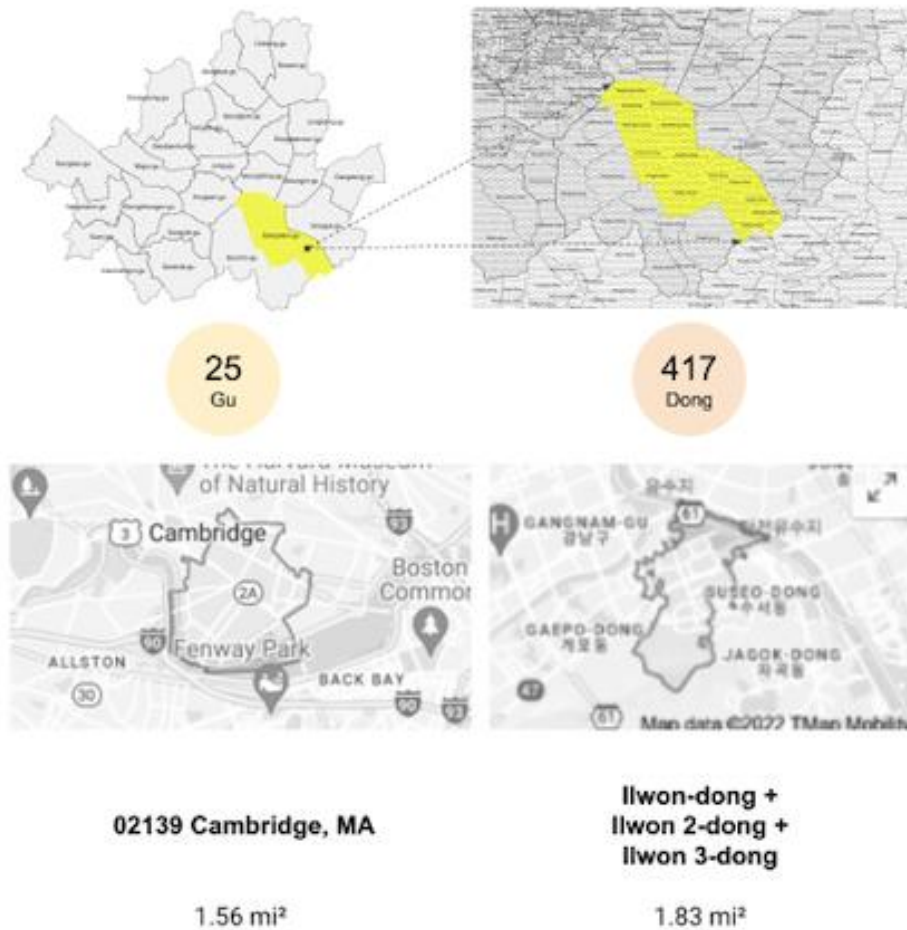


Fig 16 (above). Seoul’s administrative districts
 Fig 17 (below). Google map showing zip code 02139 in the U.S.A and three administrative dong in Seoul

Moreover, The fact that the welfare and administrative center exists at every smallest administrative district in Seoul also presents an opportunity to tailor each center for the needs of the local demographics.

The Seoul City has 25 *gu*, which is subsequently broken down into *dong*, comprising 417 dongs in total. The graphic above illustrates the minute scale of a *dong*, which is the smallest administrative district of Seoul. A comparison with a U.S. zip code can be used to fathom its size. For example, zip code 02139 in Cambridge, measures 1.56 square miles. In Seoul, this would correlate to a combination of roughly three adjacent dongs. Ilwon-dong, Ilwon 2-dong, and Ilwon 3-dong together would add up to 1.83 square miles. While each county and zip code will vary in size, this comparison shows the granularity of the administrative dong in Seoul, and its potential in meeting local needs of each neighborhood with more precision.

Post Office

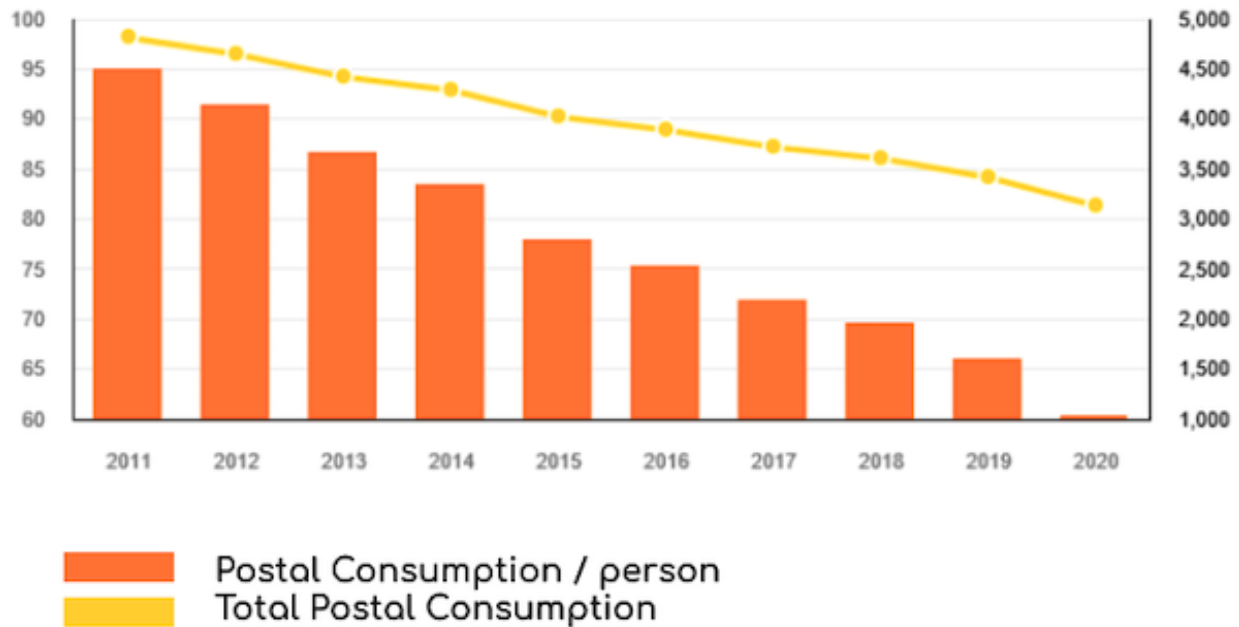


Fig 18. South Korea's postal consumption by person (illustration credit: E-Country Indicator)

Post offices also possess high potential for alternative use. The biggest reason for this potential is the decreasing the postal consumption every year. A data by Statistics Korea shows that individual postal consumption per person has decreased from 91.3 uses per year in 2011 to 60.3 in 2022. Similarly, total postal consumption has decreased from 4651 in 2012 to 3124 in 2020.¹² South Korea is a country with lighter postal consumption, according to the statistics published by Union Postal Universal in 2018. Compared to other OECD countries South Korea shows less than 50% consumption rate for postal services.

¹² E-Country Indicator, Postal Consumption per person.

	South Korea	Japan	U.S.A.	United Kingdom	France	Germany
Domestic Postal Consumption per person	64.8	131.6	448.0	201.3	151.3	216.5
Domestic Postal Consumption (unit: billions)	33.2	167.4	1464.0	134.0	98.7	178.2
Population (unit: thousands)	51160	127190	326770	66570	65230	82290

Fig 19. Postal consumption per person by country (data source: UPU Postal Statistics 2018)

Statistics Korea analyzes this phenomena as having two roots: First, South Koreans do not use postal services in producing records of financial transactions between individuals, or writing cheques. Second, with advanced IT technology, South Korea is more familiar with using alternatives to postal services such as e-mail, e-billing, and SMS (Short Message Service).¹³ This trend is only projected to intensify with further digitization and a shift away from physical postal services.

In fact, the number of post office itself has been decreasing every year as well. There were 3,650 post offices in 2010 yet the number fell to 3,405 in 2020.¹⁴ This correlates with decreasing postal consumption. It is expected that this trend will continue unless newly idle space is put to another use.

¹³ Ibid.

¹⁴ Korea Statistics, Distribution of Post Offices by Year

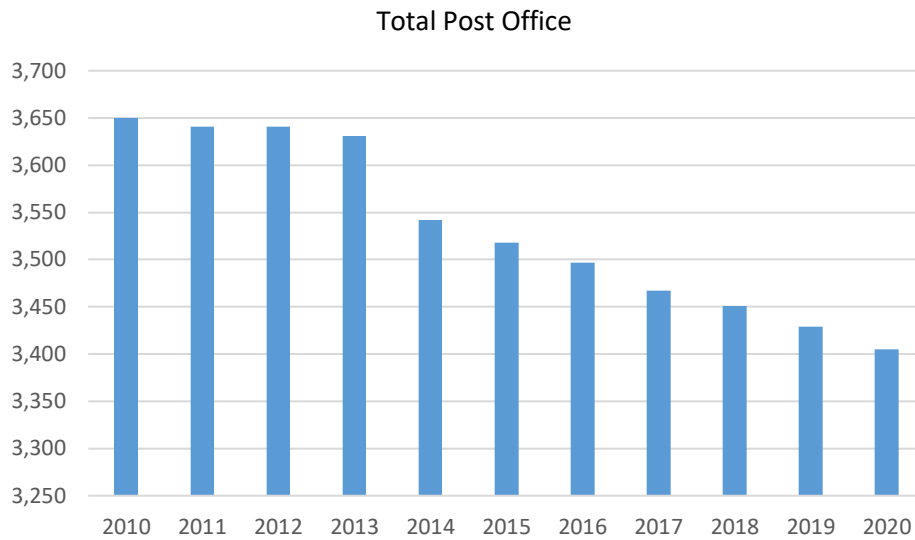


Fig 20. Number of post offices in South Korea (data source: Statistics Korea)

In light of such societal shift, it would be beneficial to consider alternative uses for the space that Korea Post possesses. In fact, an act on special cases concerning postal service operation (abbreviated Postal Service Act) was passed to allow using property of postal services to sublease the space to a third party in exchange of profit.¹⁵ More specifically, Article 22-2 of the special act states: The Minister of Science, ICT and Future Planning shall, when granting permission for the use or profit of postal property prescribed by Presidential Decree or lending it in accordance with the permit or loan, a user fee or loan fee may be collected accordingly. The amendment to the previous law reflects the demand for expanding rental market for sub-lease contracts that are used to host shared offices and shared kitchens. This law will allow the general public to lease ten high-rise buildings owned by Korea Post in central Seoul for extended purposes that include shared office.

¹⁵ Korea Law Information Center, An Act on Special Cases on Postal Service Operation

CHAPTER 2

LOGISTICS

2-i) Project Phasing

Analyzing transport satisfaction scores¹⁶ and average commute time¹⁷ for the 25 administrative

Gu (Kr)	Gu (Eng)	Transport Satisfaction	TS score	Average Commute Time	CT Score	SUM
도봉구	Dobong	5.87	1	40.5	1	2
구로구	Kuro	5.85	1	38	1	2
중구	Jung	6.07	2	39.3	1	3
용산구	Yongsan	5.75	1	35	2	3
중랑구	Jungrang	5.75	1	36.7	2	3
은평구	Eunpyeong	6.05	2	38.8	1	3
강서구	Gangseo	6.01	2	37.7	1	3
동작구	Dongjak	6.18	2	37.5	1	3
송파구	Songpa	6.03	2	38.1	1	3
강동구	Gangdong	6.23	2	38.1	1	3
종로구	Jongro	6.26	2	35.3	2	4
성동구	Seongdong	5.99	1	34.2	3	4
광진구	Gwangjin	6.24	2	35.1	2	4
동대문구	Dongdaemun	5.92	1	33.3	3	4
성북구	Seongbuk	6.44	3	39.2	1	4
강북구	Gangbuk	6.5	3	42.3	1	4
노원구	Nowon	6.33	3	41.6	1	4
서대문구	Seodaemun	5.7	1	33.5	3	4
마포구	Mapo	5.84	1	34.1	3	4
양천구	Yangcheon	6.72	3	42.8	1	4
금천구	Keumcheon	6.4	3	38.2	1	4
영등포구	Yeongdeungpo	6.49	3	39.8	1	4
관악구	Gwanak	6.26	2	36.6	2	4
서초구	Seocho	6.56	3	33.5	3	6
강남구	Gangnam	6.49	3	34.8	3	6

min 5.7 33.3
max 6.72 42.8
avg 6.1572 37.36

Fig 21. Transport satisfaction and average commute time by district
(data source: Seoul Open Data Portal)

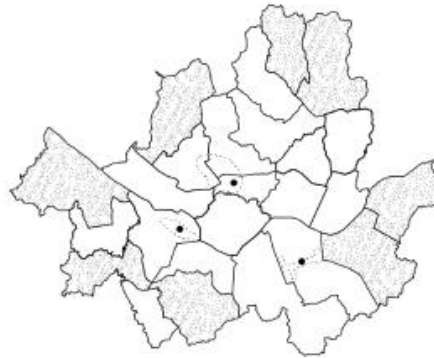
¹⁶ Seoul Open Data Portal, Seoul City Traffic Satisfaction Statistics, last updated April 12, 2022

¹⁷ Seoul Open Data Portal, Seoul City Commute Time Statistics, last updated April 12, 2022

“gu” in Seoul, this thesis identifies and categorizes all the gu in Seoul City into three groups according to regions with high priority for office space demand.

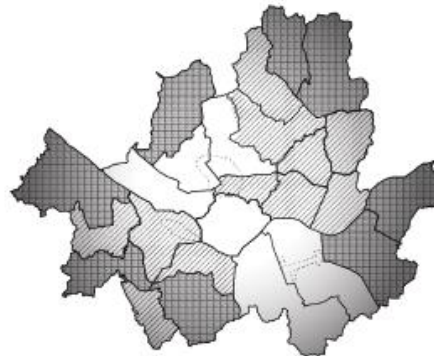
Phase 1

- Beta test in high priority regions
- Co-Working Offices in three core business districts



Phase 2

- Addition / densification in high priority regions
- Beta test in medium priority regions



Phase 3

- Expansion to low priority regions

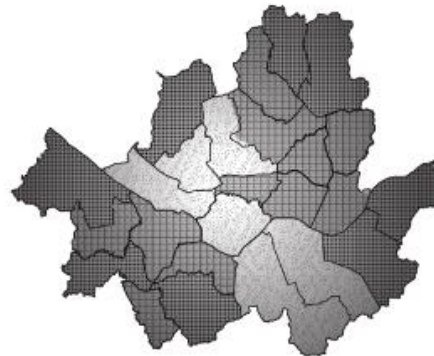


Fig 22. Project Phasing diagram

Phase 1	Phase 2	Phase 3
<i>High Priority</i>		<i>Low Priority</i>
Dobong	Keumcheon	Jongro
Kuro	Jungrang	Seocho
Eunpyeong	Dongjak	Gangnam
Gangseo	Seongdong	Mapo
Songpa	Dongdaemun	Yongsan
Gangdong	Yeongdeungpo	Seongbuk
Nowon	Gangbuk	Seodaemun
Gwanak	Jung	

Fig 23. Categorization of Seoul's district according to project priority

Based on the three categories, phase 1 of the project would engage first with high priority regions with low transportation satisfaction and high commute time such as Dobong-gu and Gangdong-gu. The primary intention is to alleviate office demands as well as high commuting costs of the geographically peripheral regions of Seoul City. At the same time, phase 1 of the project will implement three co-working offices in each of the CBD, YBD, and GBD business district. These larger-scale offices in densely populated city center will offer alternative working environment for day time workers in the area as well single family households who reside near the city centers.

Subsequently, phase 2 would add project density to the areas serviced in phase 1, while starting the service in medium priority regions such as Keumcheon-gu and Seongdong-gu. Despite the proximity to the CBD district, Jung-gu is included in phase 2 due to its low transport satisfaction cost, as well as its slightly above average average commute time.

Finally, phase 3 would follow with further densification as well as expand the project to low priority regions such as Gangnam-gu and Seocho-gu, which have excellent scores in terms of both transportation satisfaction and commute time.

2-ii) Site Selection Strategy

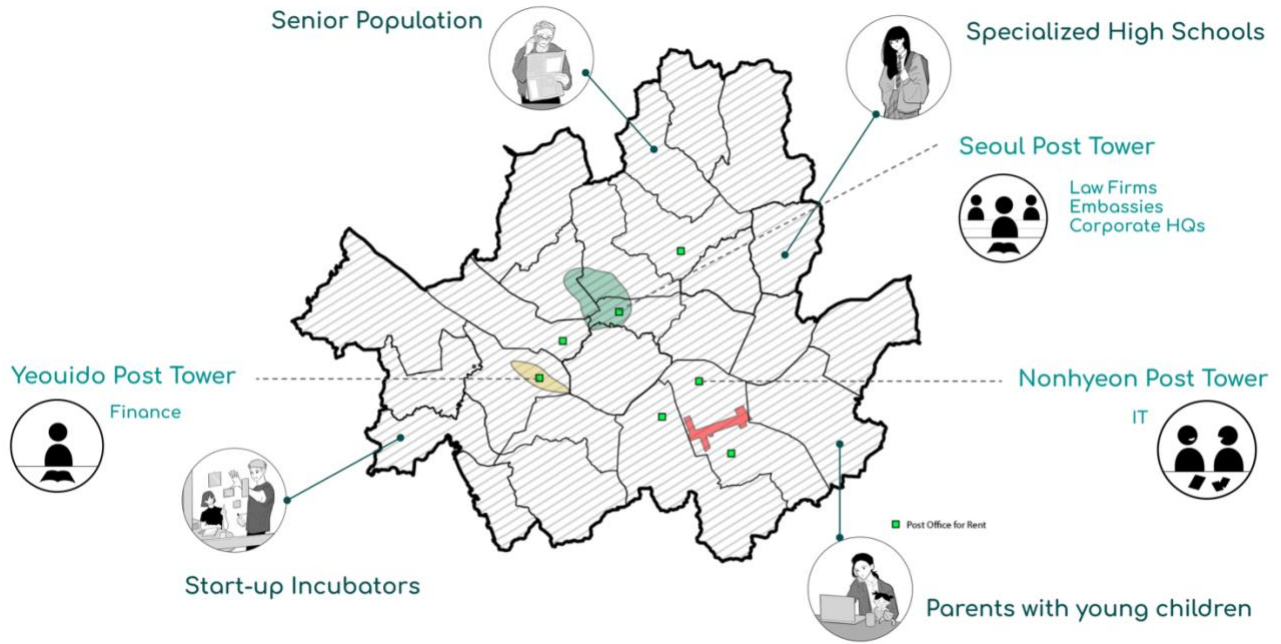


Fig 24. Site selection strategy

The project will employ two site selection strategies. Based on the project phasing mechanism discussed in the preceding section of this chapter, high priority regions will be selected based on transportation satisfaction score and average commute time. Within each region, welfare and administrative centers will be given the opportunity to respond to the highest and best use of its available space based on local demographics and needs. For example, there is an increasing move among newly married couples and young parents to relocate to the Southeastern part of Seoul for relatively inexpensive housing costs. In this case, the administrative centers that service matching demographics could provide childcare services besides functioning as flexible work spaces. On the other hand, the Southwestern part of Seoul has recently been attracting start

up incubators and accelerators that are relocating away from the GBD area, which is saturated in terms of office demand and rent. The administrative centers around such demographics could offer floorplans that are more in line with co-working offices to offer flexible meeting space for aspiring minds to meet and discuss their business plans.

Other branches of the project could also include healthcare services for local areas with high senior population, as well as study spaces for areas with a dense student population.

At the same time, the three business districts can utilize high-rise buildings owned by Korea Post to establish larger scale co-working spaces with a more conventional layout. The intention is to create office floorplans that will cater to the unique business sector of each district while offering flexible working places for densely populated urban area.

2-iii) Design Criteria

The aim of the project is to not only provide flexible working space, but also other social benefits that will make the newly imagined public infrastructure places people want to spend time in.

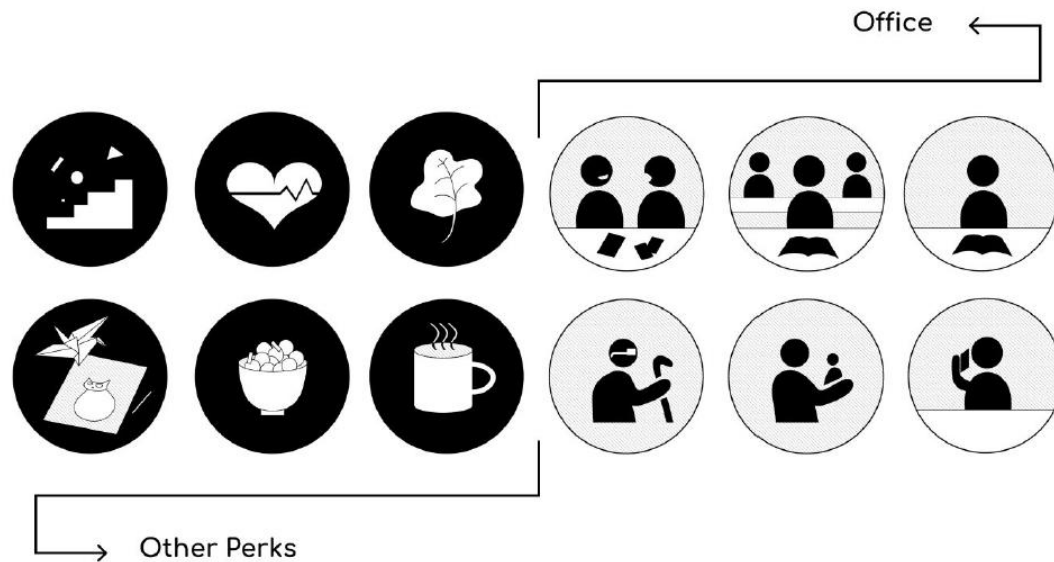


Fig 25. Design typology icons

The design typologies in subsequent pages are established to identify needs that are strongest in a given region, and to provide spatial typologies that will offer added amenities, or “perks,” according to that need. Besides providing different kinds of office spaces that have varying degrees of privacy and openness, various amenity spaces will create transform public infrastructure into place locals would want to spend time in.

User Typologies







Typology Icon	Space	Description
	<p>Private Quiet Space</p>	<p>Private space ideal for activities that require high concentration</p>
	<p>Private Individual Space</p>	<p>Private space that allows conversations and interactive work via landline</p>
	<p>Shared Quiet Space</p>	<p>Open and shared, but quiet space ideal for studying and concentration</p>
	<p>Shared Open Space</p>	<p>Shared space ideal for discussion and in person meetings</p>
	<p>Childcare Services</p>	<p>Provide childcare services</p>
	<p>Senior Services</p>	<p>Provide senior services such as healthcare and senior lounge</p>

Fig 26. Office user typologies

Amenity Typologies







Typology Icon	Space	Description
	<p>Coffee Bar</p>	<p>Area for coffee breaks and social interaction</p>
	<p>Botanic Garden</p>	<p>Each location will have the option of adopting green interior strategies for positive psychological effects as well as added benefits like natural air purification</p>
	<p>Workout Area</p>	<p>Gym or yoga studio will offer remote working employees a chance to enhance their work-life balance</p>
	<p>Communal Kitchen</p>	<p>Communal kitchen could house various cooking classes as well as a venue to consume home-packed meals</p>
	<p>Craft Studio</p>	<p>Creative place that hosts various studio events</p>
	<p>Amphitheater</p>	<p>A public area where visitors can sit down to relax or to watch a live performance</p>

Fig 27. Amenity space typologies

2-iv) Design Catalog

The following catalog suggests convenient modules that can be utilized according to the spatial need of a particular location or place.

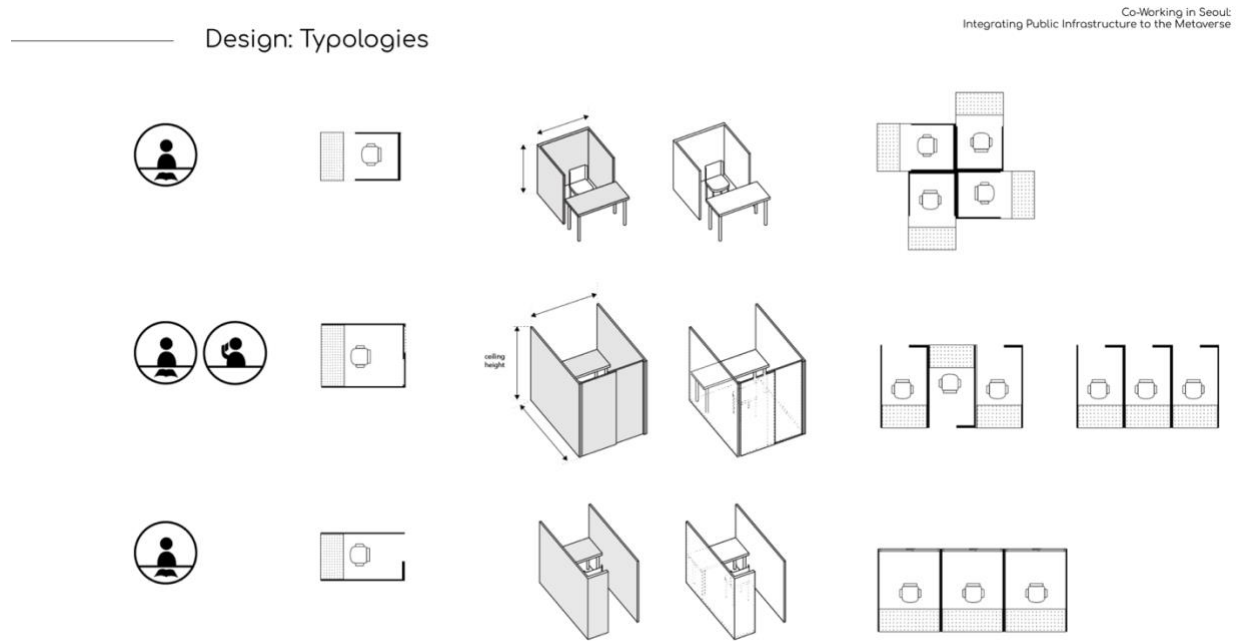


Fig 28. Design typologies for individual space

Since one of the main pillars of the project is providing alternative remote working space, it is of paramount importance to provide a comfortable and efficient working environment that will enable the user to focus. However, each individual may have different preferences for work environment. The modules above suggest three types of desks that offer varying degrees of privacy. The module on the top offers a private desk that is still open, while the module in the middle offers a completely private area for maximum concentration and private conversations. The module on the bottom offers a mediated experience with a semi-open partition.

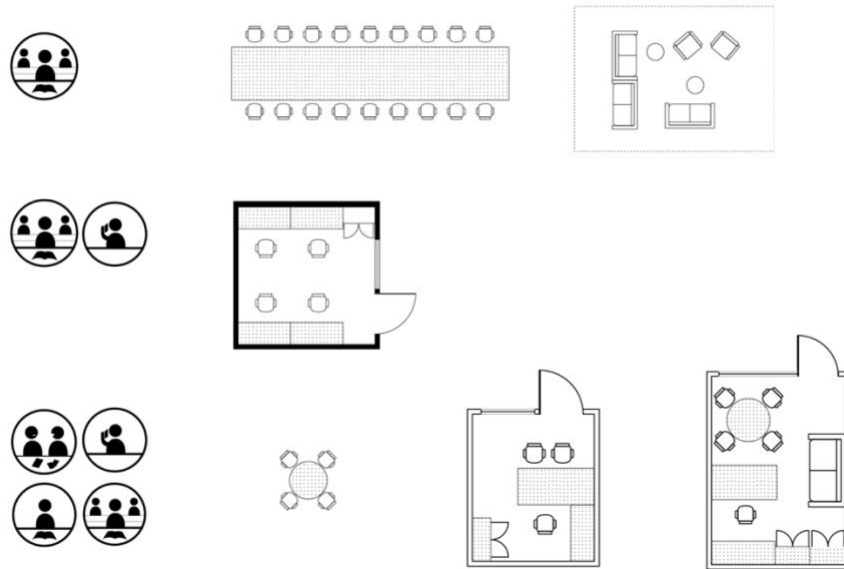


Fig 29. Design typologies for shared work space

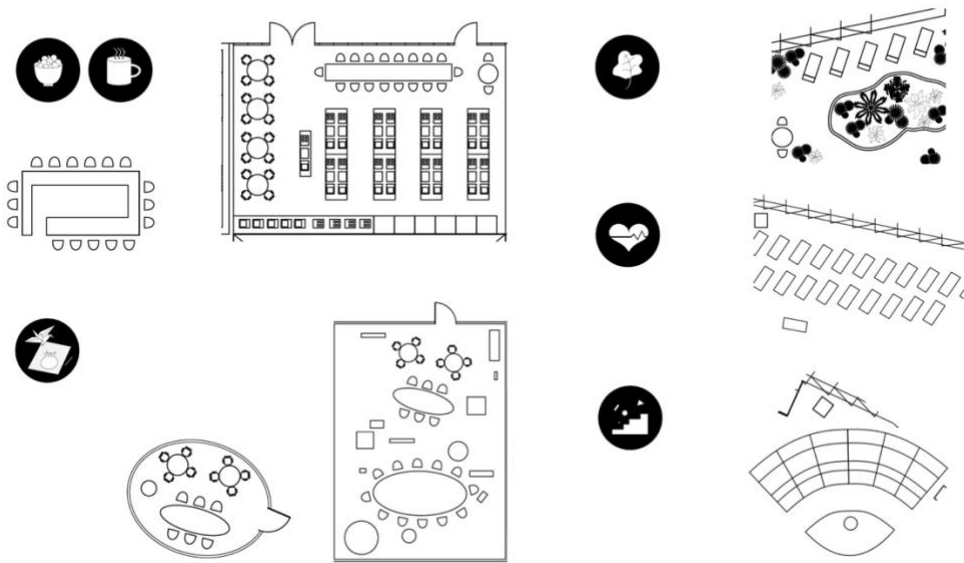


Fig 30. Design typologies for shared amenity spaces

Various group seating arrangements are included in the glossary to offer options for each location and their primary users. Large library-style communal desks and lounge areas are suitable for a flexible style of interaction and work. Closed offices with various seating arrangements respond to different needs of the users depending on their activity and work types. The glossary of available office spaces and amenities offer go-to typologies that can quickly and efficiently respond to the demands of each project location. While the detailed layout and parameter of the space will have to be adjusted to make efficient use out of each given space, the modular nature of the office seating arrangements and the loose geometry that govern the typology of amenity spaces will offer solid placemaking strategies while leaving room for spatial adjustments.

CHAPTER 3

DESIGN

This chapter will introduce three examples that illustrate how existing public infrastructure can be utilized for alternative uses. For this purpose, Sangil 2-dong Welfare and Administrative Center’s floorplan is reimagined in three scenarios with different local demands, while a floor on Seoul Post Tower and Yeouido Post Tower are reorganized as co-working space, each with a different spatial strategy that aims to serve the main sectorial interest of the area.

3-i) Sangil 2-dong Welfare and Administrative Center

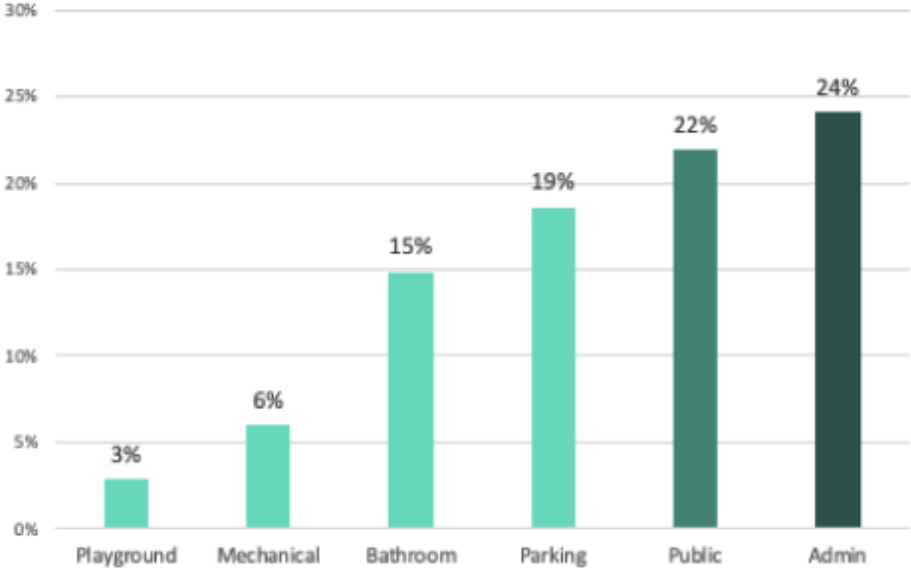


Fig 31. Spatial usage of a welfare and administrative center

Typically, a welfare and administrative center has 22% publicly oriented space and 24% administrative space. While every center would have a different public to administrative space ratio and different program needs, this section of the project assumes that both the public and administrative spaces, apart from service areas such as mechanical, bathroom, parking and circulation spaces can be altered.

The following image is a prospective floorplan for the second floor of the welfare and administrative center in Sangil 2- dong, located in Gandong-gu. The graphic below is a second floor floorplan of the center, which has been adapted from a drawing authored by JooArchitects. For reference, the original design by JooArchitects was selected by Seoul City design competition in December of 2021, and is expected to be constructed by early 2024.

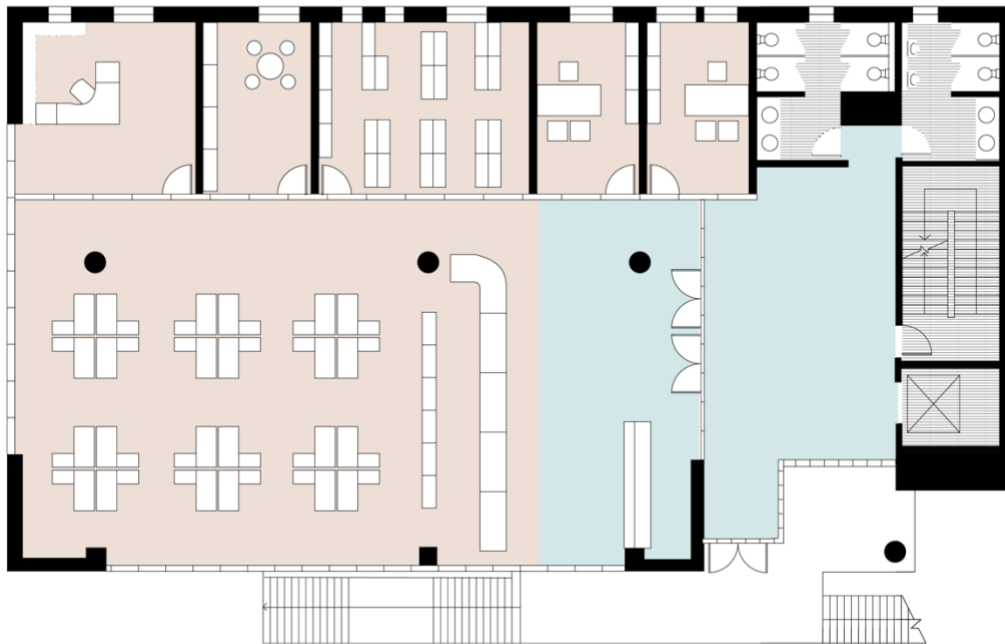


Fig. 32 Existing second floor plan for Sangil 2-dong's Welfare and Administrative Center (design source: Original design by JooArchitects, published by Seoul Metropolitan Government)

As seen in the lower left corner of the plan, a significant portion of the space of the floor is dedicated to administrative work. The area indicated in pale blue refers to public space, but it is more or less a temporary space rather than a space that the public can actually utilize. The upper portions of the map are also dedicated to administrative spaces like the executive room and file storage. While two rooms in the center upper corner are allocated for healthcare consulting, they

are closed areas in which private interactions can happen, yet do not offer suitable environment for housing large number of public for various purposes. With the development of Metaverse 120 center, as for all the welfare and administrative centers in Seoul, this plan will eventually face an option to adopt changes.

Considering the plan as a prototype of a current welfare and administrative center, the plan can be organized according to different hypothetical scenarios in which it is placed in neighborhoods with different needs. The original plan for the center can be reorganized to provide spaces that would fit the highest and best use of each particular neighborhood. For the following maps, the pink areas correspond to new administrative space while the blue areas correspond to public programs. It is to be noted that the floorplan that caters to senior population has a larger administrative presence compared to the other two. On the other hand, the floorplan that serves for mainly co-working purposes have minimal administrative presence.

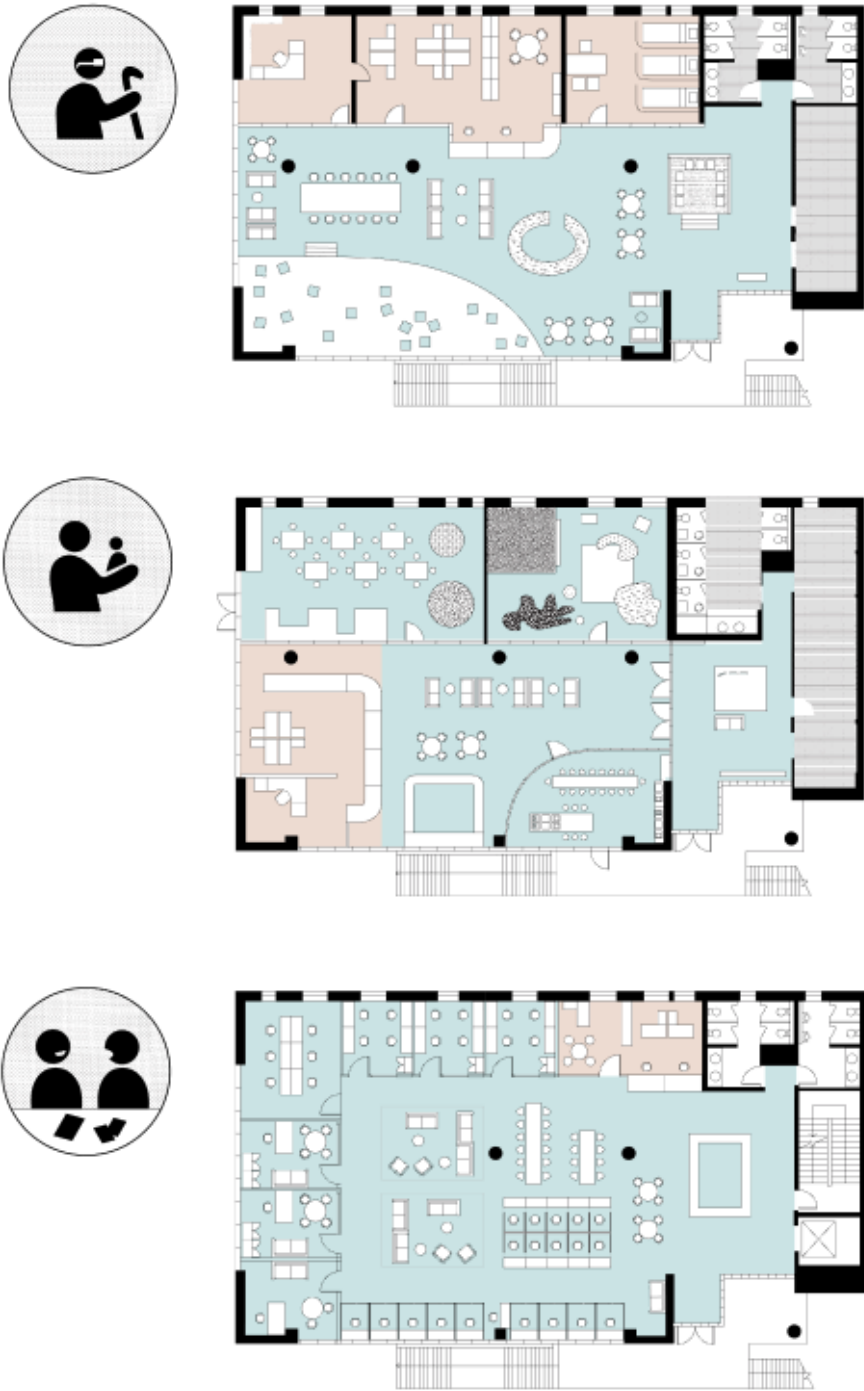


Fig. 33 Alternative floorplans for potential users

Scenario 1: Senior Care

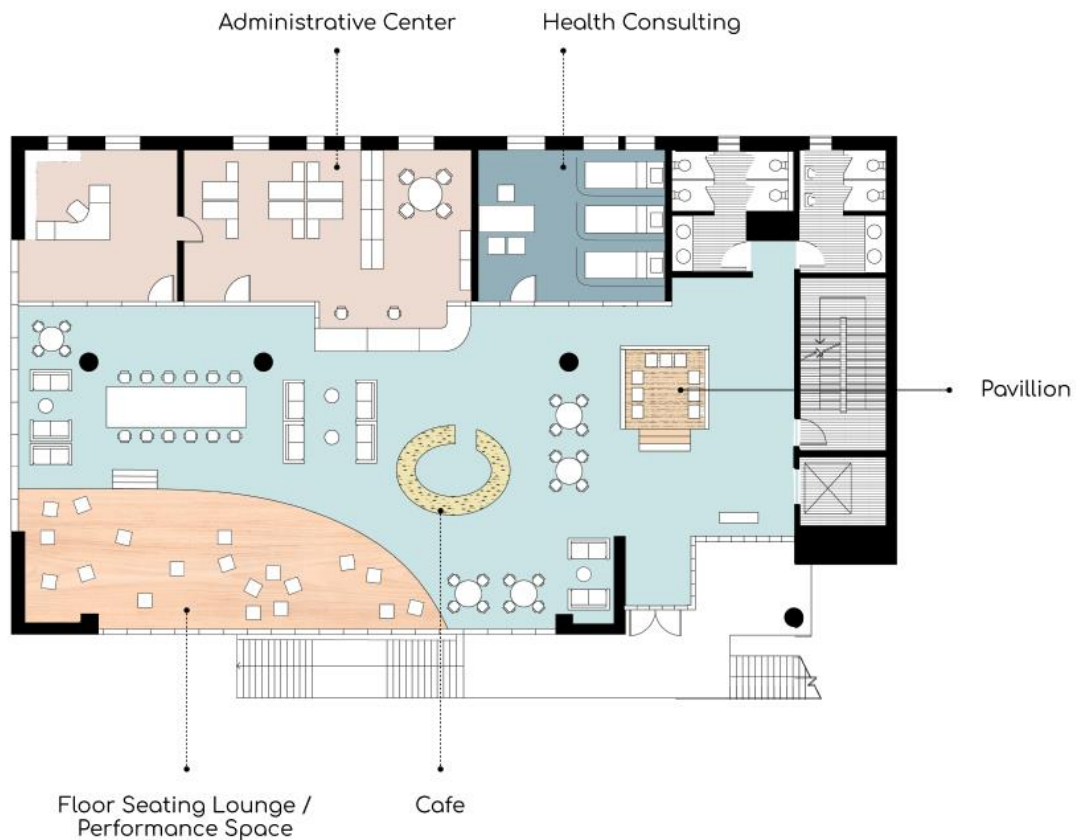


Fig. 34 Alternative design for enhanced element of senior care

For a neighborhood with dense senior population, a new layout could still include the administrative center as one of its major programs, since the senior population would be more used to the traditional in-person administrative service. At the same time, more public space could be dedicated to programs like health consulting, cafe, various types of lounge and seating arrangement as well as performance space. Senior center, pronounced *No In Jeong* in Korean, is a cultural space where senior citizens can gather to socialize. The particular floorplan borrows elements of the typical *No In Jeong*, with Korean seating arrangements in the form of floor seating area.

Scenario 2: Childcare

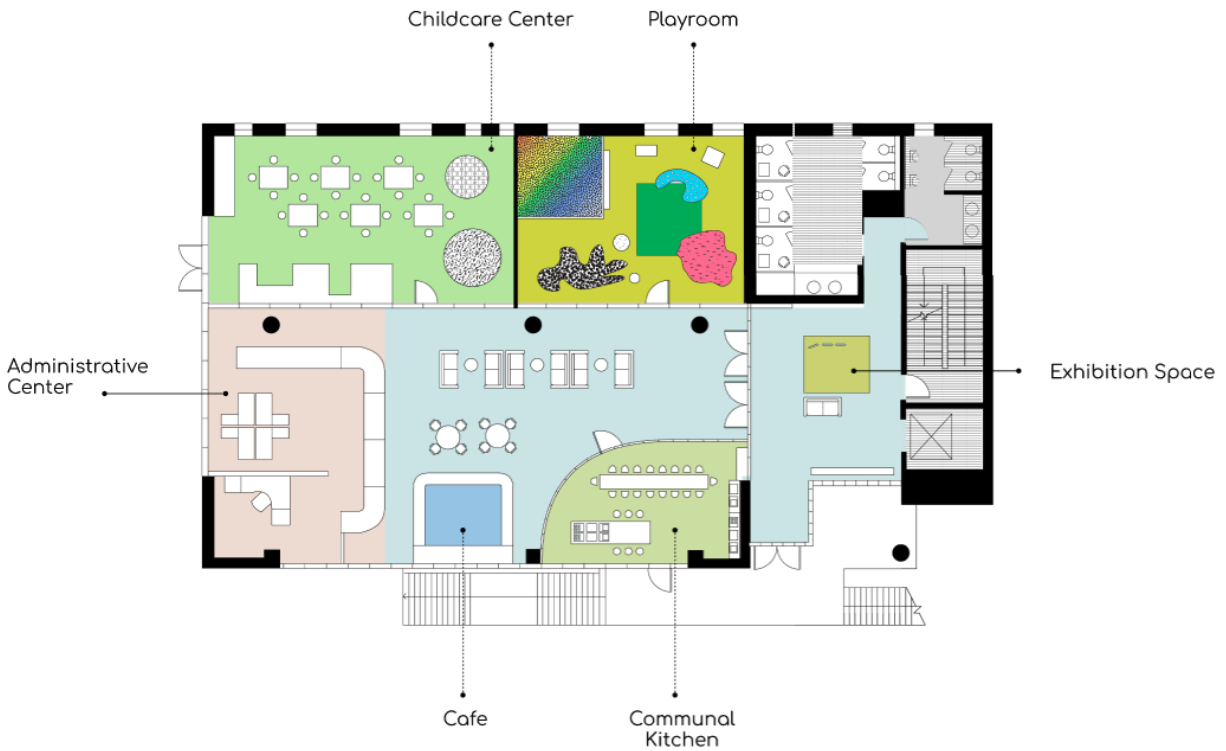


Fig. 35 Alternative design for enhanced element of child care

On the other hand, for a neighborhood with high density of newly married couples and couples with young children, an alternative layout could accommodate childcare services, enlarged bathrooms for nursing and flexible working space for the parents. It could also house a communal kitchen to ensure parents commuting to the welfare and administrative center for work with their children to prepare or heat up lunch during the break. The administrative center still functions, but at a minimized scale. The lounge area in the middle can be utilized as flexible work space as well as space for social interaction. The lobby area, which originally did not have a specifically attached function, could be utilized as a gallery or exhibition space to showcase children's work.

Scenario 3: Co-Working



Fig. 36 Alternative design for enhanced element of co-working

For neighborhoods in close proximity to start-up incubators or dense student population, the physical presence of the administrative center could be minimized while transferring the space for shared offices, meeting rooms, individual pods, as well as flexible lounge-type working space. The floorplan will offer various kinds of working environment according to the specific needs of the visitor, whether it be for quiet study or group discussion. The open floor plan in the middle also has different types of seating arrangement ranging from a communal library desk, couches, to open individual pods.

3-ii) Seoul Post Tower



Fig. 37 Alternative layout for Seoul Post Tower
(design source: original design by Space Group)

This section discusses the possibility of reappropriating high-rise office buildings in business districts that are owned by Korea Post can as co-working spaces. The picture above is a sample layout for a co-working space that could be located on the 11th floor of the Seoul Post Tower. Located at the heart of the CBD, Seoul Post Tower has high potentials for attracting local traffic interested in an alternative working environment. Considering the diverse nature of the business sectors in and around the CBD district, this floorplan allocates individual offices on the either end of two wings while placing communal amenities such as amphitheater, studio, coffee bar, rooftop garden, and yoga studio at the center. The intention is to create a mix of private and

public spaces, while creating an open and inviting place that the users can enjoy, even if it is not only for work.

Seoul Post Office												
Rent Roll												
Date 2022-05-11												
Rent Roll												
Tenant	Floor	Net Rentable Area		% of GIA	Deposit		Rent		Operating Expenses		Rent Period	
		py	m ²		Amount	/py	Amount	/py	Amount	/py	Begin	End
Co-working Office	9F	539	1781.83	2.45%	₩ 458,150,000	₩ 850,000	₩ 45,815,000	₩ 85,000	₩19,404,000	₩36,000	1/1/23	12/31/23
Income												
	Area (m ²)	Count	Total	%	Price	Gross Income	Vacancy	Net Expected Income				
Private Pod	2	23	46	3%	₩ 370,000	₩ 8,510,000	10%	₩ 7,659,000				
Private Office	5	21	105	6%	₩ 650,000	₩ 13,650,000	10%	₩ 12,285,000				
Large Office	7.6	21	159.6	9%	₩ 1,100,000	₩ 23,100,000	15%	₩ 19,635,000				
Coffee Bar	7	1	7	0%	₩ 3,000,000	₩ 3,000,000	10%	₩ 2,700,000				
Yoga Studio	260	1	260	15%	₩ 4,000,000	₩ 4,000,000	10%	₩ 3,600,000				
Meeting Room	60	2	120	7%	₩ -	₩ -	15%	₩ -				
Unassigned Seat	1.5	50	75	4%	₩ 250,000	₩ 12,500,000	15%	₩ 10,625,000				
Other Communal Space			1009.23	57%			10%					
SUM		119	1781.83	100%		₩ 64,760,000		₩ 56,504,000				
Costs												
	Price / m ²	Area	Cost									
Office Fitout	₩ 2,000,000	1781.83	₩3,563,660,000									
Furniture	₩ 200,000,000		₩200,000,000									
Capital Reserve / year	₩ 100,000,000		₩100,000,000									
Facility Management	₩ 20,000	1781.83	₩427,639,200									
SUM			₩4,291,299,200									
Equity Multiple (Unlevered)	0.16											
discount rate	2%											
10-year IRR	8%											

Fig. 38 Financial modeling for converting a floor of Seoul Post Tower into a co-working space

Financially, this plan for a co-working space would generate a monthly revenue of 56 million Korean Won, which is 20% above the market rate for leasing the entire floor, even factoring in 10-15% vacancy. While there are initial costs associated with office fit out, the 10-year IRR will amount to 8%, and will only increase for the following years since the government would not have to pay any rent.

The payment system could be set up in two ways. First, each individual employee can subscribe to the co-working space. Second, companies can purchase corporate plans and then distribute coupons or passes to the employee interested in using the system. The latter option would be more viable and sustainable from a business stand point.

3-iii) Yeouido Post Tower

Another example is from the Yeouido Business District, which represents the financial sector of Seoul. The graphic below shows an existing floor plan for the Yeouido Post Tower, which is the newest high-rise construction owned by Korean Post. While the current floorplan is efficient, it is organized in a heavily corporate style with repetitive office patterns.



Fig. 39 Typical floor layout for the Yeouido Post Tower
(design source: original design by KUNWON Architects, Planners & Engineers)



Fig. 40 Alternative floor layout for the Yeuido Post Tower

Considering that the YBD is a financial district, the alternative plan above reorganizes the space while putting an emphasis on creating individual spaces for privacy. There is an ample number of publicly oriented programs, but they are away from the private working spaces so that the two disparate functions do not interfere each other. Compared to the alternative plan for the Seoul Post Tower, there is a higher priority in creating individual and private spaces in this plan.

Yeouido Post Tower													
Rent Roll													
Date 2022-05-11													
Rent Roll													
Tenant	Floor	Net Rentable Area		% of GLA	Deposit		Rent		Operating Expenses		Rent Period		
		py	m²		Amount	/py	Amount	/py	Amount	/py	Begin	End	
Co-working Office	9F	368.611	1218.55	1.68%	₩ 199,787,162	₩ 542,000	₩ 19,978,716	₩ 54,200	₩12,901,385	₩35,000	1/1/23	12/31/23	
Income (Monthly)													
	Area (m²)	Count	Total	%	Price	Gross Income	Vacancy	Net Expected Income					
Private Pod	2	31	62		5% ₩ 350,000	₩ 10,850,000	10% ₩	9,765,000					
Private Office	5	14	70		6% ₩ 600,000	₩ 8,400,000	10% ₩	7,560,000					
Large Office	7.6	7	53.2		4% ₩ 1,000,000	₩ 7,000,000	15% ₩	5,950,000					
Coffee Bar	7	1	7		1% ₩ 2,500,000	₩ 2,500,000	10% ₩	2,250,000					
Yoga Studio	260	1	260		21% ₩ 3,500,000	₩ 3,500,000	10% ₩	3,150,000					
Meeting Room	60	2	120		10% ₩	- ₩	15% ₩	-					
Unassigned Seat	1.5	50	75		6% ₩ 250,000	₩ 12,500,000	10% ₩	11,250,000					
Other Communal Space			571.35		47%		10%						
SUM		106	1218.55	100%		₩ 44,750,000		₩ 39,925,000					
Costs													
	Price / m²	Area	Cost										
Office Fitout	₩ 2,000,000	1218.55	₩2,437,100,000										
Furniture	₩ 180,000,000		₩200,000,000										
Capital Reserve	₩ 50,000,000		₩100,000,000										
Facility Management	₩ 20,000	1218.55	₩292,452,000										
SUM			₩3,029,552,000										
Equity Multiple (Unlevered)	0.16												
discount rate	2%												
10-Year IRR	9%												

Fig. 41 Financial modeling for converting a floor of Yeouido Post Tower into a co-working space

Financially, this layout will generate around 40 million Korean Won as monthly revenue, while reaching 9% IRR in the 10th year. The office fit out will cost around 3 billion Korean Won, but all the expenses will be covered in the 6th year of the operation, and will offer a steady cash flow thereafter. While there will be a significant initial costs associated with the office fit out, the project will be a financially profitable business for the government in the long run while also providing immense benefits to the public. This would create a win-win scenario for both the private and public sector. The government can benefit from increased revenue while companies can meet their office demands by tuning into the program. During the final review of this thesis, a question about the possibility of a massive move away from the city center has been posed as a result of this new paradigm. This may lead to a significant office rent decrease in the traditional business districts, which may have negative impact on the government's revenue in terms of real estate tax revenue. This may offset the positive income that is created by the new system proposed in this thesis. While the broader economic implications of the project are yet to be further discussed, this is a question that will open new doors of research going forward.

3-iii) User Interface

Another component of the project is ensuring easy, real-time access to the public. A mobile app would be an ideal tool to enable this feature. The mobile app could offer easy access to available office or space based on the user's current location, number of party, or space type.



Fig. 42 User interface suggestion for a co-working space app in Seoul

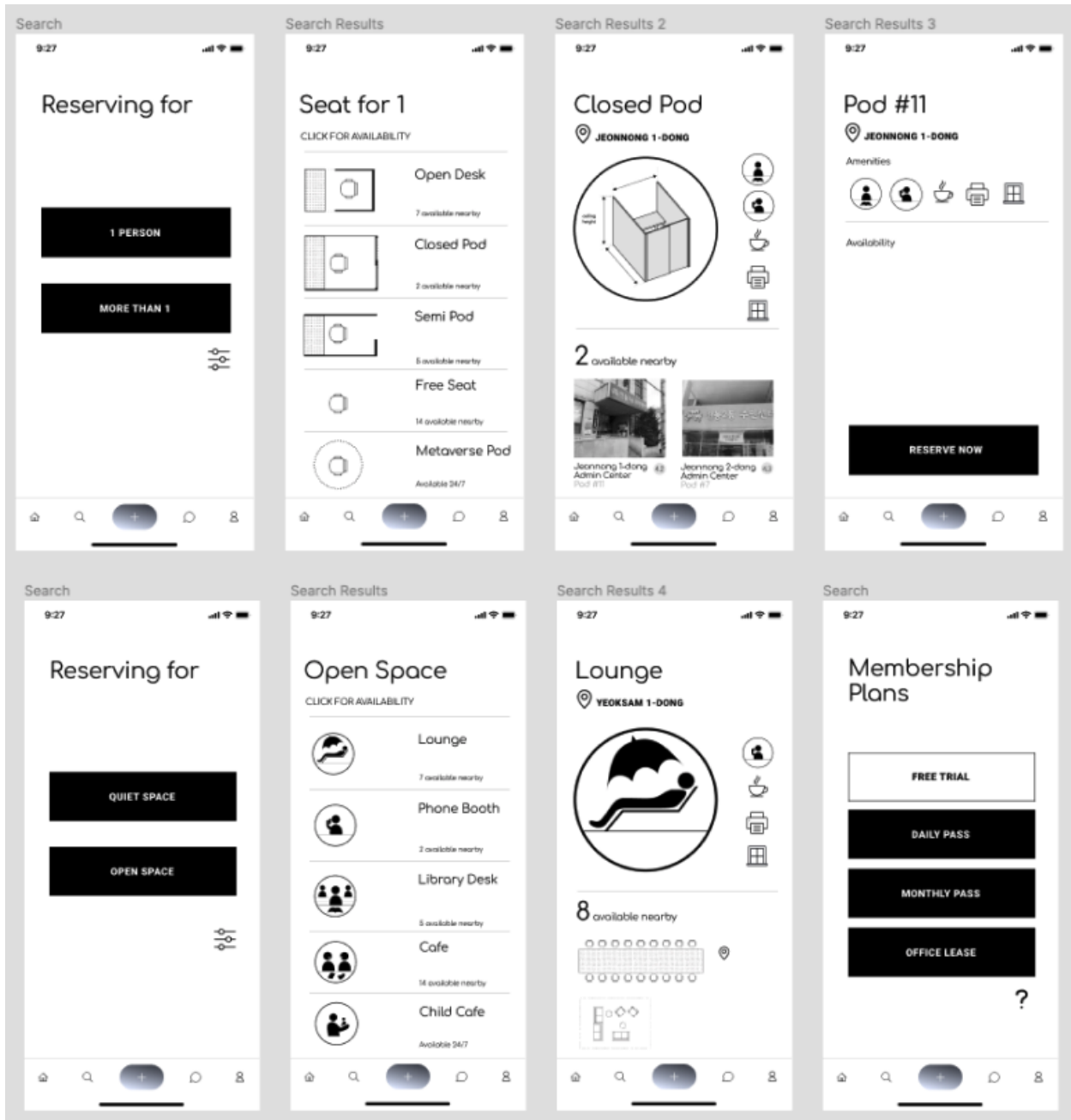


Fig. 43 User interface suggestions for a co-working app in Seoul

Each user will have the option of reserving desks that can be assigned. The mobile app would further implement a shared working culture in which each employee will receive multiple possibilities to “shop” for the working environment.

The mobile app could also integrate social aspects such as chats and featured stories of neighbors, so that local users can bring that social element of the co-working into the mobile space, and vice versa.

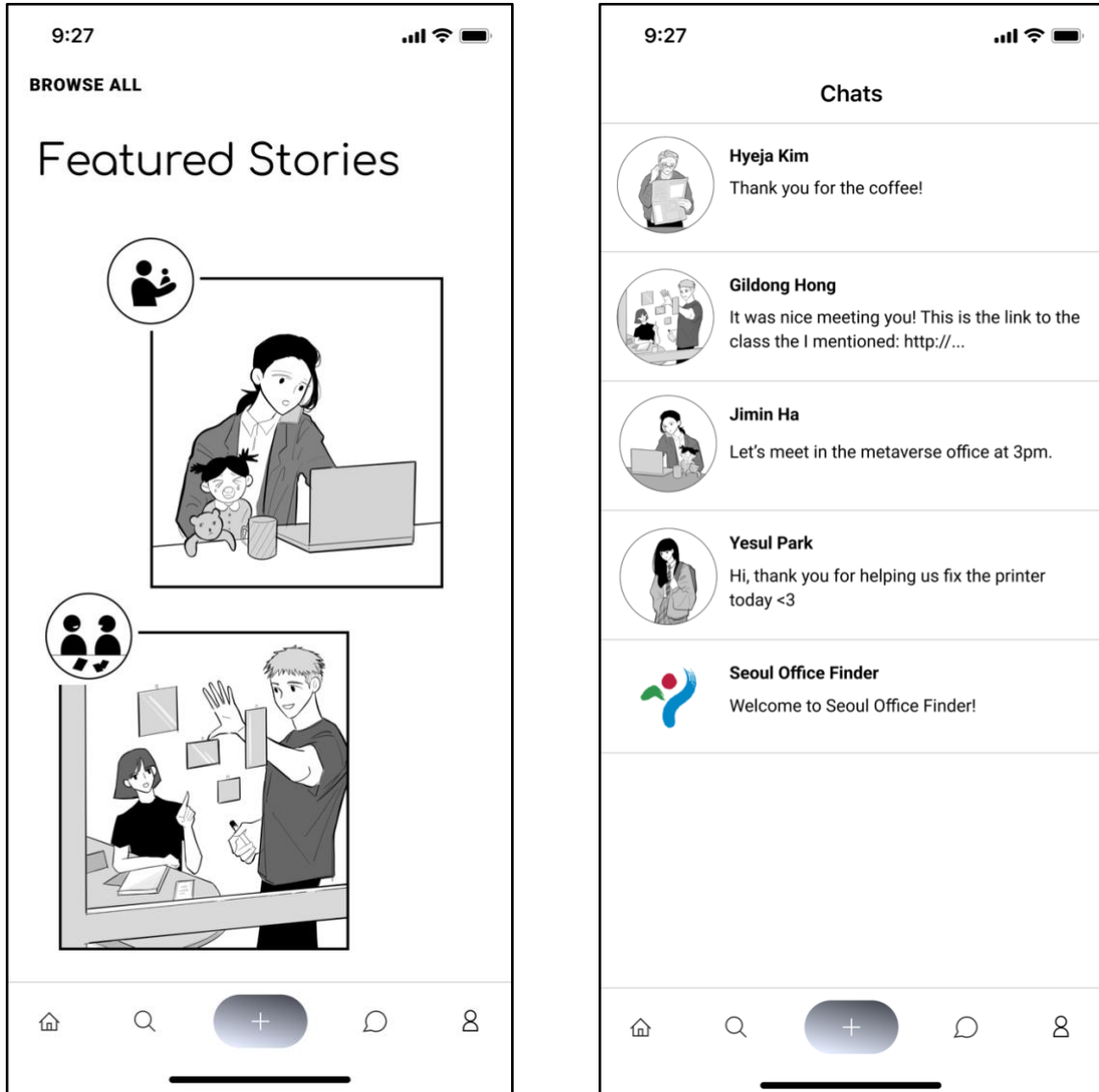


Fig. 44 Suggested interface designs for featured stories and chats

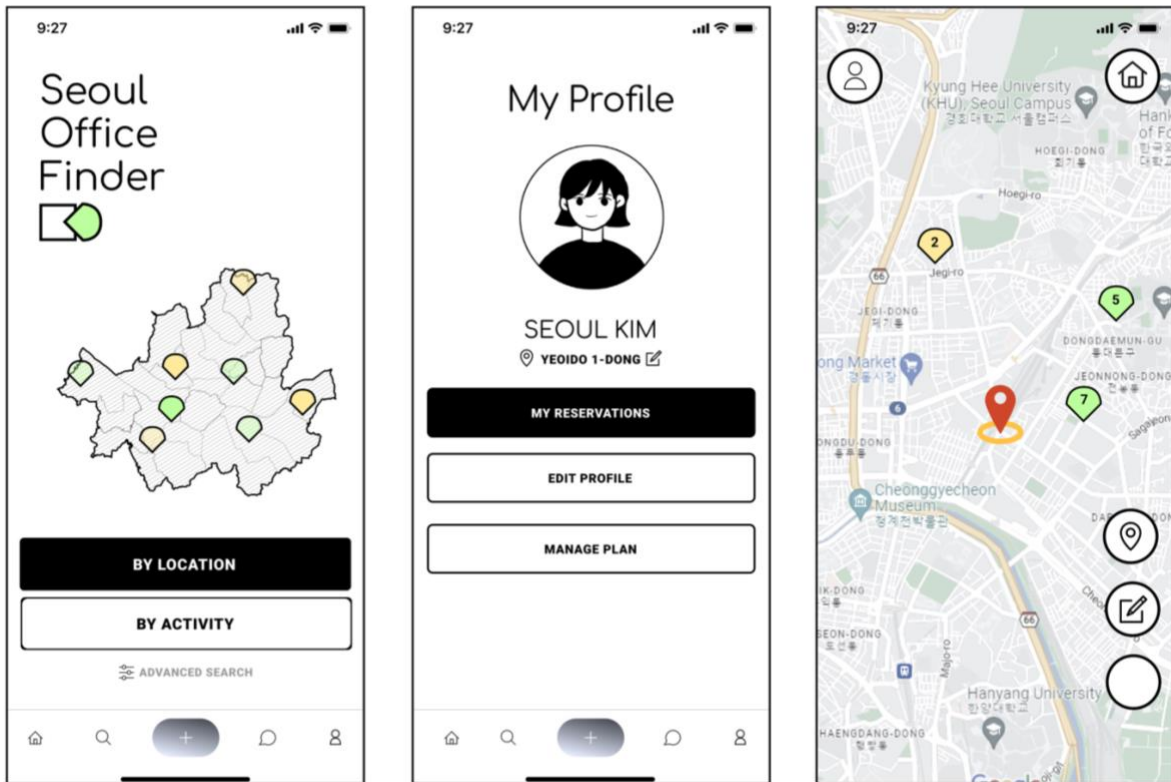


Fig. 45 User interface suggestions for a co-working app in Seoul

CHAPTER 4
CONCLUSION

This thesis studies and looks into matching social demand and supply for flexible co-working space that would provide an alternative to both the home office and the traditional office. In the recent years, the COVID-19 pandemic as well as introduction of the metaverse have further elucidated Seoul’s existing conditions such as high demand for office space, dispersion away from the business districts, as well as rising traffic congestion costs. The current state of affairs necessitate a new kind of remote working space, and public infrastructure can be reappropriated to meet that demand. While the project still needs further considerations on multiple fronts, it is an attempt to generate a new remote and co-working ecosystem that produces social good through an organic connection between the private and public sectors.

The project has two desired effects. First, it aims to create a new paradigm of work that offers combined benefits of both the home office and the traditional office. Second, it strives to build a symbiotic system in which both the public and the government both benefit from the highest and best use of newly available public infrastructure.

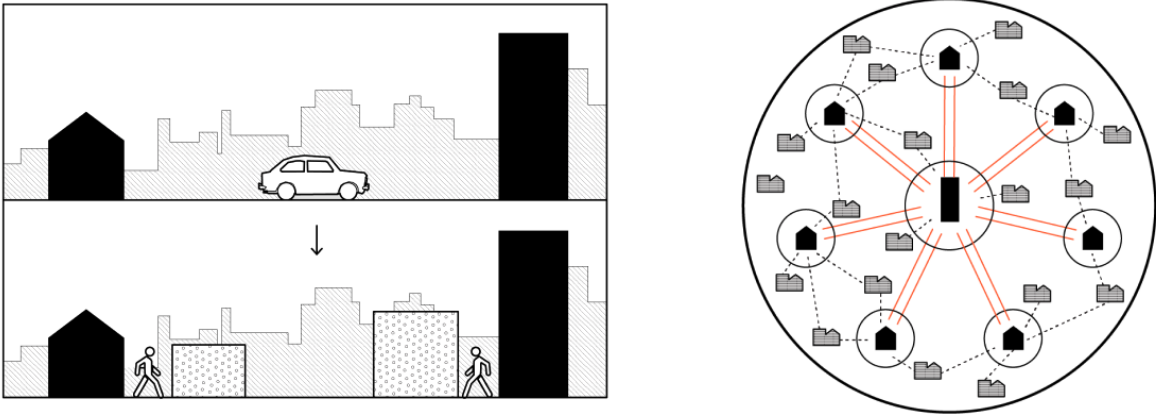


Fig. 46 New paradigm of remote work

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ILLUSTRATION
CREDITS

Fig 1: Original diagram

Fig 2: Original diagrams

Fig 3: Original diagram based on Forbes survey. Source link:
<https://www.forbes.com/sites/ashiraprossack1/2021/02/10/5-statistics-employers-need-to-know-about-the-remote-workforce/?sh=6f9c3a5f655d>

Fig 4: Data and graphics by WeWork.
 Source link:
https://res.cloudinary.com/wework/image/upload/v1617909915/WeWork_The_future_of_work_is_hybrid.pdf

Fig 5: Original diagram

Fig 6: Original diagram

Fig 7: Original diagram

Fig 8: Original diagram

Fig 9: Data and graphics by Colliers.
 Source link: <https://www.colliers.com/en-kr/research/2022-apr-korea-quarterly-office-report-q1-2022-colliers>

Fig 10: Original diagram

Fig 11: Original diagrams

Fig 12: Original diagrams based on Seoul Open Data Portal.
 Source link: <https://data.seoul.go.kr/dataList/229/S/2/datasetView.do>

Fig 13: Graphics by Seoul Open Data Portal.
 Source link: <https://data.seoul.go.kr/dataVisual/seoul/seoulLivingMigration.do>

Fig 14: Graphics by Ji Young Park. Source link: <https://www.si.re.kr/node/61067>

Fig 15: Original diagrams based on Seoul Metropolitan Government
 Source link: <https://news.seoul.go.kr/gov/archives/539004>

Fig 16: Original diagrams

Fig 17: Google Map

Fig 18: Data and graphics by E-Country Indicator.
 Source link: https://www.index.go.kr/potal/main/EachDtlPageDetail.do?idx_cd=1368

Fig 19: Graph based on UPU Postal Statistics.
 Source link: https://www.index.go.kr/potal/main/EachDtlPageDetail.do?idx_cd=1368

Fig 20: Graph based on Statistics Korea.
 Source link: https://kosis.kr/statHtml/statHtml.do?orgId=127&tblId=TX_12002_A015

Fig 21: Excel analysis based on Seoul Open Data Portal
 Source link for transport satisfaction: <https://data.seoul.go.kr/dataList/264/S/2/datasetView.do>
 Source link for average commute time: <https://data.seoul.go.kr/dataList/229/S/2/datasetView.do>

Fig 22: Original diagrams

Fig 23: Original diagrams

Fig 24: Original diagrams

Fig 25: Original diagrams

Fig 26: Original diagrams

Fig 27: Original diagrams

Fig 28: Original diagrams

Fig 29: Original diagrams

Fig 30: Original diagrams

Fig 31: Graph based on data.go.kr.
 Source link: <http://data.seoul.go.kr/dataList/OA-12964/S/1/datasetView.do>

Fig 32: Linework based on design by JooArchitects.
 Source link: <https://project.seoul.go.kr/view/viewDetailArch.do?cpttMstSeq=386>

Fig 33: Original linework

Fig 34: Original linework

- Fig 35: Original linework
- Fig 36: Original linework
- Fig 37: Linework based on design by Space Group
- Fig 38: Excel analysis
- Fig 39: Linework based on design by KUNWON Architects, Planners & Engineers
- Fig 40: Original linework
- Fig 41: Excel analysis
- Fig 42: Original diagram
- Fig 43: Original diagrams
- Fig 44: Original diagrams
- Fig 45: Original diagrams
- Fig 46: Original diagrams