



POLICY NOTE

RETHINKING CITIES FOR RESILIENCE AND GROWTH IN THE POST-COVID-19 PANDEMIC ERA

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Summary and Key Points

Besides a variety of urbanization issues that recognized by scholars, policy makers and practitioners before the COVID-19 pandemic, the rapid spread of this infectious disease has highlighted various critical urban development issues such as the lack of basic medical facilities, limited governance capacity to ensure efficient use of resources, and limited settlement structures and public spaces to ensure social distance. The COVID-19 pandemic has brought about these issues that need a paradigm shift from the status quo in various related fields of urban development, and required rethinking of the role and transformation of cities toward post COVID-19. This policy note promotes new insights to answer questions related to resilient cities that have arisen due to the COVID-19 pandemic.

We highlight six topics in particular:

- i. Urban resilience
- ii. Urban economics, metabolism, and flows: production, consumption, and supply chains
- iii. Governance networks: institutions, organizations, and enhanced use of ICT and big data
- iv. Social dynamics: human capital, social equity, inequality, and quality of life
- v. Built environment: work facility, working environment, ecosystem planning, and social distance
- vi. Urban demographics and urban forms: aging population, shrinking cities, and distance communication through ICT

The COVID-19 pandemic has significantly changed citizens' lifestyles and work styles, especially in large cities, and this has had a significant impact on the nature of land and cities. In this policy note, we will investigate how the transformation of cities should take place in the future in relation to various urban aspects and propose urban planning implications.

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^{††} We hope that the academics, researchers, and consultants involved in this study will benefit from reading this policy note and that it will help in developing new models and strategies to solve various problems that COVID-19 has caused for the six urban aspects outlined within.

INTRODUCTION

Urbanization has highlighted various issues, and urban researchers and practitioners have tackled urbanization problems, including road congestion, air pollution, and soaring land prices. According to the United Nations, the urban population accounted for 30% of the world's population in 1950, 55% of the population lived in urban areas in 2018, and there is an expectation that the proportion will increase by 68% by 2050 with an additional 2.5 billion people in urban areas (United Nations 2018). Besides a variety of urbanization concerns, the rapid spread of infectious diseases is a critical issue in urban areas. The COVID-19 pandemic has produced a major crisis in cities all over the world, representing a paradigm shift requiring the rethinking of the role of cities and urban functions.

The following three circumstances are currently observable as urban reactions to the COVID-19 pandemic:

- 1) The high risk of new infections, such as COVID-19, stemming from living in cities.
- 2) The implementation of a convoluted list of restrictions on urban activities.
- 3) The dramatic introduction of remote working, including working from home, in industries, even in regional cities.

We elaborate on the gravity of the observations with some examples.

Concerning the first point, with a geographic distinction from rural areas, efficiency in accommodating a larger population within a smaller area often characterizes urban areas. Such densification results in a closely knit fabric of dwellings, industries, warehouses, amenities, and other services. Densification not only adds to the complexity of the network dynamics for the supply chain that maintains the efficiency of the city but also increases the conflict of interaction among the members of the population. Thus, during the COVID-19 outbreak, city populations were at higher risk of infection.

Regarding the second point, urban lockdowns and restrictions on going out prohibited social activities, eating out, and leisure activities and recommended telecommuting for work. As a result, the number of people working from home has increased and a new form of work and home integration is in progress. In the future, there will be a growing trend to reduce the size of offices in central Tokyo or to use vacant space for other purposes, and offices themselves will tend to change so that they can be shared or used for multiple purposes (*The Japan Times* 2020).

In relation to the third point, the range of jobs that allow remote work has expanded. The development of information security, virtual desktops, document-sharing services, and online meeting systems has led to the introduction of remote work into industries. For example, call center operations were reportedly difficult to carry out remotely due to the difficulty of managing vast amounts of customer data. Still, insurance companies have also introduced remote work. Working remotely in the audit firm business was apparently difficult from the security point of view because of the handling of financial statements before their announcement, but an increasing number of corporations are shifting to remote work. Based on this situation, some companies have decided to relocate their headquarters from urban to rural areas. COVID-19 has caused companies to consider more choices for their location due to ICT technology innovations.

Geo-spatial technology, in particular location intelligence, has also evolved dramatically as a result of COVID-19, leading to demonstrated tracking applications that visualize human

activities on a large scale. These big data of human traceability have made it possible to analyze the flow of people in detail and extensively.

With cities under lockdown, public transport shut, health care services running at overcapacity, and a skyrocketing number of infections, there is a need to rethink and strategize cities as resilient engines of growth. This book is an exploration in this direction.

In the current pandemic situation, organizations, governments, and leading think tanks have attached considerable importance to finding strategies to make cities more resilient. Historically, several epidemics in the past have caused long-lasting and irrecoverable damage within globalized cities of the world, particularly harming man-made environments, societies, economies, and individuals' mental health.

LITERATURE REVIEW

Urban Resilience

Redundancy, Robustness, Adaptation, and Components of Resilience in the Wake of COVID-19

What constitutes resilience? This is a simple yet overly complicated question, especially in the wake of COVID-19. "Resilience" comes from the post-classical Latin *resilientia*, meaning "the fact of avoiding." In English, Francis Bacon's *A Natural History* (1627) was one of the first written records to define resilience as "action or an act to rebounding or springing back" (Caputo, n.d.).

Resilience emerged initially as ecological resilience and subsequently extended beyond the field of ecology. Eventually, three meanings of resilience arose: (1) a response to disturbance; (2) the capacity to self-organize; and (3) the capacity to learn and adapt (Carpenter et al. 2001). Later, additional characteristics of a resilient system developed, such as "resilient thinking," which emphasized adaptability and transformation as its essential features (Folke et al. 2010).

Folke et al. (2010) also showed that the components of resilience are robustness and transformation. Robustness is the persistence of a specific characteristic or circumstance in a system under perturbation or conditions of uncertainty. Transformation is a new component as a guiding way of making a living and involves changing the state variables and the scale (Folke et al. 2010).

In a study of 140 published papers reviewing the thematic areas of the COVID-19 pandemic's impacts on cities and major lessons for urban planning, design, and management, Sharifi and Reza Khavarian-Garmsir (2020) found that the existing evidence and observations were mainly limited to air and water quality improvements. They also concluded that the pandemic affects particularly poor, marginalized, and vulnerable groups disproportionately. Table 1 summarizes their findings.

Adaptation is the newest component of the discussion of resilience. The critical point to understand is that resilience is a changing concept rather than a static condition. The adaptive cycle incorporates the dynamic requirements of resilience and shows that continuous adaptation is one of the best ways to face uncertainties through resilience (Asokan 2015).

Urban studies have often discussed resilience as a way to build cities against disasters. However, there is a need for a change in the conventional way of thinking about resilience

based on disaster preparedness and response to the pandemic. Moreover, it is necessary to consider whether the traditional way of thinking about resilience based on disaster preparedness and response requires revision and alteration. If so, from the standpoint of the alterations in urban activities that the pandemic has induced, how should researchers understand urban resilience in the future?

Table 1: Major Issues that the Pandemic Has Revealed and Recommendations for Post-COVID Planning

| Theme | | Major Issues that the Pandemic Has Revealed | Recommendations/Implications for Post-COVID Planning |
|------------------------------|-----------------------|---|---|
| Environmental quality | Air quality | <ul style="list-style-type: none"> - Traffic emissions are major sources of pollution in many cities - Non-traffic sources of pollution are also important in some contexts - In some contexts, COVID-19 transmission/mortality rates have a strong association with high levels of air pollution - Long-term exposure to air pollution can increase human vulnerability to pandemics | <ul style="list-style-type: none"> - Greening the transportation and industry sectors can provide major air quality benefits - Measures to reduce traffic-related pollution are not enough to address air quality in all contexts - As measures aiming to reduce some pollutants may increase secondary pollutants, holistic approaches to pollution mitigation are necessary - Reducing air pollution can contribute to reducing the transmission/mortality rates of pandemics |
| | Environmental factors | <ul style="list-style-type: none"> - Evidence on the association between temperature and COVID-19 transmission rates is inconclusive - When the wind speed is low, air pollution is likely to intensify the transmission rate | <ul style="list-style-type: none"> - During pandemics, countries should promote social distancing and other protection measures continuously, irrespective of the environmental conditions - Improving air quality can contribute to addressing issues related to COVID-19 and other pandemics in both the short and the long term |
| | Urban water cycle | <ul style="list-style-type: none"> - Unregulated human activities have resulted in the contamination of water resources in many cities - Drugs used for the treatment of COVID-19 patients may pollute freshwater resources - A lack of sewage treatment facilities in poor areas undermines the effectiveness of lockdown measures | <ul style="list-style-type: none"> - Countries should prioritize the designing of regulations to minimize negative agricultural, industrial, and traffic impacts on water resources - Sufficient disinfection of water plants and wastewater treatment plants and measures such as the prevention of sewage leakage into freshwater resources are essential to reduce human exposure to the virus |
| Socioeconomic impacts | Social impacts | <ul style="list-style-type: none"> - COVID-19 has exposed old problems and placed inequalities in a new light - Inequalities make containment challenging and may lead to further diffusion of the virus - Enforcing social distancing and other response measures is challenging in slums | <ul style="list-style-type: none"> - Countries should prioritize more inclusive actions toward reducing inequalities and addressing the needs of vulnerable groups - Slum upgrading should be a priority - Economic support mechanisms should accompany social distancing policies - Enhancing the sense of community is critical for improving response and recovery capacities |
| | Economic impacts | <ul style="list-style-type: none"> - A homogeneous economic structure increases vulnerability - The economic impacts of the pandemic affect marginalized groups disproportionately - The global supply chain makes | <ul style="list-style-type: none"> - Diversifying the urban economic structure is essential - Developing relief programs to support vulnerable and marginalized groups is necessary during pandemics - Transformation to a more local |

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| | | cities vulnerable to disruptive events | supply chain that increases self-sufficiency is necessary to deal with the economic fallout of the pandemic and similar future events |
| Management and governance | Governance | <ul style="list-style-type: none"> - The absence of proactive planning and emergency plans is a major reason for the failure to respond effectively in some countries - Fragmented urban governance erodes response and adaptation capacities | <ul style="list-style-type: none"> - Long-term visioning and integrated urban governance enhance adaptive capacities - During pandemics, local governments should provide vulnerable groups with economic and social support - In addition to top-down initiatives, certain levels of local leadership and community engagement are critical for a timely response to pandemics |
| | Smart cities | <ul style="list-style-type: none"> - Smart solutions have contributed to developing more effective and efficient response and recovery measures (e.g., identifying and isolating infected individuals, reducing human-to-human contact in service delivery, etc.) - Techno-driven approaches have been successful in containing the virus but have raised concerns regarding privacy protection and transparency | <ul style="list-style-type: none"> - Public access to real-time and geo-referenced data enables better response to and recovery from adverse events - Techno-driven approaches should not undermine privacy issues or undergo misuse to reinforce power relations - Human-driven approaches are more suitable for citizen empowerment - Combined approaches are better suited to containing the pandemic, dealing with privacy concerns, facilitating coordination and information sharing, and controlling the spread of misinformation |
| Transportation and urban design | Transportation | <ul style="list-style-type: none"> - Increased transport connectivity is a risk factor that may contribute to the diffusion of infection diseases - Public transportation may increase the risk of transmission during pandemics - The pandemic may increase negative attitudes toward public transportation | <ul style="list-style-type: none"> - Smart mobility restrictions, based on the transmission risk of different transportation modes, are essential for containing the spread of the virus - More attention to minimizing the potential public health risks of public transportation is necessary - A modal shift to cycling and walking offers a unique opportunity to promote active transportation further |
| | Urban design | <ul style="list-style-type: none"> - Density alone is not a key risk factor contributing to the spread of the virus - Some cities lack appropriate levels of green and open spaces to meet the outdoor exercise and recreation demands of their citizens while fulfilling social distancing requirements | <ul style="list-style-type: none"> - Better access to amenities and public health infrastructure make high-density areas less vulnerable to pandemics - Considering multiple other benefits of compact urban developments, planners should continue to promote them - Cities should allocate more space to pedestrian areas and open spaces |

Source: Sharifi and Reza Khavarian-Garmsir (2020).

Urban Economics and Mobility Flows

Resources, Independence, Interdependence, and Sustainability

From pre-industrial times to the postmodern era, human society has experienced spatially concentrated economic activities. Even though natural features drive some industrial development, mechanisms related to the forces of agglomeration are more fundamental;

these have also played an important role in the formation of urban areas and industrial structures.

Businesses can benefit from locating close to each other or operating in urban areas. Especially in the case of cities, the assemblage and professionals transfer knowledge, information, and skills. In an agglomeration, ancillary industries provide common goods, and geographic proximity can reduce costs and enhance trust. Whether it is the reduction in transportation costs or the gains of positive externalities from technology spillovers, urban economics has been a convoluted central theme in the field of urban and economic geography.

Cities have been the perfect place to develop social ties, grow businesses, belong as citizens, earn income, and create more opportunities. However, the mobility restrictions that the pandemic has induced have affected the economic landscape in cities across the world. Central business districts and city centers, restricted to office buildings and business activities, are losing property value with the declining demand since the start of the pandemic. The pivotal point was businesses with large workforces opting for working from home to reduce infection risks. The policy decisions to start remote working and flexible hours have subliminally induced a negative demand for privately owned and shared office spaces. Moreover, the effects of the industrial economic impacts of the pandemic have had implications for real estate, infrastructure demand, and markets.

With the sudden rise in remote working, diversity in the demand in the housing market has emerged. Liu and Su (2020) noted that the decline in the housing demand is more substantial in denser neighborhoods and central cities in the US. Their findings also highlighted a persistent decline in the housing demand in areas with higher densities, which may remain in the near future. On a regional level, Del Giudice, De Paola, and Del Giudice (2020) reported that the levels of rising distrust regarding adequate sanitation have evolved into a declining housing demand in neighborhoods and cities that have observed high mortality rates in Italy. Consequently, their housing sales have declined in the short term as a result of the stigma and declining income due to lockdowns (Baleari, Füss, and Weigand 2021). On the contrary, Kondo (2021) stated that workers with work-from-home experience are twice as interested in relocating to rural areas. Fujita and Hamaguchi (2020) argued against using the pandemic housing demand as a decentralization tool in mono-centric agglomerations such as Tokyo to promote regional revitalization and digital transformation.

Besides housing markets, the evidence shows a significant impact on the informal sector and has direct implications for public finance and social and economic inequalities. In line with this, Martínez and Short (2021) proposed revalorizing the urban land market as a starting point for post-pandemic urban economic revival to make cities more livable and affordable. However, with the increasing income inequalities, the policy question of how to manage the transformation in the urban housing and commercial real estate demands to maintain economic growth and sustainable development remains unanswered.

Governance Networks: Institutions, Organizations, and Enhanced Governance with the Use of Big Data

Accountability, Efficiency, and Inclusion

A variety of organizations and levels of government may govern cities. Each form of government has its advantages and disadvantages for the assumptions, directionality of vision, and parameters of the governance structure.

Several factors influence cities' governance and formulate the foundations of their commitment to responsibility, accountability, responsiveness, competitiveness, innovation, and sustainability, all of which collectively contribute to a city's capacity for resilience. These factors include:

- 1) the formal level of government that bears the responsibility for governance (Enderlein, Wälti, and Zürn 2010; Hooghe and Marks 2010);
- 2) political and administrative arrangements (McCubbins, Noll, and Weingast 1989);
- 3) the level of planning that the government imposes and the preservation of the city's image from the time of its establishment (Ren 2008);
- 4) the role of a city in the larger regional and national context (Barca, McCann, and Rodríguez-Pose 2012; Capello and Perucca 2018);
- 5) ideations over the ideal city residents sharing the city development responsibility on the holistic front (Meek 2021; Prysmakova-Rivera 2021); and, lastly,
- 6) individual accountability for taking responsibility for the planning and maintenance of the city infrastructure, both physical and social.

Such factors, which reveal the interdependence and interconnectedness between the government and the governed, are also the key elements that augment the complexity in determining the critical path for development, redevelopment, conservation, sustainability, livability, and resilience.

Over the past three decades, the broader changes in the political economy have decentered a robust and functional public sector. Diverse social agents have mobilized multi-sector agents, assuming the power to order, manage, and regulate cities and spaces (Harvey 1989; McCubbins, Noll, and Weingast 1989; Dahiya 2005; Dahiya and Das 2020). Furthermore, the COVID-19 crisis has exposed paradoxes and contradictions in the contemporary governance order—business as usual dictates that a subject is productive and surplus producing in the name of “human capital” (*Pandemic Urbanism Praxis in the Time of COVID-19* 2020). Such a self-fulfilling nature has no place in a public health crisis that demands social distance (Davis 2020). The countries that withstand the crisis are not necessarily democracies but those with strong, independent institutions, the capacity for legitimacy around data-driven decision making, and collective interpersonal trust (Dellmuth and Tallberg 2020; Fukuyama 2020; Hamilton and Hammer n.d.).

Observing the trend to promote “compact cities” in Japan, Hashimoto (2020) suggested the case of smart cities rather than a central control system for efficiency, involving the building of a decentralized, self-reliant governance structure from buildings and houses, through districts and towns, to cities and regions in a hierarchical structure. Big data and ICT-based infrastructure monitoring as well as citizen engagement systems could add extensively to such approaches to networked governance.

Given this background, there is a need to identify and document how governments might respond in a crisis such as the COVID-19 pandemic and how we can direct the response to make our cities more resilient through efficient and inclusive governance.

Social Dynamics: Human Capital, Social Equity, Inequality, and Quality of Life

Diversity, Access, Adaptability, and Innovation

Urban planning is about helping to shape physically the places where we live, work, and play. Unfortunately, the current pandemic is an urban planning challenge that has distorted the

critical strength of planners—to step back and consider the bigger picture. To plan for a future society, planners need to consider economic, social, physical, and environmental issues to arrive at a solution that offers the optimal results for all. However, the dynamic, sudden, and non-linear fluctuations in routine living conditions induced by the pandemic are affecting populations in several ways.

Pandemics of the past have shaped present-day cities and the current pandemic. Recent research at the intersection of urban planning and public health has revealed that stakeholders involved in urban planning are continuing to create and recreate geographies that induce inequality. For instance, the aggregation of small stores into large supermarkets creates unequal access to food stores for different ages, income classes, and social groups (To and Chong 2017; Saunders 2020). Besides, according to socioeconomic groups, countries worldwide have adopted the practice of housing segregation (Choi, Lee, Kim, and Seong 2019). Highlighting the impact of the economic crisis on 34 OECD member countries, the biennial OECD overview of social indicators noted that social spending increased least in the countries that were most affected by the situation between 2008 and 2012 (OECD 2014). The 2019 edition of the review also presented the change in social dynamics through a gender lens. In particular, the report spotlighted discrimination based on economic, social, and ethnic backgrounds. Along with social backwardness, the report recommended the inclusion of sexual and gender minorities as a top policy priority for OECD member country governments (OECD 2019).

In the early days of the pandemic, cities witnessed a reverse exodus of daily wage workers from cities to their native hometowns and hinterlands. In addition, workers involved in manufacturing essential commodities responded with strikes and another form of counteraction to the rising labor demands and widening inequality. However, under-noted tension and discomfort exist in demarketing the compensation for work and an equitable quality of life in city environments—questioning belongingness and engagement beyond work, well-being, health, and safety. Such challenges have arisen and expanded during the pandemic, particularly in countries with high levels of inequality.

Given the past structural conditions that led to disparities and inequity, will stakeholders in the future planning of cities be able to leverage this crisis as an opportunity to pursue a development model that is more equitable, accommodating, and resilient? More contributions from urban sociologists are necessary to reduce the enhanced inequality due to the COVID-19 pandemic, and policymakers need to ensure effective and efficient social policy implementation.

Built Environment: Work Facility, Working Environment, Ecosystem Planning, and Social Distance

Functionality, Connectivity, Integration, and Transformation

It is not the first time in history that people have reimagined buildings and cities in response to disease. Disease outbreaks have always been drivers of innovations in architecture and urban design. Pandemics often expose spatial inadequacies and highlight the need for change, redevelopment, and retrofitting. For instance, the bubonic plague of the late 1800s lasted for 20 years in Bombay (now Mumbai). However, the positive and direct result was the creation of the Bombay Improvement Trust (BIT) in 1898. The trust drew up plans and guidelines to cross-ventilate and decongest the city (Lentin 2020). The critical point is that pandemics and epidemics have acted as catalysts in innovating the urban form and services.

In most countries, the shelter requirement response to the COVID-19 pandemic has been synonymous with humanitarian aid agencies and national disaster relief departments, such as prop shelter camps, makeshift hospitals, and the use of discarded shipping containers and other modular solutions. Such a move highlights the absence of distinction between immediate response and long-term needs—of individuals, communities, neighborhoods, and cities. Such actions also emphasize the inadequate knowledge of response agencies in terms of understanding the nature of the pandemic, causing pathogens and space needs, to curb its immediate-, medium-, and long-term impacts.

Learning from SARS and HIV/AIDS, Sample (2012) noted that it is not possible to control disease through one fixed location, but modernism utopia has encouraged the creation of continuous spaces filled with light and air; on the contrary, today, we understand spaces differently as being filled with pathogens and other invisible matter. Another study drew learning from the correlations between architectural parameters and communicable diseases like tuberculosis. Pardeshi et al. (2020) observed the effects of a slum redevelopment policy on tuberculosis transmission in resettlement colonies in three locations in Mumbai. Their findings revealed a strong correlation between a lower capacity for ventilation and sunlight and higher incidences of tuberculosis in buildings in which the authorities had relaxed or violated the bylaws to increase the floor area ratio of the slum rehabilitation project. The implication of such studies is most relevant for over 1 billion members of the global population living and working in slums and slum-like conditions, predominantly in the global south (UNDP 2019).

Considering the post-pandemic increase in the demand for safe, livable, and affordable housing, how can we design, retrofit, and redevelop built environments in cities to address the current and future pandemics? Future research could suggest improvements to the built environment of cities in both permanent and temporal use to prevent the spread of infectious diseases.

Urban Demographics and Urban Forms: Aging Population, Shrinking Cities, and ICT Intervention

Shrinking Cities, Aging Populations, and ICT Intervention

A shrinking city results from a continuous population loss in a spatial area, and urban shrinkage presents planning challenges such as vacant houses, urban decay, economic decline, unemployment, and segregation (Döringer, Uchiyama, Penker, and Kohsaka 2020). Moreover, urban shrinkage interlinks with the aging population in a nation because there is an association between population decline and a declining birthrate and a change of the population pyramid to account for the older population. Under this population change, the population inflow to urban areas eventually decreases, and the urban regions in a city shift to shrinkage.

This situation is affecting even the biggest megacity globally, Tokyo, which is the first shrinking megacity in the world (United Nations 2018), and its suburbs have already experienced several phenomena of shrinkage, such as vacant houses and urban decay (Hattori, Kaido, and Matsuyuki 2017). Moreover, even in its inner places, shrinkage has already occurred in the property market (Kawai, Suzuki, and Shimizu 2019). The phenomenon of shrinkage is drastically apparent in the suburban areas of a city, where it coincides with an aging population (Tateishi, Takahashi, and Nakano 2020).

In the context of urban development, the discussion on the development of cities to meet the high standard of living of their inhabitants is crucial. Maintaining the coherence of the urban

planning strategy, it is necessary to tailor a city to meet the needs of its citizens based on cooperation between various groups of interest (Brodulak 2017). From this perspective, gathering the voices of all citizens is essential, and city planners should be aware of the situations of marginalized people, such as elderly people and those with disabilities. Furthermore, intelligent technologies can contribute to reducing the gap among stakeholders to enhance the usability of cities.

More precisely, since an aging population is observable in many countries, it is necessary to redevelop cities with an awareness of the specific needs of all citizens, including older adults. Using smart technologies for city development, appropriate ICT infrastructure provision can contribute to creating smart cities. Of course, the citizens of smart cities are not limited to using ICT in their homes. They live their lives in their society and contribute to community development. Health care is especially important for older adults, and smart cities can help to meet elderly people's needs in terms of housing assistance, health care, social participation, community support services, leisure, and culture.

Future research can suggest improvements from urban form change by tackling the current circumstances, such as population decline, population aging, and shrinkage of the urban form.

THE WAY FORWARD

Some scholars and policymakers have just begun to discuss the nature of cities after COVID-19. Ishii (2021) suggested six substantial changes as a result of the experience of the COVID-19 pandemic:

- 1) A change in the demand for office space due to the change in working styles and the resulting change in urban land and space use.
- 2) A change in urban structure in response to urban compactness, such as "15-minute communities," due to the change in lifestyles.
- 3) A decrease in the number of retail stores and a change in sales methods due to the shift in consumption styles.
- 4) The promotion of smart factories for sustainable operation of the manufacturing industry and the integration of industry and housing.
- 5) A paradigm shift in the travel industry due to the rapid decrease in travel and the expansion of tourism that integrates work and life.
- 6) The expansion of the use and effectiveness of big data due to the rapid development of urban digitalization and the promotion of smart cities.

The issues that cities originally faced before the COVID-19 pandemic have become apparent since the experience of the pandemic, and both citizens and governments have become strongly aware of the problems. Hashimoto (2020) suggested that future cities should pursue the urban model with dynamic and open characteristics, both spatially and temporally. Spatially, these cities would naturally encompass rural and agricultural areas and may extend as necessary beyond national boundaries. Temporally, they should accommodate not only growth and expansion of urbanized areas but also metabolism and changes in urban morphology and encompass relationships with rural areas. In designing such an urban model, city networking and the concept of a "resilient city" are important.

To summarize, a resilient city means a city with a strong capability to adapt to changes in external and internal conditions such that it recovers quickly from the effects of changes,

including natural disasters and shocks. In the present situation, not only the observation of urban activities and growth but the interlinking and exchange of solutions that individual cities have developed to enhance their resilience are emerging as the critical way forward.

The post-COVID recommendations that researchers are currently issuing are still sporadic and will need to evolve and undergo structural organization through many discussions in the future. It will also be necessary to conduct empirical verification before and after COVID-19 and to make recommendations that reflect the reality of a city. Through this discussion paper, we hope to propose more advanced structural reforms for cities post-COVID-19 and contribute to policymakers' future urban management.

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