

EMPOWERING “SMALL FLOWS” IN THE URBAN FABRIC: experiences from Japan

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Aerial view of K-TOWN
K-TOWN was designed by the author and APLdw. Photo by Toshiharu Kitajima, 2017

Born in 1949, Hidetoshi Ohno is Emeritus Professor at the University of Tokyo and the principal of the architectural firm APL design workshop. He published *Fibercity Tokyo 2050* in 2006. In the updated publication in 2016 *Fiber City, A Vision for Cities in the Age of Shrinkage*, he proposes a new theory of urbanism for shrinking cities in the post-industrial era, connecting “fiber units” in the city to redesign the information, transportation, and industrial networks, as well as the landscape. Hidetoshi Ohno is a member of JIA (Japan Institute of Architects) and AIJ (Architectural Institute of Japan).

KEYWORDS

- URBAN FABRIC
- ARCHITECTURE
- FLOWS

In the context of “Shrinking Cities” experiencing a decrease in population and facing multiple and globalized risks, the theory of urbanism must be reconsidered.

Current urban planning relying on “big flows” needs to be challenged to empower local solutions and help tackle the environmental, social and economic challenges that lie ahead, notably in Japan.

While big flows rely on a further, faster, larger-scale philosophy, with externalities that economically exclude marginal territories, small flows, on the contrary, seek to strengthen urban resilience and foster economic development through local solutions. Smaller urban interventions in the urban fabric could indeed help cities survive in the age of shrinkage. The scale and the responsiveness of small flow projects – three examples from Japan from senior mobility to corporate housing are presented here – allow their management to be accessible to small organizations, to reflect local diversity and to be easily accessed by the public while achieving socio-economic impact.

INTRODUCTION

Many cities face risks. In Japan, a city such as Tokyo will experience – among other risks – a rapid decrease of population and deterioration of infrastructure. In the Age of Shrinkage, urban planning and architecture need to be reconsidered in the megacity as well as smaller-scale cities. During the 21st century, “Big Flow” – meaning the flow of things “further, faster and on a large scale” – has become predominant within cities. However, for cities to become more resilient, it seems important to empower “smaller flows” meaning connecting smaller “fiber units” with each other and changing the urban structure through small interventions in the urban fabric. Three examples of urban interventions that favor Small Flow over Big Flow are presented in this article.

1. CONTEXT IN JAPAN: CHALLENGES OF SHRINKING CITIES AND CURRENT URBAN PLANNING

1-1. THE THREE CHALLENGES FACED BY JAPAN

Japan is facing three big risks: (1) demographic change, (2) natural disasters and (3) public debt.

(1) Concerning demographic change in Japan, depopulation and the aging population are serious issues. The birthrate in Japan is still less than 1.5. Japan's population is predicted to fall to 60 million by the end of this century (in other words, half of the present figure according to the medium-fertility assumption). The elderly population will be nearly 40 million before the year 2060, or 40% of the entire population at that time. [Fig.1]

Depopulation causes industrial production to drop and the market to shrink. In the city, there will come to be more and more vacant houses, closed shops and unused public facilities. As income from taxes falls, governments will not be able to afford the expenses of maintaining civic facilities.

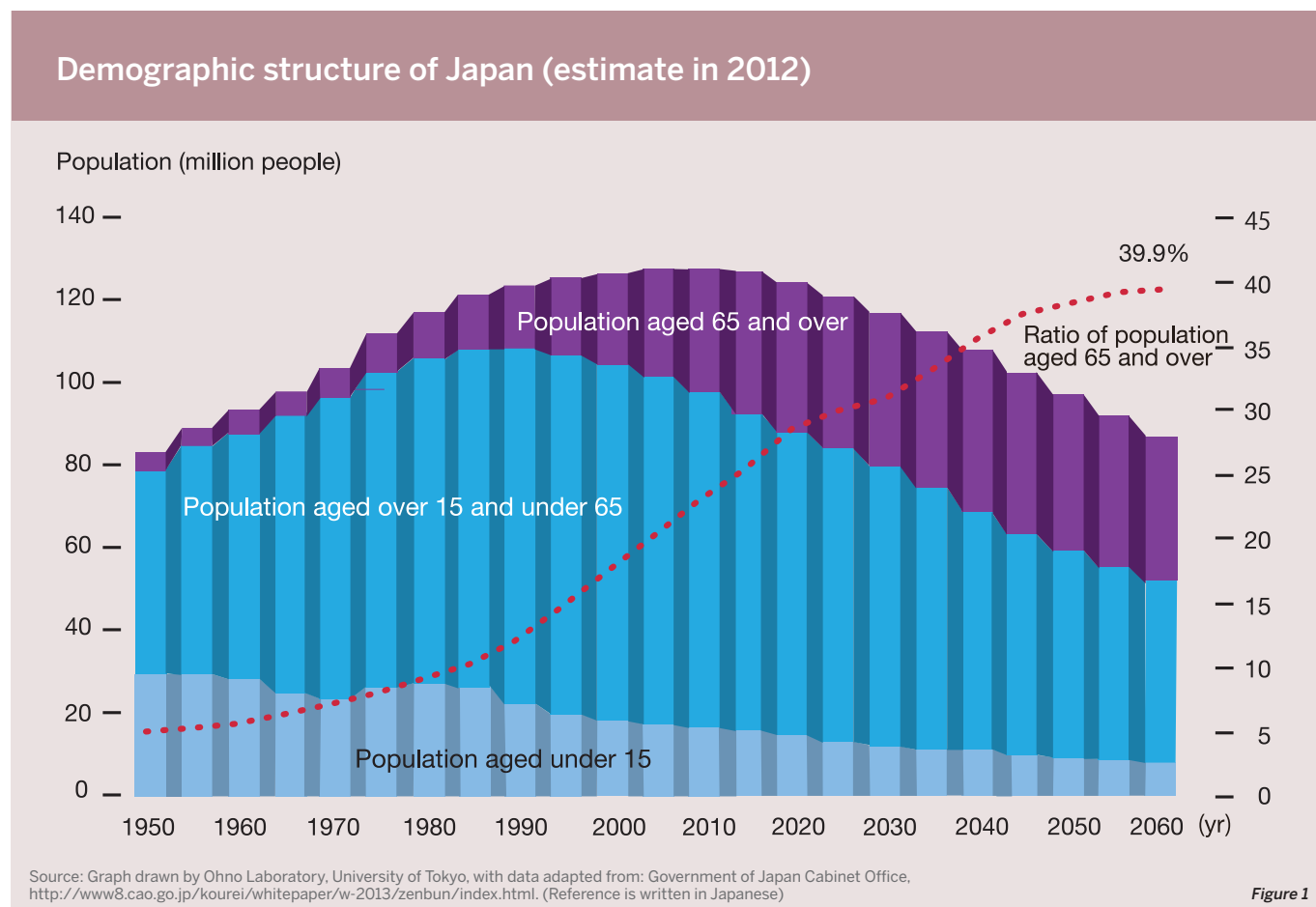
The increase in the elderly population may also cause production to drop and raise governmental expenditures on medical and nursing care.

It also means that, on the household level, many elderly people may become single and some may even live in poverty. Still, there is no

denying that even the physically and financially weak should be able to live in comfort in a democratic country. Mobility is one of the most fundamental conditions of life.

(2) Among natural disasters, earthquakes and subsequent disasters like fires and tsunamis (tidal wave) are the biggest menace to Japan. Typhoons also cause storms, floods and landslides. They attack the Japanese archipelago every summer and fall. Apart from them, the country also sometimes experiences volcanic eruptions. It is nearly impossible to predict the occurrence and intensity of an earthquake and it costs a lot of money and time to prepare measures against them, as it is not sufficient to reinforce a building alone and it is necessary to reorganize the city for safety in the event of a big earthquake.

In terms of disaster mitigation, planners are zealous about realizing their ideal and assume a strong hatred of the real city in front of them. High seawalls are being constructed in the coastal cities and villages attacked by the 2011 Tohoku earthquake and tsunami. The biggest problem with such high sea walls is that it is not possible



to construct and maintain the same kind of seawall along every coast in Japan, even though most of the cities along the Pacific Ocean face equally dangerous chances of tsunamis. The only realistic measure for disaster prevention may be a combination of physical and non-physical means. Japan, in this sense, is far too inclined toward physical measures – in other words, construction.

(3) As for financial problems, most OECD countries have some form of debt, but Japan's debt is extraordinarily large and increasing. It exceeds twice its GDP. Statesmen say that this unhealthy financial situation is the result of the increasing cost of medical and nursing expenditures as well as interest payments. But public construction should also be added as a reason for this debt. Japan developed into the second largest economy in the world in a short period of time after the Second World War. The key to this achievement was the government-guided development of industries and a Keynesian policy. The improvement of public facilities as a Keynesian strategy is extremely effective when infrastructures are not yet fully developed, as in Japan in the 60s and 70s. The construction of social infrastructure directly stimulates economic activity and improves living standards. On the other hand, the success of this policy led to the mistaken belief that city planning meant planning the construction of urban facilities.

These three challenges – demography, natural disasters and public debt – are, in a sense, unique to Japan. However, some common problems inherent to the 21st century can also be observed. Those regions where the birth rate is high will not be able to maintain their productivity when they get rich. Countries enjoying economic prosperity will not be able to grow forever. It is also important that every region on earth should worry about global warming problems today. Generally speaking, growth and development will not be the same as in the 20th century. Many regions will sooner or later experience the same difficulties that Japan faces now. These difficulties are derived from the transition from growth to decrease, or from expansion to shrinkage. The biggest challenge in the 21st century is how humanity can overcome this unprecedented transition.

1-2. PREDOMINANCE OF BIG FLOW OVER SMALL FLOW

Another problem in the 21st century is the predominance of "Big Flow," which has become more and more overwhelming over the years. Big Flow can be defined as the flow of things "further, faster and on a larger scale." This "flow" includes transportation as well as the economy,

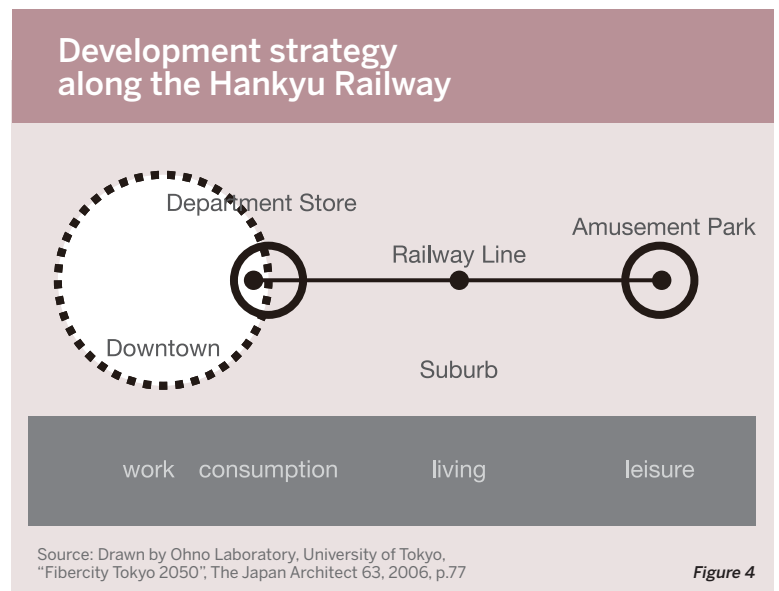
information and energy, among others. Looking back, human history can be described as a history of technical innovations for Big Flow. For example, technical progress in ship building and sailing made geographical discoveries possible and brought gold as well as tomatoes and potatoes to Europe. They yielded enormous wealth to the Iberian Peninsula and enriched European dining. Richard Arkwright created power by using the flow of the river to make cotton clothes an affordable commodity. The Industrial Revolution laid the grounds for a world empire for Great Britain.

Before the mid-19th century, Japan was divided into quasi-independent domains under a feudal system. It was after the civil war that the modern constitutional monarchy was established. One of the first measures taken by the new central government was laying out the railway and postal systems.

In the 1920s, suburbanization started in Japan. Railway systems connecting the city center and the suburbs made it possible for the middle class to live away from the city center and gave them fresh air and life among the greenery. With this big change in city form, a businessman called Mr. Ichizō Kobayashi [Fig.4] devised a business model for suburban development.

The Shinkansen was the first bullet train in the world, developed by Japan. It was for the Tokyo Olympics in 1964 and was developed as a means of connecting the two main areas in Japan – the Tokyo metropolitan area and the Kansai area, which includes Osaka, Kyoto, and Kobe. The fastest train prior to it had taken 6.5 hours between Tokyo and Osaka, while the Shinkansen required only three hours. Since then, the Shinkansen network has been constantly expanded to cover the four main islands of Japan.

It is important that speed can change domestic geopolitics. When movement between cities was limited to railways traveling about 100 kilometers per hour, multiple cities serving as commercial and cultural centers could coexist within a single prefecture. But when travel speeded up to 200 kilometers per hour, many of those cities fell by the wayside. Only a limited number of cities such as Sapporo, Sendai, Tokyo, Yokohama, Niigata, Kanazawa, Nagoya, Kyoto, Osaka and Fukuoka have prospered; each dominates a large



Source: Drawn by Ohno Laboratory, University of Tokyo, "Fibercity Tokyo 2050", The Japan Architect 63, 2006, p.77

Figure 4

commercial sphere of influence that extends beyond prefectural borders. Big Transportation has developed by wiping out Small Transportation at the same time. Streetcars operated in 67 cities in Japan from the 1930s through the 1950s, and closely-knit bus networks had also existed.

What happened with the Shinkansen is that most small and medium sized cities have declined in exchange for the prosperity of a small number of cities. After the Shinkansen began its operations, former main lines were demoted to local lines. There were many cities on former main lines where the limited express train service was abolished and a Shinkansen station was not built. These cities declined.

The automobile has affected contemporary city form in much the same way as the railway. Because the prewar suburbia established by Ichizō Kobayashi was formulated on the railway transportation system, it had a linear configuration. The contemporary suburbia formulated on automobile transportation, however, has a dispersed configuration like a nebula.

Development of the Internet has accelerated the velocity of information. It has enlarged the retail industry. Thanks to the online retailer Amazon, anyone – even someone living in a remote, rural area – can purchase books from the world's biggest bookstore. Although this may seem like a dream come true, it is a nightmare for local economies. When a purchase is made from Amazon,

everything except for the wages of the local home delivery service employees is swallowed up by the company headquartered in Seattle; this also includes the consumption tax. Big Flow sucks dry local economic vitality and weakens localities. When we rely solely on Big Flow, we eventually undermine our own economic environment.

There are many flows in the human body, for instance, breathing, eating, sweating and blood circulation. Blood runs in a system of veins. It is hierarchically organized, its capillaries are very fine and it spreads densely. Big Flow seems to choke these capillaries.

2. THREE PROJECTS TO EMPOWER SMALL FLOWS AT THE CITY LEVEL

As described above, every city – at least cities in a mature society – faces a few big questions. One is how the city can survive in the age of shrinkage. The other is how the city can empower Small Flow under the predominance of Big Flow. Modernistic

Green partition - One of the proposed urban improvement strategies implemented through the intervention of fibers



Source: Drawn by Ohno Laboratory, University of Tokyo, "Fibercity Tokyo 2050", The Japan Architect 63, 2006, p.36

Figure 6

city planning cannot deal with such questions. This is the reason why we need new urbanism. One prospective answer is to develop a method of changing (improving, adapting, adjusting) the urban structure through small interventions in the urban fabric.

These three projects that I have led, presented below, are relevant to this idea of small interventions.

2-1 FIBERCITY: A VISION FOR CITIES IN THE AGE OF SHRINKAGE

The first project is a book entitled *Fibercity*, published in 2016.

This is a polemical and pragmatic book that includes urban projects for the reorganization of Tokyo and Nagaoka to maintain their vitality, even in the age of shrinkage. [Fig.5] *Fibercity* is also a planning theory dealing with existing cities that attempts to control place and flow inside cities simultaneously through the manipulation of relatively small linear elements that I call "fibers." Eleven projects are proposed in the book. Green Partition is one of them. Green Partition is a strategy by which the spread of fires after earthquakes is arrested by dividing high-risk disaster areas into small sections with long, narrow green belts. [Fig.6]

Victims of earthquake debris do not constitute the greatest number of earthquake casualties in Japan. Rather, the highest number of casualties to date have occurred due to fires caused by earthquakes in the Tokyo metropolitan area in 1923 and Kobe in 1995. Because most of the houses at the time were wood constructed, they were light but flammable.

As fires after earthquakes occur in many places simultaneously, fighting such fires is very hard. It is therefore important to replace such flammable structures with fire-resistant structures and firebreaks to prevent these fires from spreading.

Improvement measures for such flammable districts have been two-fold up until now: road widening and consolidating narrow housing lots to create fire-resistant collective housing complexes. Road widening projects have been implemented by local governments in an effort to create firebreaks to prevent fires from spreading, improve access for fire-fighting vehicles, and secure escape routes for inhabitants.

But in fact, it not only takes an enormous amount of time to expropriate residents along the planned roads, but the project budget swells as the cost of expropriating increases. With our proposal, even if a disaster were to strike, the spread of fire

would be minimized and precedence given to the safe evacuation of inhabitants to secure, open spaces. In order to achieve this goal, hazardous areas should be finely divided by green partitions that will help arrest the spread of fires.

In the course of time, as empty land becomes available, it can be absorbed into the green partition, with parts of it being converted to areas of refuge and others used as evacuation routes. At the same time, the green partition will introduce vegetation into areas that lack it, bringing life to artificially barren lands. To make this plan a reality, 8% of the land in each district will need to be converted to these proposed green partitions. This will cause land values to increase and offset the loss of properties used toward the construction of these green partitions.

2-2 SMALL MOBILITY FAIR

The second project, "Next Mobility bazaar" is a fair for small mobility services organized in Kurobe in 2017.

In a few decades, Japan's elderly population will constitute 40% of the national population. Although most of the elderly will not need care at a nursing home, walking around will still not be an easy task for many of them. When people become old, their cognitive capacities more or less weaken. Newspapers often report on traffic accidents caused by the elderly. Some drive their cars on the opposite lane, while others step on the gas pedal instead of the brakes.

In addition to their individual conditions, the urban condition also becomes inconvenient for such people. All enterprises, from supermarkets to family restaurants and fast food stores, are concentrated in shopping malls or along bypasses in cities that are premised on the ownership and use of automobiles. As a result, there has been an increase in areas where people without access to automobiles also lack access to their daily meals. People who lack such access are referred to as "shopping refugees" in Japan, while such areas are called "food deserts" in England. Some people feel helpless in a society so overly dependent on the automobile.

In an aging society, some utopian ideas of mobility conceived in the age of growth may sometimes become dystopian. For example, there is a housing estate in a suburb of Tokyo that was planned on the idea of a cul-de-sac in the 70s. As the central area of the estate is reserved for pedestrians only, residents are forced to walk in their everyday lives. Many residents who bought their homes here in the 70s have become old and find it difficult to walk. A non-profit organization has started to help them with a bicycle taxi service.

Professionals of the physical environment should be obliged to create a society where any disabled person can go where they want, when they want. The Next Mobility community, led by the author, has held, a fair inviting many organizations dealing with small mobility services/products, even for infants and young adults, twice in different cities. A further goal is to create a forum for engineers and companies interested in small mobility. The objective of this exhibition is to demonstrate people's right to move about, especially for the weak such as the elderly, children and those who do not have a driver's license or a car. This is a question of human rights or democracy. Everyone should be given the opportunity to move when and where they like. What is needed is a kind of mobility somewhere between the automobile and foot. This is the idea behind "small mobility." [Fig.8]

Mrs. Uchiyama began to experience pain in her knee 10 years ago when she was 65 years old. She tried to find an easy vehicle but none of the ready-made, motorized wheelchairs attracted her. So she decided to make what she liked on her own. She started a development process with engineers and converted her factory in China, where they used to manufacture paper strings for ceremonial occasions, into a factory for her product. Finally she succeeded in creating a very compact and user-friendly motorized scooter. According to her, since this kind of vehicle is subsidized as a welfare machine by the national nursing care insurance, major manufacturers can set high prices for them. Their supposed users are therefore capable of affording them. However, people who are eligible for the insurance need to be officially recognized as people requiring long-term care. Unfortunately, most of these people have likely already lost their drive to go out. She believes those who really need this kind of mobility machine are those for whom care is not yet required. Such people, however, must purchase the machine by themselves — in other words, without being subsidized by insurance. Mrs. Uchiyama therefore strived to provide her machine for an affordable price and succeeded in doing so. While autonomous car technologies may be useful for such elderly people, the elderly should also activate their muscles and brains as much as possible. Because when we stop using our body, it will easily begin to weaken and fail.

2-3 K-TOWN

The third project developed with APL design workshop is a company dormitory in a town called Kurobe.

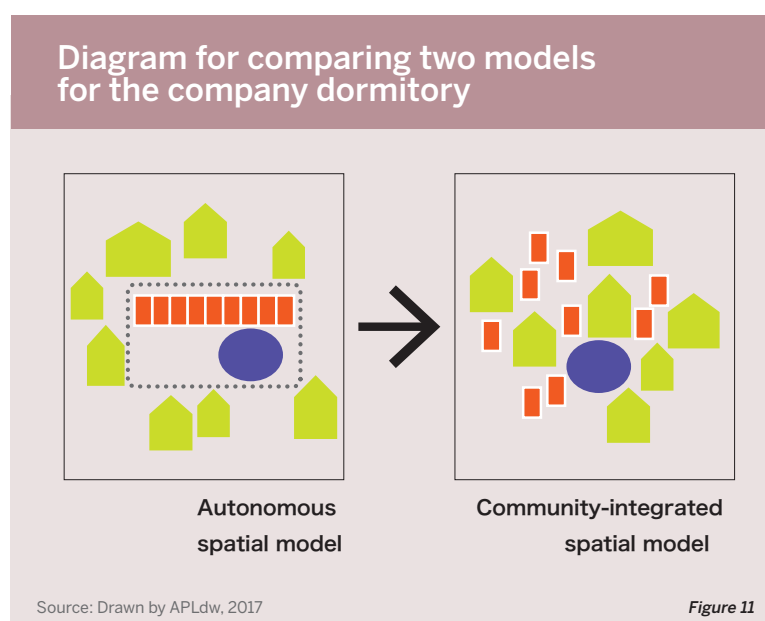
Kurobe is a small town with a population of about 40,000. It contains the factory campuses of YKK, an international company that manufactures zippers and building components such as window sashes.

The YKK headquarter is in Tokyo, but they decided to move half of their headquarter functions to Kurobe for risk diversification after the Tohoku earthquake in 2011.

With this shift, they needed to move many of their staff to Kurobe. This was the reason for developing a new dormitory in Kurobe.

Just as YKK thought, excessive concentration in any one place may make a company vulnerable. Diversity is often the key for yielding dynamism. This is the reason why YKK's strategy is so attractive in Japan. Many enterprises hesitate to go out to local cities, even though they can maintain easy accessibility to Tokyo through ICT, bullet train and airplane. And what's more, they can also save money.

The most noticeable aspect of this project is that the dormitory's configuration is different from those of conventional dormitories. The most popular configuration for a company dormitory is an enclosed arrangement. This segregates the dormitory from its neighborhood. Our proposed plan integrates dormitory residents into the neighborhood. YKK chose this site near the railway station as a means of revitalizing the declining area by bringing in a younger population. As mentioned earlier, in most local cities, people like to live in newly developed areas where automobile life is easier.



CONCLUSION

These three projects deal with different kinds of flows presented in different manners.

The first project presents a general theory about small interventions into the urban fabric with several strategies. In the second project, a new type of flow that is manageable by the weak enters into the scene of public mobility. In the third project, a flow of younger people appears in a stagnant city center through a private company's initiative and architectural presentation.

The strength of small interventions is that they can be managed even by a citizen group, small municipality or small corporation. They reflect the diversity in society and preserve some aspects of the uniqueness of local cultures. They can be easily comprehended and accessed by the public. Moreover, inconvenient results can likely be corrected because urban reformation through a limited scale of intervention is inevitably incremental. They help provide some room in a world virtually dominated by the cruelty of "Big Flow."