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研究課題名(和文) Shrinking Cities: Graph Geometric Simulation of Tagawa and Okawa City, Fukuoka Prefecture

研究課題名(英文) Shrinking Cities: Graph Geometric Simulation of Tagawa and Okawa City, Fukuoka Prefecture

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研究成果の概要(和文)：小規模な日本の都市は、高齢化や人口減少、不況の煽りを受け、縮小しつつあると指摘される中で、政府は中心市街地を基盤とした大規模なインフラ整備により都市の拡張を依然として進めている。本研究では、コンパクト・シティの理論を基礎とした上で、「中道ノード」の利用をもって、よりコンパクトで、より効率が良く、便利な都市のネットワーク・パターン構造を調査することにより、都市収縮計画の提案を行った。

研究成果の概要(英文)：Small Japanese cities have been shrinking with issue of aging, depopulation and weakened economy, but government continues to expand city boundaries and build large infrastructure at "city center". This research, based on the compact city, suggests a tighter, more efficient and convenient network pattern structure by revitalizing the "centrist nodes". This is accomplished by identifying and strengthening significant nodes and streets in shrinking cities.

研究分野：都市計画

キーワード：縮小都市 コンパクト・シティ センターノード 高齢化住宅

1. 研究開始当初の背景

Cities have been evolving continuously throughout history to respond to the need and desire of the inhabitants at that particular period of time. The changes may be contributed by the influence of culture and important local, regional, international events and trends. This research defines such urban reformation into 4 phases:

Phase 1: Collapse of coal towns

Phase 2: City expansion and urban sprawl

Phase 3: Global economy and urban adaptation

Phase 4: Shrinking networks in aging cities

(1) Phase 1: Collapse of coal town

The oil crisis in 1970s led to the less reliance of the fossil to produce energy. The result was the sharp reduction of coal mine industries. The industrial towns that relied on their coal mine industries, including Tagawa and Okawa Cities in Japan, were suffered severely during that time. For example, Tagawa city in Fukuoka Prefecture was a coal town with an excess of 100,000 residents in 1950s but that number was decreased by half in 2010 (50,300 in year 2012). Ever since the coal mine was closed in 1964, the city has been struggled with lack of employment and removal of coal-age town housing.

(2) Phase 2: City expansion and urban sprawl

With the free-market approach of the government and collapse of manufacturing industries in 1980s, urban sprawl reached its peak. Cities grew larger and larger. Impacted by rapid economic and population growth in mid-20th centuries, many satellite cities were constructed in suburbia for the expansion of metropolis. However, growth came to an end but Japanese government continues to merge cities to make them larger even until today. There are 1822 cities in year 2007, 40% decline from 1999. Such move gives the impression that the planning for urban and regional development in Japan is still based on prediction of growth. Nevertheless, population fell in 70% of cities in Japan, currently standing at 127 million; but that number is predicted to be decreased by 22% by 2050.

2. 研究の目的

Most of the cities in Japan and Hong Kong have been shrinking for the last 15 years with issues of depopulation, aging population and weakened economy. Lower population/infrastructure density associated with shrinkage can cause tremendous physical and environmental problems associated with efficiency and accessibility. The forceful expansion of smaller cities despite shrinkage is very

damaging for them, which may result in speeding up their death.

This research, based on the compact city, suggests a tighter, more efficient and convenient network pattern structure by revitalizing the “centrist nodes”. This is accomplished by identifying and strengthening significant nodes and streets in shrinking cities.

3 . 研究の方法

(1) Literature Review

The history of city growth and contraction of cities in Japan and Hong Kong were reviewed. Sustainable urban design concepts, including compact city, smart growth and carbon-zero city were examined, to relate this research to the larger framework and mainstreams.

(2) Documents and photos of Japanese and Hong Kong were collected. Their physical changes were recorded. Field studies were organized to investigate different parts of the cities in Japan and Hong Kong. The researchers confirmed the location of existing infrastructures, old factories, buildings and vacant land lots. Special attention was given to old buildings and vacant lots that were situated at locations with have outstanding centrality.

(3) After extensive urban analysis, 4

historical phases in urban developed were defined and elaborated. 5 Design principles and strategies were examined to revitalize the shrinking cities.

4 . 研究成果

The 2 latter phases of urban reformation are defined comprehensively in the research.

(1) Phase 3: Global economy and urban adaptation

Industrial cities which used to rely on coal or manufacturing business are significantly weakened in the new global economy. A large number of Japanese industries relocated other factories to southeast Asia, while others have been losing customers as their product price could not stay competitive with the developing countries.

(2) Phase 4: Shrinking networks in aging cities

It is critical to come to a realization that cities are no longer growing but shrinking, and urban planners need to re-develop strategic plans and policies for effective city contraction. Compact city promotes high residential density, mixed land use, public transportation system, and an urban layout that promotes walking and cycling. Inherited from the Garden City Movement, Such sustainable urban layout would encourage more social

interaction and improve the livability of residents. Compact city principles are important for urban renewal include mixed land uses, small walkable nodes and sustainable concentration of residents. Furthermore, Fiber City suggests design strategies such as “green web” and “urban wrinkle” to re-create a walkable city and promote re-use vacant lands for greenery and emergency escape way.

The revitalization of centrist street may include a mix of building units that could satisfy the need of different types of residents: nuclear families, single families, students, artists, elderly and handicapped. Starting from the viewpoint of local town revitalization, urban planners should contemplate beyond the basic town planning principles and conceptualize a new lifestyle for urban inhabitants, based on re-developing an more efficient urban layout to encourage walking.

Consequently, 5 different strategies were analyzed to revitalize the retail buildings and residential buildings along the centrist nodes of cities. Such strategies would also be appropriate for the other shrinking cities such as Hong Kong.

(1) Intensify the Floor-area ratio of Buildings in Cities

With the concept of Compact City, the scale of extremely high density would be appropriate. The intention is to improve the energy efficiency of buildings, reduce environmental degradation, and enhance humanistic scale of its shopping streets, lifestyle and interaction.

(2) Promotion of local craftsmanship

Many suburban towns such as Okawa have unique natural treasure and infrastructure with historical value. Planners may find spectacular landscape, temples, traditional architecture, craftsmanship unique to the town. Itsukushima shrine in Hiroshima, Japan, has flourished its surrounding streets and local residents for centuries.

(3) Architecture tour along centrist nodes

Many neighbourhoods in North America attempt to define the local tourist spots within their neighbourhood with folklore. It would raise the civic pride, and attract tourists in the community. Moreover, they encourage local artists to inhabit in their neighbourhood, and create unique studios, galleries and cafes.

(4) Self-sustaining lifestyle for elderly, non-nuclear families

Urban planners could encourage buildings designed with various features and functions, so inhabitants would gradually develop a sense of ownership and care with

their buildings. The collective housing and co-housing, along with local small-scale farmland for organic agriculture and plazas could keep the inhabitants satisfied, stabilize the population in the shrinking cities, and encourage interaction among residents. The Unite de Habitation of Le Corbusier is a well-known example, attempting to include inside a building, everything an inhabitant needs in a city.

(5) Integration with civic services

There appear to be a new trend of government attempting to be more open, and developing a more intimate relationship with its residents. On the contrary, many civic facilities such as stadium and libraries are seen as under-utilized. There are opportunities to integrate vital public facilities in the private residential building complex, such as city halls, music halls, postal offices, schools and sport facilities (stadium, swimming pool). Such integration would lead to a higher consciousness of sustainability in cities, further improves the public relation of government, and heightens the civic pride.

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5. 主な発表論文等

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6. 研究組織

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