The Floating Towns of Tomorrow

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Urban Planning Solutions to Challenges in Coastal Communities

By

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FOREWORD

In the midst of the current global crisis, grappling with climate change and the impending threat of rising sea levels, Singapore, like other low-lying island nations, cannot afford to ignore serious consideration of creating "new land" through the innovative use of Mega Floating Structures.
This comprehensive booklet, authored by Torrisi & Procopio Architetti in collaboration with Lim Soon Heng, the Founder and President of the Society of Floating Solutions (Singapore), serves as a catalyst to promote the possibilities of urbanizing nearby islands into sustainable floating towns for the Singapore of tomorrow. The study booklet presents visions of three new towns of tomorrow utilizing the islands around Singapore.
The authors' use of clustering small islands with floating structures gives rise to the ability to achieving varied urban design of high and low-rise building forms giving a variety of spaces for housing and commercial uses. The advantage of the use of islands is the avoidance of conflicts with the shipping lanes of the Port of Singapore.

Singapore is an ideal location for the creation of buildable land with floating platforms because of its benign climate. Located in the inter-tropical convergence zone, the city-state benefits from low wind speeds, minimal wave action, and natural protection against tsunamis.

Leveraging Singapore's global success in the supply of offshore floating rigs and floating production and storage platforms (FPSOs), to develop technological expertise in the construction of Mega Floating Structures for the industries, towns and cities of tomorrow, could offer limitless economic opportunities.

EDWARD H Y WONG
Managing Director, AWP Pte Ltd
Past President, Singapore Institute of Architects
Honorary Fellow, The Society of Floating Solutions Singapore

PART I

INTRODUCTION

An uncertain future awaits us and the challenges that humanity must prepare to face are difficult and at the same time stimulating. Issues such as climate changes, renewable energy, population growth and constant concentration of residents in urban areas are the challenges of the future and some answers to these challenges are already on the way.

New plans for floating cities could be one of these answers and it seems they are a viable solution to address climate changes as well as population growth in land-scarce cities. Currently there are some ongoing developments for floating cities in Korea and in the Maldives. Other floating developments are currently explored near Panama for seasteading communities and a huge industrial floating development is planned in Saudi Arabia.

Far from discussing utopian visions or far-off ideas, this exploration focuses on innovative solutions poised to materialize sooner than anticipated, leveraging existing technology.

Within the first section of this work, we present, based on a pilot proposal for Singapore, practical urban planning solutions that hold relevance for numerous coastal cities worldwide.

Singapore serves as an exemplary case study, having expanded its territory through land reclamation in recent decades, a practice that, though effective, is environmentally detrimental and unsustainable in the long run. As an island surrounded by smaller islands, Singapore is a city-state grappling with limited land availability, a burgeoning population, and a flourishing economy that continues to attract many. These factors underscore the urgency of our study, aiming to address future challenges and alleviate concerns about what lies ahead.

In such a context, the first questions we wanted to address with our study were:

How to face population growth in a typical land-scarce city like Singapore?

What solutions can be explored for the planning of our future?

Being aware of the complexity of the issues and that it is not possible to give definitive solutions, our proposals should be therefore considered as an input for further studies, as a first step towards open debates involving multiple parties, not just for operators in the planning and architecture industry, but for all those who wish to feel involved in rethinking our cities and who want to contact us to propose solutions, ideas and criticisms.

How to face population growth in a land-scarce city like Singapore? To answer this question we have identified two ambitious ways to support Singapore's long-term development needs (fig. 1.1):

1. A better use of the areas on the mainland through the relocation offshore of some industrial and military activities (floating industrial developments) with the aim of freeing up areas for some new high-density mixed-use developments.

2. The possibility of urbanizing the smaller islands around Singapore by means of mixed-use developments, both on land and floating through the use of very large floating structures (platforms).

The new expansion of the city should be planned according to the same principles and rules that have characterized the urban planning of modern Singapore over the past 40 years. Continuity with the plans of the past is essential to ensure that the new developments are harmonious and that the new parts of the city are vibrant and liveable.

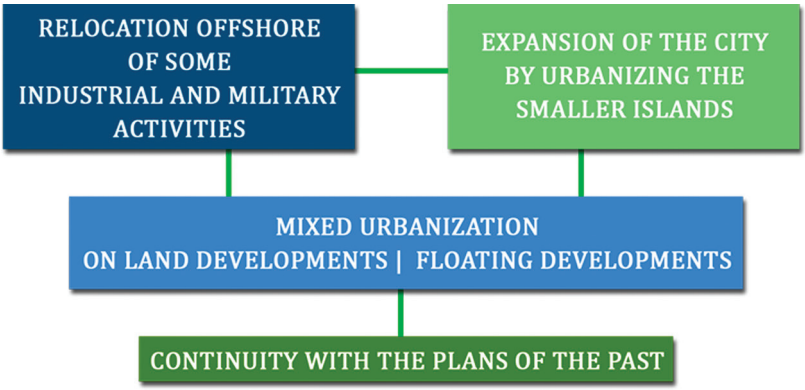


Fig 1.1

Not everyone is aware of the criteria and principles that have been used to plan modern Singapore over the past 40 years. So, although there is no shortage of publications that illustrate every detail of the "Prototype of a city", the conceptual model that incorporates all the above criteria and principles, we will try to describe it briefly in this book so that our proposed pilot project inspired by it is understandable to all readers.

PROTOTYPE OF A CITY

The prototype of a city that inspired the planning of modern Singapore is an organic system consisting of multiple hierarchical cells.

According to this model Singapore was divided in 5 regions from 600,000 to 1 million inhabitants (Fig. 2.1), in turn divided in 26 new towns from 150,000 to 300,000 inhabitants (Fig. 2.2), then in neighborhoods from 4,000 to 8,000 inhabitants and precincts from 700 to 1,000 inhabitants.

In this system each region, new town, neighborhood and precinct has its own centre. Daily necessities are available in neighborhood centres which are accessible by foot, higher-level needs are available in new town centres or regional centres that are accessible by bicycle or bus, leaving the activities of the highest level for the CBD (Central Business District) which is accessible by MRT, bus or car.

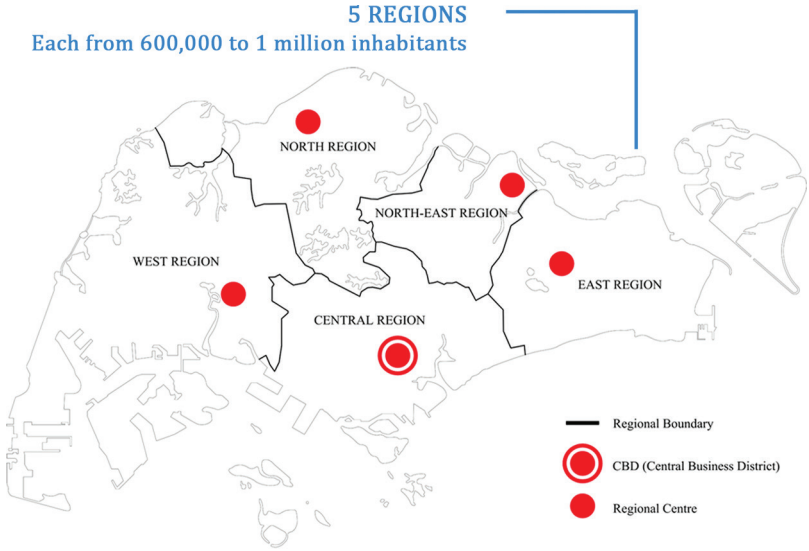


Fig. 2.1

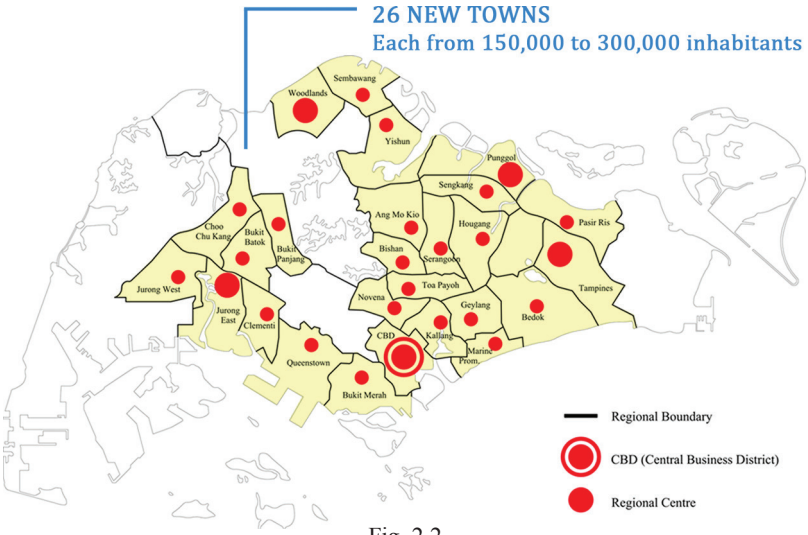


Fig. 2.2

These decentralized structures achieve the twin goals of a good quality of life and reduced traffic congestion. Thanks to this prototype, Singapore was built according to the vision of a "unique tropical city of excellence. A city that is healthy and beautiful, unique and gracious, with a distinctive character"(1).

We believe that this model should be followed for future plans of the city, and in particular, the new town planning unit should be considered as a reference model for the future expansion of the city.

(1) Liu Thai Ker, 2015, Challenges and Reforms in Urban Governance – Insights from the developments experience of China and Singapore, pag. 82 -148

The self-sufficient new towns are the core concept of the prototype. Unlike other part of the world, where the satellite towns generally refer to small isolated towns on the edge of a metropolitan area, in Singapore's plan a new town is a major planning unit, the key to the success of an urban plan that works very well.

According to the Prototype, a new town consists of:

A minimum land area of 15 sq.km and a population from 150,000 to 300,000 persons.

A road system with major and minor arterials, local roads, expressways and the MRT which traverses the town centre.

Parks and green spaces are distributed at the town, neighborhoods and precincts levels and possibily connected each other by linear public green belts to form green corridors.

A percentage of land reserved for a non-pollutive industries located at the fringe of the town (high tech, general light industries, food factories).
This provides job opportunities close to home and reduces daily long-distance commute, preventing traffic congestion.

Wet markets, sports complex, outdoor cafes and food courts are necessarily provided to symbolize Singapore's traditional lifestyle.

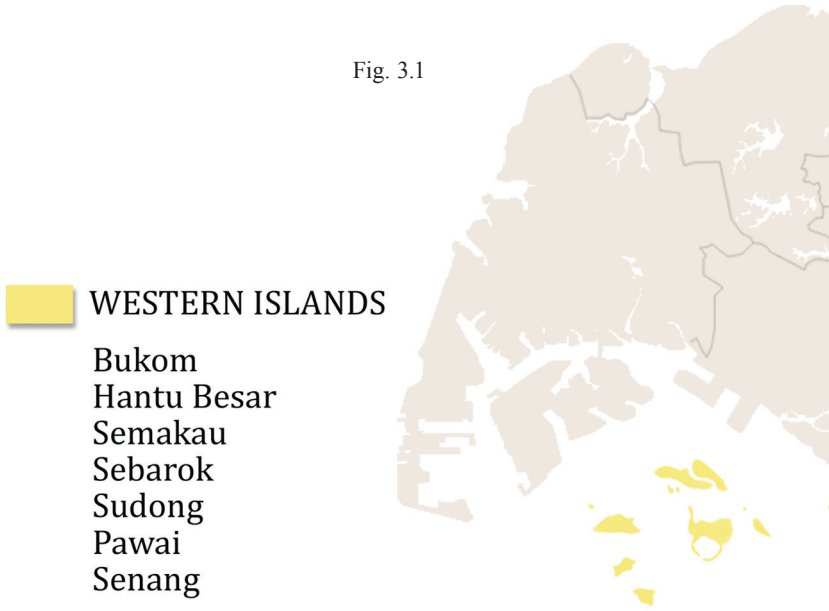
Each new town was in turn divided in neighborhoods, defined by arterial roads, and precincts, defined by local roads.

URBANIZING THE SMALLER ISLANDS

According to the aforementioned Prototype of a City, a self-sufficient new town is the most important planning unit among those that make up the city.

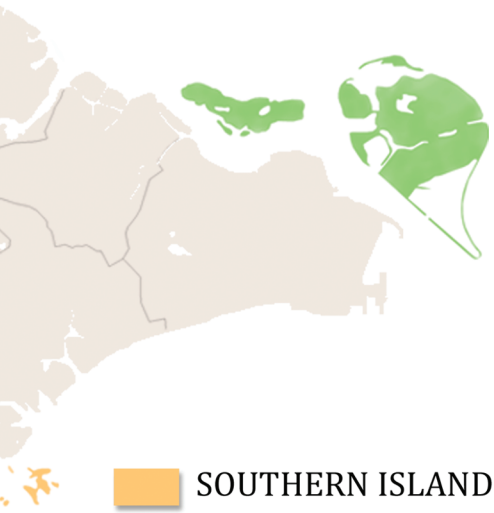
Thinking about a future mixed on land or floating development for the smaller islands surrounding Singapore (Fig. 3.1) and considering their size, shape and their peculiarity of small archipelagos, it seems that each group of these smaller islands can be the ideal location for a future new town.

Fig. 3.1



Each of the 3 groups of islands (Western Islands, Southern Island and Eastern Islands) could encompass an area large enough to allow the planning of a new town built partly on land and partly floating on the waters of the archipelago.

Such a development consisting of 3 new towns would ensure accommodation for at least 720,000 new inhabitants. Minimum, as it is worth remembering that a floating development is always easily scalable and flexible according to the future needs.



EASTERN ISLANDS

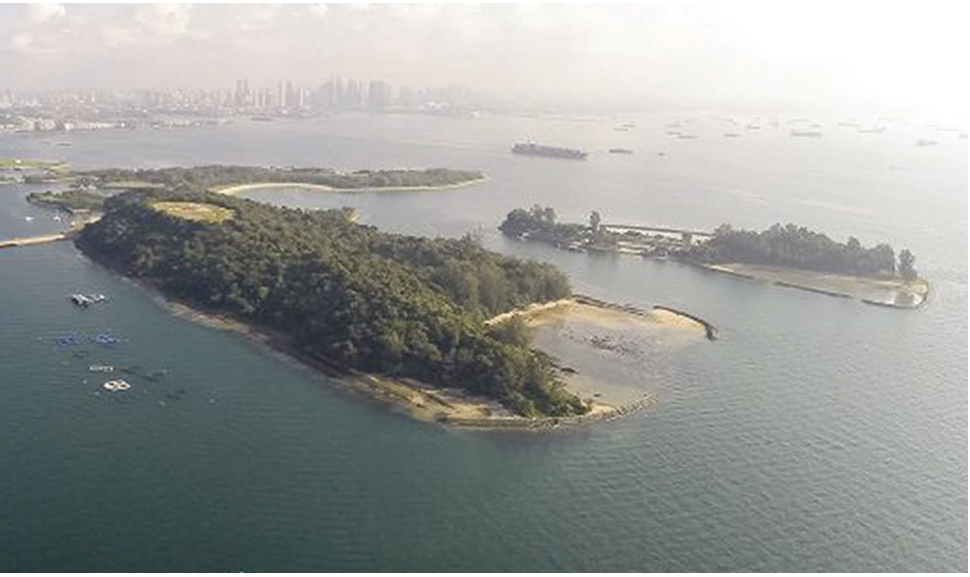
Palau Ubin
Ketam Island
Tekong

SOUTHERN ISLANDS

St. John
Lazarus
Kusu
Tekukor
Sisters Islands

Southern Islands_ Aerial view (Source: http://islandnation.sg/story-from-the-sky/)

SOUTHERN ISLANDS DEVELOPMENT



New Development Total Area (On Land and Floating): 8.3 sq.km

On Land Area (Islands): 1.55 sq.km

On Water Area: 6.75 sq.km

Estimated Population: 70,000 inhabitants distributed in 7 neighborhoods of 10,000
Each neighborhood is in turn divided in 10 precincts of 1,000 inhabitants.


Tekukor Island
SOUTHERN ISLANDS
Sisters Islands

Fig. 3.2


Tekukor
Island
Subar Darat
Island
Sisters'
Islands


The Southern Islands of Singapore
Seringat Island
new green
existing green
fresh water reservoir
new buildings
existing buildings
N
Kusu Island
t. John sland
Lazarus Island

Fig. 3.3

The Site

The Southern Islands (Fig. 3.2) are part of the central region of Singapore and include Sisters Islands, Tekukor, St. John, Lazarus and Kusu Island.

The new development concerns the creation of a new urban area built both on land and on water (Fig. 3.3).

The future new town will be connected to the mainland by the extension of the Sentosa Express and by the already existing ferry service from Marina Bay, which should be appropriately enhanced.

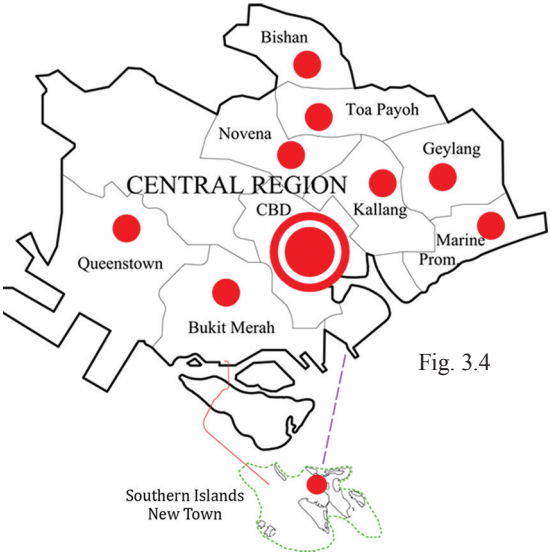


Fig. 3.4

Fig. 3.5

As part of the central region (Fig. 3.4) and due to the proximity to the Central Business District and to Sentosa, this development should be strongly characterized by touristic, economic activities and by medium-high level residential areas.

Of the new 7 neighborhoods envisaged by the urban plan (Fig. 3.5), three are built entirely on floating platforms like independent islands (N3, N4 and N5), while the other four (N1, N2, N6 and N7) are mainly developed on land. The New Town centre (N1) is located on the northern part of Lazarus Island, where the high-density commercial, tourist and residential buildings are most concentrated.

Fig. 3.6

The main marinas and the ferry station, as well as museums, theaters and leisure facilities are also located in this area.

The floating neighborhoods are instead characterized by a lower population density and low/medium-rise buildings, however they are equally provided with all the necessary infrastructures and services such as sports complexes, parks, shops and markets.

Tekukor Island, Sisters Islands, Kusu Island, and St. John Island as well as the southern part of Lazarus Island, are not affected by the new developments and their lush vegetation as well as their existing buildings are entirely preserved.

Fig. 3.7

Western Islands_ Aerial view (Source: http://islandnation.sg/story-from-the-sky/)

WESTERN ISLANDS DEVELOPMENT