The Story of Hong Kong – Review of her Infrastructure Developments and Strategies to meet a Sustainable Future

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Abstract

With the taking off of her economy from the beginning of 1970s’, Hong Kong has experienced a continual growth in GPD at averaged 8% per annum up till the outbreak of the economical crises that spread across the eastern part of Asia in 1998. As many developing cities or countries have been facing, the pace of development in infrastructure could easily be lapsed behind under such rapid expansion. This may result to the occurrence of a number of problems due to the demands, such as in transportation, housing, environment or other basic logistic support required by a modern city, cannot be instantaneously be met from such growth. If the worst come to the worst, it may depredate the urban quality, and the long term economic development may also be jeopardized.

In view of this, the Government of Hong Kong in the past decades has invested multi-billions of dollars every year in the development of infrastructure facilities in order to keep Hong Kong to be a convenient, modern and competitive world-class city. These facilities include developments in the port and airport, railway, highway, new towns, and other strategic works that aim to improve the urban structure, environment and living condition of the entire territory.

The purpose of this paper serves to provide a brief summary of what has been done in the past decades, and to review the strategies and coverage of these works in order to have an overall understanding of these developments in the meeting of Hong Kong’s future challenges.

1 Introduction

To accommodate somewhat 7 million people in a piece of land of size slightly bigger than 1,050 sq km like Hong Kong is not an easy task. Needless to mention the 240 outlining islands and hilly topography that contributes to about 62% of the total land area which cut the territory into bits of almost disconnected lands.

The overall population density per sq km in Hong Kong is about 6450 in 2002. The figure conceals wide variations among different areas in the territory. The averaged population density in the metro areas is about 7 times greater than in the New Territories, the vast piece of rural land situated on the north of the metro. Thanks to the continual development of new towns outside the metro areas since the 70’s and other loosely introduced urban restructuring and thinning programs, the difference in population density is gradually dropping in the recent years.

Hong Kong was once a industrial center during the early 60’s famous for her cheap labours and family-styled factories. Hong Kong had experienced a drastic economic take-off since the 70’s, followed with a gradual economic restructuring process resulted from the migration of her industrial base into the mainland after the opening of the economical policy in China in early 80s. The process has transformed Hong Kong from a manufacturing-based economic structure into a re-export, financial and services-based structure. And of course, a sound legal system, strong international linkages,
efficient transportation and a strong team of entrepreneurs are also the key elements in Hong Kong’s success.

2 A Review of Hong Kong’s Development in general

As a slow developing colony of the United Kingdom, Hong Kong did not have the eyesight, motivation nor resources to develop herself into a center city with the required social, economical and urban facilities before the wars. However, as a political consequence after the 40s’, such as the change of the governance of China, the rush-in of capital from mainland during the civil wars, the Korean war, the onwards political hurdles in the Communist China between the 50s’ and 60s’, as well as the lack of competitors in the nearby regions, Hong Kong had successfully developed herself into a regional center which founded on a primitive yet functional and flexible manufacturing-based economy. And of course, the basic logistic capability such as a relatively efficient government, sound law system, and her positioning as an international port with free trade policy, also contributed to the success of her rising-up. Yet such success to certain extent was based on the sacrificing of a number of factors such as the living standard of majority of the citizen and the natural environment. As a result, poor housing condition, dense population, lack of community facilities, serious mis-use of land and polluted environment could be found all over the territory.

![Photo 1 a & b – Tsuen Wan (left) and Kwun Tong, situated at the edge of the metro districts, are satellite districts or new towns of the first generation. They show sign of aging but the renewal and restructuring process remain slow.](image)

Situation had slightly improved after the late-60s’ accompanied with the gradual taking-off of Hong Kong’s economy. Studies and planning at a strategic level to improve overall development of the colony was then conducted in a more systematic way in order to address to various demands. In 1972, Hong Kong had completed the first Outline Plan which aimed to set a long term land use and development strategy to meet the territory needs and to stipulate the necessary planning rules and standards for implementation.

As the economical, social and political background of Hong Kong experienced drastic changes to a more positive side, a more detail and all-rounded studies was launched after 1980. During the 80s’, a series of planning studies such as the Hong Kong Sub-Region Planning, Rural Planning, Metroplan and Port & Airport Development Plan had been completed for public consultation, decision making and finally for implementation [1]. These studies also served a very important task such as to set a framework to coordinate with other major development strategies. In 1996, a consolidated plan known as the Territorial Development Strategy (TDS), was finally introduced.

TDS is the highest tier in the hierarchy of town plans in Hong Kong. It provides a board, long-term framework on land use, transport and environmental matters for the planning and development of the territory. The followings are the main objectives as set out in the TDS [2].

**Objective 1:** To enhance the role of Hong Kong as an international city and a regional centre for business, finance, information, tourism, entrepot activities and manufacturing.
Objective 2: To ensure that adequate provision is made to satisfy the land use and infrastructure needs arising from sectoral policies on industry, housing, commercial, rural, recreation and other major socio-economic activities.

Objective 3: To conserve and enhance significant landscape and ecological attributes, and important heritage features.

Objective 4: To enhance and protect the quality of the environment with regard to air, water quality, noise, solid waste disposal and potentially hazardous installations by minimizing net environmental impacts on the community.

Objective 5: To provide a framework within which to develop a multi-choice, high capacity transport system that is financially and economically viable, environmentally acceptable, energy efficient and make provision for the safe and convenient movement of people and goods.

Objective 6: To formulate a strategy that can be carried out both by the public and private sectors under variable circumstances, particularly with respect to the availability of resources and significant changes of demand.

3 A Review of Hong Kong’s Infrastructure Development

The investment in the infrastructure development by the government of Hong Kong in a coordinated and strategic manner can be dated back to the early 70s’. These developments were introduced roughly in four waves. The first wave started in early 1970 till its end with development mainly on the container port, mass transit railway, and the forming of new towns of the first generation. The second wave continued throughout the 80s’ with concentration on the improving of territorial transportation based on highway, as well as the further development of new towns of the second generation. The entire 90s’ can be regarded as the third wave of development, during which, the new airport and its associated projects, another major phase of container terminal facilities, and a series of high-speed highway system, were being commissioned. After 2000, a series of railway lines have been completed which bring the fourth wave as the era of mass and rapid transit.

From the functional point of view, infrastructure development in Hong Kong can also be categorized into 5 areas as summarized below:

3.1 Port and Airport Facilities

The first batch of container terminals was put into operation in the early 70s’. At present, there are nine container terminals under the operation of five different operators (Container Terminal No. 1 to 9). Totally 25 berths situated in the Kwai Chung basin are provided with a handling capacity of 12 million standard container units per annum. These facilities, together with the prosperous market in the southern part of mainland China, have positioned Hong Kong into the busiest container port in the world [3].
On the air transport side, studies to relocate the Kai Tak Airport situated in the congested built-up area in Kowloon City had been carried out since the late 70s. A number of sites and options had been put forward since then. It was until 1991 after the signing of the Memorandum of Understanding between the governments of the United Kingdom and the People's Republic of China, the decision for the relocation and construction of a new international airport was then finalized. Within 6 years’ time, a new airport on a site located at an uninhabited island of Chek Lap Kok, together with a series of associated and supporting facilities known as the airport core projects, was completed for operation in 1998.

These core projects included the formation of the required land for the construction of the new airport and other related facilities, some of which are situated in the metro areas with the dual purpose for providing reserved land for long-term urban re-structuring. The projects also provided the necessary transport link between the new airport and the downtown city, which included the construction of a 35 km expressway with a new cross-harbour tunnel and two long-span bridges (Tsing Ma and Kap Shui Mun Bridge), as well as the 30 km Airport Railway. These projects cost about US$25 billion altogether, but excluding the capital input from the commercial sectors such as operators of the air cargo terminals and other real estates and property investments. These projects not only led to the completion of a world-class international airport that enhanced Hong Kong’s competition in the region, they also set an important backbone for the continual development of Hong Kong on a strategic territorial basis in the coming decades.

3.2 Formation of New Lands

Hong Kong has very limited land resources particularly in the built-up areas surrounding the harbour. There has always been a pressing need to provide additional land for housing, social, economical and other logistic purposes to meet the needs of rapid economic and population growth. Since there is very few available land in the built-up areas, majority of the new land formation is thus acquired through the process of reclamation. Such operation has provided more than 600 hectares of land within the metro area during the past 2 decades, which included the large-scale reclamation that took place in West Kowloon, Tseng Kwan O, Central and Wanchai; as well as some less-extensive projects like the Hung Hom Bay, Aldrich Bay and Tsuen Wan Reclamation.

On the positive side, the forming of land by reclamation around the harbour can serve a number of purposes such as to provide new land for essential major transport infrastructure, to facilitate the thinning out of densely populated areas by providing land for housing and additional community facilities, or to improve cityscape such as by providing waterfront promenades etc. However, strong arguments have also been raised from professional bodies, environmentalists and general public that the irreversible process of reclamation may have critical drawback in particular to the ecology and
hydrology of the harbour, induce mis-match or mis-use of land, causing over-development and further reduction of the harbour area etc. It is expected that the forming of new land through reclamation could hardly be enforced in the future due to these reasons.

3.3 New Towns Development

Hong Kong has developed 9 new towns since the initiation of its New Town Development Programme in 1973 to cope with the increase in population and to improve the living environment by decentralizing the population from the over-crowded urban districts. The planning concept for new towns is to provide a balanced and self-contained community as far as possible in terms of provision of infrastructure, community facilities and other basic urban needs. These new towns, of course, serve also the function to provide the ancillary resources to allow the relieving, upgrading and re-structuring of the old and run-down areas in the metro districts [4]. The 9 new towns can be roughly classified into 3 generations. The first generation which included the Tsuen Wan, Sha Tin and Tuen Mun new towns, started development in early 70s’. Tai Po, Fanling/Sheung Shui and Yuen Long, being the second generation new towns, were formed in the late 70s’. While the latest generation, covering the Tseung Kwan O, Tin Shui Wai and Tung Chung new towns, were developed within a span from the 80s’ to 90s’. The current population of these new towns is about 3.5 million which formed a very significant figure when compares to the total population of 6.8 million.

As a natural outcome, these new towns attracted the moving-in of low-income population due to the cheaper land cost and their relative remoteness from the metro area, the majority of which are dwelled in public houses owned by the Housing Authority. A number of social problems arise due to such inherited conditions. In this connection, one of the prioritized policies of the government is to provide more efficient transportation facilities in particular railway transport to convenient inhabitants getting into the metro areas for employment and other community supports, at the same time to attract more investment into the new towns so that a more balanced and self-sufficed community can be better developed.

3.4 Transportation Facilities

Within the 1050 sq km territory, Hong Kong has a road network of about 2000 km, of which about 250 km is within an expressway system. To make the road network updated, the government has undertaken a series of comprehensive transport studies since the late 1970s’ which aimed to provide an efficient land transportation network to serve the rapidly increasing population, economical and developmental growth. In the recent decade, the planning and development of the road network is coped closely with the Territorial Development Strategic plans that geared the development to more
long-term strategic goals of the territory. For instance, the territorial sub-region on the northwest New Territory is planned mainly to support higher density of population as well as to be used as a major transportation link with mainland China due to her geographical vicinity. A number of expressways (trunk routes) are thus provided to the area for the efficient moving of people and goods. These expressways include the 26 km Route 2 and the 35 km Route 3 that linked the area with the airport and metro districts. A new cross-border link, namely the Deep Bay Link and the Shenzhen-Hong Kong Western Corridor, are under construction and scheduled for completion in mid 2006.

According to the final report of the Comprehensive Transport Study released in 2003 [5], railway is prioritized to form the backbone of future passenger transport for its environmental friendliness and efficient mass carrying nature. In the report, it also stressed that the development of the rail system should synchronize with the land-use development.

There are two railway operators in Hong Kong, namely the Kowloon Canton Railway Corporation (KCR) and the Mass Transit Railway Corporation (MTR), of which, the former is a wholly government-owned organization.

There are a few important milestones in the development of the railway network. Hong Kong has her first mass transit railway system in 1979. In 1983, the then 73 years old KCR Kowloon-Lo Wu Line was converted into a double-tracked rail and underwent full electrification, indicating that the railway was localized that served individual new towns with mass transit capacity. It was until 1998, the second major rail line, the MTR’s Tung Chung and Airport Express Line, was put into operation which linked the new airport and the adjacent new town of Tung Chung with the metro.

It becomes more fruitful after 2000. In 2002, the MTR 12 km Tseung Kwan O Line was put into operation. A year later, the KCR 31 km West Rail followed. There will be two more lines, namely the East Rail Tsim Sha Tsui Extension Line and the Ma On Shan Line, both owned by the KCRC, opened in early 2005. Some more major railway lines, such as the Lok Ma Chau Spur Line (cross border link), Kowloon Southern Link Line and the Shatin-Central Line, have been commenced or approved for construction, with a schedule for opening in 2007, 2008 and 2010 respectively.

In 2003, the railway system has a total length of about 200 km which accounts for about 28% of daily domestic passenger travel and 80% of cross-boundary passenger trips [6].

### 3.5 Facilities of Logistic and Community Support nature

There are facilities that serve to provide the essential services to a city, or to provide with the basic infrastructure that is required to achieve specific functions or targets as part of the strategic
development of the territory. Examples of these kinds of facilities, again, can be classified into a few categories under Hong Kong’s special situation.

- Public facilities such as for community services, sport, recreational and cultural purposes, or other focus projects for tourism or image building nature.
- For essential services such as for water works (reservoirs, aqueduct, treatment plant etc., while electricity supply is provided by monopolized utility companies under two geographical sub-regions).
- For environmental improvement purposes such as for sewage disposal (Strategic Sewage Disposal Scheme and Harbour Area Treatment Scheme), storm water and flood control, or for waste treatment and disposal.
- Projects with a specific or strategic function such as the Industrial Park, convention and exhibition centre, Science Park, Cyberport, large-scale theme park (The Disney Land), the West Kowloon Cultural District, leisure and recreation district (North Lantau), or other strategic urban regeneration, cityscape and landscape improvement projects etc.

4 Procurement, Delivery and Operation of the Infrastructure System

The actual provision of major infrastructure projects not only involves huge amount of capital and the commitment of public funds, it also affects the financial position, detail design, implementation, risk characteristic, quality of services, onward operation and maintenance of the items. The government of Hong Kong adopted a rather flexible and diversifying approach in the procurement of various major infrastructure projects depending on their nature, potential of the projects, market and financial situation from time to time in order to obtain the best option for implementation. As a result, in majority cases, very high quality, reliable, economical and financially viable projects are being delivered which in general well-served the preliminary functional targets in the overall development of the territory.

Below are some categories of projects under the procurement system adopted in Hong Kong.

- **Wholly government-owned projects:** Traditionally all public works of general nature such as the provision of community facilities, land formation and highway projects etc. are financed, implemented and managed by government. Departments including the Civil Engineering, Highways, Territory Development, Drainage Services and Water Supplies departments are the main agencies representing the government in the delivery of such projects. These projects are funded by the government directly under tiers of pre-approved procedures. And for some major projects, even though approval has been obtained from other policy bureaus, final financial approval is still required from the Legislative Council before the commencement of work.

- **Specially franchised projects with capital directly from the Government:** In Hong Kong only the railway services are of this nature and they are operated by the MTRC and KCRC. The MTRC was originally a specially franchised corporation provisioned mainly for the running of railway services in the metro area. Her set-up and authorization was defined by the MTRC Ordinance. However, the corporation has undertaken a privatization process in 2000 of which 33% of its assets are owned by public shareholders. KCRC is a 100% government funded corporation charged with the task of operating and developing domestic, cross-boundary and intercity railway services in a prudent commercial manner. These two organizations have developed very strong experience in railway operation for the past 30 years. Recently, government tends to input certain competition between the two operators when they are bidding for new lines and services. The purpose of such arrangement is to obtain the best options such as in the case of the 12 km Shatin-Central Line in which the KCRC has won the contract for the putting forward of a more sounding proposal.

- **Projects operated by statutory bodies:** Examples of these kinds of projects include the Industrial Estates and the Science Park (managed by the Hong Kong Science and Technology Parks Corporation), Hong Kong Convention & Exhibition Centre (operated by the Trade
Development Council), Airport at Chek Lap Kok (by the Airport Authority), or in the implementation of specific urban renew projects (through the Urban Renewal Authority) etc.

- **Projects under Build-Operation-and-Transfer arrangement**: Mainly employed for tunnel projects including all the 3 harbour crossing tunnels and 2 highway tunnels in Hong Kong. In such cases, the investor will be responsible for the construction, management and operation of the facility after the completion until a prescribed period which is usually 30 years. Tunnel projects are selected using this kind of procurement arrangement for they can be easily isolated from a major infrastructure system and the prediction of demand and return is more reliable and straightforward.

- **Projects operated under Public-Private Partnership arrangement** [5] or under special agreement with government: A number of representing projects such as the Cyberport, a number of real estate development projects with land owned by the government, and the recent West Kowloon Cultural Districts, are launched in this manner. Forthcoming projects such as the construction of a “Super-Prison” at Hei Ling Island and the reconstruction of the Prince of Wales Hospital, are expected to adopted similar principle in the development process. However, arguments are often being raised in the procuring of projects using this concept for the public sometimes query whether the scheme can be put forward in a fair and open manner, as well as whether public interest are being adequately conserved.

5 **Sustainable Development**

Despite all the detail planning issues in the territorial development process, one fundamental question frequently asked is: how far and in what direction we have achieved? One of the major considerations among all other issues is whether the development sustainable. Developments considered to be sustainable should be able to balance social, economical and environmental needs, both for the present and future generations [7]. At the same time, they should also be planned accurately fulfilling predetermined targets, economically viable, socially affordable and environmentally acceptable.

As for Hong Kong’s specific conditions, the following directions are identified to be the major focus in Hong Kong’s development from the sustainability point of view.

- **Development to provide good quality living environment**: this covers strategies and projects to regenerate the old urban areas, thinning out of highly congested districts, adequacy in the provision of urban facilities, harmonization in the zoning planing and utilization of land resources, creation of more job opportunity as a consequence of good planning, meeting housing and community needs by providing adequate land and infrastructure for the upgrading of the overall living quality.

- **Development to enhance Hong Kong’s functions as a regional centre**: this includes the provision of sufficient land reserves to meet the changing needs of commerce and industry, strengthen the role of Hong Kong as a global and regional financial, business, tourism, transportation and logistics centre, and the development of closer physical, economical and social link with mainland China.

- **Development to conserve environment**: this includes the conservation of natural landscape and ecology system, preservation of natural or cultural heritage of significance, ensure development with due regard to the environmental carrying capacity, development of an efficient, economical and environmentally friendly transport system, and the strengthening of a sound legal framework and statutory control system to ensure high quality and environmentally acceptable development. Other concerns such as the continual improvement of environmental quality in particular to air and water, is also a major issue.
6 Lessons Learned from Hong Kong’s Experience

Hong Kong has gained a great deal of experience throughout decades of territorial development, of which, some are of great value due to remarkable success. However, unavoidably, some experiences are quite painful and undermined long term predicaments that may take years to rectify. Summing up as below are some important lessons that we learned during the past years:

- Planning must be carried out accurately but at the same time with flexibility to cater for unexpected changes. One solid example is that in the Territory Development Strategy that publicized in 1996, three economical and population growth scenario have been introduced up to 2011. However, the picture is entirely different after year 2000. The outcome is far below the most pessimistic scenario due to a number of drastic changes both in economy and political environment.

- Prediction of future needs is very difficult yet the commitment in such long term development should be determine and full of vision. Take the construction of the new airport as an example. The project, including the supporting core projects, cost about US$25 billion and took more than 10 years to construct including the planning and pre-contract works. The new airport is now proved to be a very successful development which enables Hong Kong to remain competitive among her neighboring cities for the coming decades. However, there is also painful example as for the West Rail project which is put into operation in late 2003. The project cost US$5.5 billion but the utilization rate is only about 30% as originally expected.

- Besides good planning, a reliable means of project delivery system is very important for the success of large-scale infrastructure projects. This can assure the projects be able to obtain the required capital and satisfy the best development value, or whether the project can be delivered on time, within budget, minimizing possible risks, and fulfilling the required quality, standard, or other predetermined functions.

- Planning and development creates great conflicts of interest within the community in particular for investors and stake-holders who are directly involved in the process. Common arguments such as the location, alignment, planning rationale, acquisition of land, procurement methods, or the way of financing the project, are routine problems to solve during the development process of all major projects. Needless to mention some arguments which are of highly political nature or involving the letting of land, such as the Cyberport project (1999), or for reclamation projects such as the latest phase of Central-Wanchai reclamation (2003).

- The change in population profile also undermines uncertainty and causes impacts to the original planning. The issue can be of political, economical and social orientation. Out of such
changes, the most significant effect for Hong Kong in the recent years is the immigration rate from mainland China is much less than anticipated, which resulted to the disruption of a number of related issues such as the provision of new community facilities, demand on land and transportation, or the upward drifting of average population age. This will incur serious planning mis-match or even financial difficulty in a long run due to such changes.

- The quick up-rising of China’s economy is a threat and at the same time provides huge opportunity in Hong Kong’s development. For example, the special economy zone of Shenzhen, a city locates 30 km north of the metro area of Hong Kong, is now ranked the fourth in the world container cargo market, equivalent to about 45% of the handling capacity of Hong Kong at present. Hong Kong has to keep herself very efficient with the required logistic such as continual upgrading of her highway system in order to be competitive. Meanwhile, the rapid development in China in the areas of manufacturing and IT related industries as well as in the service sectors such as in trading and finance, professional services, real estate development etc., generates countless opportunities for Hong Kong’s investors. All these interrelating factors should be treated in a holistic manner. The role and vision of the government should be shifted from a territorial to a regional prospective so as to cope with China’s development. The search of new orientation and identity is critical for Hong Kong to become prosperous and sustainable.

The last but not the least, development under any circumstances will cause damage to environment. Good control such as the introduction of environmental impact assessment and stringent control system can only minimize the problems. Development and construction process does create huge damages to natural habitats, rural environment, create waste and pollution. At the same time, it can easily lead to over-development and uproot some kind of existing equilibrium in a society. The community should wisely consider whether such damage could be affordable for the sake of development.

Reference

[3] Dr Dong-Wook Song, Hong Kong Polytechnic University, *Cooperative Strategies for Container Ports: The Case of Hong Kong and South China*, 2002