How does the spatial and built form characteristics of Hong Kong inform its walkability?

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Abstract This paper focuses on how adjustments to pedestrian accessibility and walkability can enhance the economic and spatial value of a particular built environment. Using the case of the redevelopment of Taikoo Place in Quarry Bay, Hong Kong, this research explores user behaviour patterns and pedestrian flows at different times and locations based on the existing arrangement and future layouts.

Through these findings, this research aims to provide an assessment of the functionality, pros and cons of the the split-levelled, layers spatial structure of the public and quasi-public realms in Hong Kong – both indoor and outdoor, on the ground and above the ground, in order to generate alternative perspectives on pathways, open areas and how they are linked.

Key words: walkability, spatial structure, users' behaviour pattern

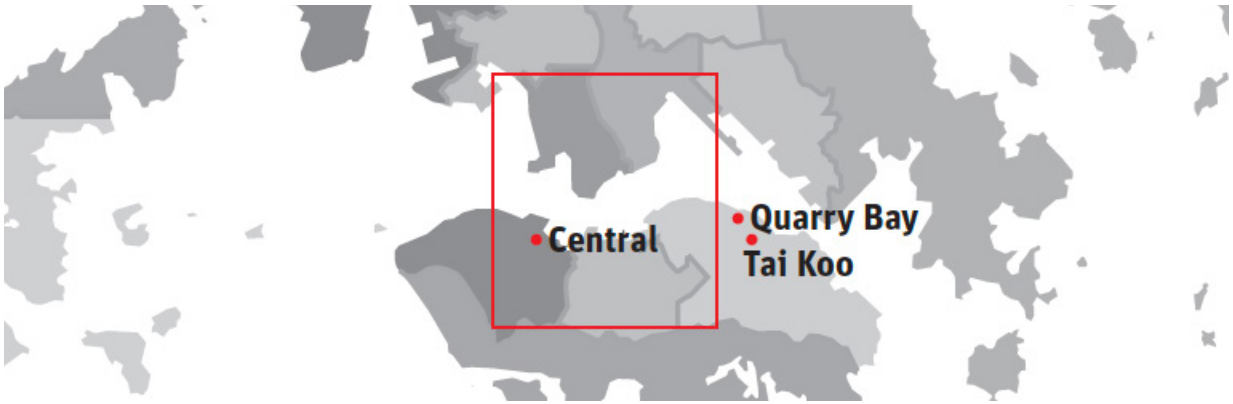

Figure 1: Hong Kong Central and Quarry Bay (source: Author, 2018)

Introduction

With the public transport system of bus and rail (MTR) in Hong Kong responsible for 90% of all journeys taken, walking is a necessity in Hong Kong, at least for the 'first mile' and 'last mile' of those journeys. given the city's density, compact and layered urban structure the walkability of these routes becomes a critical part of the city's planning.

Walking can be a special experience in Hong Kong, with the streetscape varied and prone to blockage by flying highways, mammoth shopping malls and other obstructions. This results in a requirement by the pedestrian to be less reliant on the footpath than they might be in other cities, to walk through buildings from one footpath to another, up and down escalators and along elevated walkways. The outcome is an unusual hybrid pathway, part indoor, part outdoor, part elevated, part sunken, and hence only partly on ground. A number of scholars (Zheng, 2016; Gold, 2006; Kwok, 1999; Lin, 2002; Lui, 2001; Pu, 2001; Smith, 2006) highlight the connection between foot traffic on footbridges linking commercial buildings and the tendency towards consumerism within the people of Hong Kong. Another key factor is the climate of Hong Kong, with a hot and / or wet climate for around half of the year leading people to indoor walking routes to stay cool and dry. Rotmeyer, J. (2006), Robinson, J. (2014), Ferreira, N., Lesage, S., Vishniac, J., & Wang, Z. (2013)) argue that walking via covered and enclosed walkways is mainly inspired by the tropical weather in Hong Kong.

However, in addition to the climate, the elevated and in some cases below ground walkways of Hong Kong are also clearly used in three other ways that make them a noteworthy element of the urban condition of Hong Kong.

Firstly, in districts such as Wanchai, where expressways bisect the city, walkways are used to separate foot traffic from vehicular traffic. Secondly, in densely over-developed districts such as Causeway Bay that are subject to intense pedestrian overcrowding at street level, pedestrian walkways offer an alternative release valve to relieve the pressure and danger of this. Finally, walkways are used in combination with elevators, escalators and travelators to provide step-free, walkable routes across the underlying steep terrain upon which a proportion of Hong Kong's built form is constructed.

Whilst the causes can be a topic of debate, there is a growing consensus that good walkability will bring substantial benefits to the city and its people (GovHK: https://www.pland.gov.hk/pland_en/p_study/comp_s/hk2030/eng/finalreport/). These benefits include better public health, higher real estate values, travel time savings and greater accessibility, increased economic opportunities, as well as other environmental and social gains. With so many overlapping factors and interests in the value of walkability, what are the key elements to consider in terms of creating a more walkable environment in Hong Kong?

Numerous assessment tools have been developed in recent years that can measure the useabilty of pedestrian environments, including Geographic Informations Systems (GIS), Space Syntax and empirical studies of pedestrian behavior patterns. This research add to this data set with findings of existing and expected walk-

ability patterns within the multi-layered public and quasi-public realm of Taikoo Place in Hong Kong.

Spatio- functional walkway and street level usage

The research into public space and accessibility by Rapoport (1975), Lynch (1984), and Tshu (1996) argue how the city is formulated by people, and continually evolving with the people who live in it. They further state how this human foundation constitutes the social 'institutions' that drive the generation, synthesis and implant of the multilayered decision-making process within the city. There is a cyclical process whereby the physical and social-economical relationships among these entities create the framework within which these 'institutions' develop.

In Hong Kong, like many other cities, the urban form and spatial structure may be viewed as the resultant form and framework for many of these social institutions, overlaid on the density of urban form which in turn is informed by the original topographical condition and the morphological development of the city as it has built upon this. An additional factor more peculiar to Hong Kong, particularly Hong Kong Island, is the practice of land reclamation. The northern shoreline along which the urban heart of Hong Kong lies has been realigned and shifted outwards a number of times over the last 100 years.

In simple terms then, Hong Kong's spatial structure can be interpreted from three pespectives – density of urban form, topography, and the social institutions of the people that occupy this.

Firstly, density has many different definitions or interpretations, what the important is the understanding of the physical as well as the social-spatial relationships among objects, people or the built-up area of a certain place. The housing and workspace required for the sheer number of people living and drawn through economic migration to the city is a key factor. The individual islands of Hong Kong, including Ap Lei Chau and Tsing Yi, are amongst the most densely populated land masses in the world. This has led to the 'left-over' space for common public areas and circulation being very limited. The tendency is towards vertical expansion to the maximum height and maximum allowable footprint on each site.

Secondly, the topography of Hong Kong, and the typology of the built form set upon it, are also a factor in how elevated walkways come into being. From a topographic perspective, there is often a disconnect in the section of the street, with retaining structures raising the footpath on one side of the road two storeys or more higher than the other side. In the building typology there is a planning regulation that makes it permissible to build 'podiums' that occupy the full 100% of a building plot up to 16 metres in height, above which a tower extending further upwards should reduce to a smaller percentage. Elevated walkways connecting podium to elevated ground, or from podium to podium, are often the most direct connection that can be made.

This has led to narrow pavements in Hong Kong being overwhelmed with people, and a manipulation and redefinition of the ground surface in response to this (Frampton, 2012).

Elevated walkways and pedestrian bridges have hence become one of the defining characteristics urban form in Hong Kong. The Hong Kong MTR station is one such example of a multi-level pedestrian network with a

very busy flow, given its position at the junction of city routes in all directions, and as the main departure and arrival point into the city from the popular Airport Express train service to Chek Lap Kok international airport. Such transport interchanges provide tremendous opportunities for the development of underground pedestrian tunnels. Similarity, these subterranean walkways reduce the foot traffic at street level.

In an area of such high traffic the pedestrian bridges and tunnels do not solely perform as an alternative mean of access. These routes also support a wide variety of commercial activities and hence stimulate economic vitality. Upon the creation of multiple grounds, it gives rise to permeability and multiple access points.

Case study: Taikoo Place

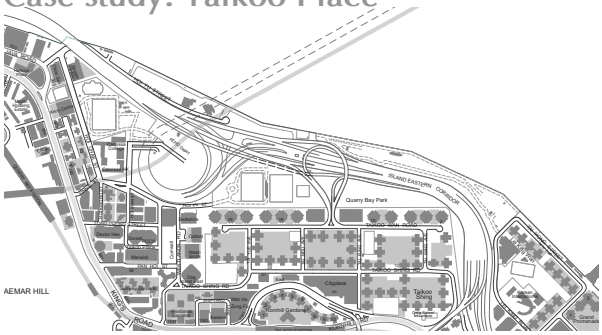

Figure 2: Taikoo Place in Quarry Bay with landmark buildings (source: Author, 2018)

Taikoo Place is an office complex located in Quarry Bay, in the eastern part of Hong Kong Island, Hong Kong. The complex includes the office buildings, and some open external areas in internal atrium spaces with some amenities and restaurants. The complex is set within a residential neighbourhood, with some commercial and banking facilities within the surrounding streets, and adjacent to the larger residential district of Taikoo Shing. Surrounding the site to the East are the elevated parklands of Mount Parker, and across the East Coast Expressway is a harbor-side promenade.

Taikoo Place is owned and managed by Swire Properties, one of the largest developers in Hong Kong. The adjacent City Plaza office and shopping complex is also part of their portfolio, which is surrounded by the 12,000 apartment complex of Taikoo Shing, also constructed by Swire.

These three complexes are all constructed on the site of the former Taikoo Sugar Refinery and Taikoo Dockyard. As a business district , the ambition for the area is for it to become a new CBD area in Hong Kong. Commencing from 2014, three warehouse style office buildings were demolished to make way for two new grade 'A' office towers and a large quasi-public square. Connecting the square to the surrounding buildings will be an elevated and enclosed first floor walkway.

Quarry Bay is one of the sub-districts of the Eastern District of Hong Kong Island, with an overall area of approximately 209 hectares and a total population estimated to be in the region of 143,000 (Hong Kong Government, 2017).
The different zones of the Quarry Bay outline zoning plan and their respective areas, in hectares and percentages are listed in Figure 3 below.

As stated in the explanatory statement of the Quarry bay outline zoning plan, the redevelopment of the former Taikoo Dockyard into a major self-contained residential estate (Taikoo Shing) has marked the gradual transformation of Quarry Bay from an industrial/dockyard area into a major residential/commercial commu-

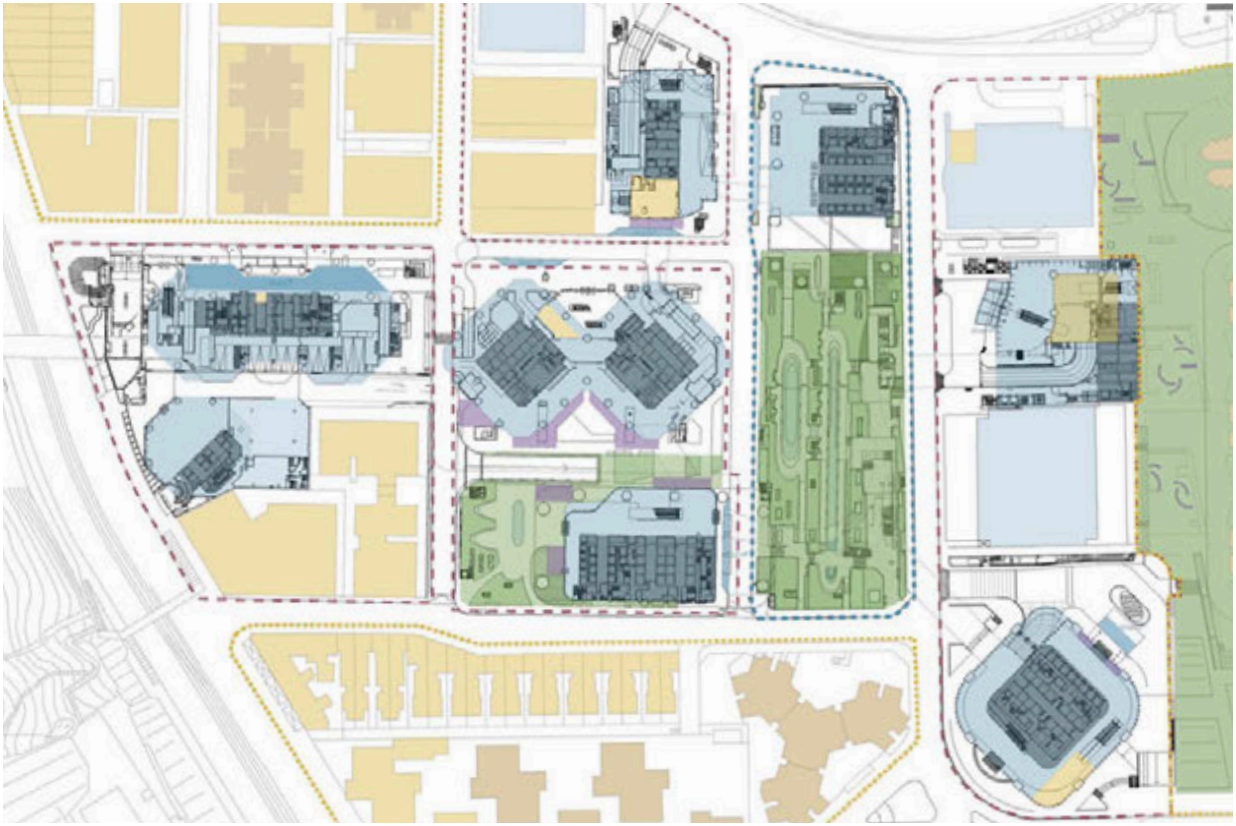

Figure 3: Zoning plan for Quarry Bay, Hong Kong (according to Quarry Bay outline zoning plan)(source: Hong Kong Government)

Figure 4: Taikoo Place and Quarry Bay; Landuse and Zoning(source: Hong Kong Government)

nity. This, together with other similar developments, most of which are concentrated at Westland Road, Shipyard Lane and Taikoo Trading Estate, become out of place with the surrounding land uses. As a result, the interface between these industrial and residential buildings is subject to environmental problems which are a major source of complaint from the public. In order to encourage more residential development in the area these existing industrial areas are specifically zoned to encourage redevelopment into compatible or residential uses.

The sequential development of Quarry Bay began in 1990 with the commercial buildings along Tong Chong Street, linked by an elevated pedestrian bridge to Quarry Bay MTR station. Building work continued until the completion of One Taikoo Place in 2009.

Construction work began again in 2014 and the office towers of One Taikoo Place opened in 2019 and Two Taikoo Place is due to open in 2021.

Understanding this development in relation to the existing built form in Quarry Bay, this area shows an interesting spatial structure in terms of street layout, building typology, and its accessibility and walkability through the ground level and above the ground level. This redevelopment will extend the usage of street level for both residential and commercial users at both ground and first floor levels.

The new quasi-public landscape of Taikoo Square, built by Swire on private land but open to the public, is currently under construction, with the new elevated walkway due to link the square to the surrounding office towers in 2021.

While the benefits of high urban walkability might apply across geographies, the magnitude of these benefits and ways to realize them could be quite different from one place to another in terms of accessibility, consumer cost savings, public cost savings, efficient land use, liveability, public fitness and health, economic development, and equity. Site observation and measurement from Quarry Bay MTR station and the neighbouring Taikoo Shing MTR station showed that 8000 people arrive per hour at both stations and use the street level to walk through to their final destination. Before the constru-

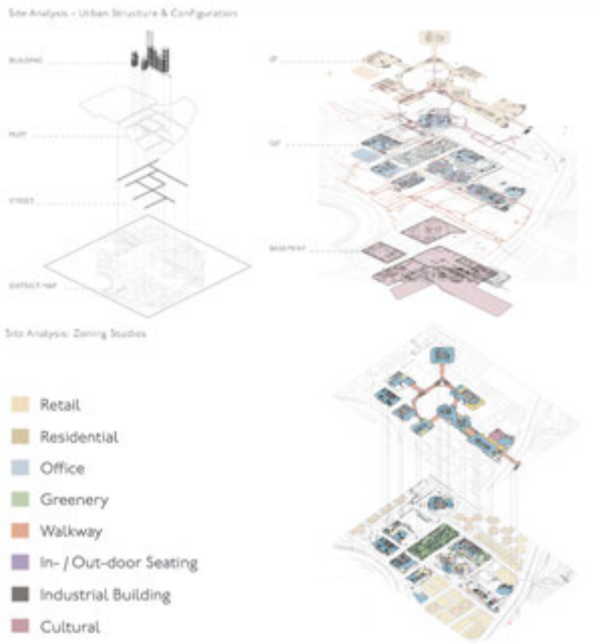

Figure 5: Three-Dimensional map of Taikoo Place and its elements(Source: Authro)

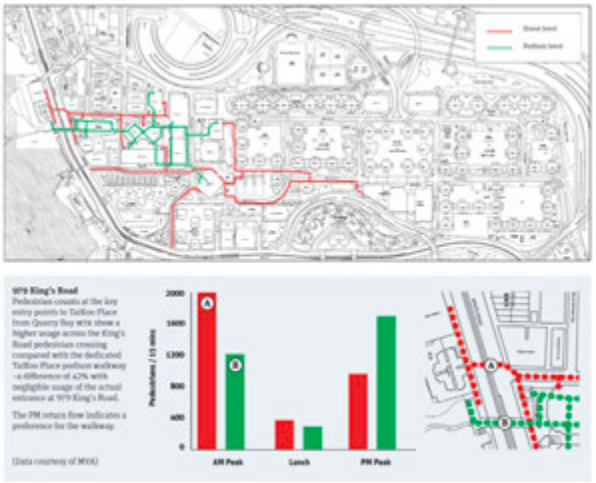

Figure 6: Existing footbridge performance (source: MVA 2016)

ction and demolition of the previous first floor walkway, the footbridge pedestrian users are mix 1800 in every 15 mins along the 8 buildings, totalling 35 % of the footbridge walking population. This data shows the division of different users between ground level and aboveground level, as well as the different pattern of human flows on the ground level when compared with the public realms and the footbridge. Most of the footbridge users are office workers, and the ground level street users are mostly local residents or local business people.

The purpose of the walkway bridge is to enhance the connectivity across the development and increase footfall to the restaurant and other commercial outlets that exist within the internal realm of the development at ground and first floor.

However, considering Quarry Bay's diverse population density and spatial complexity, the vertical integration of Building typology with horizontal layering of pedestrians and walkway have not developed a comprehensive urban design strategy directly related to such a cityscape both for external and internal public realm.
To analyse the walkability on both street level and footbridge at Taikoo Place, it become clear that it cannot be descried by master plans or elevations. It signifies a series of socio-spatial relations which will contest many assumptions and conjectures in existing architectural and urban studies, particularly regarding the notion of public space, topography, density, mobility, and spatial equity which is the outcome of a series of geographic, economic, and regulatory determinants (Lai and Baker, 2014). It reveals the potential socio-spatial relations of the new walkway at Taikoo Place, especially the new linkage point between new Taikoo Garden and One Taikoo Place, which will bring additional economic value and opportunities yet to be investigated.
The data also highlights how the specific benefits associated with accessibility and permeability in Quarry Bay are numerous and interrelated. It is crucial to recognize them, and in light of that to rethink the physical and social connection in terms of connectivity, permeability, diversity, variety and integration with public transportation.

Conclusion

Can Hong Kong be considered a modern-day pioneer of the skywalk? If so, why? Is it because of the tropical weather, high density, hilly topography and pollution? Do these factors impact on the walkability of the city?

There has been considerable interest globally in recent years in developing the walkable streets, neighbourhoods and cities. Much of this research, is geared towards cities that are less hot and humid, less mountaineous, less densely built up and populated. This research has therefore highlighted some design principles specifically for the case of Hong Kong, and relevant for other cities of comparable scale and climate.

Considering Quarry Bay and the redevelopment of Taikoo Place as a specific example, the new walkable footbridge at first floor level will play an important role in the Quarry Bay re-development project in terms of enhancing the environmental, economic, and social success of the scheme.

In conclusion, although there are long term design strategies required and plans needed to

transform Hong Kong into a truly walkable city, this paper has highlighted the particular factors to consider in making a truly social streetscape. It has identified the importance of different dimensions of design, management, equity, business ownership, behaviour and interaction in working places (Penn, Desyllas, and Vaughan 1999), linking accessibility, density and diversity to explain the 'spatial capitals' (Marcus 2010).

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