

## Hong Kong as a contemporary laboratory for the future scenarios of vertical growth

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### **Abstract**

*During its brief history, the skyscraper has experienced radical transformations that have profoundly changed its character, redefining the system of urban relations that it establishes with the city. Among the main typological changes of the skyscraper, there is the passage from “single vertical building” to “aggregation of several buildings”. Over the last few years, the relationship between the skyscraper and the city has been enriched by connections operated through sky-bridges which have altered its fruition methods. The paper aims to focus on the city of Hong Kong, which is emblematic as regards the vertical experimentation and the construction of public pedestrian infrastructures (called CEW). There will be analyzed 2 paradigmatic points for understanding Hong Kong’s vertical tissues: the osmotic relationship between interior/exterior and the intersection with the infrastructural system (and the formation of covered squares). This research aims to develop this theme through a theory of Vertical Fabric, a critical system that investigates the spatial conformation inside and outside the skyscrapers in the light of a morpho-typological criterion. Considering the skyscraper as a vertical fabric, it is possible to highlight the relationship between the urban path and the building, and the implications of the service core in the spatial articulation of the skyscraper itself. Central and Admiralty districts testify as vertical growth is linked to the phenomenon of internalization of the paths that governs the relationships between skyscrapers and horizontal connective structures. As an immediate result of this phenomenology, we find the definition of a new paradigm of urban mobility, realized through a ground plan at altitude which performs the function of access, exchange and meeting. The paper also intends to focus on the changes in relational dynamics between the high building and the metropolis, outlining the possibility of considering individual buildings as micro-cities that host gathering places.*

**Keyword:** *typology, vertical fabric, vertical densification, Hong Kong, hyper-connections*

### **Introduction**

The purpose of this paper is to propose an analysis of Hong Kong's vertical densification in the light of a theory of Vertical Fabrics<sup>1</sup>. This combination might seem unusual, but it is an interpretation that fits within the studies of Saverio Muratori and Gianfranco Caniggia's Roman school of urban morphology. Before analyzing the specific case of Hong Kong (considered as a case in which the coexistence of a whole series of phenomena of crossing, mobility, and hyper-connection typical of today's megalopolises) it is good to dwell

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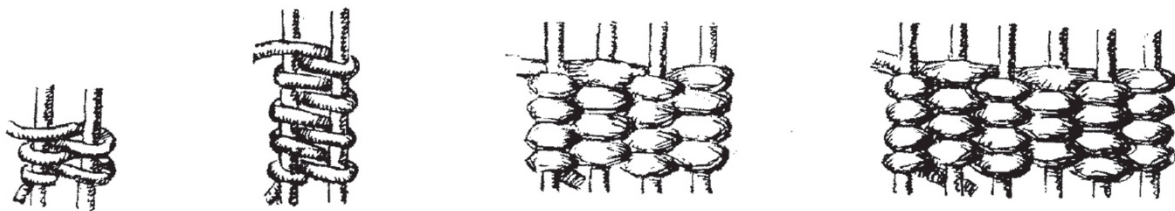
<sup>1</sup> This research was developed in the author's doctoral thesis and then, subsequently, through participation in conferences and scientific papers.

on the notion of fabric and the possibility of increasing this concept of further meanings. This term is closely linked with the world of architecture, also given the polysemy that has always characterized it.

This contribution first intends to clarify the definition of vertical fabric by retracing the original meaning from a purely architectural and urban point of view, thus proposing the interpretation of the skyscraper as a Vertical Fabric applied to some specific districts of the city of Hong Kong.

## Background

Textile activity is one of man's first occupations, which has always been linked to the need to find shelter and to cover up. In this regard, Giuseppe Strappa focuses on the analysis of the curtains – initially used by semi-nomadic groups – and on the distinction in the use of materials based on their intrinsic technical capabilities, to identify a «technical and cultural data (in summary the way of inhabiting the territory) which contribute together to determine the type of coverage» (Strappa, 1995: 96). The original act of covering up and taking shelter is therefore deeply linked to the textile activity. Certainly, the link between the concept of fabric and the world of architecture was particularly stringent throughout the Nineteenth century, when many theorists specifically dealt with the aesthetic and purely technical values of textile production. Gottfried Semper was the first to define the so-called «traces of memory» (Semper, 1879-1880) that the wall continues to possess of that initial use of mats and sheets that were the first vertical closing elements. It is good to underline how hierarchy and rationality are two distinctive and fundamental traits of the textile process (Figure 1).



**Figure 1.** Different kind of twists.

In this sense, Giuseppe Strappa maintains the following: «It should be noted that also for fabrics, as for masonry, there is no total isotropy: as in the wall two fundamental directions linked to the induced stresses (horizontal and vertical) are recognized, therefore in the tissues we can distinguish:

the direction of the warp (order of the longitudinal arrangement of the wires on the loom);

the direction of the weft (together of the threads woven transversely crossing the warp).

The directions of weft and warping (linked to the tensile strength of the fabric) determine the position of the fabric in the body by binding in a close relationship the transition of the matter-material transformation to that of the element-structure association» (Strappa, 1995: 96). The textile origin of architecture (highlighted through cultural and scientific interpretations) demonstrates the extreme flexibility of a suggestive theme,

plausible of multiple representations and paraphrases. This research, through the proposal of a reading of the skyscraper as a vertical fabric, represents the latest attempt - in order of time - to implement the literature on fabric in architecture. On the other hand, to better define an exegesis of vertical fabrics, it was preferred to pay attention to the relationships of necessity and the interrelationships established between the components of the fabrics, to be able to prefigure the skyscraper as an organism, within which all entities (spatial, constructive, functional, aesthetic) are linked together.

### **Methodology**

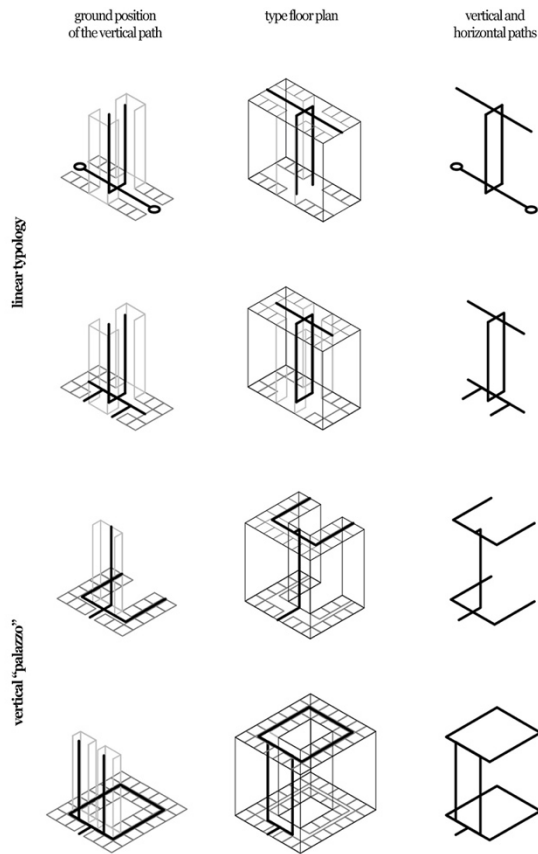
In recent years, there has been an evolution of the skyscraper model which, combined with the continuous increase in world population, has led numerous cities to verticalize entire neighborhoods, both central and peripheral. Furthermore, there has been a growing diffusion of the skyscraper type all over the world (think, for example, to the nascent vertical districts of Hanoi in Vietnam) and a constructive experimentation that has brought these architectures to new extraordinary heights (the so called slender type). Slender or super-slender skyscraper projects are now being constructed in New York and Milan, buildings that are intended to accommodate above all upper classes, so as to perpetuate the vision of the skyscraper as an "urban monster" and as a "symbol of social inequalities". In Asia – especially in Hong Kong – on the other hand, the skyscraper can unite different social classes and, from an urban point of view, to establish relationships of vertical and horizontal connection with the remaining city. It is therefore not a question of residential complexes isolated in some way from the remaining metropolitan life, but of a new vital system for the city itself. Numerous skyscrapers, although located in different cultural areas, however, show similar "urban" behaviors: if examined within the complex infrastructural and architectural system of the current megacities, the skyscraper seems to propose a "micro city" in its functional conformation, that is, an autonomous organism capable of reproducing the capillary structures and aggregative dynamics similar to those of the urban fabric.

The skyscraper, from a typological point of view, is a specialized building (of serial type); therefore, to be analyzed and interpreted as a vertical fabric it is necessary to take into account the internal structure and the spatial hierarchy that shapes the building itself. By doing so, we first proceed by analyzing the "porous" relationship between inside and outside, or between the city and a single building and examining the spatial conformation of urban paths and how they are placed in relation to the building (intersections, convergences, parallels); then we analyze the secondary flows relating only to the fruition of the tall building.

The internal/external relationship (and above all the relationship established between the urban path and the skyscraper) makes it possible to determine a whole series of urban phenomena linked to mobility, travel and stasis as well as the principle of silent dependence between the vertical path of the skyscraper and the distances of the city. The link between «complementarity between the structural system and the spatial organism» (Maretto P, 1993: 117) is fundamental in defining the distribution system of each architectural organism; in this regard, it is even more essential in the case of the skyscraper type. We can cite the studies

on the spatial configuration of buildings conducted by Paolo Maretti, for whom «(...) the architectural space is qualified first of all as a functional space, and is configured according to the intended uses and the ways of fruition from which it is promoted and to whom he is called to absolve; specifically according to the movement paths within the built space, inherent to the different functions (rest, food, work, storage), and referring to its points of exchange with the outside (access, ventilation, lighting, overlooking) through openings in the constructive envelope (...). As they focus on these and discard the internal dimensions (...) the paths are configured as “maximum void” of the load-bearing envelope in complementarity with the “maximum fullness” of the load-bearing or closing envelope: in a certain sense the "negative" tectonic respect to this, as this is the fruition “negative” concerning them» (Maretti P., 1993: 121).

Therefore, continuing according to the functional and spatial classification that is thus determined, it is necessary to analyze the section of the skyscrapers by analyzing and categorizing the types of internal axiality (Maretti P., 1993: 123); within the single architectural construction, in fact, a process of “internalization of the paths” (Ciotoli, 2017) is determined; paraphrasing the concept expressed by Maretti about the “maximum void” we can affirm how «(...) the internal distribution path coincides with a “designed void”, that is a space complementary to the “designed solid” used for shops and offices. In addition to the plan, this mechanism is revealed in the architectural section of the skyscraper, where the organic relationships and corresponding relationship between the distribution compartment, the serving space and the served space are evident (Figure 2). In this way, a real hierarchization of the architectural space is determined inside the building, reproducing, on a small scale, dynamics similar to the external ones, which contributed to the formation of the original and original characteristics of the type» (Ciotoli, 2017: 72). In particular, we can categorize the internal flows (coinciding with the maximum void) as multi-directional axes. Proceeding in this way it is possible to configure a new and recent level of modification in the typological process of the skyscraper; in fact, as Gianfranco Caniggia affirmed: «The “processual typology (tipologia processuale), intended as a necessary foreword to urban renewal, pursues several aims that are to be well considered in order to understand the previously raised issues: to define the processual development over time of each building we aim to consider; to adapt it to the current concept of “living house” with regard to its “structure”; to work in relation to the “typological process”; to describe the building changes that have occurred coherent with the “typological process”; to recover the “structure of the first building” (struttura di prima edificazione) as the unavoidable foreword to the generative planning of future developments; to produce a typological zoning, to define the acceptability of building changes» (Caniggia, 1997: 229).



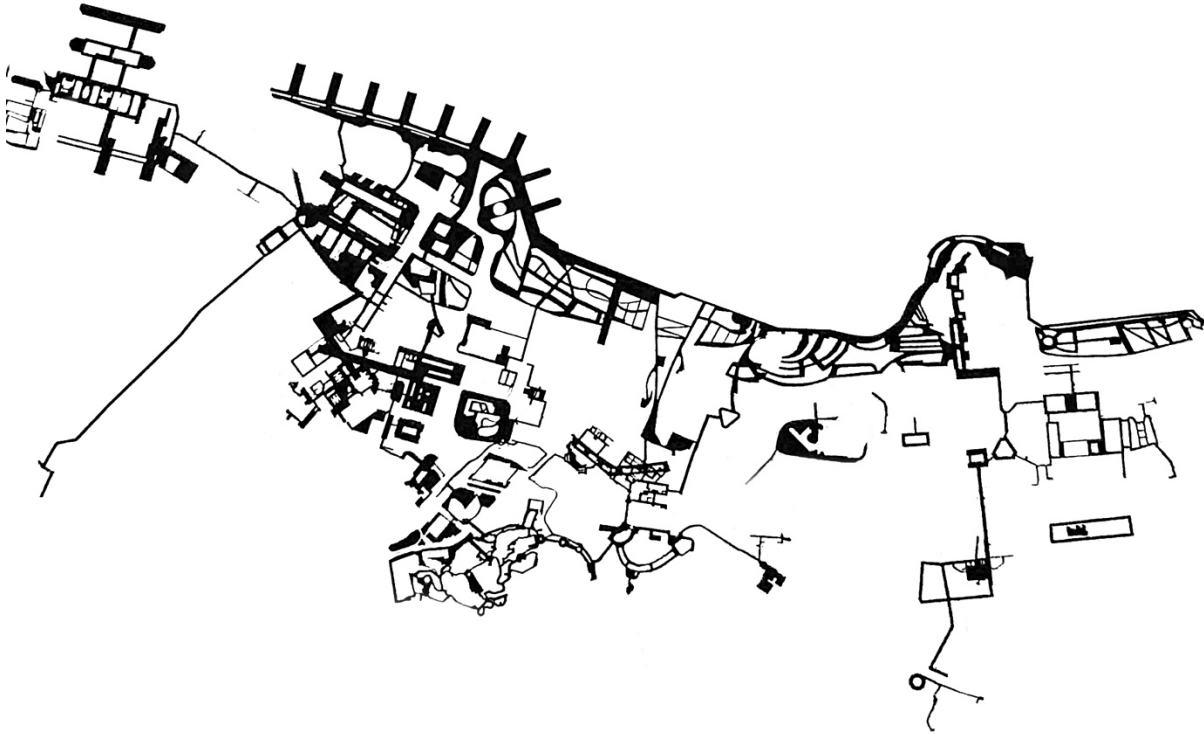
**Figure 2.** Configurations of the service core in the skyscraper typology.

### Methodology applied to the case study of Hong Kong

Hong Kong, for a whole series of morphological and historical peculiarities that characterize the city, is probably the case study par excellence to find a possible practical application to the interpretation of the skyscraper as a vertical fabric. Given its small surface, the city has the largest number of vertical architectures in the world per development area. What interests us most, for the purposes of this paper, is the interconnection that occurs (on different levels) and takes place in some neighbourhoods of the city. As Adam Frampton, Jonathan D. Solomon and Clara Wong argue, «Urbanism in Hong Kong is a result of a combination of top-down planning and bottom-up solutions, a unique collaboration between pragmatic thinking and comprehensive masterplanning, played out in three-dimensional space. Footbridge networks throughout the city that grew piecemeal, built by different parties and different times to serve different immediate needs, eventually formed an extensive network and became a prevailing development model for the city’s large-scale urban projects» (Frampton, Solomon and Wong, 2018: 6). The peculiarity of Hong Kong does not consist so much in the presence of the CEW (Central Elevated Walkways), that is a system of aerial routes that structure most of the mixed-use districts of the city,<sup>2</sup> as in the diversification of the connectives (elevators, stairs, spiral stairs and moving walkway) as well as in the territorial extension of the entire

<sup>2</sup> The presence of pedestrian walkways is widespread in other anthropic-cultural contexts such as, for example, Saint Paul, in Minneapolis.

pedestrian travel system. Therefore, an interconnected and simultaneously active system is created on three levels: the underground one (already tested, for example, in Calgary, Shinjuku district in Tokyo, etc), the basement one, where the level roads are accessed, and finally the suspended one, consisting of roads very busy pedestrian streets that extend continuously from the Admiralty district to Sheung Wan, passing through Central and up to Victoria Peak (the innermost part of the island) (Figure 3).



**Figure 3.** Pedestrian Circulation Network (CEW) in Hong Kong.

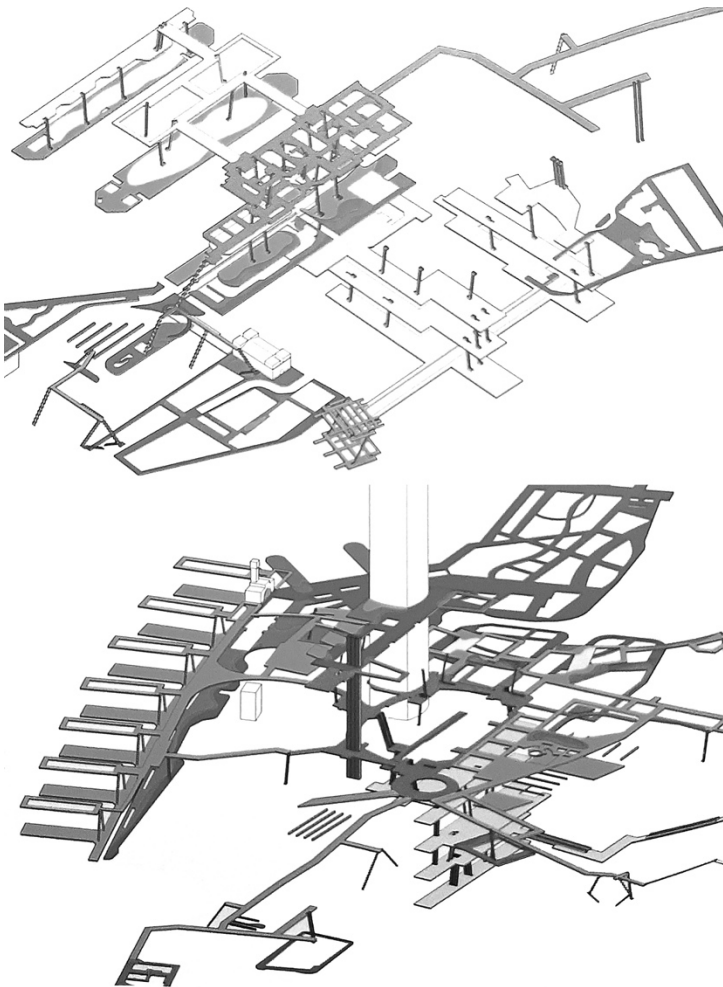
A designed void space is therefore created between the level and the suspended level. For this reason we can affirm that: «Ground is a continuous plane and a stable reference point. It is the surface on which the conflicts of urban propinquity: public and private, planned and impromptu, privileged and disadvantaged, are worked out. (...) Hong Kong enhances three-dimensional connectivity to such a degree that it eliminates reference to the ground altogether» (Frampton, Solomon and Wong, 2018: 6). Specifically, in Hong Kong, we experience what, from a theoretical point of view, we had already defined as «(...) aggregation of vertical fabrics in which the internal texture is due to the intersections between the vertical path of the building and the whole of horizontal pedestrian streets (at height, level, underground ones)». In this way, the horizontal connection elements (i.e. the roads of the CEW) in addition to orienting the directions of travel between the outside and the inside, sometimes offer the possibility of actually crossing the individual skyscrapers, to have a horizontal continuity at height. This uninterrupted system has its "urban gate" at the Shun Tak Center (in the Sheung Wan district) and extends uninterruptedly along with the profile of the island, also seeking new correspondences towards the interior. The Shun Tak Center is a large multifunctional structure as well as

being a docking centre for ferries and ships. Precisely for this reason, in addition to experiencing a real functional hybridization, in the section of the building, it is possible to note how at the intersection between the horizontal element and the vertical structure there is a functional specialization as well as a formal hierarchy of spaces (Figure 4). From a morphological-type profile, we are witnessing the generation of spatial nodes which, from a functional point of view, correspond to entrance halls, rather than lobbies generally used by citizens as resting spaces. By schematizing the above, we affirm that we are faced with the coexistence of:

main travel axes (horizontal and vertical);

secondary travel axes that guarantee mobility within individual buildings and aggregates of buildings (they develop mainly as horizontal, but sometimes we can also have a plurality of secondary vertical paths);

spatial and functional nodes that hierarchize and rhythm mobility along the routes; these are usually positioned at the intersection between the horizontal and vertical travel axes.



**Figure 4.** Some example of the layered structure of the CEW in the Shun Tak Centre (Sheung Wan district) and in the IFC Exchange Square (Frampton, Solomon and Wong, 2018).

## Result and discussion

This research, therefore having its own character of autonomy, is however included within a much wider academic dialogue, in which the study of vertical densification and the mapping of community places is the background to the daily life of a society in change, through which to identify new strategies for the governance of metropolitan areas.

The basic theoretical approach for the study of these phenomena and the possibility of considering them as vertical fabrics has in the past found interest in ERC research calls. Reference is made to the research "The importance of textile in art and architecture" (2009-2013) in which an EU research team explored textile discourse from within an emerging and challenging field of research.<sup>3</sup> With respect to this approach, this research constitutes a further possibility of development in the purely architectural field of vertical textures of today metropolitan cities. The mechanism of nodes, axes, paths is, in fact, stimulating to understand and direct new urban developments, especially by virtue of the fact that these places are in fact, public spaces in all respects even if inserted within individual architectures. The originality of the proposed project is presented at a delicate moment in the international scientific community whereby the research itself could become a driving force to systematize and direct the most current urban phenomena also in other cities. World interest is now focused on the possibility of re-signifying collective places and, even more so, this interest is actual in vertical cities, where these spaces are often placed inside the architecture (not just outside). It is, therefore, a trans-disciplinary experimentation also from a social point of view, as well as possible stimuli from a morphological approach.

## Conclusions

The theoretical approach of Vertical Fabrics has been theorized by the author since her PhD thesis, but the volumetric confirmation of this approach in the case of Hong Kong is also part of research that is being developed. If the cases of vertical building-fabric are still few and limited to some experiments conducted by individual architects, Hong Kong is the most complete example of three-dimensional vertical experimentation, in which we try to trace a human dimension. In this sense, the coexistence of public travel axes that intersect vertical buildings with a mixed one is also interesting as a hybrid space is created, in which public travel is inserted within a private building. The public / private relationship is therefore perhaps one of the further development aspects that research such as this could carry out, thus also reaching new formal and typological classifications of the relationship spaces thus conformed.

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