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## Horizontal densification: portraits of alternative cities

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### **Abstract**

*Today the conditions affecting the transformation of cities are multiple and linked to phenomena of global range, such as the increase in population and the number of inhabitants in urban centres, the pressures of the global economic model, the climate emergency, the digital revolution and the issues connected to the recent SARS-Cov-2 pandemic. The relationship between the containment of natural soil use and population growth tends to be resolved by designing vertical cities, implemented through the typology of the tower and skyscraper: design models that generate a controversial relationship between urban morphology and architectural typology in most of European cities. The subject of this study is to verify how in the design, planning and construction of new urban fabrics, it is possible to find credible alternatives to the typical scenario of vertical development, albeit declined in its many variants, and to verify what other examples can be found that explore the possibility of developing cities through horizontal densification. The research presented here proposes to address this study through the choice of a methodological-critical approach capable of intercepting experiences and case studies already underway in those areas of critical social, economic and cultural concentration and select those case studies considered more incisive and bearers of positive experiences, and to analyse the different treatment of land use in the various experiences of vertical and horizontal densification.*

**Keyword:** density, urban tissue, city-density models, city growth, Lazar Khidekel.

### **The issue of density in urban context**

Density is the rationale used for cities. The concentration of activities and people in an urban context involves numerous positive aspects: it stimulates the economy thanks to the 'agglomeration effect', it is good socially by exposing human beings to a diversified experience, it is also a good ecological principle when dealing with climate change as city densification requires less infrastructural resources (Sennett, 2020). In 'Death and Life of Great American cities' Jacobs describes the concentration of people and activities as a need for a vital urban centre (Jacobs, 1961). On the contrary, it generates the problem of presence of people in a limited space, with the consequent need to include, integrate, adapt and organise different life processes derived from the overlapping and assimilation between variable and unpredictable human behaviours.

Since the end of the 20th century, globalisation and the spread of technologies have radically changed the geography of our living spaces: the increase in population in cities has put pressure on urban planning indices, the progressive depletion of natural resources has focused attention on limiting land use, on energy efficiency and technological innovation, favouring the choice of a vertical urban development model.

In the experiments of the Modern Movement the skyscraper typology, originated in the United States, was imported to Europe as a suitable way of solving the main problems of the big city, was used as a polarising element against the dispersion of the urban fabric. The iconic significance of the skyscraper is characterized by a level of fascination that even countries with planned economies have not been able to escape, even though this is the typology that the ascendant phase of capitalism has imprinted on human settlement since colonial times. In the contemporary city the use of tower and skyscraper typologies generates points of rupture within many urban fabrics and triggers the process of dissolution of the relationship between urban morphology and architectural typology.

Is it possible to think of an alternative way of making cities? Is it possible, for instance, to shift the question of density from the vertical to the horizontal axis? This work intends to demonstrate through a selection of case studies how in the design, planning and construction of urban fabric it is possible to find credible alternatives to the usual vertical scenario.

### **Tested models for city-density**

Research studies on urban density and on the most apt forms and typologies able to tackle it have been conducted since the Industrial Revolution up till today. Many solutions and methodologies have been developed through the years to define the most suitable strategies when designing cities. The differences in approach lie mainly in the attitude towards which the issue of the historical city was tackled: on the one hand there are those who chose to revise its principles but accept its continuity; on the other hand, there are those who firmly denied this continuity by opposing sometimes radical alternatives in some cases.

A few of the experiments are based on the principle of building the city by blocks: within a regular road layout, the block represents the minimum unit which, composed of the sum of individual buildings, defines a fixed identity, and through repetition composes the urban design. Cerdà's experience in Barcelona's expansion plan is emblematic, just as Wagner's is for Vienna or Schumacher's is for Hamburg. In other cases, the new parts of the city are defined by a specific typology - line, block, etc. - which becomes the element of construction and delimitation of free spaces: for example, the cities developed in the period of Italian Rationalism. In other cases, however, the construction of housing does not have a direct relationship with the urban fabric, and it is represented by a single artefact that fits into the urban context by introducing a new dimension, in the same way that an imperial palace, with its exceptional characteristics, does when set in an urban context: this is the case of the Viennese experience of the Höfe.

Another model and strategy of growth was developed along a priority axis: the vertical one. The North American experience represents the myth of vertical development. Its fascination is condensed in the upward tension, in the "vertiginism" as a disruptive effect in the search for type-morphological innovation, in the new system of relations that these great masses impose, creating a new model of vertical and multi-level urban

density. If Chicago represents the ideal laboratory driven by land speculation, by the use of the load-bearing iron framework and the development of the lift, it is thanks to Louis Sullivan and his "The Tall Office Artistically Considered", that the question of vertical development was brought back into the discussion within a broader reasoning on the form and theme of the skyscraper, removed from the problems of style and returned to the reasons for the composition of form and figuration. On the other hand, skyscrapers have been creating a new city-effect ever since Mies van der Rohe, after overcoming the Berlin experience of Friedrichstrasse, sanctioned the prototype of vertical development in the aligid residences of Lake Shore Drive in Chicago. Pure prisms in which the load-bearing steel grid is superimposed on a secondary grid of double-T pillars, which in turn support the façade elements. They are the premise of the famous Seagram Building in New York, built together with Philip Johnson from 1954 to 1958 and 160 meters high.

### **Alternative models for the city-density**

Alternative models are represented by the case studies that propose a model of densification in open rupture with the continuity of history, a fairly new feature for almost all European cities which over time had regenerated their urban forms by studying and looking back at the experiences of the past.

This critical attitude emerges for example in Le Corbusier's work, when in "Vers une Architecture" he openly supports the idea to refuse the form of the historical city, promoting a re-thinking of the city along the vertical axis, based on the American skyscraper model (Le Corbusier, 1923). The "City for three million inhabitants" is monocentric, based on an infrastructural structure, and divided into zones characterized by different typologies of buildings. In the centre, 60-storey high cruciform skyscrapers stand out on an open park area and accommodate business and service activities. From East and West, he placed the production facilities, and all around the 5- and 6-storey residential typologies of "redents" and "immeubles villa", combining high residential density with a large amount of open land.

Hilbeseimer, in his theory of "Grosstad Architecture" uses the third dimension to address the complex relationship between the manufacturing city, residential neighborhoods and infrastructure. His idea of a vertical city involves two overlapping urban levels distinguished according to function: the underground level for vehicular traffic, while the first levels emerging from the ground, for commerce, productive and financial activities. The residential spaces are positioned at the highest levels, well separated from the level below, and they are placed in specific high buildings that take on the role of "landmark" within the general masterplan.

The model of the densified city is then taken up by Ernst May, who, in his famous table, illustrates the process of transformation of the urban block as a natural evolution towards the system of building in line, the ultimate goal of an egalitarian architecture, which places all the buildings with the same orientation. The type of block with a collective courtyard, which was used when building entire neighbourhoods in the 1910s and

1920s, does not appear in this scheme, although May, in his project in Frankfurt, only reached the most abstract and rational configuration with the Westhausen siedlung of 1929.

## Horizontal densification

*Figure 1. Khidekel. Design for a futuristic city above water 1925.*

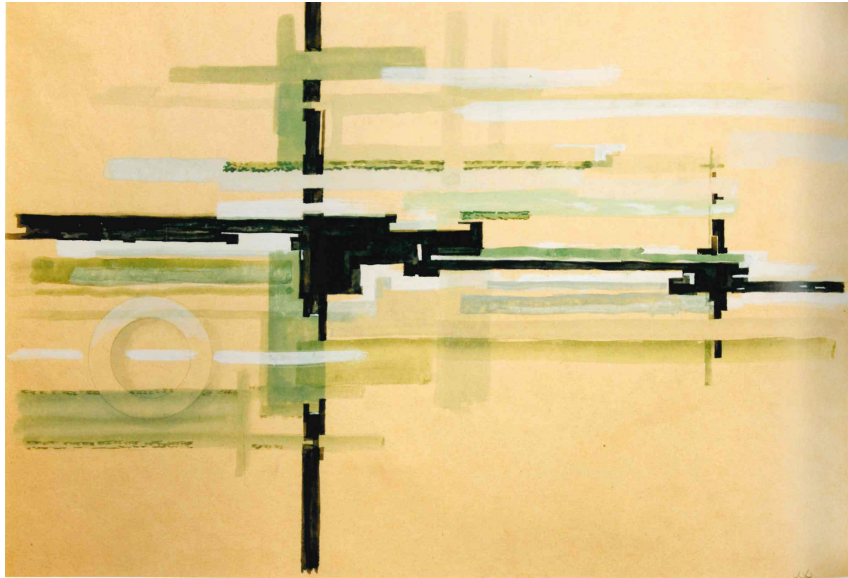


*Khidekel, R. (2014) Lazar Khidekel and Suprematism, (Prestel, New York), 157.*

Leslie Martin's study, published in the book "Urban space and structures" (1971), tries to demonstrate that the issue of density is closely linked to form and that, for example, the large courtyard is, even from a technical point of view, the best form of urbanisation in a city when compared to a tall and isolated building. His publication questioned many of the aspects concerning the opportunities and advantages of vertical densification. Martin demonstrates how the courtyard in the centre of a plot allows to occupy less land with the same density, and it also allows the concentration of free space in the centre of the plot to be used as green space, while maintaining a lower building height. In addition to numerous diagrams and the use of the Fresnel diagram, which shows a succession of concentric squares delimiting areas of equal area, Martin himself makes his reasoning explicit.

On the topic of experimentation on urban fabrics, another noteworthy case which excludes the exploitation of the third dimension, is the Soviet linear city, that embodies the anti-capitalist model par excellence. This prototype can be traced back to Arturo Soria y Mata's "Ciudad Lineal" (1882) and Gonzalez del Castillo's "Cytè Linéaire Belge" (1919), in some ways linked to figurative experimentation within an aesthetic and political context, and not only urban, which echoes certain conceptual ascendancies of Kandinsky, point-line-surface,

and certain visions of Ochitovič on disurbanism as an antithetical formula to Western capitalism. On the other hand, antithetical settlement models were measured between Wright's organic formulations (Brodacre City) and the productivist anxiety of American Fordism of Richard Neutra with "rush city" (Rush City), and the planned linear economy of the Soviet Union, from the Magnitogorsk projects of Miljutin and Leonidov, to the "Green City" of Ginzburg and Barsc, which are emblematic of a communitarian vision of urban settlement on a human scale, partly analogous to the principles of Lluís Sert's "humanised city".



**Figure 2.** Khidekel. *Design for a Horizontal Structure above Water, 1925.* In: Khidekel, R. (2014) *Lazar Khidekel and Suprematism*, (Prestel, New York), 152.

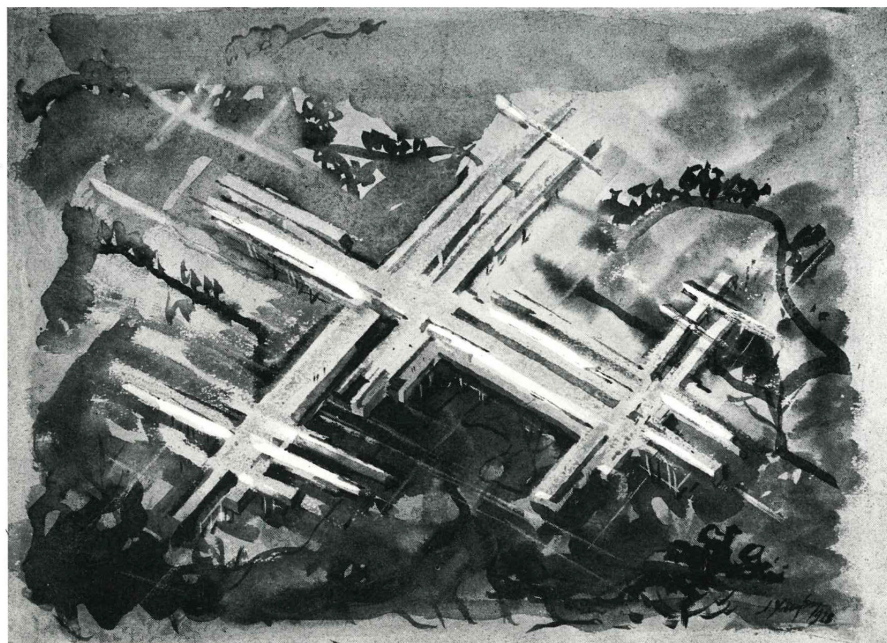
The other particular cases to mention are the projects of horizontal and suspended cities that Lazar Khidekel developed in the 1920s (Figure 1), in the context of the Soviet avant-garde. He designed projects for a city raised from the ground and generated by the superimposition of linear structures: weightless supremacist structures seemed to float in the air, while the arteries of vehicular traffic were separated underground or well above the levels intended for residence.

The idea behind Khidekel's cities is to conserve nature, he deeply believed that the founding act of a city should act together with the preservation of nature rather than in its destruction. That is the reason why his "horizontal skyscrapers" are suspended above the natural elements: land, water, in some cases gravitating towards the cosmos. The project for floating cities contains some of the most radical ideas of those years. A series of concrete pillars supports horizontal bodies consisting of one or two floors, separated by canals that connect to the open sea. The functions are multiple and assigned to specific zones: residence, commerce, production, services, and divided by green strips of parkland.

"Modern cities separate man from nature.... The construction of a city ultimately turns into the destruction of the natural environment. [...] The erection of urban architecture directly on the ground disrupts the natural



state of the environment, its topography, vegetation, bodies of water and other features that define the uniqueness of the area" (Khidekel, 2014: 37)



**Figure 3.** Design for a city on pilotis: variant with horizontal blocks, 1925-28. Axonometric view In: Khan-Magomedov, S. O. (1987), *Pioneers of Soviet architecture*, (Thames and Hudson, London), 302.

Lazar Khidekel's experience derives some principles from the Garden-city concept, but in a wider perspective. For the author, in fact, it is not a question of organising human settlement and the portion of natural territory within well-defined boundaries, but of allowing interaction between the city and the landscape as a whole. The space is intact, the environment untouched: Lazar Khidekel's cities consider nature as something to be protected, not conquered. From the principles of vertical zoning, he assumes the separation of vehicular traffic and the division of activities on different levels. The road system, in most of his projects, is organised in underground tunnels, and emerge on the surface only at specific points in order to keep the surface as free and unaltered as possible. Between Le Corbusier's idea of the city, which distinguishes typologies through a hierarchical approach, and Hilbelseimer's, which adopts a paratactic strategy, Khidekel's experience is on a much more abstract level, able to go beyond his specific historical period. It produced a regeneration of the avant-garde that is still revolutionary today as it contains a set of principles that represent a wealth of ideas to be developed for the contemporary city.

### **Vertical and horizontal density**

This set of case-studies provide an answer to the question posed by the change in structural conditions in a given historical period. Over time the structure of the city has been affected by articulated phenomena, such as population growth or changes in its production systems. Today there are variables such as the digital

revolution, the conditions imposed by the current global economic model, the climate emergency and even the recent SARS pandemic Co-vid 2 and all the variables linked to the wider phenomenon of globalization. In specific historical moments, the city's social, political and environmental conditions are reflected into its physical forms through the change in the use of its urban devices: housing, collective buildings, public spaces.

Khidekel's experience represents a wealth of ideas that can be used to think about alternative horizontal densification. It is no coincidence that in some of his writings from the Unovis period we find a note saying that their project wouldn't have been understood before one hundred years. Khidekel's cities are cities for the future, his cities share many problems with ours. The author shows us that the same starting conditions of limits in land use and high-density factors can lead to alternative outcomes of vertical development, and that it is possible to think about a different kind of densification. Khidekel invented a renewed perspective to look to the relationship with nature and density, his designs gather the sources of modern thinking: the genesis of a new way of imagining a relationship with space, light, movement and future.

### **Horizontal densification: an alternative model**

Nowadays rapid urbanization and urban development has consumed a lot of land resources. This phenomenon has up to now considered vertical density as the most convenient mechanism of urbanization, able to deal firstly with the problem of urban land consumption.

The case mentioned above can represent an alternative idea for a vertical city development, considering the methodological aspect through which a coherent composition of physical bodies forming the urban settlements can come to be.

The design of the city (or part of it) is usually regarded both as an urban and architectural issue, at least in the sense that every general intention – an intention aiming at globally shaping a plan – is supposed to be accompanied by a defined group of formal and qualitative attributes granting a general strategy that is coherent to the idea of vertical or horizontal growth.

This theoretical position as to the issue of density is usually charged with technicism. This charge is not due to the fact that such a position can be considered a result of current technical applications, but to the fact that a position such as this is based on the existence of a fixed and unchangeable concept of use which has become the joining element between land and building, site and architectonic object.

The interest for these types of examples can neither exhaust nor show the meaning of the idea of horizontal density. It is also true that Lazar Khidekel's patterns for horizontal buildings and organization proposals are based on a functioning complexity, suggested as a comprehensive alternative to the current city development, as well as partial alternatives concerning the class of residence-services.

Through this model of complex patterns of organization, alternatives to the vertical development correspond to the refusal of any description of urban fact given as a catalogue of conventional solution to the problem of land consumption. In that case the horizontal density can no longer be considered a utopian vision, but it refers to the concept of built land, including in this idea the whole relation of complex and autonomous organization of buildings with the city as a whole of buildings and a built land

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