Urban Relay: Circulation Morphology
[accelerator city]

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ABSTRACT

Generally, in the contemporary cities vertical buildings are conceived and implemented as subdivided volumes that set up highly regularized modes of inhabitation. This condition limits the possibility for more complex and adaptive spatial relationships between program and use. This limitation exists at a time when the relationship between individuals and their patterns of living is becoming increasingly more complex. This thesis will explore the design of the mixed-use building through a study of program, circulation, skin, and form. Sited in Boston at a point of intersection between programs, people, and of conflicting physical parameters, this project will develop a system to (re)organize space within a given volume and the flows through it. This system of programmatic organization will be mediated through a responsive network of circulation and the articulation of surfaces that frame the liminal spaces between uses.

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sectional analysis drawing

Unité d'Habitation, Marsaïles
Le Corbusier
In many urban contexts, the sectional quality of a typical vertical building reveals repetitive independently functioning floors with minimal connection beyond. Circulation through this section consists of nodal points of connection between one floor and another and also between one floor and the ground. This current scenario does support a level of flexibility by allowing for individual worlds to be held together within a framework. This creates a series of different programmatic uses all encapsulated within a skin. Although such buildings may be called “mixed-use”, their inherent potential for adjacencies and interrelationships is denied.

Along with this spatial and formal disjunction, the possibilities for social and public interaction also conforms to the logic that is imposed by this typical programmatic organization. That of a limited number of interconnection points between the different levels of movement based on a system of similar repetitive floor slabs. Within this, public interaction is reduced to the amount of time that is used to enter and exit the superstructure as well as the time spent within the space of an elevator. These two realities devise a set of issues that can be translated into a design criteria based on the redistribution of vertical (and horizontal) space to accommodate a more active system of social interaction that takes advantage of the heightened velocity of daily activities.
site movement diagram
vertical past
[inside-out]

The questioning of the space that creates a vertical architecture has existed since their initial designs themselves. These issues encompass discussions of structural innovations, environmental concerns, and in a large part, formal and aesthetic qualifications. Within this, there is also a history of considering the vertical building in relation to its spatial arrangement from a view that is more see from the "inside-out."

This shift occurred from in the time between 1960 and 1980 with built examples that consist mainly of vertical buildings with an interior “atrium” of public space.¹ This concept became the dominant means of adding another layer of public space to the previous standards for towers that are dominated by their outward formal expression. Resolutions of these types can be seen in the large interior spaces within the hotels of John Portman and other architects who followed.

Near this same time, the work of Rem Koolhaas in Delirious New York was a critical look at New York City. In this book, Koolhaas investigates many aspects of New York and in a several places he discusses the internalized relationships within vertical buildings. In his analysis of the Downtown Athletic Club, Koolhaas describes a “complete conquest - floor by floor - of the Skyscraper by social activity.”² He does this by explaining a world of thirty-eight repeating

initial programmatic folding
floors that exist through containing a wide array of independent and discrete activities that all function within a volume and are all used to achieve a singular goal. This ultimate goal of personal self-improvement for the inhabitants is concluded through the interconnection of many sub-programs. Thus, it is the rigid three-dimensional grid of the steel frame and the elevator that allow for any combinations and adjacencies of programs.

Although Portman proposed one type of solution, and Koolhaas pointed out a problem that may not be a problem, it was years earlier and through the work of Le Corbusier that another type of approach was explored. In his project for the Unité d’Habitation in Marsailles, Le Corbusier combines living units, recreation spaces, a hotel, a co-operative store, and several other communal amenities within a contained rectangular mass. Embedded within this arrangement are several modes of circulation including stairs, high-speed elevators, and “interior streets.” Through this assemblage, Le Corbusier stitches together a web of spaces for dwelling and living, with the lines of communication and circulation between them. In this sense, the building begins to live up to the metaphor of a city.
Figure 1:
Informal Socializing as Measured in Time Diary Studies, 1965 - 1995
vertical network
[social capital]

Through a redefined vertical organization that increases the physical interaction within a mixed-use environment, the social patterns of its inhabitants can also be transformed. In this way the new organization can provide a system that increases “social capital” through its circulation and programmatic adjacencies. Robert Putnam states that “social capital refers to the connection among individuals - social networks and the norms of reciprocity and trustworthiness that arise from them.” Putnam also concludes that surveys in 1999 reveal that “America’s civic life had weakened in recent years...and that our society was focused more on the individual than the community.” In response to this decline, the spatial relationships between several different types on inhabitants and their additional support programs, communal crossings and gatherings can permissible. Thus, an urban vertical building can promote an increase in the social capital of its inhabitants through a re-organized distribution of spaces, programs and the connective tissue between them. In doing this, a multiplicity of interior public spaces will be created.

5. Ibid., 25.
Part of this decline in the community as a function of public or social interaction may be related to the increasing number is individuals who exist at a hurried pace. In his book *Faster*, James Gleik explains many scenarios in which people are becoming more and more obsessed with time and speed. These descriptions range from the steps taken to save time cooking to the studies conducted in order to measure the differences and speeds of thinking. In relation to elevators Gleick explains that “Once on board, our antsiness only intensifies as we wait for the door to close. How long? *Door dwell*, as the engineers call it, tends to be set at two to four seconds. For some, that is a long time. And not just Americans. ‘If you travel in Asia at all, you will notice that the DOOR CLOSE button is the one with the paint worn off…’”

By mixing living spaces with amenities within a volume that are connected by public spaces and a series of movement possibilities, the sense of efficiency can be obtained and promote interaction. The result is a fast environment, yet one that still supports social connections and potentially builds social capital.

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intersection

The site is related to the existing potential development of the air-rights over the Massachusetts turnpike in Boston, MA. This site is at the intersection of the Massachusetts Avenue with the turnpike. This site exists as a condition of intense intersection for the flows of people, vehicles [public and private], and other transportation and commutation systems. By sitting within this web of movement and systems, the building’s circulation can be infused with its context and the internalized movement within it becomes an extension of the site’s existing connections and flows.
Figure 2:
Reprinted from Massachusetts Geographical Information System
Its position at a node of intense movement and intersection inherently gives to the building a porus and ephemeral quality. It is passed through by shoppers, tourists, inhabitants, and by the vehicles passing underneath.
The characteristics of the surroundings in terms of views in to and out of the site create the parameters that will govern vertical placement of programmatic elements. These properties also define a critical level within the project at the eighth floor mark. This point represents zone of change where the contextual pieces of the site are redefined with respect to a vertical building in this specific space. After this level and absolute all subsequent levels take on a similar relationship to the site and creates a flexible zone for the absolute height of the building.
organizational diagrams
program: live - use relationships

The programmatic elements of the building consist of a mixture of uses within two main categories:

a. living
b. support

a. The living group contains four types of varying duration and temporality. No residency is considered permanent due to the transient and ephemeral quality of the site and the more rapid patterns of living and working. From this the four inhabitation groups are:

W - daily user - retail consumers
X - hotel user - tourists and business travelers
Y - temporary work / live-work - short term city inhabitants
Z - student living - supported by the multiple colleges and universities that encompass the site

b. The support programs include spaces for shopping, services, eating, communal work, conference rooms, and recreation.

vertical circulation type associations

The vertical circulation criteria was based on a system of assuming connections within the program itself, between the programs, and between the program and the grounds. A logic based on speed was associated with each type of connection.
The vertical placement of program within the volume was based on hierarchical relationship with respect to duration. The most short term inhabitant closer to the bottom and the longer term closer to the top. The horizontal placed was loosely determined through a plan based criteria related to possible site extensions within the greater area.
site extentions
inhabitation frequencies (over two year span)
Within the physical relationships a networked system will connect the inhabitants with their associated support mechanisms. This system will gain both the efficiency of the virtual connection and also promote the social investment associated with actually traveling somewhere within the volume to pick-up or otherwise complete the said transaction. The virtual system itself will also be used to network the inhabitants both socially and professional to influence a building of ties and as a means of sharing information. A social intranet with a living environment.

network(ed) | virtual connections

networked(ed) connections
To begin deriving spatial and formal relationships and qualities a tool was created to model the programmatic volumes in their given vertical zones and then systematically removes space for public linking zones and for circulation. These studies were then used in conjunction with the other rules of program placement and connection in the design of the initial massing organizational study.
## space parameters

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<th>Category</th>
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<tr>
<td>Student</td>
<td>550 - 1150 sq.ft.</td>
</tr>
<tr>
<td>Temporary Work</td>
<td>550 - 700</td>
</tr>
<tr>
<td>Home / Office</td>
<td>500 - 1000</td>
</tr>
<tr>
<td>Hotel</td>
<td>250</td>
</tr>
</tbody>
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### Sections

![Diagram of student space](image)

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initial organization
initial massing design

An initial massing design was created from a reading of the diagrammatic principles and the subtracted volumes of public space derived from the generative studies based on the set number and size of dwelling units.
sketch of program placement and connections
diagrammatic section model
plan development
vertical [re]development
skin development
skin unfolded
building [systems] within site [mappings]
interior spaces
Illustrations

Figure


2  Massachusetts Geographical Information System  21

All other images produced by the author.
Bibliography


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