

# Space syntax: definitions, intuitions and aims

## 空间句法：定义、直觉与目标

John Peponis  
(translation Feng Chen)



## What is space syntax, 40 years and 11 symposia later?

如何看待和定义空间句法？尤其是在经历了四十年，召开了十一次国际空间句法会议后的今天？

## Space syntax

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**Abstract.** This paper addresses itself to the question of how and why different societies produce different spatial orders through building forms and settlement patterns. It consists of three parts. Firstly, at a metatheoretical level, it is suggested that spatial organization should be seen as a member of a family of 'morphic languages' which are unlike both natural and mathematical languages but which borrow properties from each. In general, morphic languages are used to constitute rather than represent the social through their syntax (that is the systematic production of pattern). Secondly, a general syntactic theory of space organization is proposed. It is argued that spatial patterns in both complex buildings and settlements fall into eight major types, which are interrelated in structural ways. Finally, the syntactic theory is used to integrate a number of recent general propositions made in anthropology regarding human space organization.

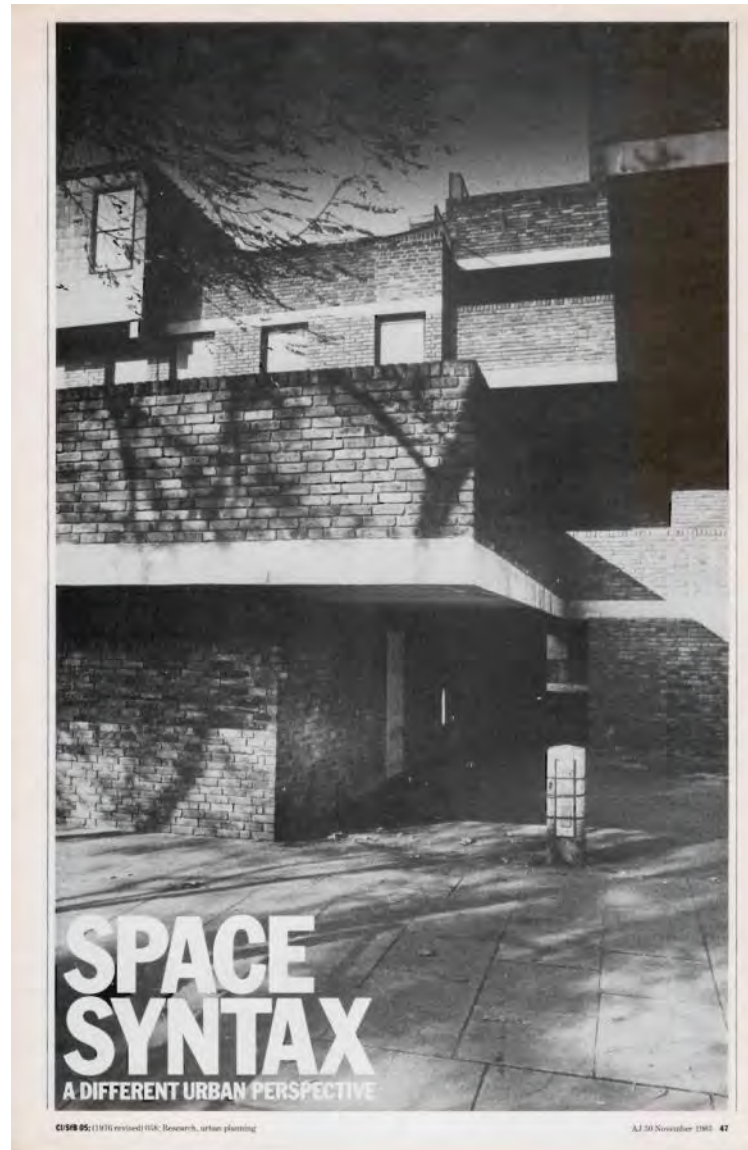
### 1 Preliminaries: mathematics and the 'sciences of the artificial'

"We cannot understand the flux which constitutes our human experience unless we realise that it is raised above the futility of infinitude by various successive types of modes of emphasis which generate the active energy of a finite assemblage. The superstitious awe of infinitude has been the bane of philosophy. The infinite has no properties. All value is the gift of finitude which is the necessary condition for activity. Also, activity means the origination of patterns of assemblage, and mathematics is the study of pattern" (A N Whitehead, 1961).

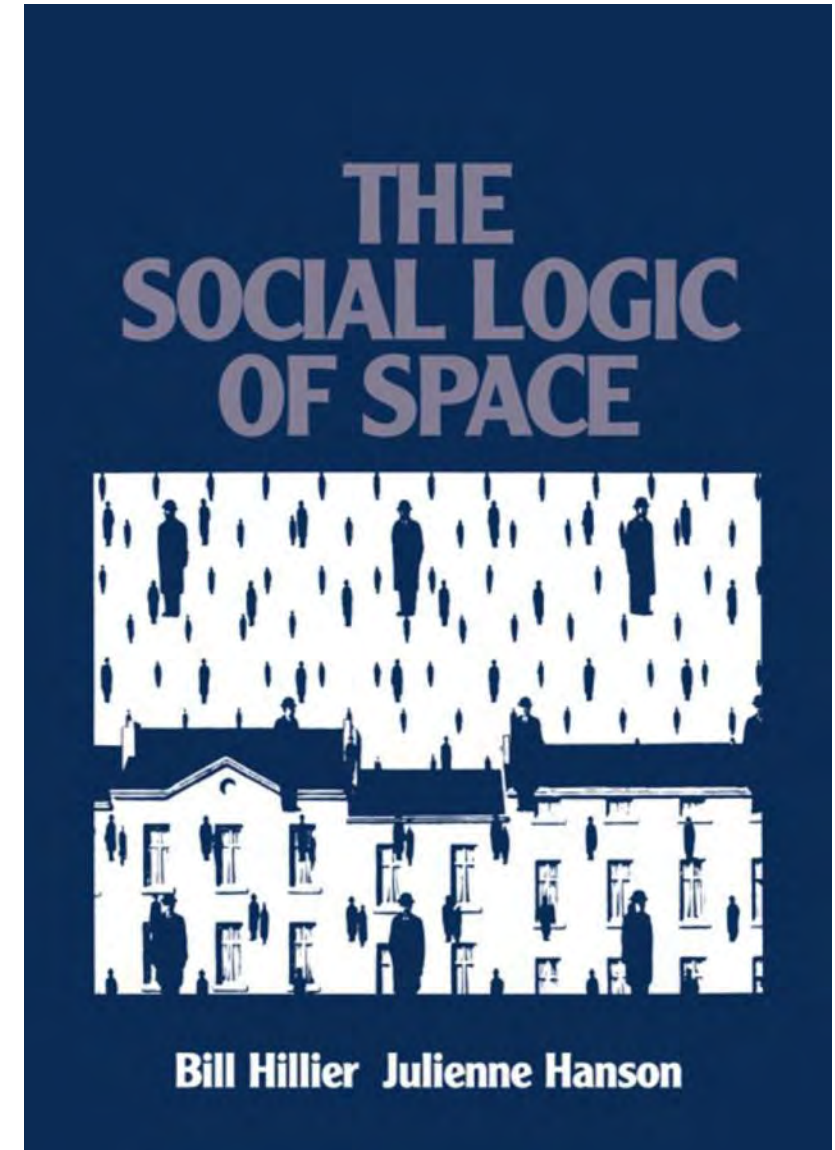
Belief in a mathematical order inherent in nature has always been a fundamental postulate of theoretical science. First put forward by the school of Pythagoras, which developed a numerical theory of natural order from such discoveries as the relation between musical harmonies and numerical proportions, it was linked by Galileo to the experimental method, and together they form the dual foundation of the modern conception of science. Analytical geometry, calculus, group theory, non-Euclidean geometries and perhaps catastrophe theory were all subsequent steps in linking our conceptions of natural order with mathematics. However unreasonable a belief mathematical order in nature may appear in principle, the 'unreasonable effectiveness' of mathematics in the natural sciences leaves no doubt that it has been amply justified by events.

But the sciences of man-made entities like settlement patterns, societies, and languages, have no such record of success to confound the sceptic. Moreover, the claims of these sciences to be excused for their poor mathematical development on account of their extreme youth sounds more and more uneasy as decades pass. However, the root reason for the lack of mathematical theories in the 'sciences of the artificial' may be that they are not sought after, since the fundamental postulate justifying the intervention of mathematics in these sciences is not a belief in a mathematical order inherent in the objects of study, but simply a belief in the power of mathematics as an instrument. In principle such a reduced claim appears justified. Even if nature does work mathematically, this does not imply that man the artificer also does.

Hillier B, Leaman A, Stansall P, Bedford M, 1976, "Space syntax" *Environment and Planning B: Planning and Design* **3** 147-185



Hillier B, Hanson J, Peponis J, Hudson J, Burdett R, 1983, "Space syntax, a different urban perspective" *Architects' Journal* **178** 47-63



Hillier B, Hanson J, 1984 *The social logic of space* (Cambridge University Press, Cambridge)



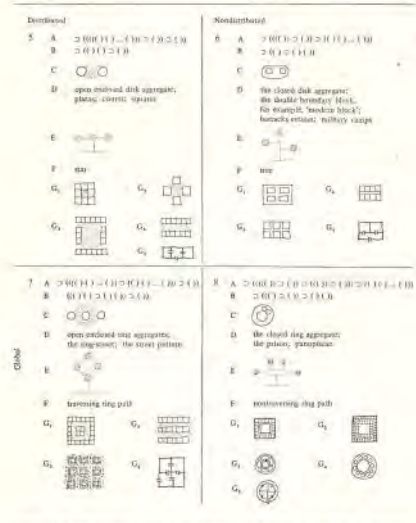


Figure 19. Morphological aschetypos.

[illegible]

Figure 19 (continued)



Fig. 10B. No significant difference in the half-contraction time (34 s).

Hillier B, Hanson J, 1984 *The social logic of space* (Cambridge University Press, Cambridge)



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## Distributed attraction: the effects of street network connectivity upon the distribution of retail frontage in the City of Buenos Aires

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**Abstract.** The City of Buenos Aires has a radial street plan, regular blocks, and a clear central place. On the basis of an analysis of the city's GIS database, we show that measures describing the syntax of its street network have a significant relationship with commercial frontage density, over and above the impact of central business district attraction. These results are obtained while controlling for the effects of population and employment density, distance from public transportation stations, and zoning. Our findings support a hypothesis that emerges from recent literature, namely, that commercial uses are subject to the distributed attraction exercised by the street network, and according to the syntax of street network connectivity. Among the variables describing the street network, those that measure how direct the connection of a street segment is to the rest of the street network, have the greatest explanatory power on the distribution of commercial frontage density. Street width and the extent to which a street segment lies on the shortest routes between all pairs of potential origins and destinations (whether by metric distance or by direction changes), have less influence. Interactions between variables indicate that the effects of spatial syntax in determining the distribution of commercial frontage density by street segment are stronger when variables accounting for other attractors (population and employment density, proximity to metrostations or proximity to other shops in the surrounding area) assume higher values.

**Keywords:** Buenos Aires, space syntax, land use

**Introduction:** two kinds of attraction, centralized and distributed

The City of Buenos Aires, capital of Argentina, represents a case of an almost ideal radial street plan with a dominant central place: the central business district (CBD) by the Río de la Plata. Its urban form, therefore, aligns well with the idea that cities have a clearly identifiable center that acts as an attractor, an idea brought into question by post-1960 patterns of suburbanization, dispersion, and decentralization (Berry and Kim, 1993). We study the distribution of commercial frontage over the city to test the hypothesis that, even in the context of a seemingly monocentric pattern, commercial land-use location is subject to two kinds of attraction related to the layout of the street network. First, the attraction emphasized by classical central place models, where the density of commercial frontage diminishes as network distance from the CBD increases. Second, the attraction suggested by emerging distributed centrality models, where the density of commercial frontage is higher

## Cognitive mechanisms underlying instructed choice exploration of small city maps

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We investigated the cognitive mechanisms underlying the exploration and decision-making in realistic and novel environments. Twelve human subjects were shown small circular U.S. city maps with two locations highlighted on the circumference, as possible choices for a post office ("targets"). At the beginning of a trial, subjects fixated a spot at the center of the map and ultimately chose one of the two locations. A space syntax analysis of the map paths (from the center to each target) revealed that the chosen location was associated with the less convoluted path, as if subjects navigated mentally the paths in an "ant's way," i.e., by staying within street boundaries, and ultimately choosing the target that could be reached from the center in the shortest way, and the fewest turns and intersections. The subjects' strategy for map exploration and decision making was investigated by monitoring eye position during the task. This revealed a restricted exploration of the map delimited by the location of the two alternative options and the center of the map. Specifically, subjects explored the areas around the two target options by repeatedly looking at them before deciding which one to choose, presumably implementing an evaluation and decision-making process. The ultimate selection of a specific target was significantly associated with the time spent exploring the area around that target. Finally, an analysis of the sequence of eye fixations revealed that subjects tended to look systematically toward the target ultimately chosen even from the beginning of the trial. This finding indicates an early cognitive selection bias for the ensuing decision process.

**Keywords:** instructed choice exploration, spatial decision making, eye fixations, map reading

### INTRODUCTION

To make good decisions within a novel environment, we first have to explore it. But how people explore novel environments to make decisions is poorly understood. Consider a hypothetical scenario that you have been accepted by a graduate school and you are visiting the university for the first time to find a house to rent. The school has provided you with a map that marks the student houses around campus and also gives you information about the bus stations, classrooms, libraries, food service, etc. Abstractly, you face an example of a common decision problem, in which you have to explore and evaluate all the alternative options to find the best place to rent. Choosing between alternative options requires assigning and integrating values along a multitude of dimensions (e.g., rental rate, amenities, distance from school, etc.). How do people explore novel environments to extract information and make decisions is considered one of the fundamental problems in decision science.

After many years of intense research in various disciplines ranging from psychology to economics, substantial progress has been made in understanding the cognitive mechanisms of

decision-making in a variety of tasks. A series of experimental studies in humans and animals have provided evidence that the brain makes simple decisions by integrating various relevant determinants of an option into a single subjective value, and then comparing these values to make a choice (Bloch and O'Keefe, 2001; Paulsen, Schoppe, and Assad, 2006; Paulsen, Schoppe, 2007, 2011; Wallis, 2007; Rangel and Chhava, 2013). Although these studies have contributed significantly in understanding the cognitive mechanisms of decision making, they have focused heavily on simple decisions that (a) take place in artificial environments, and (b) rely on values of the alternative options that depend only on the options themselves and not on the environmental properties.

Whereas in many decisions the environmental properties do not influence the economic values of the alternatives, such as deciding between products in a grocery store, there are other cases in which the value of an option strongly depends on its environment. For instance, student houses that are closer to campus are usually more expensive than distant houses, even when they share similar characteristics. Solving this type of decision problem, like any other executive process, requires exploring the surroundings

## Configurational meaning and conceptual shifts in design

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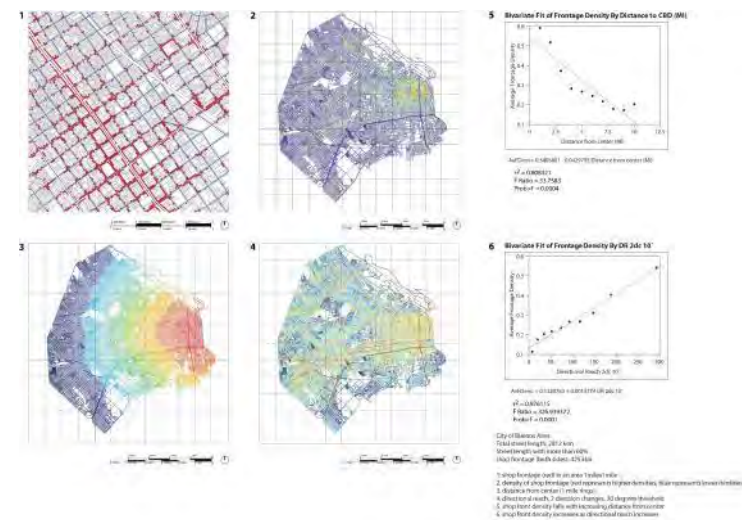
Configuration is defined as the entailment of a set of co-present relationships embedded in a design, such that we can read a logic into the way in which the design is put together. We discuss conceptual shifts during design with particular emphasis on the designer's understanding of what kind of configuration the particular design is. The design for the Unitarian Church offers an historical example of such shifts, authorised by Kahn's own post-rationalisation of the design process. We subsequently construct a formal computational experiment where the generation, description and re-conceptualisation of designs is rendered entirely discursive. The experiment serves to clarify the nature of conceptual shifts in actual design, and the reasons why a reading of such shifts cannot be based on discursive evidence only but necessarily requires us to engage presentational forms of symbolisation as well. Our examples demonstrate how a conceptual shift within a particular design can lead to the discovery of a new potential design world. In the historical case, the conceptualisation of a new design world remains implicit and inadequately specified. But the theoretical experiment allows us to make explicit how geometrically similar configurations that arise from the application of one set of generative rules may possess systematic but entirely unanticipated perceptual properties, subsequently incorporated in new generative rules.

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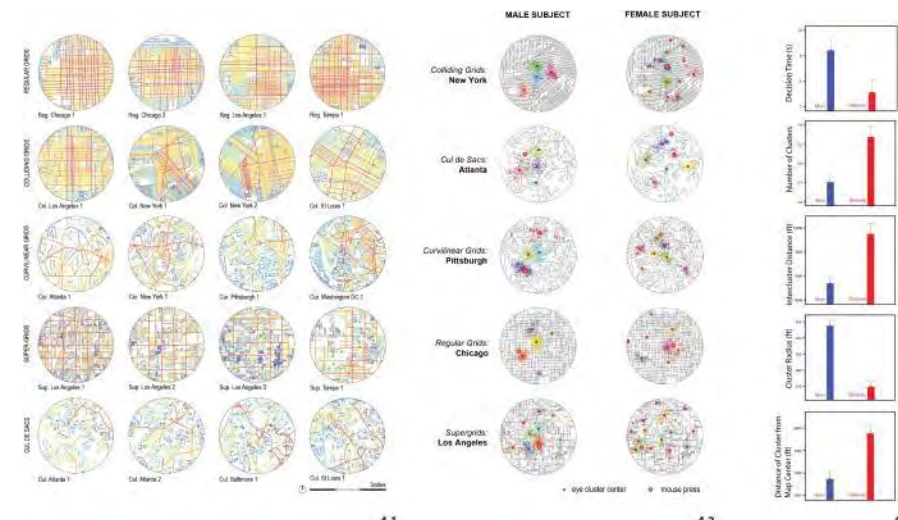
Scoppa M, Peponis J, 2015, "Distributed attraction: the effects of street network connectivity upon the distribution of retail frontage in the City of Buenos Aires" *Environment and Planning B: Planning & Design* 42 354-378

Sakellari S, Christova P, Christopoulos V, Vialard A, Peponis J, Georgopoulos A, 2015, "Cognitive mechanisms underlying instructed choice exploration of small city maps" *Frontiers in Neuroscience* 9

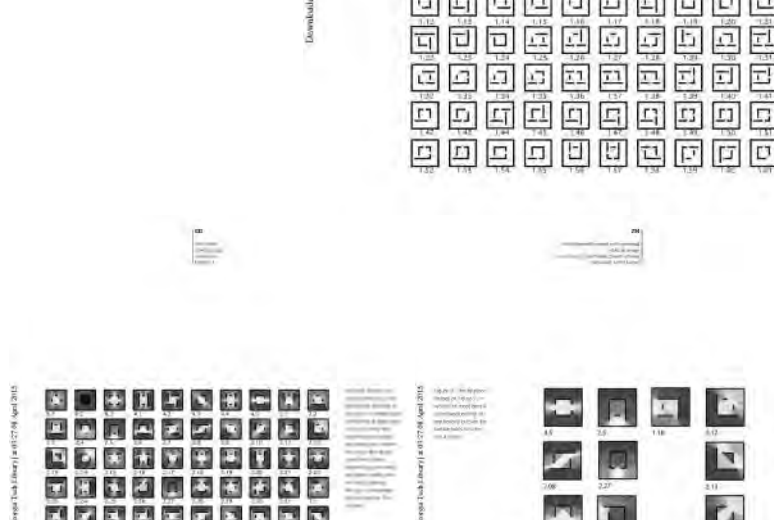
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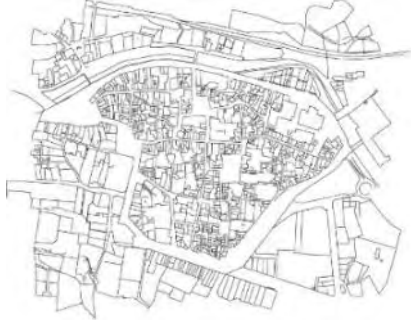


Sakellaridi S, Christova P, Christopoulos V, Vialard A, Peponis J, Georgopoulos A, 2015, "Cognitive mechanisms underlying instructed choice exploration of small city maps" *Frontiers in Neuroscience* **9**



Peponis J, Bafna S, Dahabreh S M, Dogan F, 2015, "Configurational meaning and conceptual shifts in design" *Journal of Architecture* **20** 215-243





1.1



1.2



1.3



1.4



1.5

**Space syntax is a descriptive theory of the perceptual, relational and functional affordances of inhabited space that are relevant to its cognitive and social intelligibility, thus to its planning, design and use.**

空间句法是有关空间（一般指被居住和使用的空间）的一种描述性理论。它关注空间环境在感知、关联和功能等方面的可供性（或者说支持度）。由于这些关系到人们在物理和社会层面对空间环境的认知，因而与空间的规划、设计和使用也息息相关。



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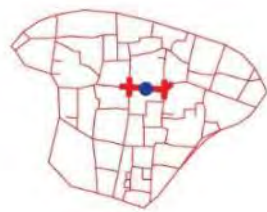
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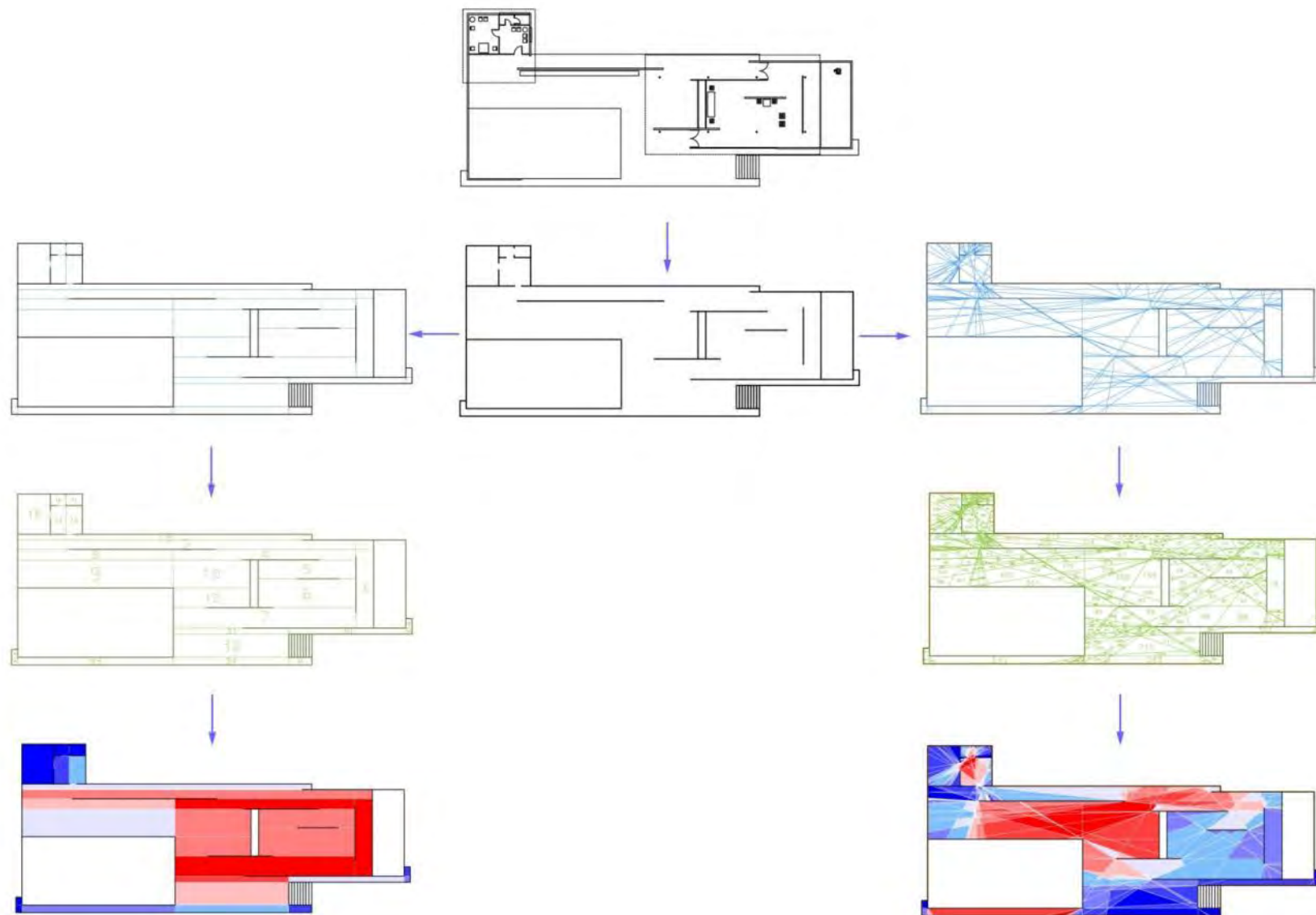
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*Space syntax* is a *descriptive theory* of the perceptual, relational and functional affordances of inhabited space that are relevant to its cognitive and social intelligibility, thus to its planning, design and use.

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**This minimalist definition places the emphasis on the evolving set of representations that run through almost all of our work.**

上述尽可能简化了的定义将重心放在了表达与再现空间手段的不断演进上，也几乎可以从我们所有的工作当中看到这点。





Space syntax is a *descriptive theory* of the perceptual, relational and functional affordances of inhabited space that are relevant to its cognitive and social intelligibility, thus to its planning, design and use.

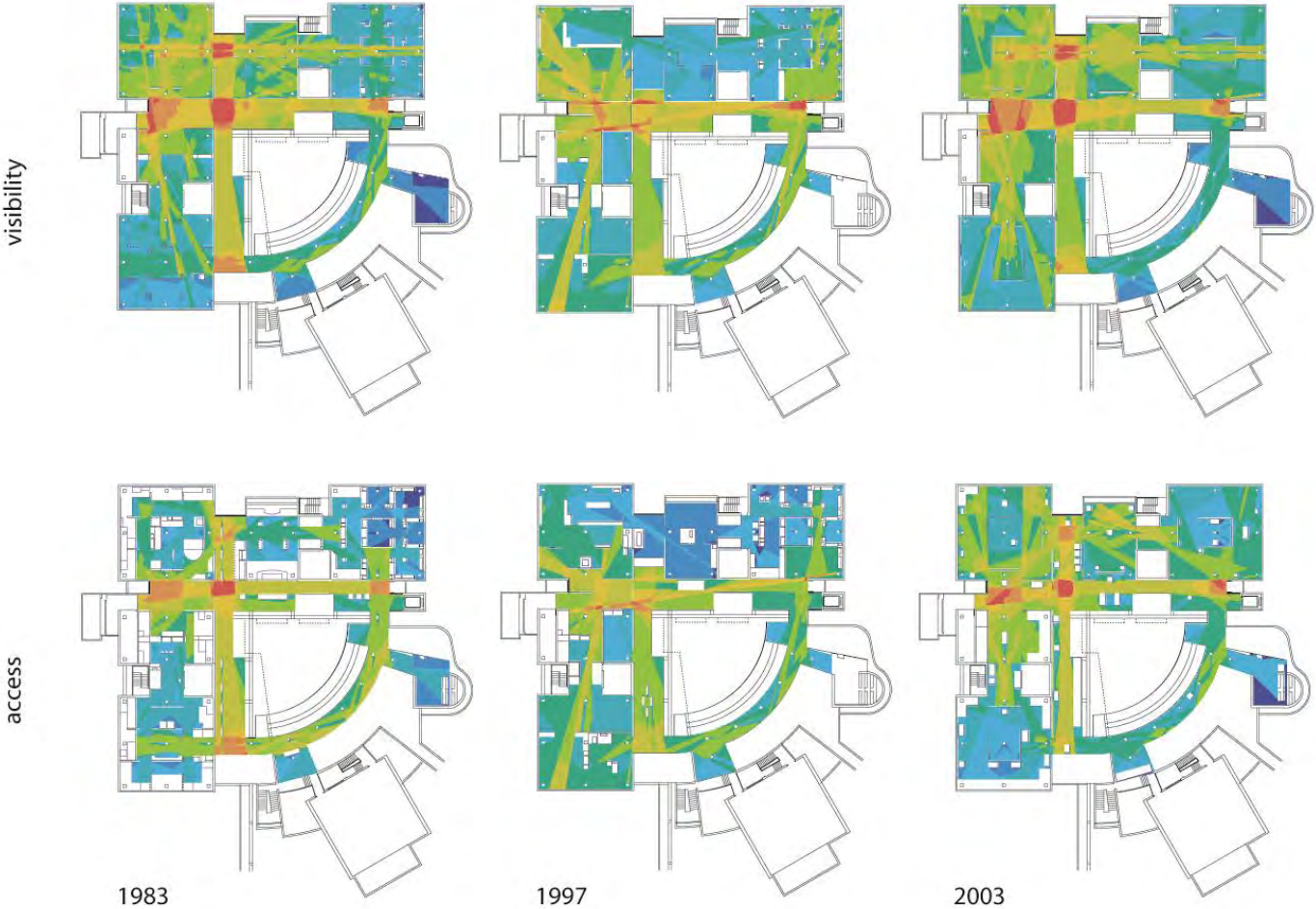
空间句法是有关空间（一般指被居住和使用的空间）的一种描述性理论。它关注空间环境在感知、关联和功能等方面的可供性（或者说支持度）。由于这些关系到人们在物理和社会层面对空间环境的认知，因而与空间的规划、设计和使用也息息相关。

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上述尽可能简化了的定义强调了不断演进的对于空间的再现方法。几乎从我们所有的工作当中都可以看到这点。

**Also, on the growing matrix of analytical ideas that bring these representations to life: different kinds of distance or centrality; different aspects of connectivity or separation; patterns of panorama or restricted view; and, as important, the patterns of animation of space through movement or co-presence as well as the patterns or retreat or seclusion.**

同时，上述定义强调了不断增长的将这些空间再现与现实生活体验结合起来的分析思路：不同类型的距离或中心性；不同方面的连接或分离；开放或受限的视域；还有同样重要的，基于穿行或共同在场营造空间活力的模式以及与之相反的规避与隔离的模式。



The intrinsic affordances of a domain can give rise to fundamental *interfaces*. Hillier B, 2002, "A theory of the city as object" *Urban Design International* 7 153-179 argues that cities can be understood as interfaces between a primary network of longer streets and a set of infill networks of ordinary streets. The objective intelligibility of cities is a function of the structure of this interface.

一个空间领域自身内在的可供性可生成最基本的界面。希利尔在论文（Hillier B, 2002, "A theory of the city as object" *Urban Design International* 7 153-179）当中曾提到可以基于一个由长街道构成的主干网络和由普通街道构成的填充网络之间的界面出发去理解城市。城市的客观可理解度取决于这个界面的形态。

This idea is rendered here using *Avignon* as an example, and Feng’s Grasshopper\_Spatialist\_Lines as the analytical tool.

这里我以Avignon小镇为例将这个想法图示出来。在分析时我使用了封晨开发的工具“Grasshopper\_Spatialist\_Lines”。

The example shows that the ‘long lines’ can be results of a process of gradual growth along paths, or by-products of major infrastructure (fortification walls), or products of incremental adjustments of boundaries and alignments, or outcomes of major design interventions. “Intrinsic” means *inherent to the spatial structure of the object*, not *emerging from ‘organic growth’*.

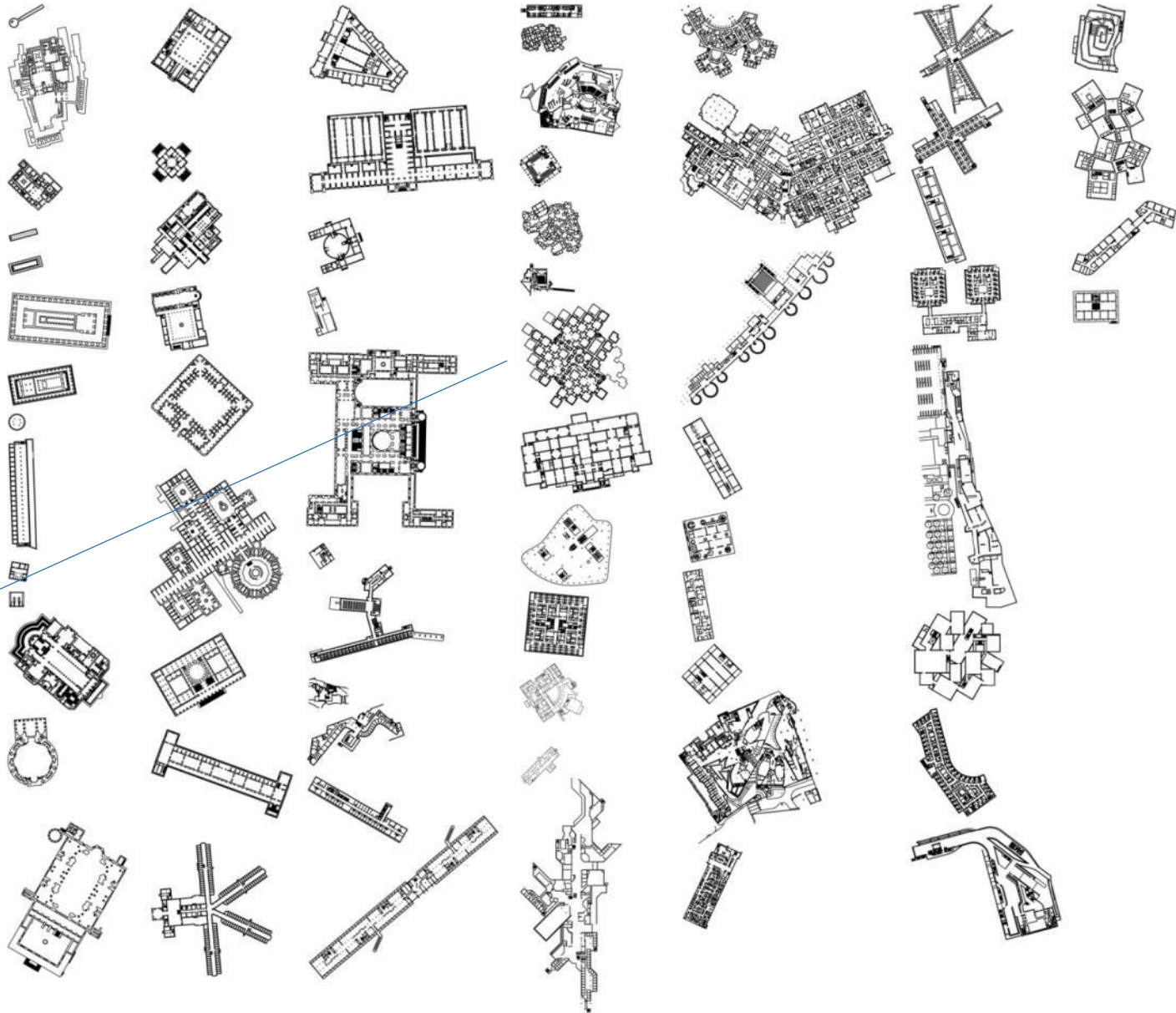
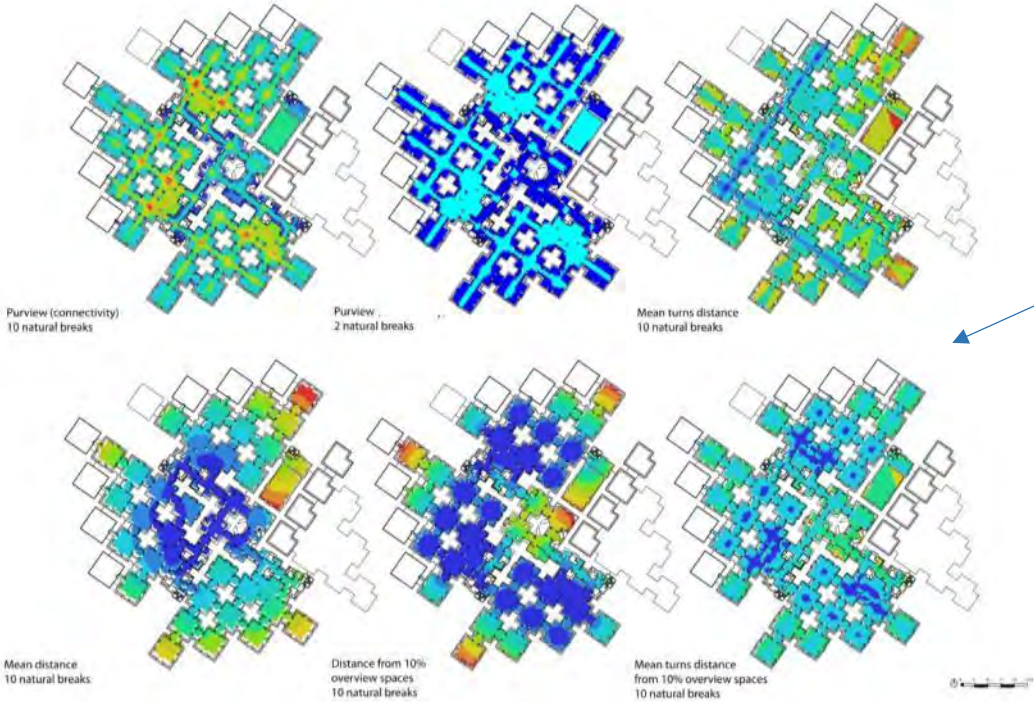
通过这个案例我们可以看到，那些“长线”的生成可能是不同原因导致的结果：可能是基于既有路径的逐步生长，可能是大型基础设施（比如护城墙）所导致的副产品，可能是经年累月的对边界和道路走向的调整，也可能是源于重大干预性的规划设计。所谓“内在的”是指源于空间结构自身，而非源于“有机生长”过程。





I presented a parallel argument on buildings, in 9SSS-Seoul, 2013. The objective intelligibility of buildings rests on the intrinsic interface between the spaces offering the greatest purview and all other accommodation. Corridors, courtyards, or atria are devices that simplify the complexity of accommodation from a perceptual and cognitive point of view. Peponis J, 2012, "Building layouts as cognitive data: purview and purview interface" *Cognitive Critique* 6 11-52

在2013年于首尔举办的第九届国际空间句法会议上，我针对建筑物做了类似的论述。建筑的客观可理解度取决于那些提供全景视角的空间之间形成的界面。从感受和认知的角度来说，走廊、中庭，以及庭院等都是简化空间复杂度的手段。



Measuring: intellectual precision  
度量：思路的精准







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Google earth

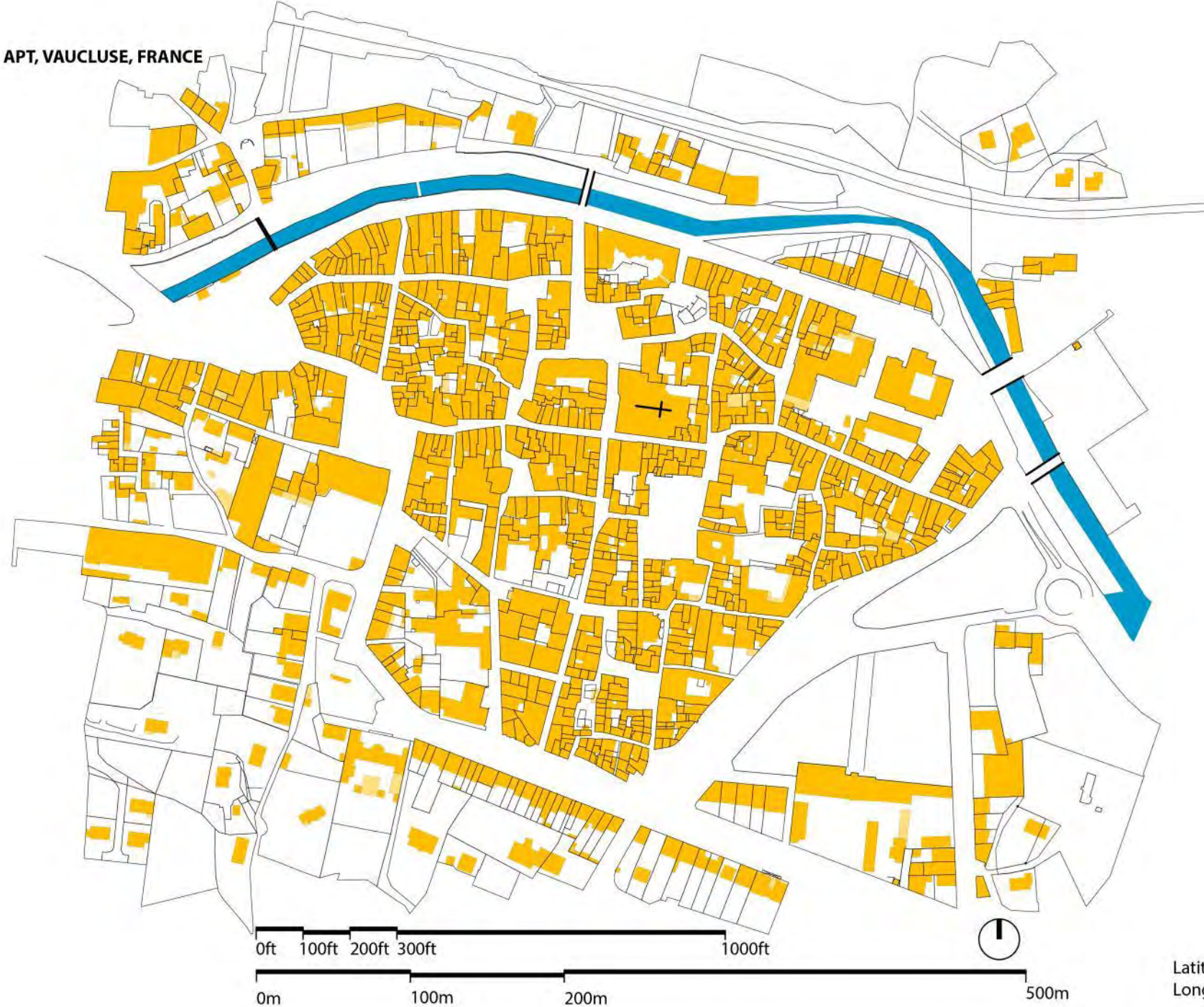
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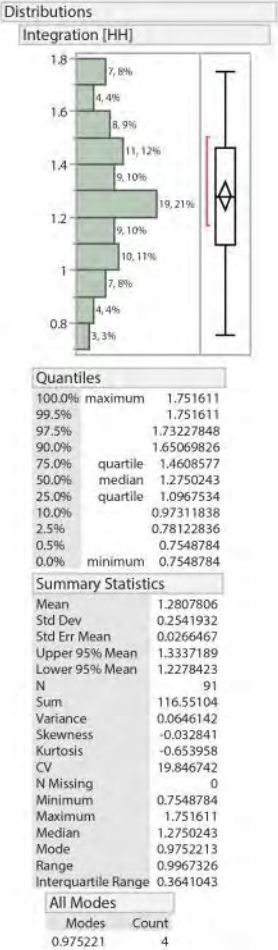
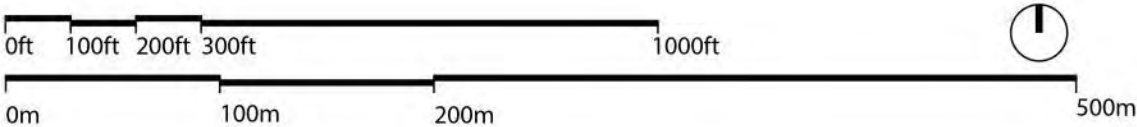
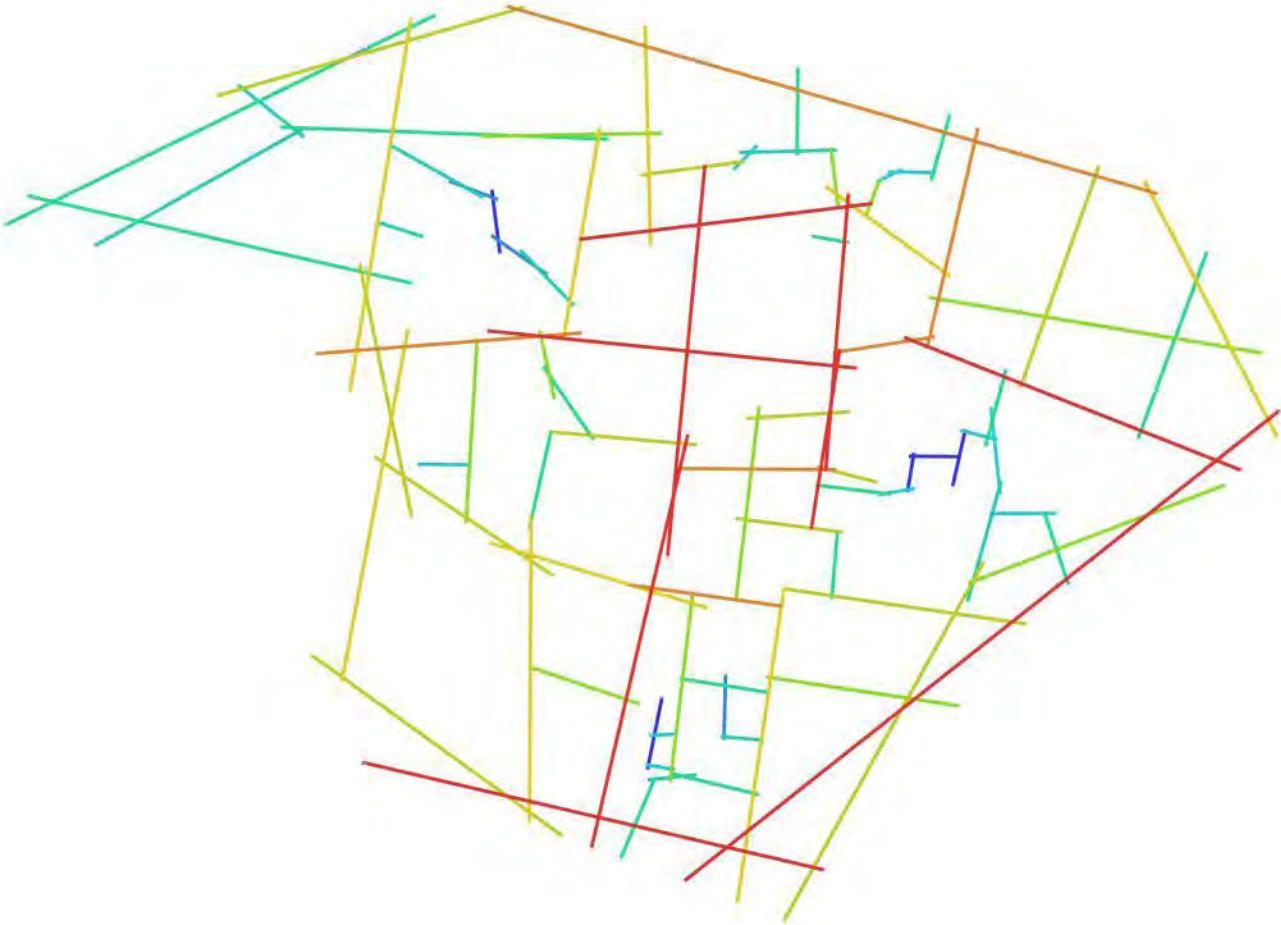




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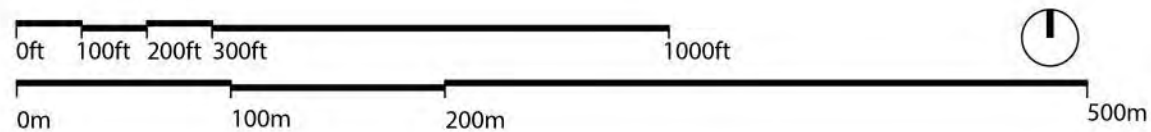
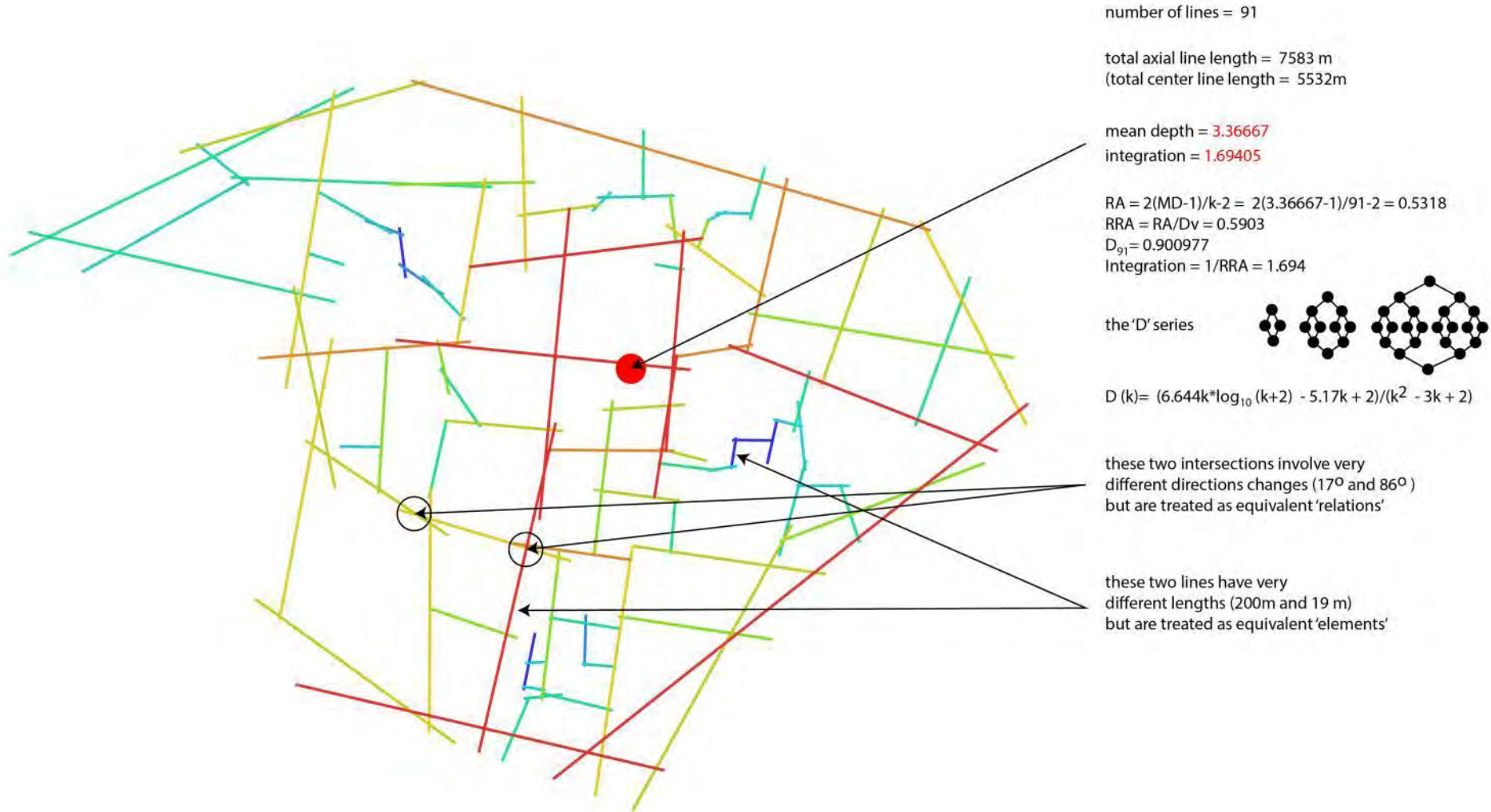
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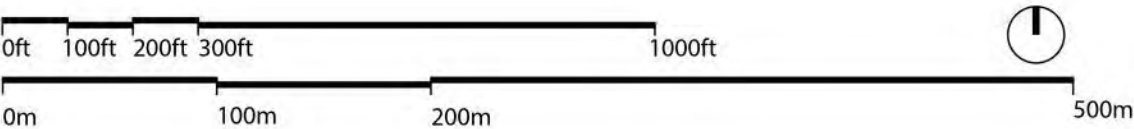
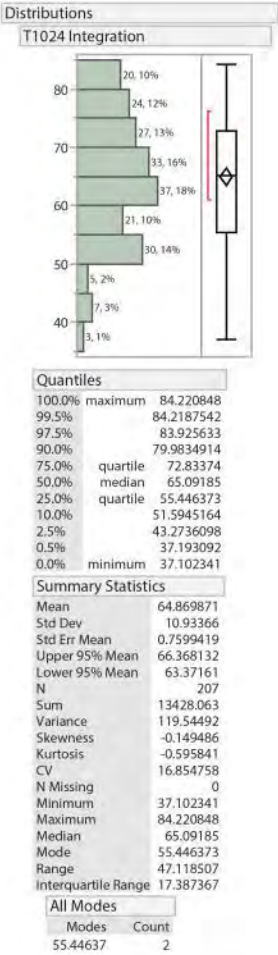
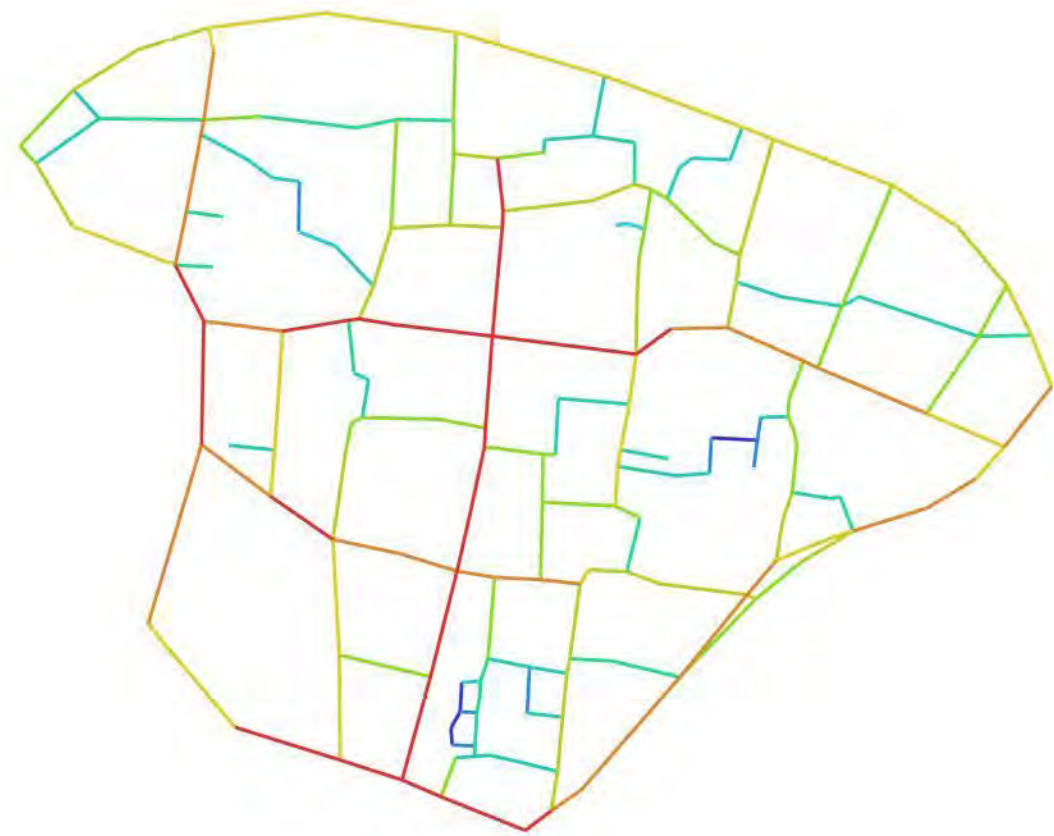
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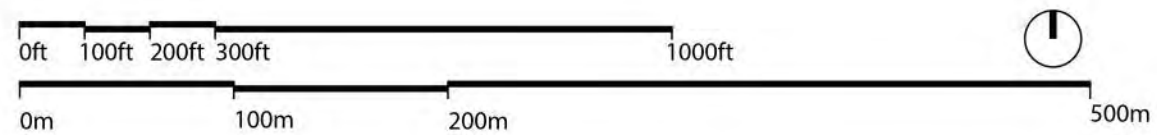
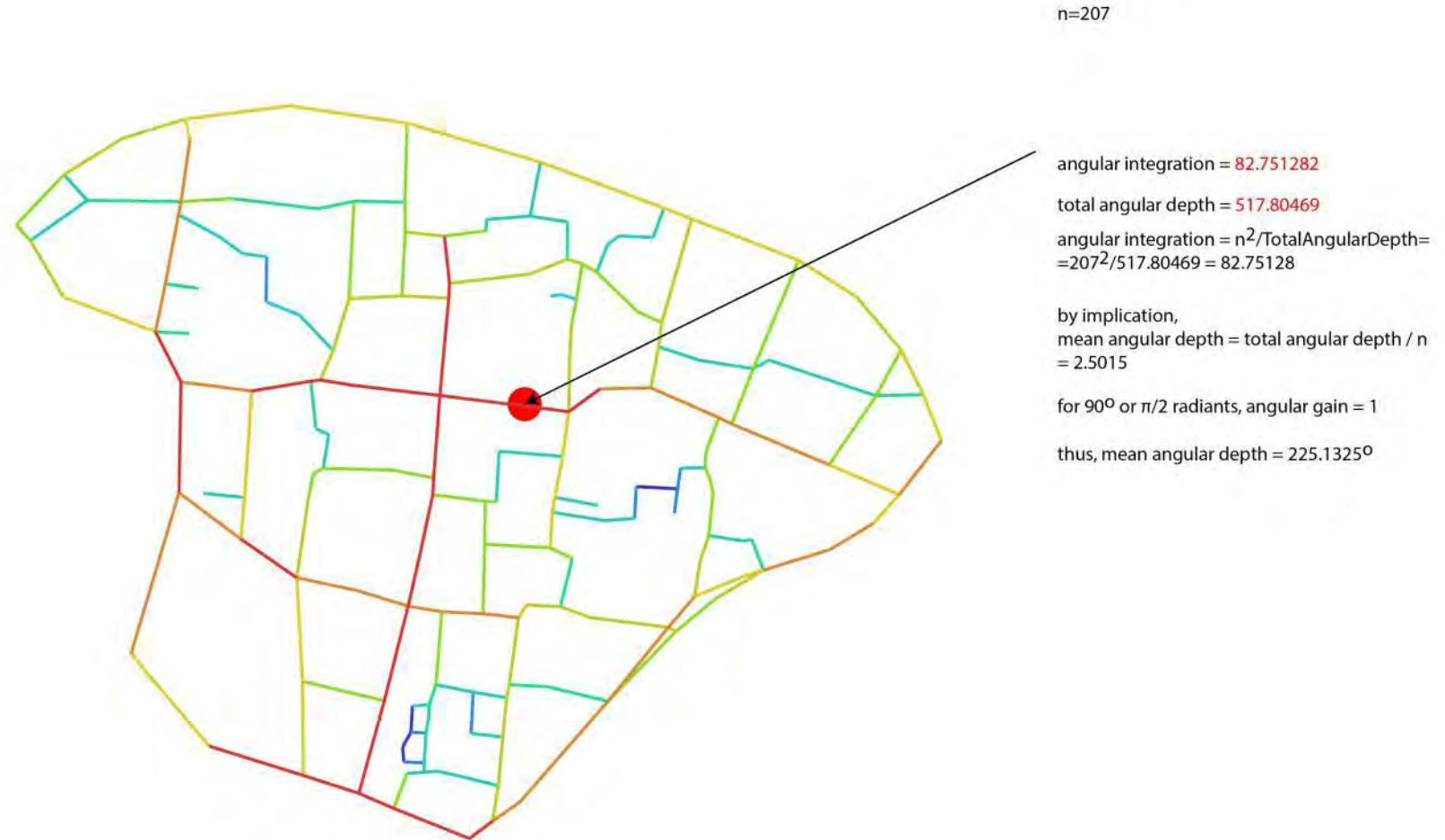


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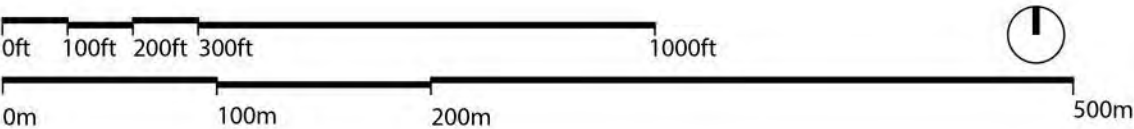
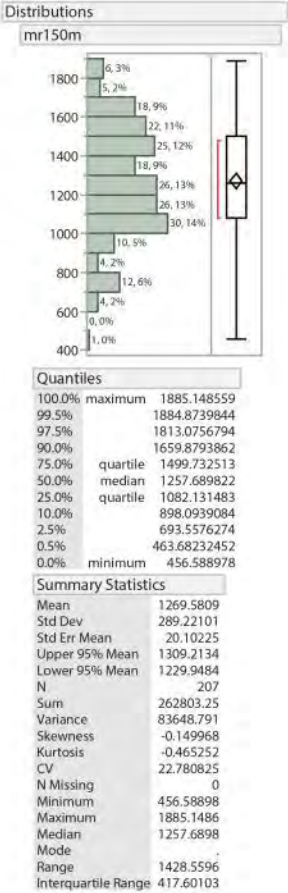
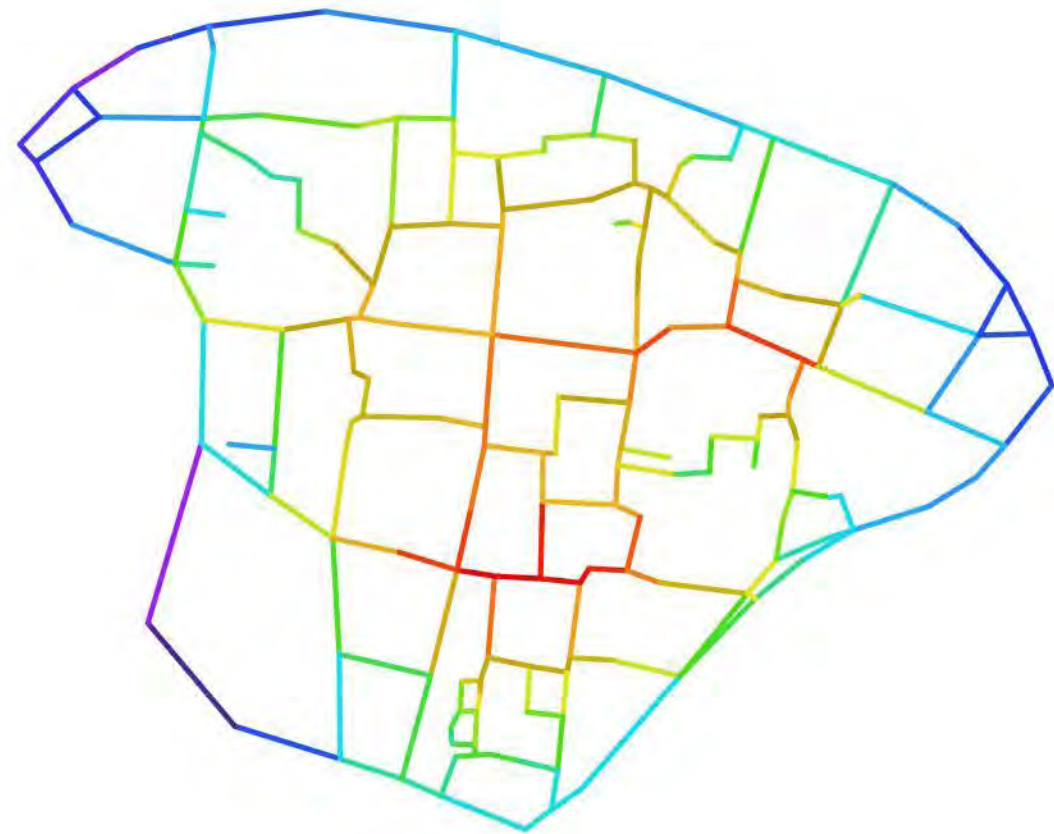


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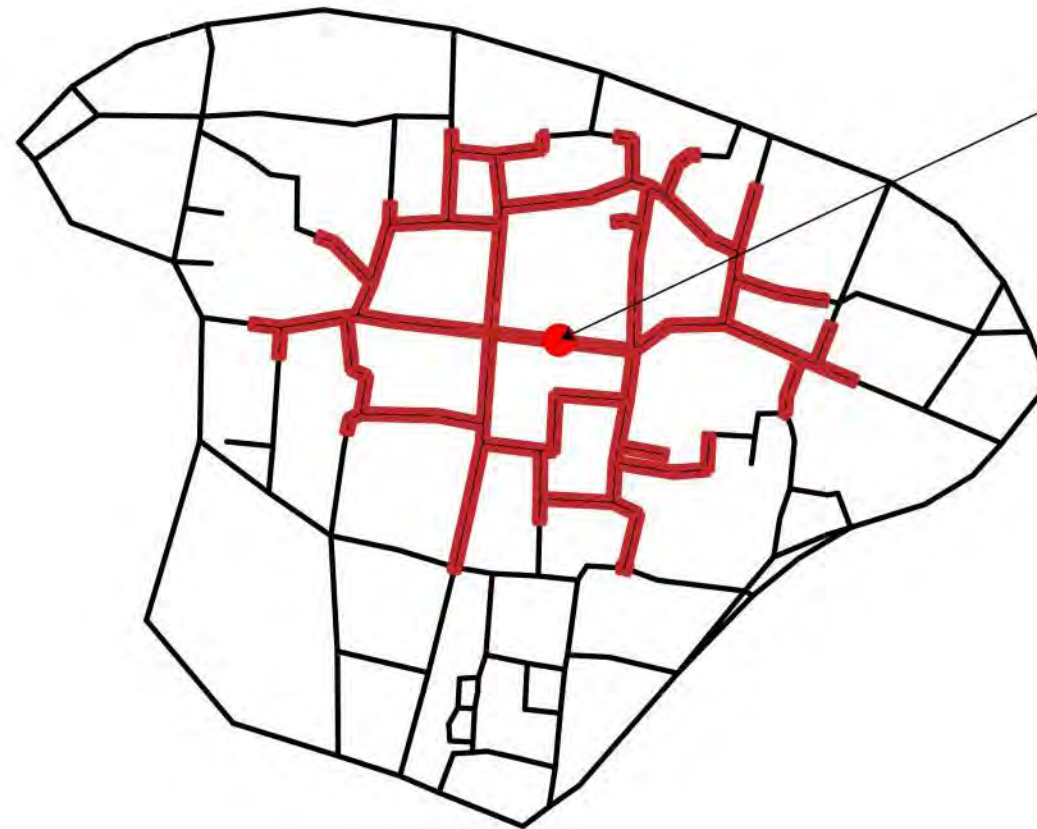
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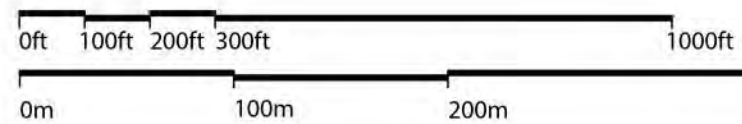
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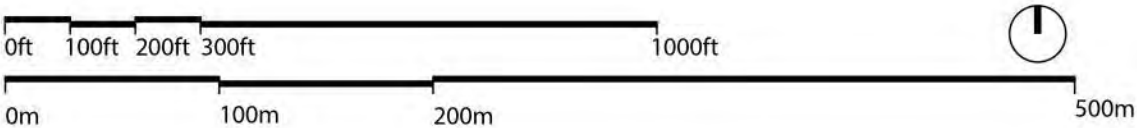
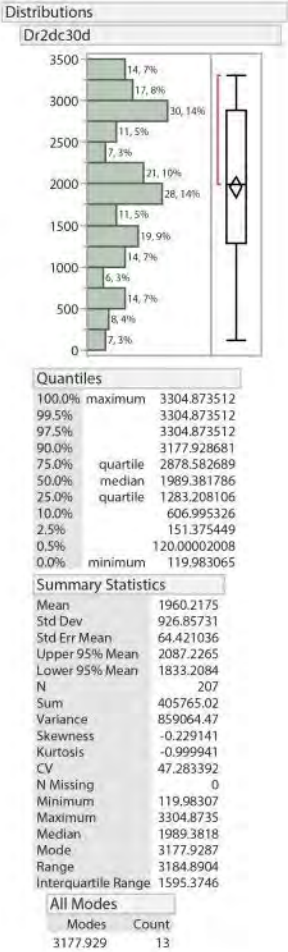
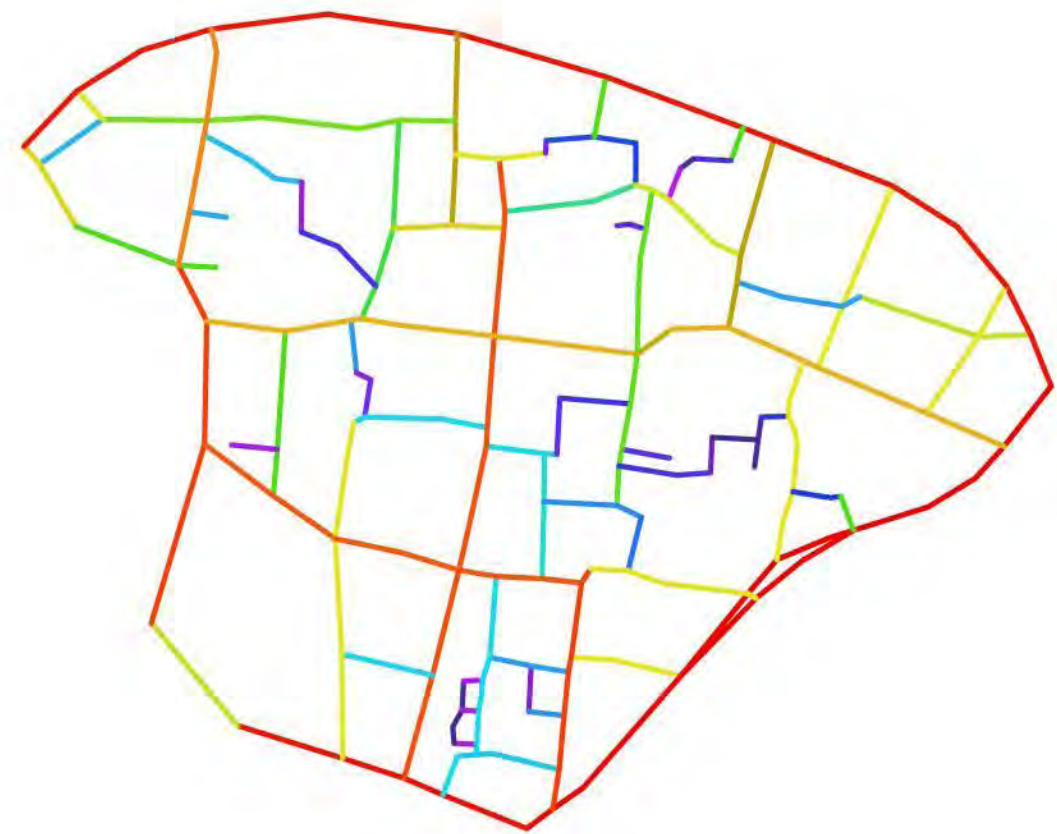
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metric reach (radius set to 150m network distance) =  
= 1681.69m

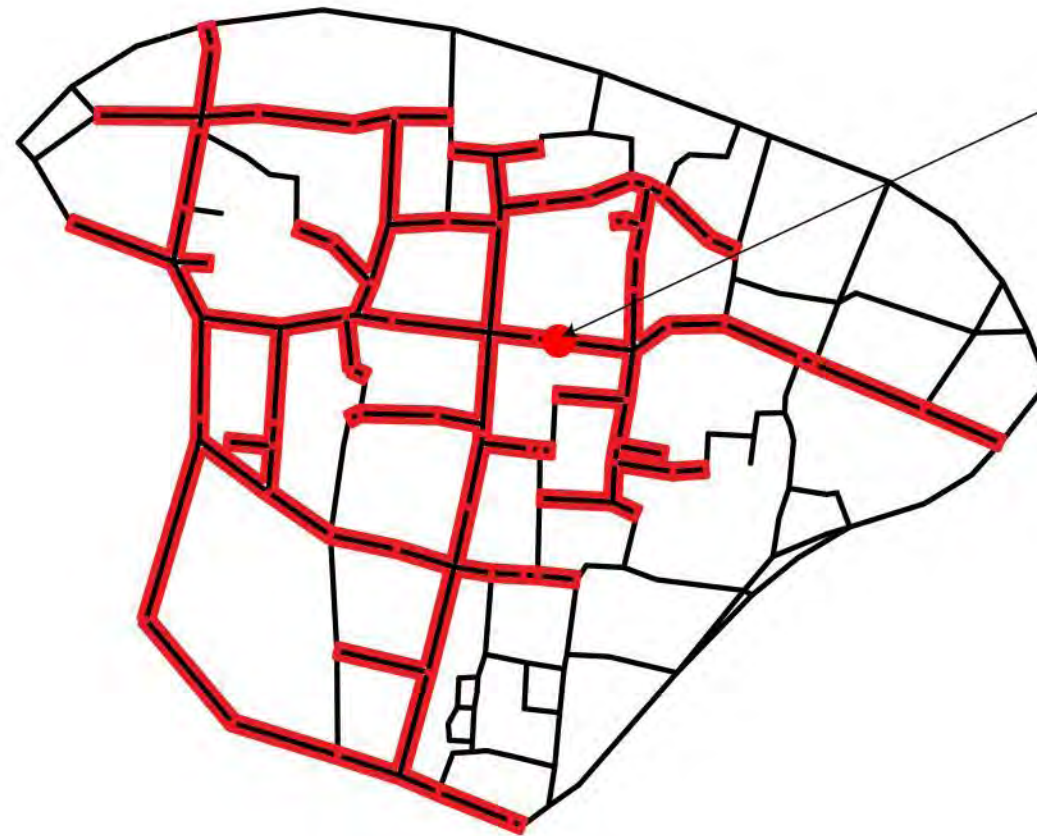


Latitude: 43°52'33.15"N  
Longitude: 5°23'48.62"E

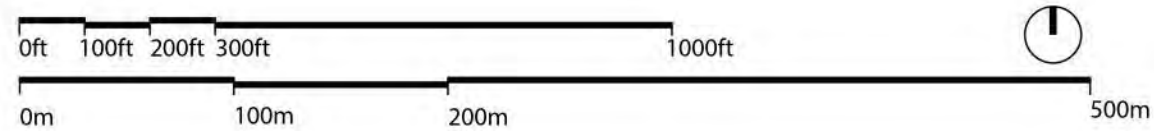




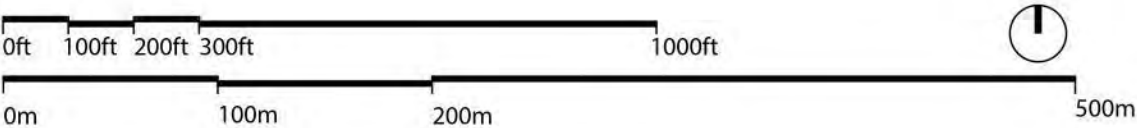
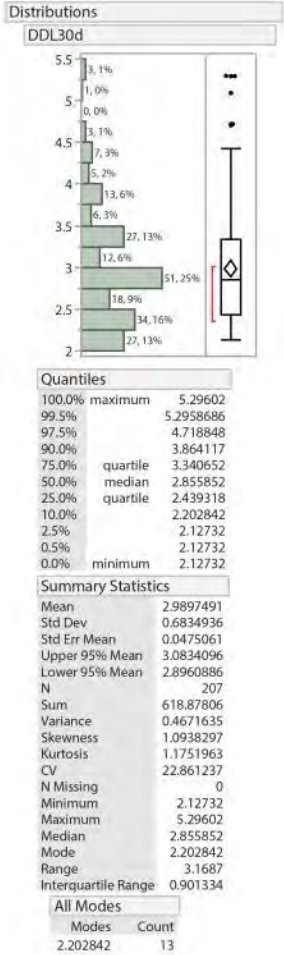
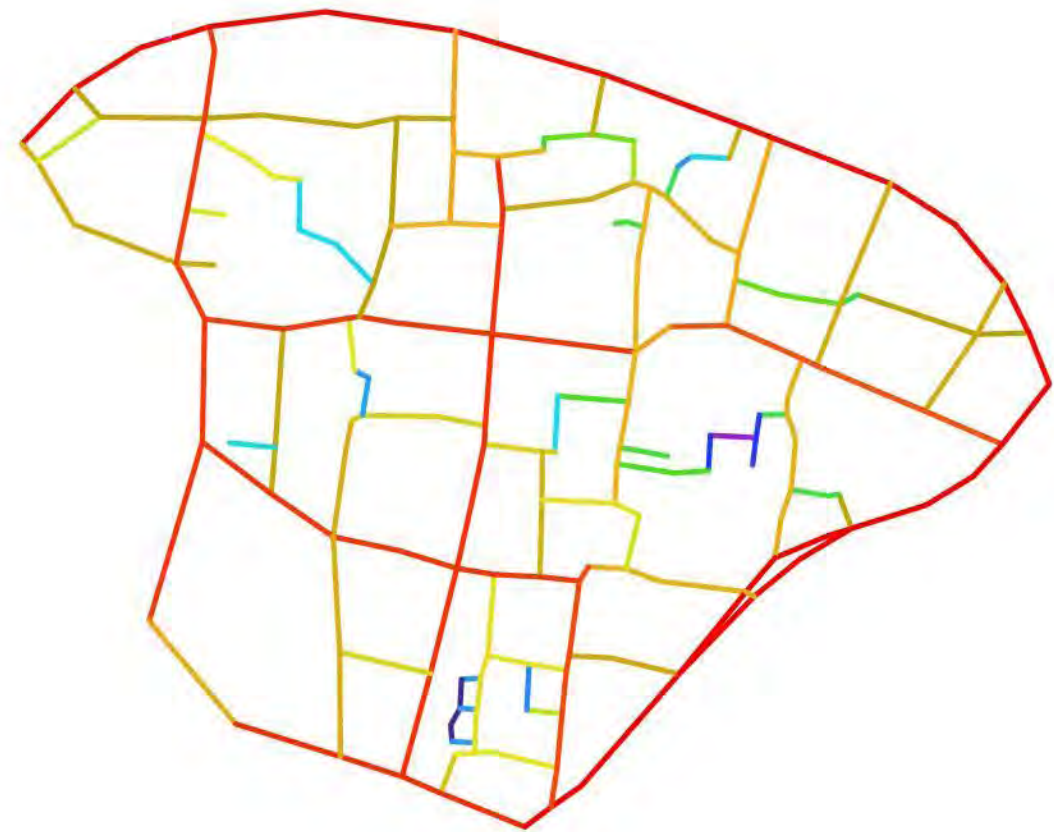
APT, VAUCLUSE, FRANCE



directional reach, 2 direction changes, 30° threshold =  
= 2606.25m

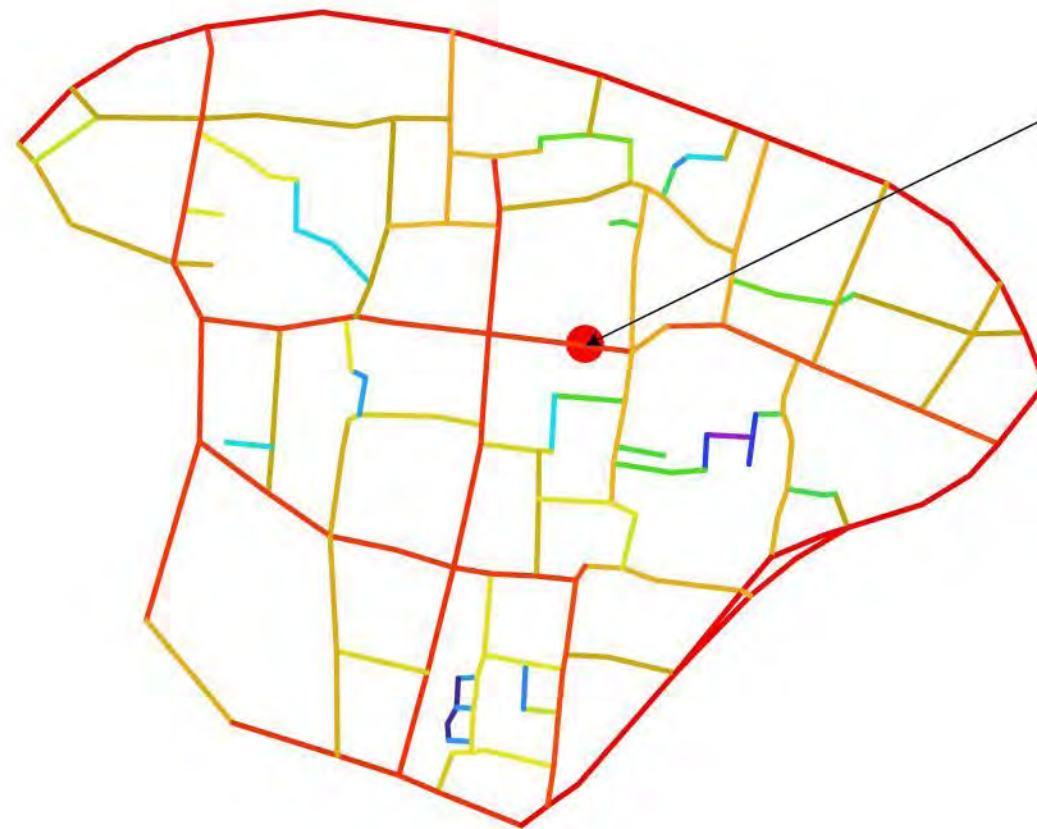


Latitude: 43°52'33.15"N  
Longitude: 5°23'48.62"E



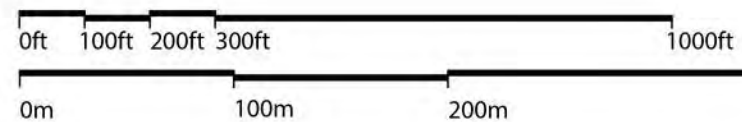


APT, VAUCLUSE, FRANCE

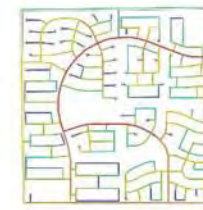
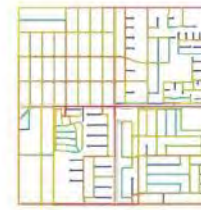
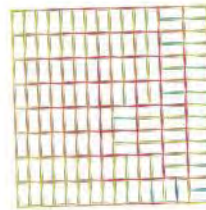
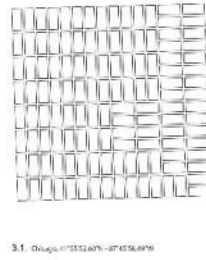
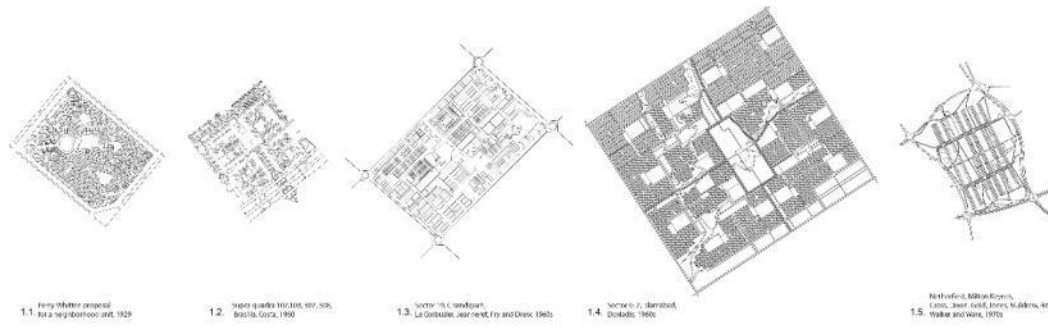


Total street length = 5532 m

Mean Directional Distance per meter (30° threshold) =  
= 2.439 direction changes



Latitude: 43°52'33.15"N  
Longitude: 5°23'48.62"E

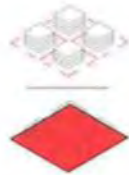




The density of the network,  $N$ , refers to the concentration of networks in an area, in this case the fabric. The density of a network is defined as network length per square metre of base land area ( $m/m^2$ ), and is calculated as the sum of the whole internal network and half of the length of the network used to demarcate the base land area. The unit of the outcome is metre of network per square metre of fabric area.

$$\diamond N_f = \frac{l_i + \frac{l_e}{2}}{A_f}$$

$l_i$  length of interior network (m)  
 $l_e$  length of edge network (m)  
 $A_f$  area of fabric (m<sup>2</sup>)



FSI reflects the building intensity independently of the programmatic composition and is calculated as follows for all levels of scale as described earlier:

◆  $FSI_x = \frac{F_x}{A_x}$

$F_x$  gross floor area (m<sup>2</sup>)  
 $A_x$  area of aggregation x (m<sup>2</sup>)  
 $x$  aggregation (lot (l), island (i), fabric (f), or district (d))



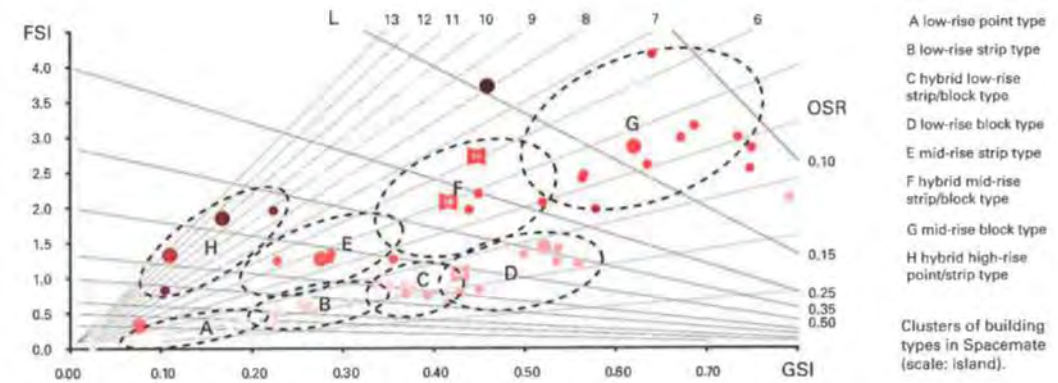
GSI, or coverage, demonstrates the relationship between built and non-built space and is calculated as follows for all levels of scale as described earlier:

◆  $GSI_x = \frac{B_x}{A_x}$

|       |  |
|-------|--|
| $B_x$ | footprint (m <sup>2</sup> )                                    |
| $A_x$ | area of aggregation x (m <sup>2</sup> )                        |
| x     | aggregation (lot (l), island (i), fabric (f), or district (d)) |



This index uses the unit  $\text{m}^2/\text{m}^2$ .





Parcel based density



Accessible density



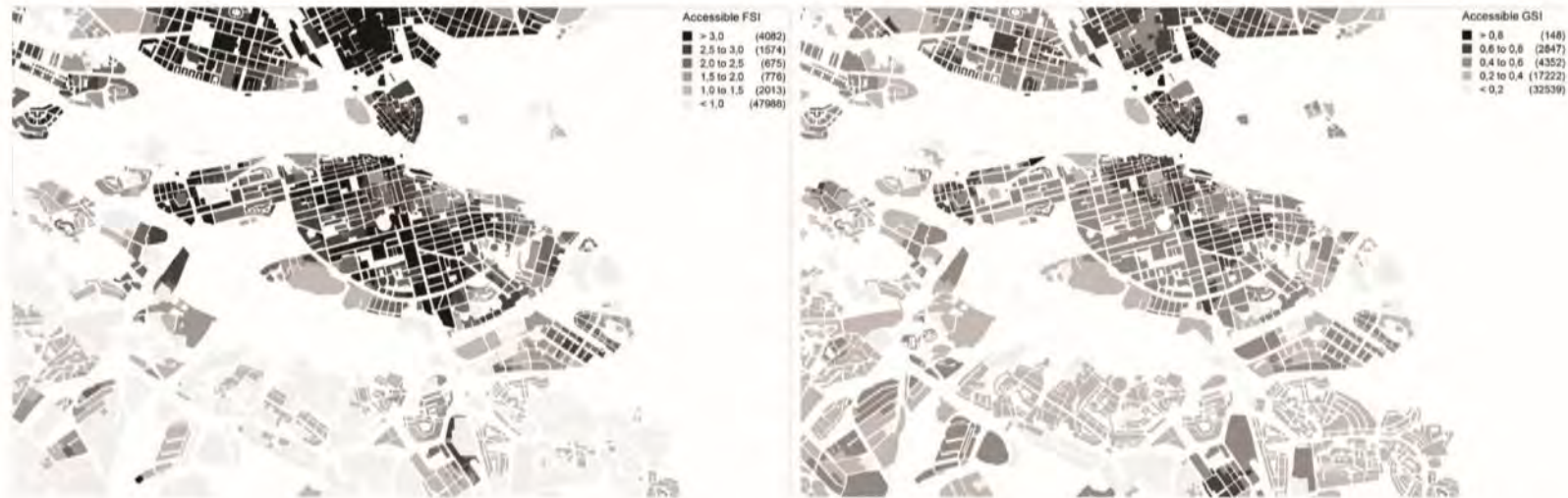


Figure 12  
Accessible FSI (left) and accessible  
GSI (right) in Södermalm, Stockholm.  
Accessible density is measured with a  
distance threshold of three axial steps  
and 500 meter.

The open city  
开放城市



【摘要】随着中国城市化进程的加速，城市空间形态的演变已成为学术界关注的焦点。本文旨在探讨城市空间形态的演变与城市生活品质的关系。通过分析不同城市空间形态的特点，探讨其对城市生活品质的影响，并提出相应的优化策略。本文的研究发现，城市空间形态的演变对城市生活品质具有深远的影响。合理的空间形态设计能够提升城市的生活品质，而不良的空间形态则会降低城市的生活品质。因此，在城市规划和建设中，应充分考虑空间形态对城市生活品质的影响，采取有效措施进行优化。

**关键词：**城市空间形态；城市生活品质；城市规划；空间形态设计

**ABSTRACT:** This paper explores the relationship between urban spatial morphology and urban quality of life. By analyzing the characteristics of different urban spatial morphologies, the impact of urban spatial morphology on urban quality of life is discussed, and corresponding optimization strategies are proposed. The research findings indicate that urban spatial morphology has a profound impact on urban quality of life. Reasonable spatial morphology design can improve urban quality of life, while unreasonable spatial morphology will reduce urban quality of life. Therefore, in urban planning and construction, it is necessary to fully consider the impact of spatial morphology on urban quality of life and take effective measures for optimization.

**KEY WORDS:** urban spatial morphology; urban quality of life; urban planning; spatial morphology design

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## 开放城市与有关美好城市生活的空间句法

The Open City and the Space Syntax of Good Urban Life

开放城市理论，作为城市设计的重要理论之一，旨在探讨城市空间形态与城市生活品质的关系。本文旨在探讨开放城市理论在提升城市生活品质中的应用。通过分析不同城市空间形态的特点，探讨其对城市生活品质的影响，并提出相应的优化策略。本文的研究发现，开放城市理论在提升城市生活品质方面具有重要作用。合理的城市空间形态设计能够提升城市的生活品质，而不良的城市空间形态则会降低城市的生活品质。因此，在城市规划和建设中，应充分考虑开放城市理论的应用，采取有效措施进行优化。

郑应昭，清华大学建筑学院教授，主要从事城市空间形态与城市生活品质的研究。郑晨，清华大学建筑学院副教授，主要从事城市空间形态与城市生活品质的研究。

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城市空间形态的演变，是城市生活品质的关键因素。合理的城市空间形态设计能够提升城市的生活品质，而不良的城市空间形态则会降低城市的生活品质。因此，在城市规划和建设中，应充分考虑城市空间形态对城市生活品质的影响，采取有效措施进行优化。

### 一、有关城市街道网络的空间句法理论

城市句法是一种描述城市空间形态的理论，旨在探讨城市空间形态与城市生活品质的关系。通过分析不同城市空间形态的特点，探讨其对城市生活品质的影响，并提出相应的优化策略。本文的研究发现，城市句法理论在提升城市生活品质方面具有重要作用。合理的城市空间形态设计能够提升城市的生活品质，而不良的城市空间形态则会降低城市的生活品质。因此，在城市规划和建设中，应充分考虑城市句法理论的应用，采取有效措施进行优化。

城市句法理论在提升城市生活品质方面具有重要作用。合理的城市空间形态设计能够提升城市的生活品质，而不良的城市空间形态则会降低城市的生活品质。因此，在城市规划和建设中，应充分考虑城市句法理论的应用，采取有效措施进行优化。

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## 特约文章 GUEST COLUMN

### 超大街区设计的多样性与尺度 Diversity and Scale in Superblock Design

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John Peponis, Feng Chen, James Park  
杨 滔 | 译  
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图1 | 超大街区设计的多样性与尺度

#### 摘要

超大街区是由主干道围合的超大街区。在超级街区设计中，这种类型的街区是城市化的重要组成部分。本文探讨了超大街区设计的多样性与尺度，并提出了相应的优化策略。

**Abstract:** Superblocks defined as large urban blocks surrounded by arterial streets, are an important part of urban life in many parts of the world. We compare different approaches to superblock design from the point of view of the diversity of urban conditions that they engender, including land use and the scale of experience. We identify emerging principles of superblock design that are increasingly directed at improved place, supporting social and cultural systems.

#### 关键词

超大街区；空间句法；尺度；城市多样性；街道网络

**Keywords:** Superblock, Space syntax, Scale, Urban diversity, Street network

#### 1 多元化的形态

城市与多元化之间的关系是城市设计的重要议题。本文探讨了城市设计的多元化形态，并提出了相应的优化策略。

多元化形态是指城市设计中包含多种不同类型的建筑、街道和公共空间。这种多元化的形态能够提升城市的生活品质，并增强城市的吸引力。

在超大街区设计中，多元化形态的实现需要综合考虑多种因素，包括土地用途、建筑高度、街道宽度等。通过合理的规划和设计，可以实现超大街区设计的多元化形态。

超大街区设计的多元化形态不仅能够提升城市的生活品质，还能够增强城市的吸引力。通过合理的规划和设计，可以实现超大街区设计的多元化形态。

超大街区设计的多元化形态是实现城市可持续发展的关键。通过合理的规划和设计，可以实现超大街区设计的多元化形态。

作为思考城市设计的一种方式，超大街区设计具有多种起源。1929年德里（Perry）的建议是超大街区设计的重要里程碑。本文探讨了超大街区设计的多样性与尺度，并提出了相应的优化策略。

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Peponis J, Feng C, Park J, 2016, "The open city and the space syntax of good urban life" *New Architecture* **164** 42-51  
Peponis J, Feng C, Park J, 2017, "Diversity and scale in superblock design" *Urban Design - School of Architecture, Tsinghua University* **5** 30-41

1. *Visible co-presence*. Society is regularly and predictably made visible as a pattern of daily co-presence in public spaces. In principle, co-presence transcends offices and roles, identities and associations. The distribution of movement and co-presence takes into account the spatial structure of the street network. The pattern of co-presence forms an ambient background, which both enables and conditions particular acts of social intercourse.

1. 以可见的方式占据和使用空间。人们可以通过在公共空间的日常共处而直观且经常性地体会到社会的存在。原则上讲，这种人群在公共空间中的共存本身已超越了其中个人所承担的社会角色、身份地位、个性特征，以及从属关系等。街网空间结构影响着人车流运动分布与共处的模式。人们在空间中共处的模式构成了城市的背景生活情境，引导并调节着特定的社交行为活动。

Lisbon 2009



Venice 2004



Syros 2006



Berlin 2008



Tianjin 2014



Boston 2012



Stockholm 2013



Amman 2014



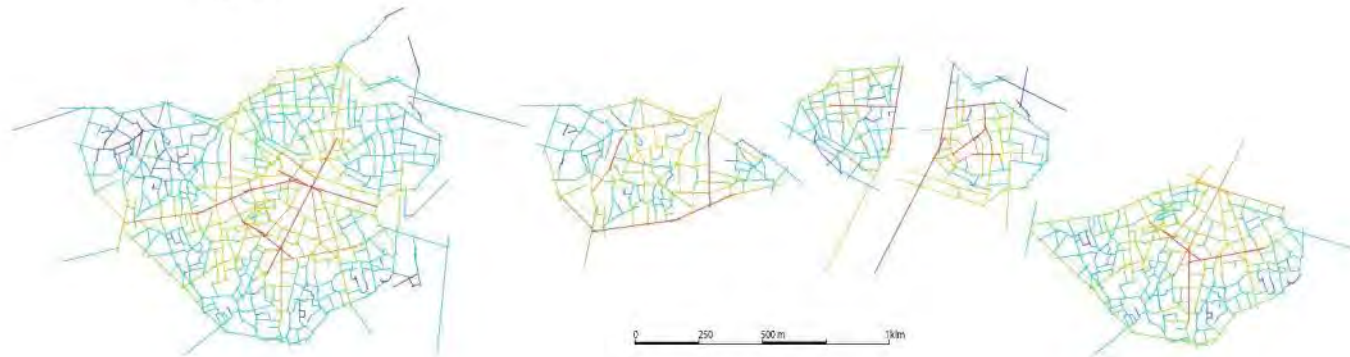


**2. Openness based on intelligibility.** Public spaces are linked into an intelligible city-wide network of connections. This supports open-ended exploratory path-making as well as way-finding directed to individual locations already identified as targets. Not only does the city teach that it is possible to find the things that one is looking for; it also teaches that it is possible to learn what kinds of things there are to be found.

**2. 从增进城市的可理解度出发，营造开放的城市。**城市中的公共空间相互连系而形成一个易于理解的跨越整个城市的连系网络。无论你是想自由地探索，还是心中已有明确的目的地，这样的城市都能支持你的活动。城市不仅可以引导我们找到我们已经明确想要的东西，它也能引导我们意识到其他存在和有待发现的种种事物。



Herakleio



**3. Distributed attraction – distributed destinations.** Prominent destinations benefit from locating in central or easily accessible places. Centrality and accessibility, however, are not the province of bounded places. Reaching one destination creates an opportunity to become aware of other potential destinations in its vicinity. Everywhere within the city, centrality and attraction are framed by the encompassing pattern of connections defined by the street network.

**3. 连续分布的吸引点——连续分布的目的地。**城市中的热点地段得益于它们所处的地理位置。它们或位于城市区段的中心，或临近四通八达的街道。然而，这里所说的居于中心或通达的城市空间并非是封闭内向的。在人们到达一个目的地后，应借助空间布局引导他们意识到周边潜在的其他去处。在城市的每一个角落，由城市街道网络界定的空间连接关系都在催生和塑造着城市空间的中心性和吸引力。

Tianjin, 2014



Beijing, 2014



Amman, 2014





**4. Layered scales.** The creation, accommodation and interrelationship of different scales of organization is fundamental to cities and their culture. Scales should be layered over urban space rather than separated into regions. Layering expresses and organizes the relationship between the intersecting and overlapping communities and networks of interaction and exchange in which we live our lives. The open city links the local and the translocal, neighborhood centrality and metropolitan centrality and makes each and their relationship more intelligible and more accessible to all.

**4. 不同尺度的交叠。**如何创造并处理、组织好不同尺度的城市空间以及它们之间的关系对城市 and 其中蕴含的文化至关重要。不同尺度的城市空间应当相互交叠，而非彼此分离。尺度的层叠不仅呈现出并组织起生活中那些具有交集的不同社区和交际网络之间的关系。开放城市连接了当地和跨地的事物，连接了街区尺度和都市尺度的中心性，并将它们自身及它们之间的联系都变得更易于为所有人理解。

Beijing, 2014



Amman, 2013



## 1. Supporting society and culture.

“In its deepest and richest sense a community must always remain a matter of face-to-face intercourse. This is why the family and the neighborhood, with all their deficiencies, have always been the chief agencies of nurture, the means by which dispositions are stably formed and ideas acquired which laid hold on the roots of character.”

一个社区，从其最丰富与最深刻的意义上来说，总是关乎人与人之间面对面的交往。这也解释了为何身处的家庭与街坊四邻，尽管它们自身有种种缺陷与不足，却起着首要的教化与熏陶作用。在这样的言传身教中，性情与人格得以稳固形成，思想得以承继和传播。

“Is it possible for local communities to be stable without being static, progressive without being merely mobile? Can the vast, innumerable and intricate currents of trans-local associations be so banked and conducted that they will pour the generous and abundant meanings of which they are potential bearers into the smaller intimate unions of human beings living in immediate contact with one another?

是否那些稳固的地方性社区必然是静态的，而那些进步的社区必然是动态的？地区之间广阔而繁杂的联系承载着丰富的意义与内容，那么，这些联系是否能以特定的存储和引导方式将那些丰富的意义与内容渗透与传达到范围更小且朝夕相处的人群单元中呢？

Dewey J, 1954 *The public and its problems* (Athens, OH), p.211

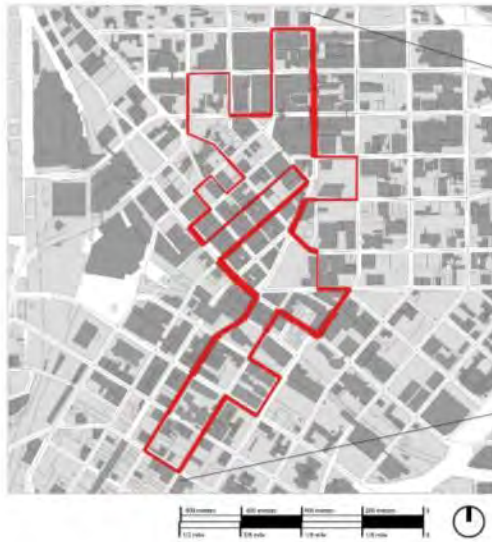
## 2. Supporting legibility and learning.

“We believe that in the course of learning something like a field map of the environment gets established in the rat's brain. ... it is also important to discover in how far these maps are relatively narrow and strip-like or relatively broad and comprehensive. Both strip-maps and comprehensive-maps may be either correct or incorrect .... The differences between such strip maps and such comprehensive maps will appear only when the rat is later presented with some change within the given environment. Then, the narrower and more strip-like the original map, the less will it carry over successfully to the new problem; whereas, the wider and the more comprehensive it was, the more adequately it will serve in the new set-up.”

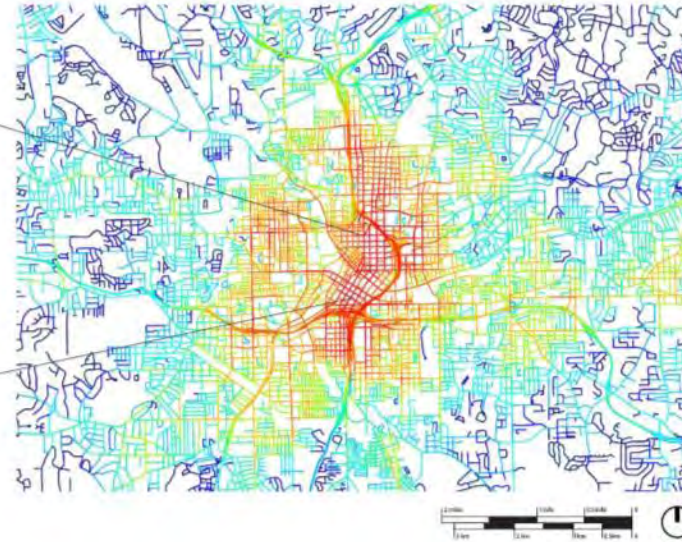
我们相信在学习的过程中，某种类似环境意向地图的东西在大老鼠的大脑中形成了...同样重要的是弄清楚这些意向图在多大程度上呈现为狭窄的条状或是相对广阔而综合的。无论是条状意向图还是综合意向图，都对或错...而只有当大老鼠被放置在些许改变后的原有环境中后，条状意向图和综合意向图的差异才会显现出来。原先的意向地图越是呈现为狭窄的条状，它就越难以被调整来适应环境中的新变化；相反，原先的意向地图越是广阔与综合，它就越能充分适应环境中的新变化。

Tolman E C, 1948, "Cognitive maps in rats and men" *Psychological review* 55 189-208



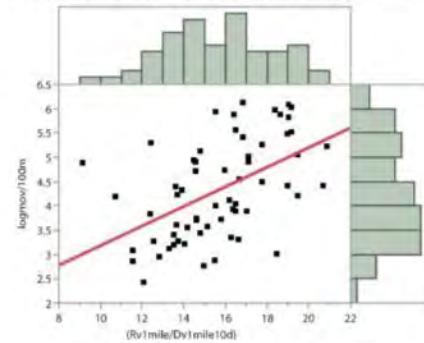


2.1



2.2

Bivariate Fit of logmov/100m By (Rv1mile/Dv1mile10d)



$r^2 = 0.260$ ;  $n=62$ ; F Ratio = 21.1278; Prob>F  $p < 0.0001$

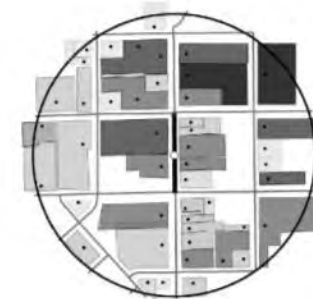
2.3



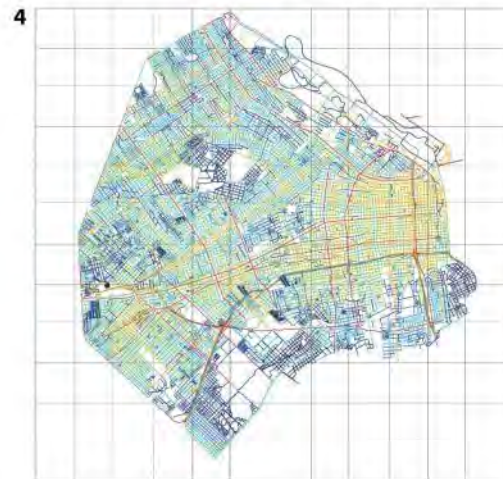
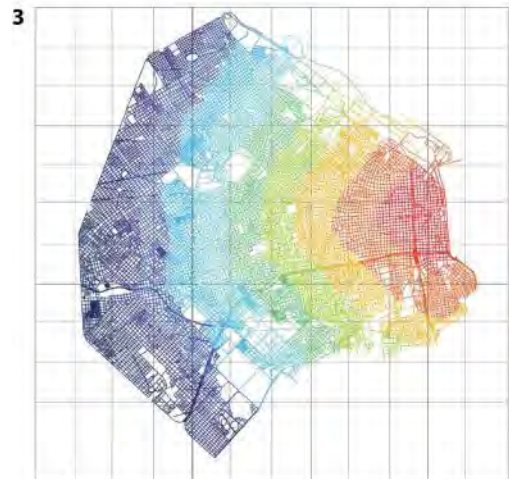
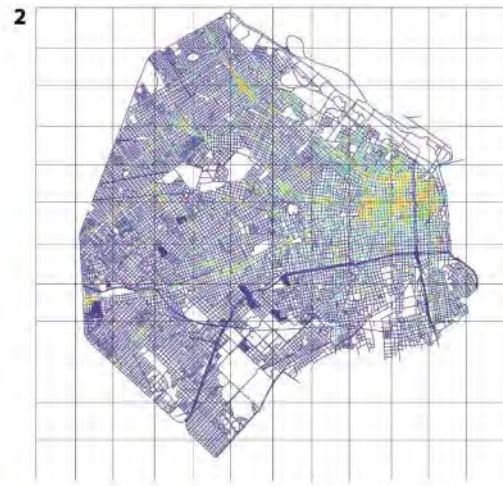
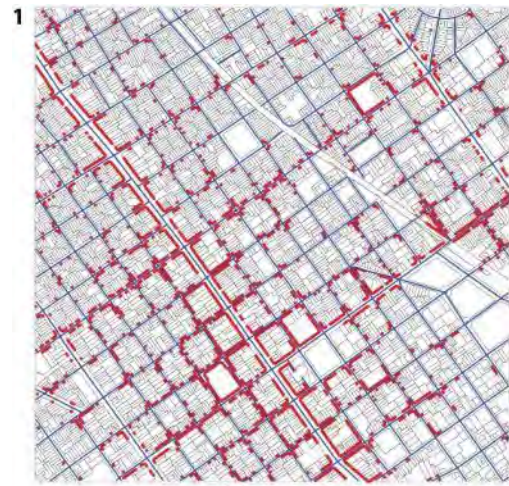
2.4



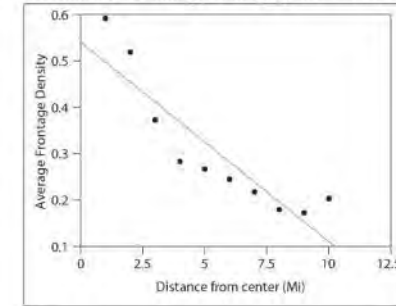
2.5



2.6



5 Bivariate Fit of Frontage Density By Distance to CBD (Mi)



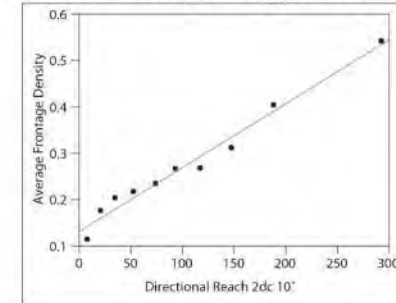
$$\text{AvFDens} = 0.5405801 - 0.0429705 \text{ Distance from center (Mi)}$$

$$r^2 = 0.808421$$

$$\text{F Ratio} = 33.7583$$

$$\text{Prob} > F = 0.0004$$

6 Bivariate Fit of Frontage Density By DR 2dc 10°



$$\text{AvFDens} = 0.1320783 + 0.0013774 \text{ DR 2dc } 10^\circ$$

$$r^2 = 0.976115$$

$$\text{F Ratio} = 326.939372$$

$$\text{Prob} > F = 0.0001$$

City of Buenos Aires

Total street length: 2812 km

Street length with more than 60%  
shop frontage (both sides): 425 km

1: shop frontage (red) in an area 1 mile x 1 mile

2: density of shop frontage (red represents higher densities, blue represents lower densities)

3: distance from center (1 mile rings)

4: directional reach, 2 direction changes, 30 degrees threshold

5: shop front density falls with increasing distance from center

6: shop front density increases as directional reach increases



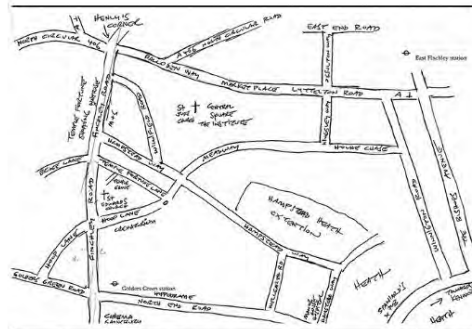


Figure 4a: Sample of a Well-Drawn Sketch Map

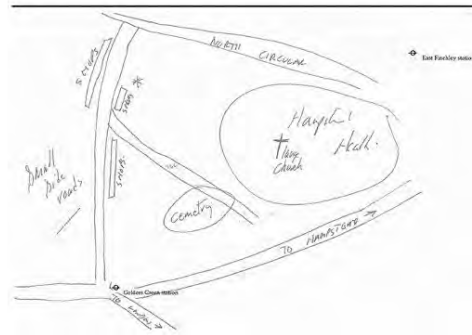


Figure 4b: Sample of a Poorly Drawn Sketch Map

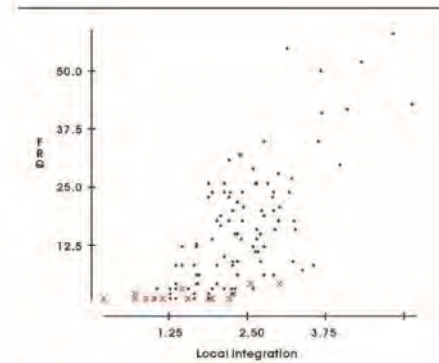


Figure 7: Scattergram Between Frequency and Local Integration

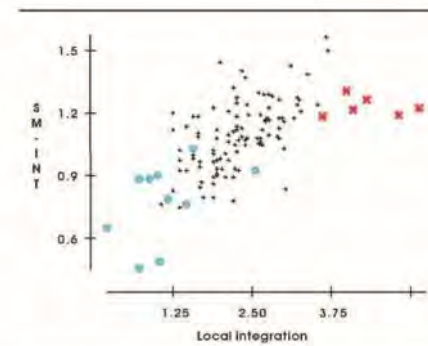
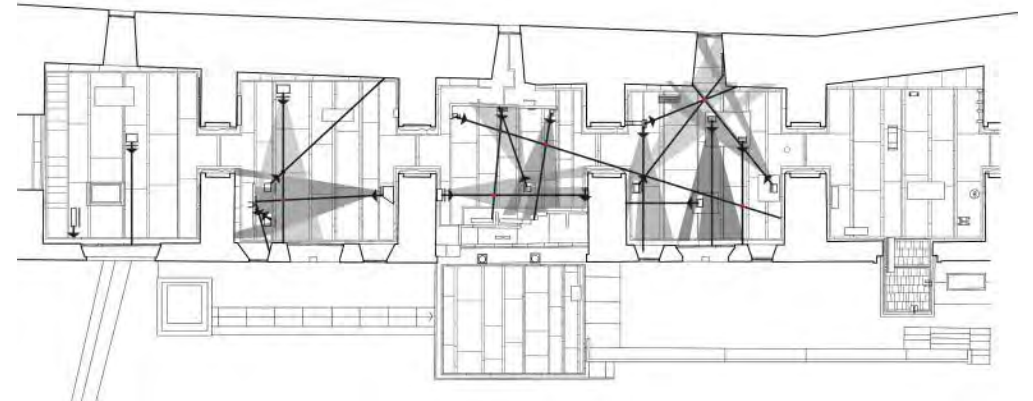
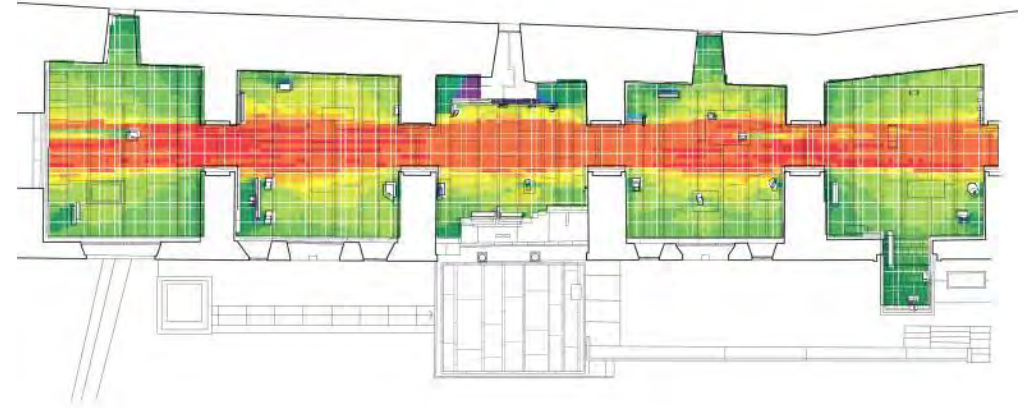
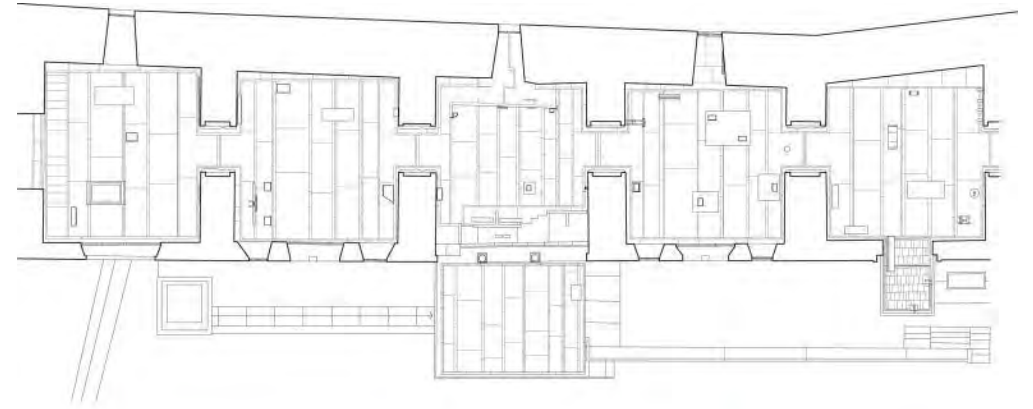


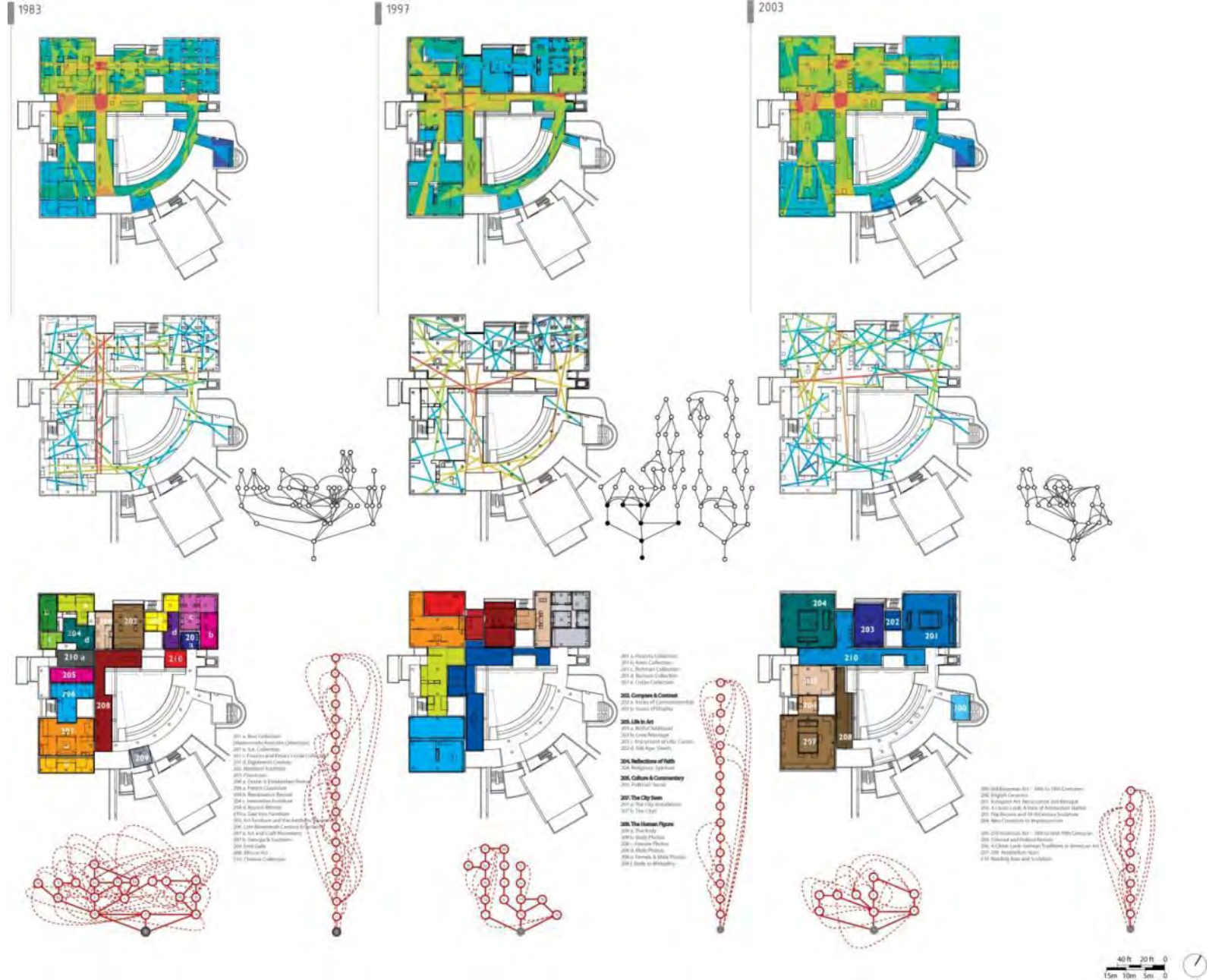
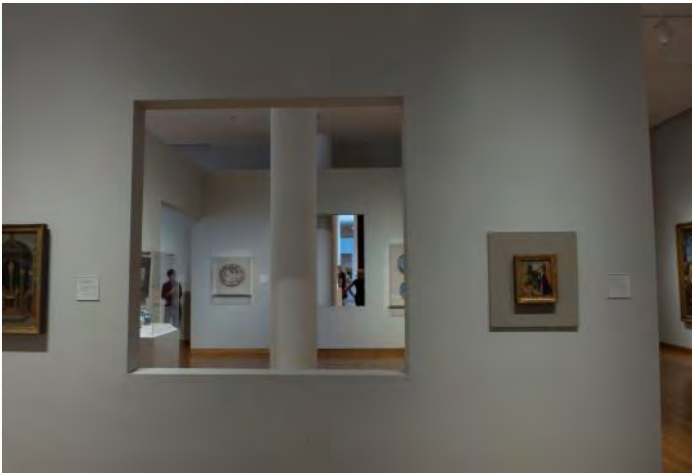
Figure 9: Scattergram Between (Vertical) Global Integration of Sketch Maps and (Horizontal) Local Integration of Reality

Embracing contingency: society cannot be taken for granted  
孕育机缘：社会并非是理所当然的存在



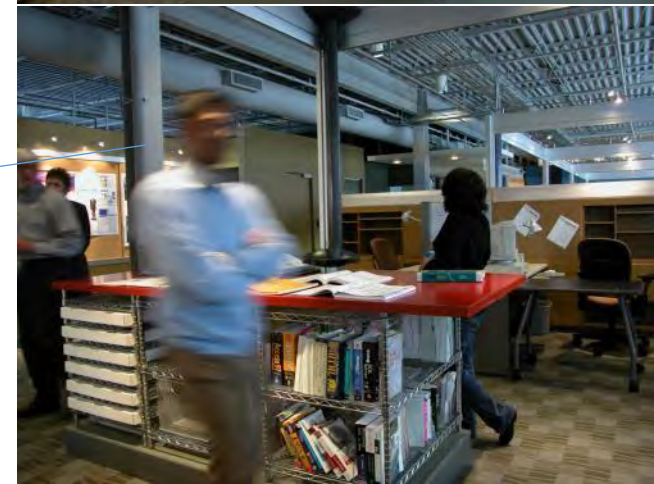
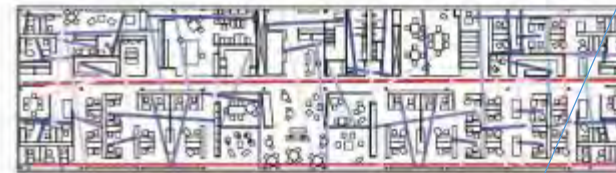
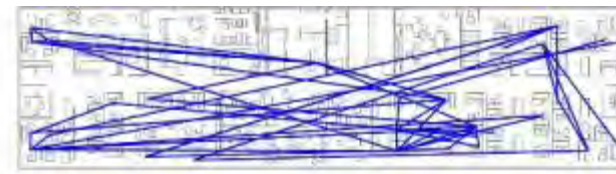
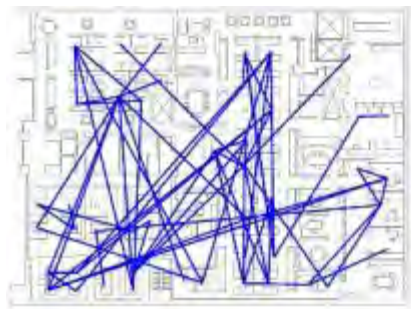


Stavroulaki G, Peponis J, 2003, "The spatial construction of seeing at Castelvecchio", in *4th International Space Syntax Symposium* Ed J Hanson, Citeseer, London pp 66.61-66.14



Zamani P, Peponis J, 2010, "Co-visibility and pedagogy: innovation and challenge at the High Museum of Art" *Journal of Architecture* **15** 853-879





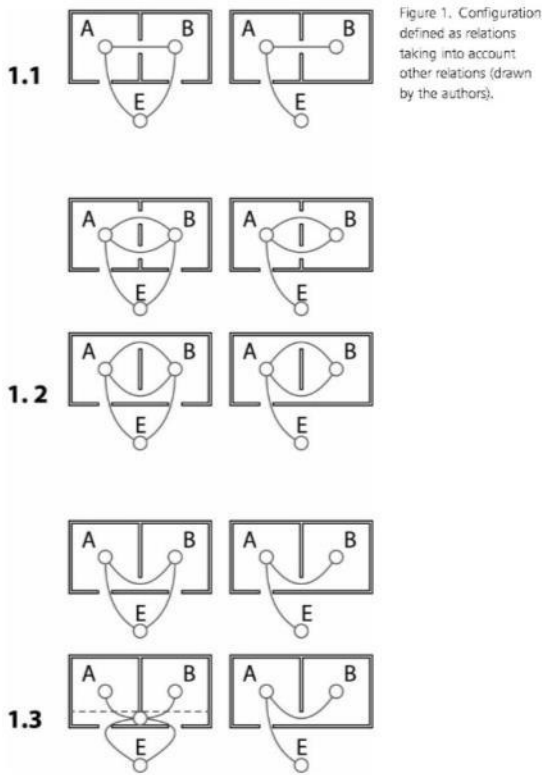
Peponis J, Bafna S, Bajaj R, Bromberg J, Congdon C, Rashid M, Warmels S, Zhang Y, Zimring C, 2007, "Designing space to support knowledge work" *Environment and Behavior* 39 815-840

What is an interface? And how does it differ from the relationships that make up the configurational language of space?

什么是界面？它与构成空间组构语言的关系之间有何不同？

Relationships of permeability from one space to another, intersections between one line and another, or one visibility polygon and another are all one-to-one direct relationships. The definition of configuration – relations taking into account other relations – acknowledges this and points to the fact that systems of relationships have properties that affect the individual relationships themselves. In this sense configuration is about one-to-one direct relationships becoming networks of one-to-all mediated relationships.

相连的一对空间，相交的一对轴线，或是相叠的一对视域多边形，均体现了一种直接的一对一的关系。构型的定义——即基于多方关系而形成的关系——承认这一点并指出关系网络的一些属性会影响到个体间的关系。从该意义上讲，构型将一对一的直接关系变为了一对多的多方介入的关系网络。



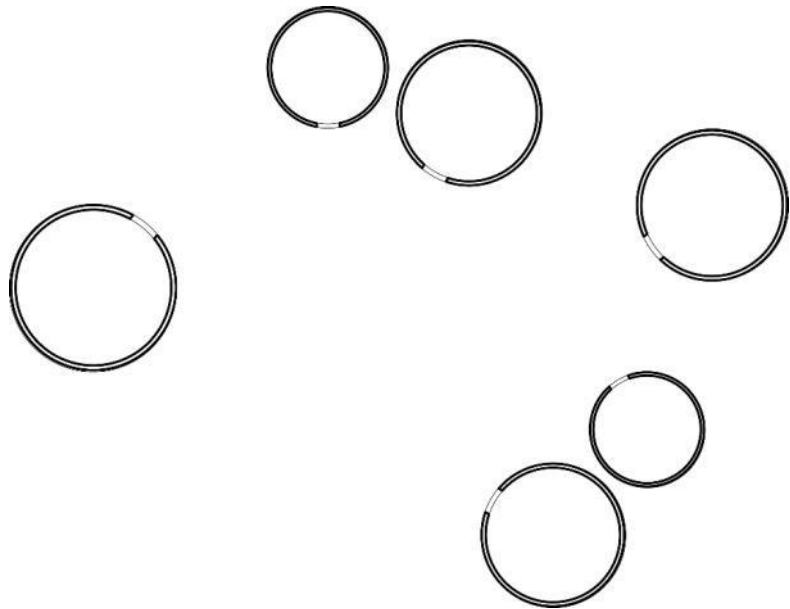
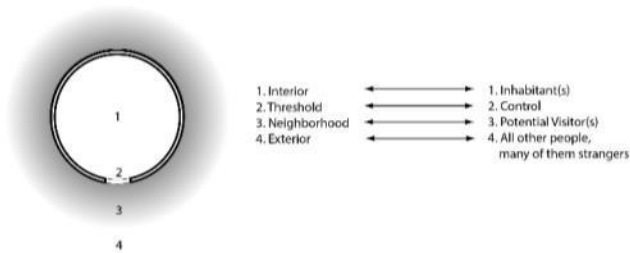


The idea of interface is more complex. An interface may be realized as a local relationship, but is, actually or potentially, repeated. Repetition implies that one member of the relationship is a class of similar objects, whether discrete or composed into networks. The other member of the relationship is continuously extended over the pattern of repetition. The original idea of a carrier space containing elementary cells is the prototypical example of an interface.

界面的概念更为复杂。尽管一个界面可以呈现为一种局部的关系，但它实际或潜在的被不断重复。重复意味着关系中的一方是一类相似的对象，无论它们是离散的还是网络化的。而关系中的另一方则连续遍布于重复的模式之中。举例来说，一个包含基本单元的载体空间即可被视为一个最基本的界面。

Thus, the idea of interface goes back to the fundamental interplay between the continuous and the discrete, homogeneity and heterogeneity, similarities across space and connections in space. And, as important, the domain of application of an interface can be a part of a configuration, or a configuration as a whole. Interfaces, in other words, are complex relationships that always imply some level of conceptualization.

因此，界面这个概念来源于连续性与离散性的互动，同质性与异质性的互动，空间的相似性与连通性的互动。一个界面可呈现于局部或整体构型之中。界面，换句话说，是复杂的关系，并离不开一定程度的概念化。

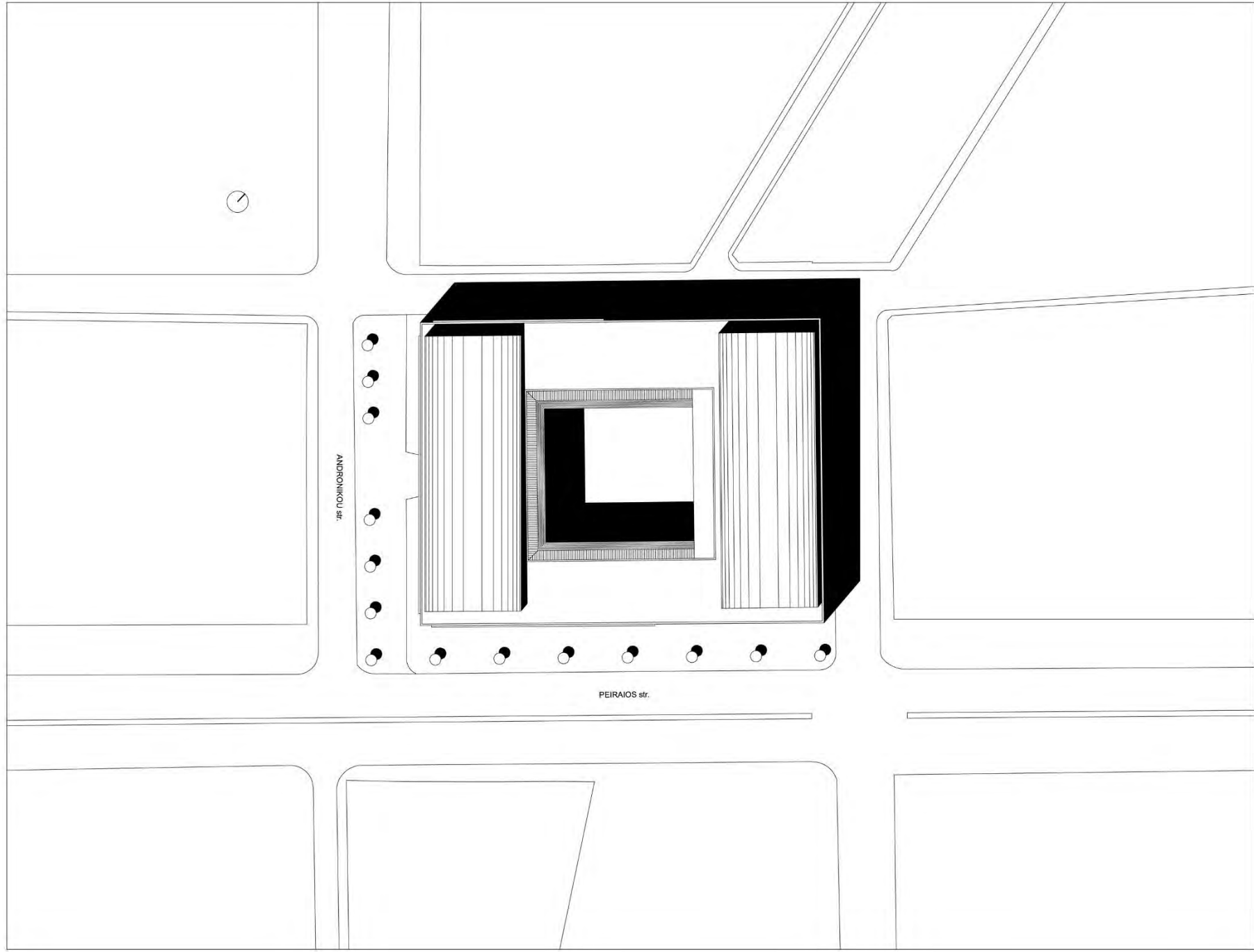


There is, in the *Social Logic of Space*, a second definition of interface: An interface is constructed as two or more social categories (men and women; doctors, nurses, medical staff and patients; teachers and students; administrators, support staff and researchers) are brought into structured contact in space.

《空间的社会逻辑》一书中给出了有关界面的第二个定义，即当两个或多个社会群体（比如男性和女性；医生、护士、医务人员和病人；教师和学生；管理者、助理人员和研究者）在空间中依循特定的模式进行接触时，就构建出了一个界面。

This definition leads to insight only because the spatialization of the relationship of social categories is systematically mapped on particular spatial relationships, whether centrality or depth from the entrance, whether the interface of the distributed and non-distributed sub-systems or simply the interface between circulation and spaces of primary use. Thus, the interface of different categories of people is anchored upon the interface of different kinds of spaces.

这个定义之所以具有启发性，是因为特定的社会关系体现在特定的空间关系之中，比如中心性或距离入口的深度，连续分布式的和非连续分布式的子系统之间的界面，或是交通空间和主要功能空间之间的界面。因此，不同类别的人群之间的界面依托于不同类型的空间之间的界面。

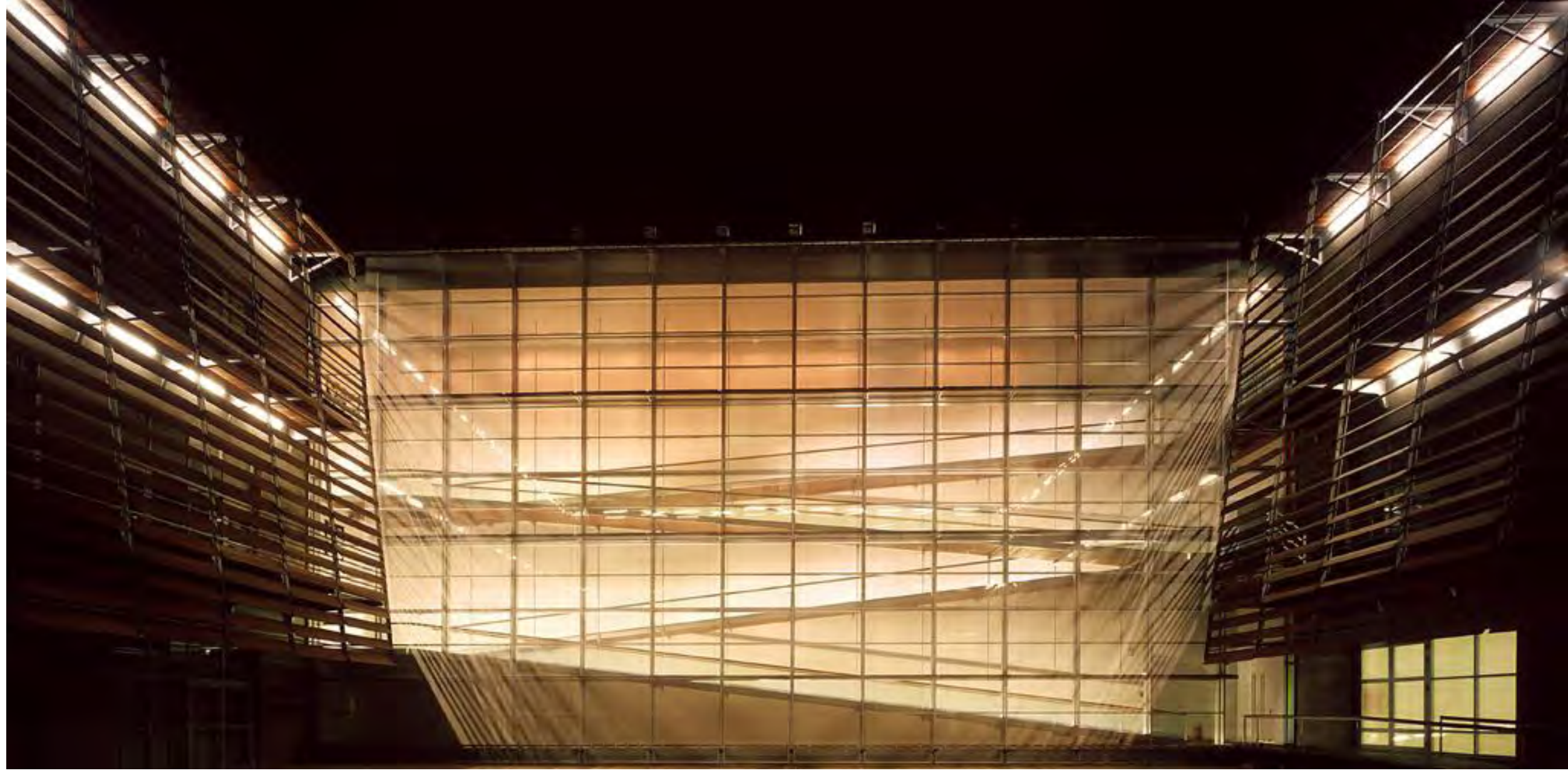




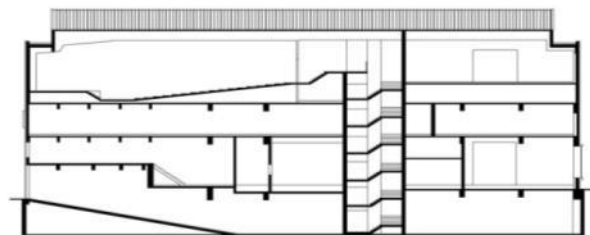




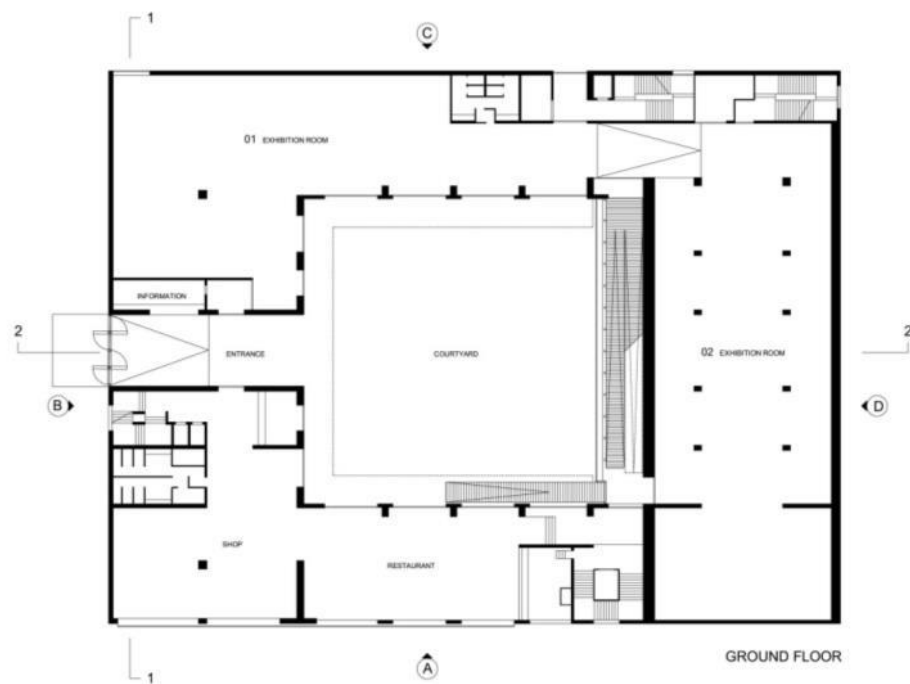
Benaki Museum, Pireos, Athens, 2004. Architects: Maria Kokkinou + Andreas Kourkoulas



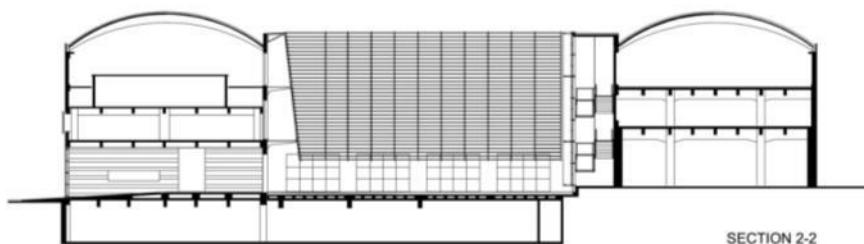




SECTION 1-1



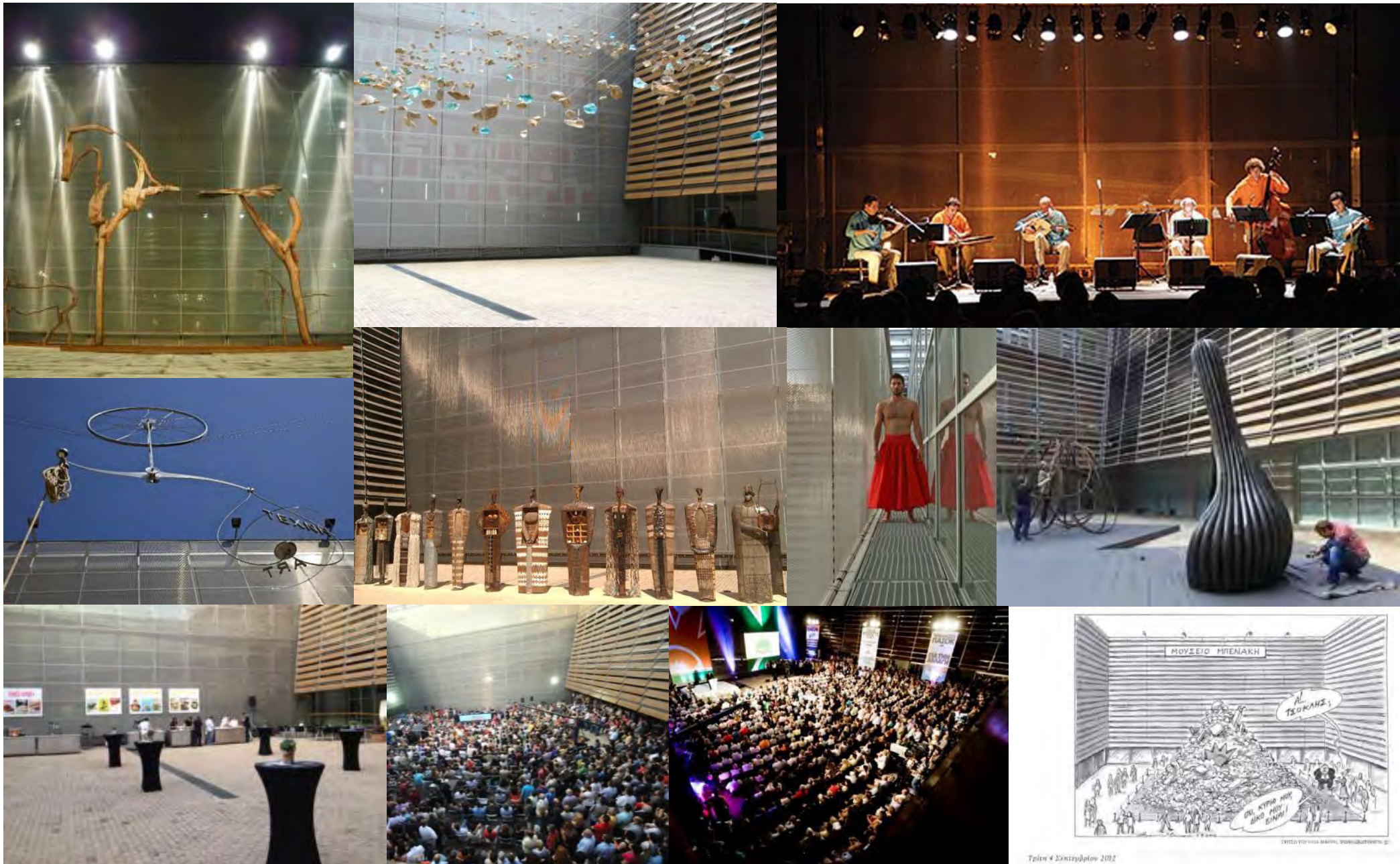
GROUND FLOOR



SECTION 2-2



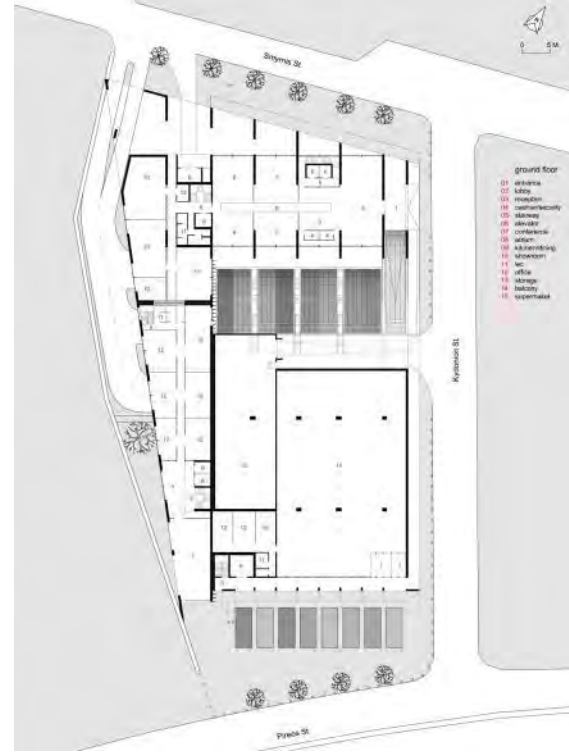
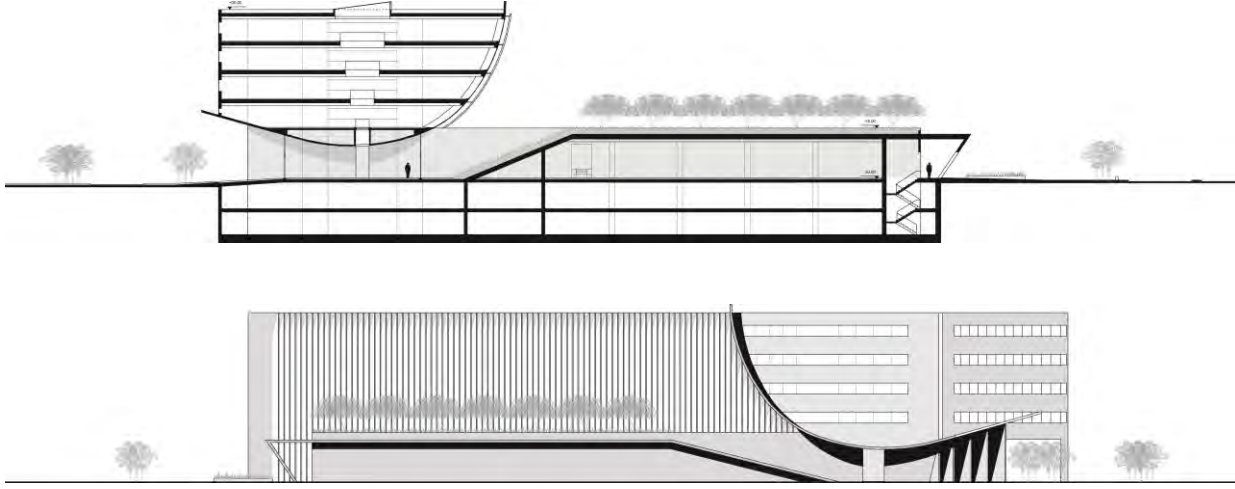




Τρίτη 4 Σεπτεμβρίου 2012



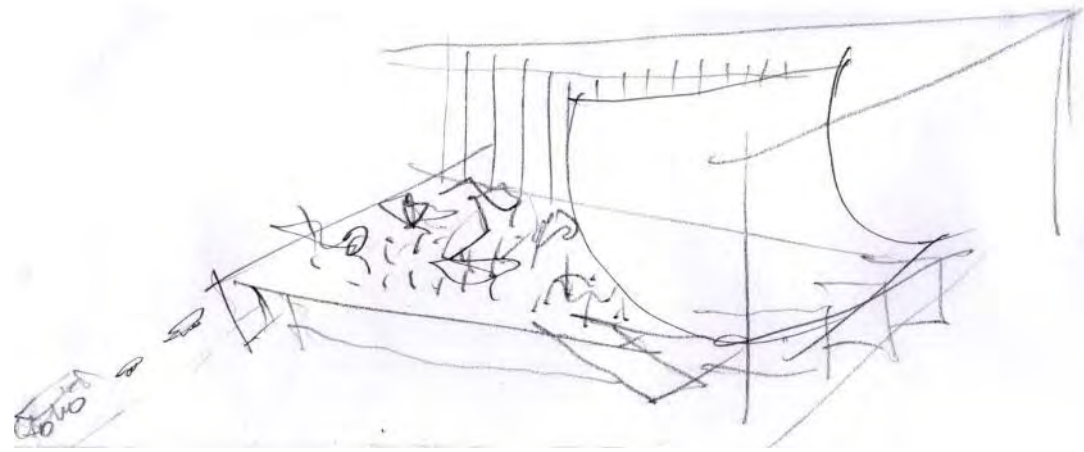








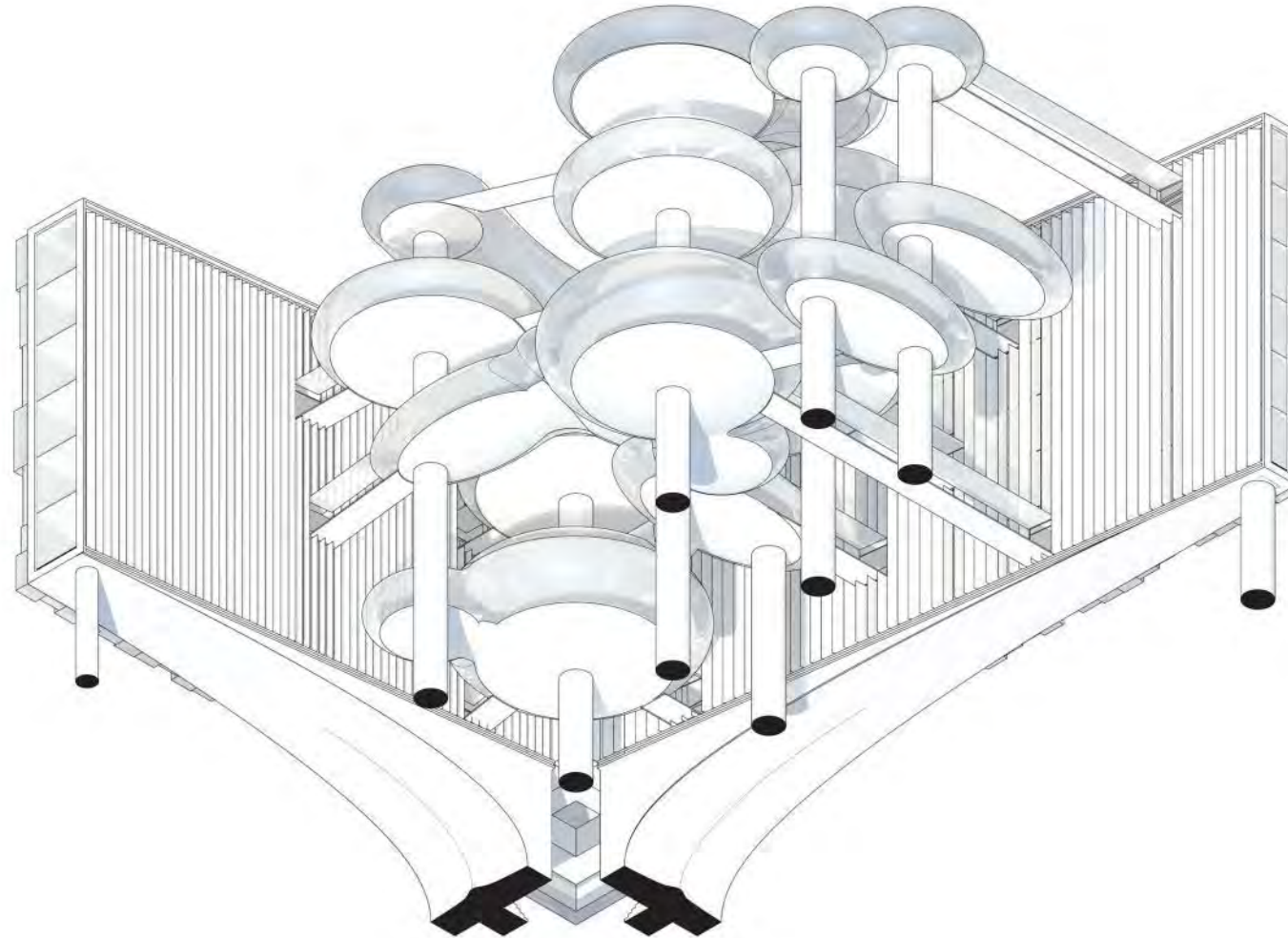


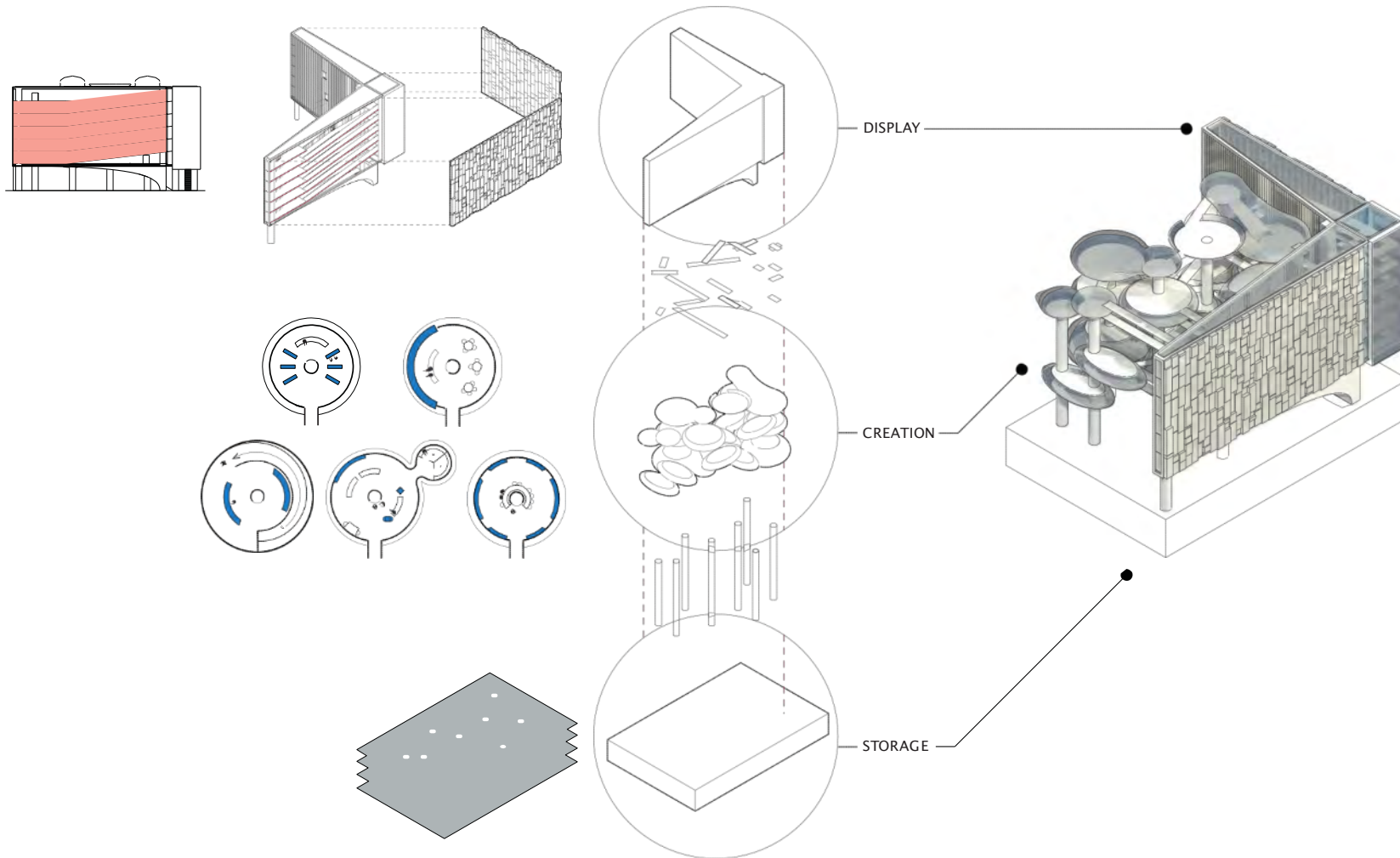




# ELEVATE

Christina DeLurgio | Collin Garnett | Tim Peterson









Elevate responds to its urban environment with an open plaza that engages the two pedestrian streets on its west and south sides. This creates a visual landmark for the surrounding area of narrow streets and arcades, thus drawing people from Omonia Square.





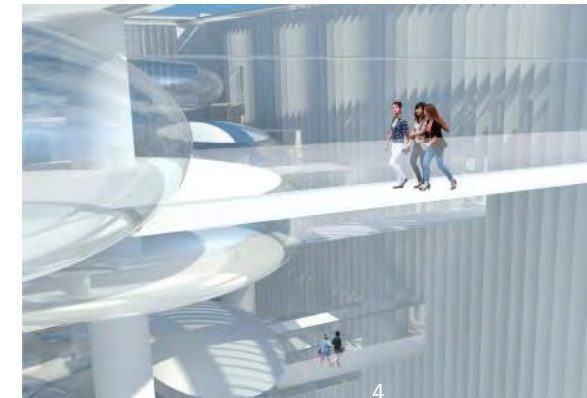
Shoppers approach the base of the wall after crossing the urban plaza or coming in from the main street.



Escalators and elevators invite ascent into the display wall.



While browsing along the ramps, shoppers scan products with their phones and receive direction to pods.



Bridges cross the open space between the wall and the pods, allowing for spectacular views.



Once in a pod, shoppers can consult with associates about the products seen in the wall or displayed in the pod.



Associates summon products from the underground storage facility using a smart interface.



Associates retrieve items from elevator cores, allowing shoppers to test or try on products before choosing to purchase. At this time, customization or design development is considered.

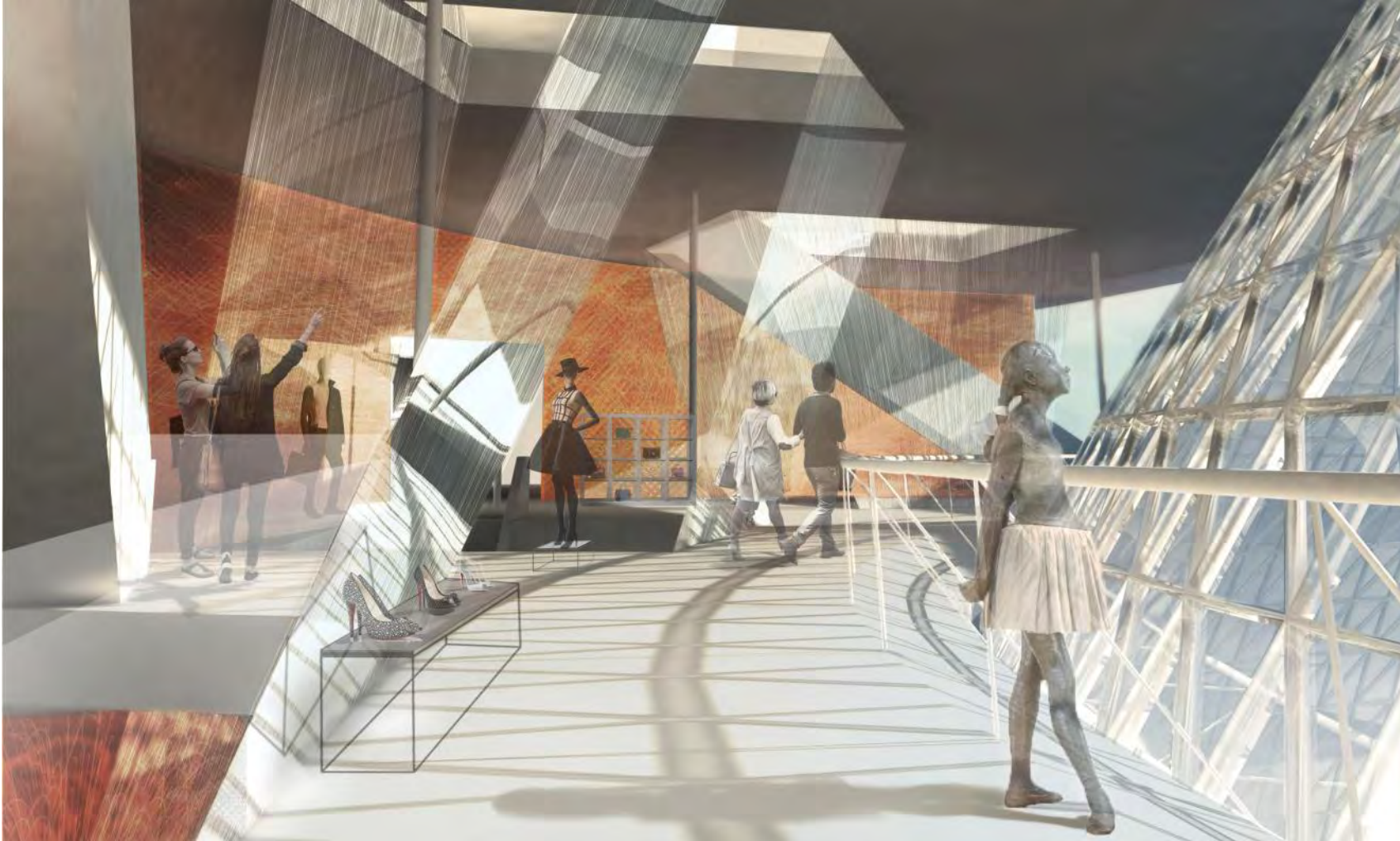


Associates help shoppers to complete their purchases using mobile POS systems.



# NEW WAVE

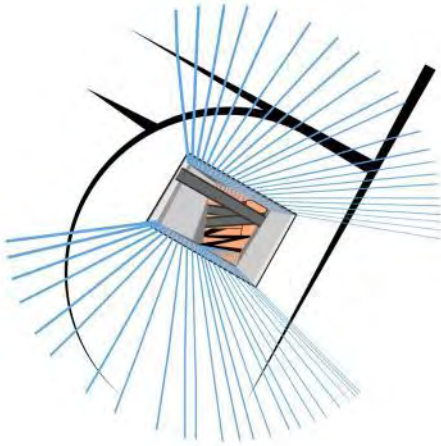
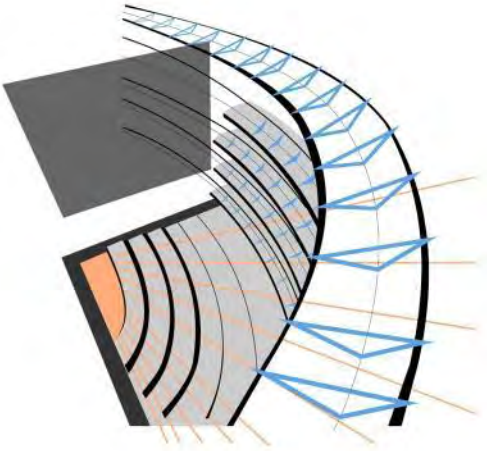
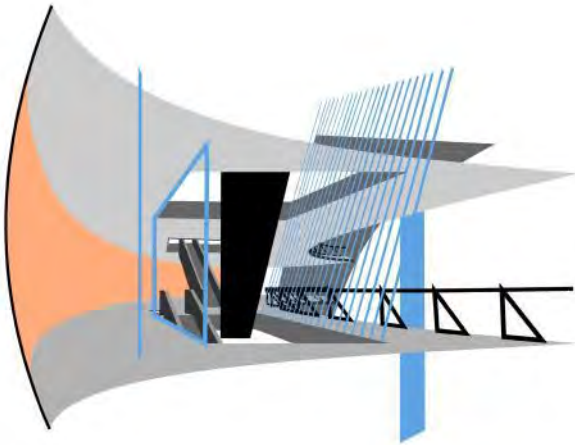
Danny Griffin | Maria Pastorelli | Skylar Royal



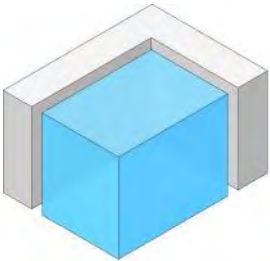
The survival of shops will not depend on speed and automation, but on leveraging the opportunity for social and sensual excitement.

Abundance is not about being confronted by many things, but about coming to understand what the things offered afford you.

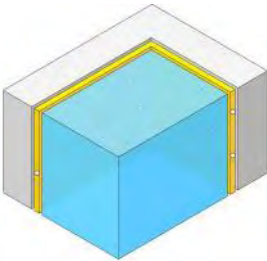
The physical store has to provide easy searchability, decluttered displays, expert consulting, comfortable trial and seamless purchase.



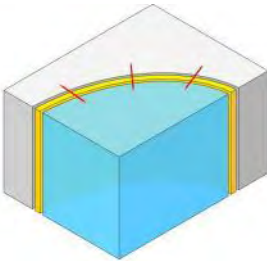
ORGANIZATION



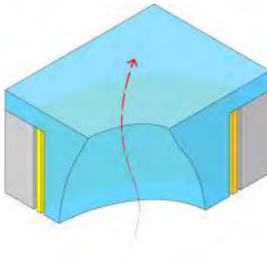
SEPARATED STORAGE  
DECLUTTERS DISPLAY



DELIVERY WALL REPLACES  
SHOPPING CART



VIEWING, SELECTION, AND  
RETRIEVAL ARE INTEGRATED  
THROUGH A DIGITAL I  
NTERFACE

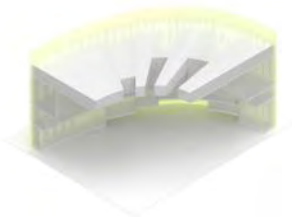


SELECTED PRODUCTS AWAIT  
THE CUSTOMER AT THE TOP  
FLOOR LOUNGE

FORM



ENFOLDING PUBLIC SPACE  
INTO STOREFRONT DRAWS  
PEOPLE IN

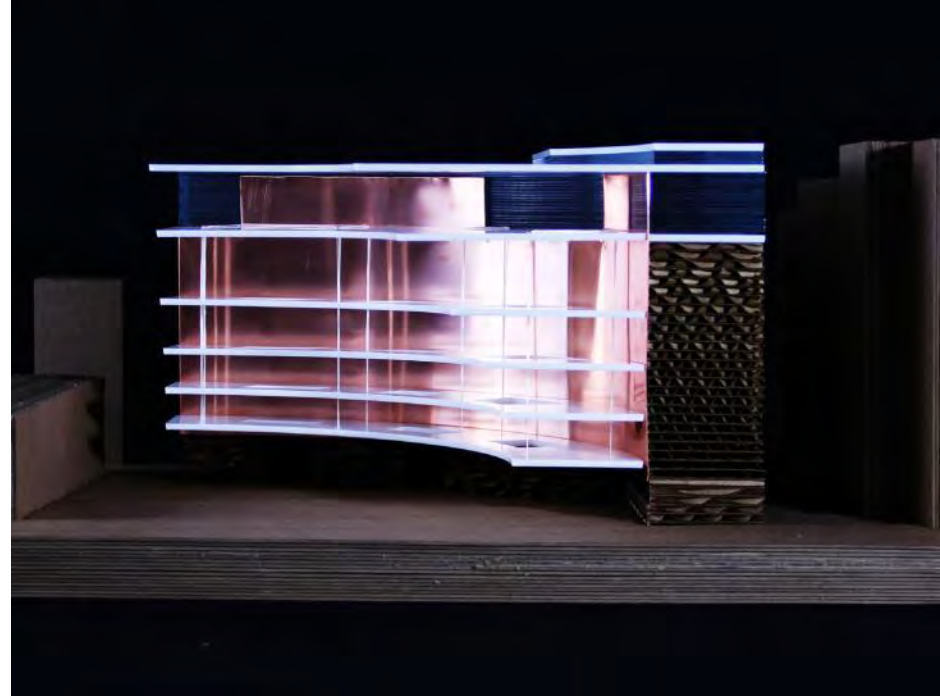
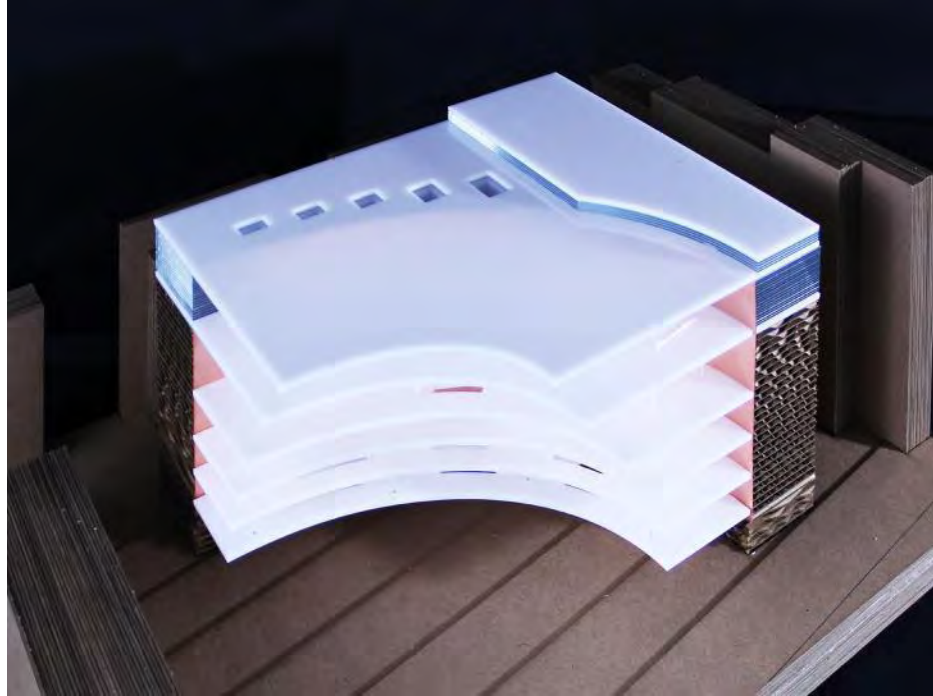


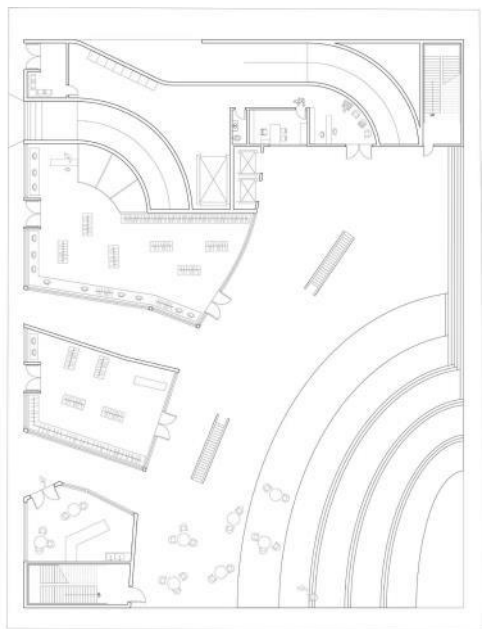
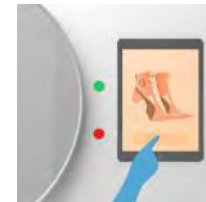
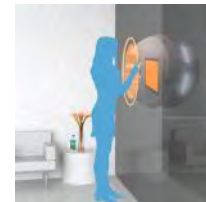
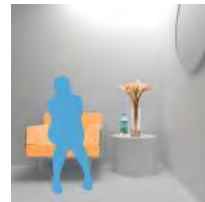
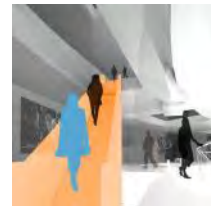
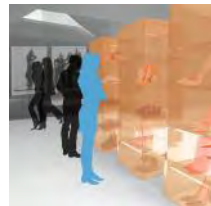
CHANNELS OF  
LIGHT AND  
MOVEMENT  
STEER PEOPLE UP



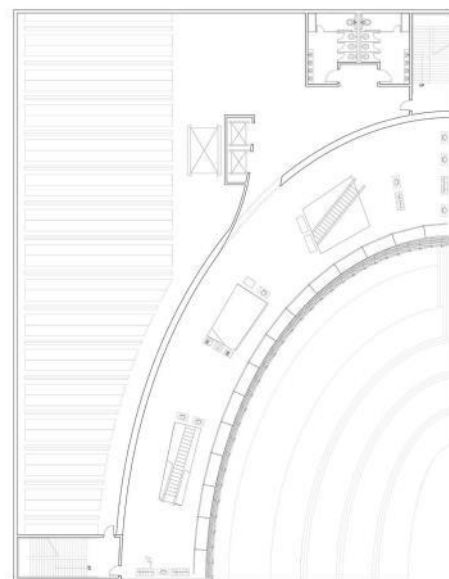
SPACIOUS AND CATERED  
ENVIRONMENT BRINGS  
PEOPLE TOGETHER



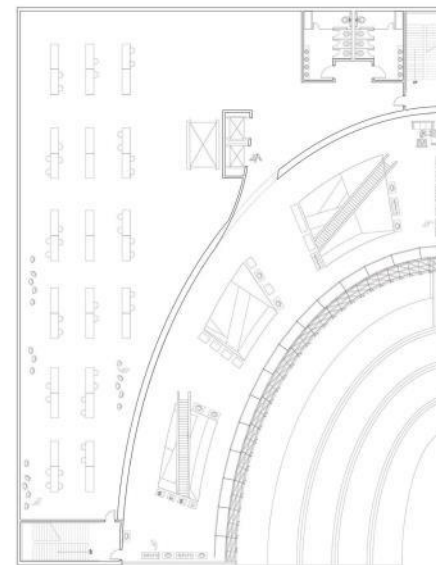




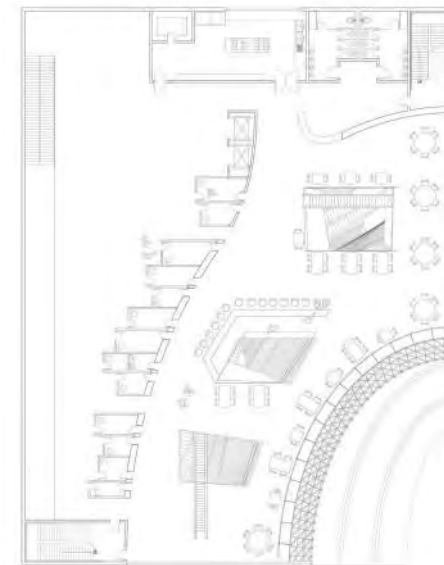
GROUND  
FLOOR



1ST  
FLOOR



4TH  
FLOOR



5TH  
FLOOR



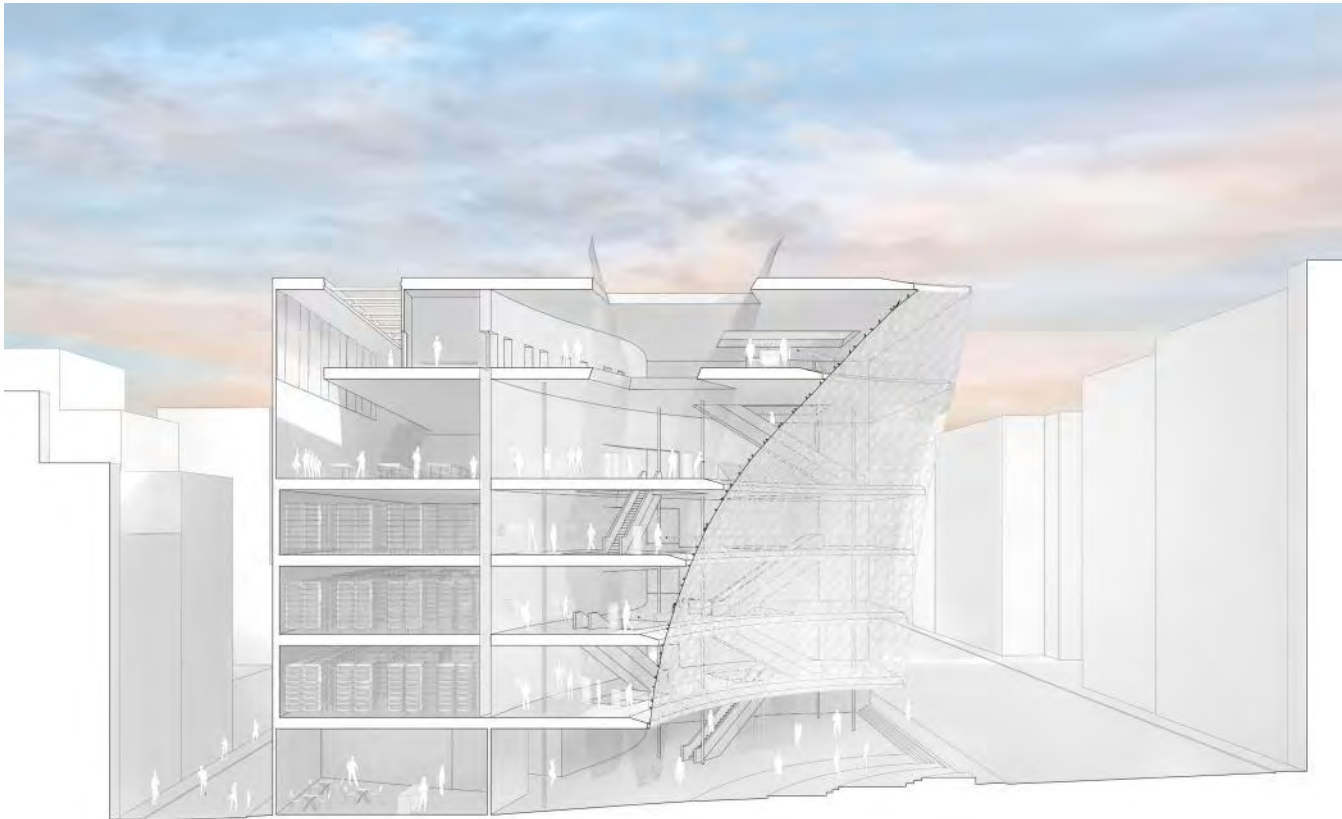


The curated and interactive display of products is enjoyable in its own right and frames decision-making aided by conversation.

The digital interface and the automated retrieval system running within a thick curved wall lets visitors shop unencumbered from having to carry things around.

At the top level, the trial period is extended. The contrained and isolated fitting room is replaced by a spacious lounge adjacent to a restaurant and bar. The space also functions as a stage for fashion shows, exhibitions, and other events. Views of urban landmarks, such as the Acropolis and the Lycabettus Hill, offer site-specific backgrounds.

Each shopper's "cart" is brought and arranged in a dedicated area, where a consultant is available. The top floor lounge is also linked to the atelier floor below so that customers can have extended consultation with tailors and other experts.



In the case of the Kalmar plant of Volvo, Sweden, 1970s, the creation of a more flexible interface between territorially distinct collaborative groups drove the integrated design of space and technology.

