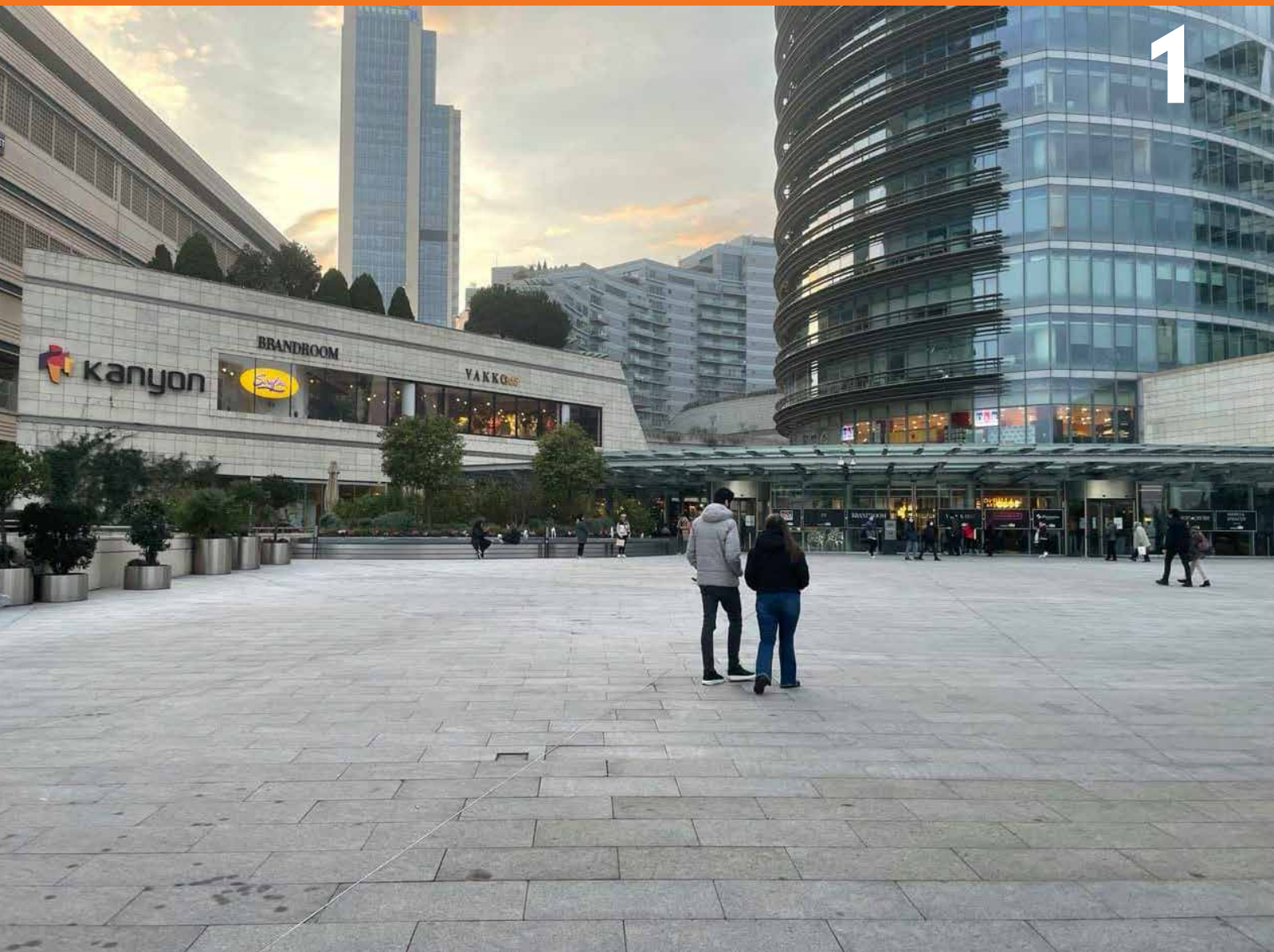
Espaço Público
Public Space

Circulação e o Espaço em Arquitetura
Cartografia Portuguesa
Urbanismo Paisagístico

Circulation and Space in Architecture
Portuguese Cartography
Landscape Urbanism



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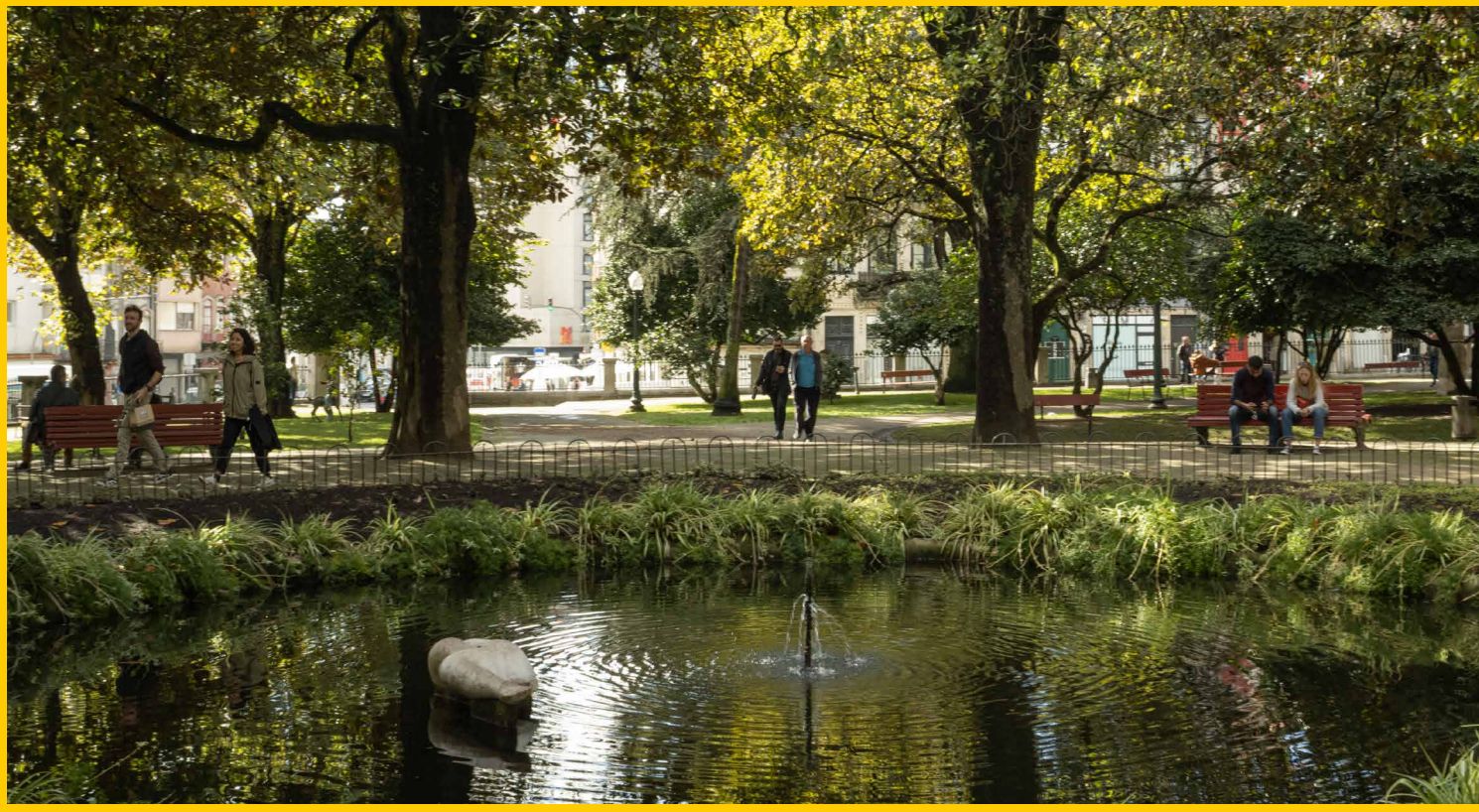

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PSp Public Space

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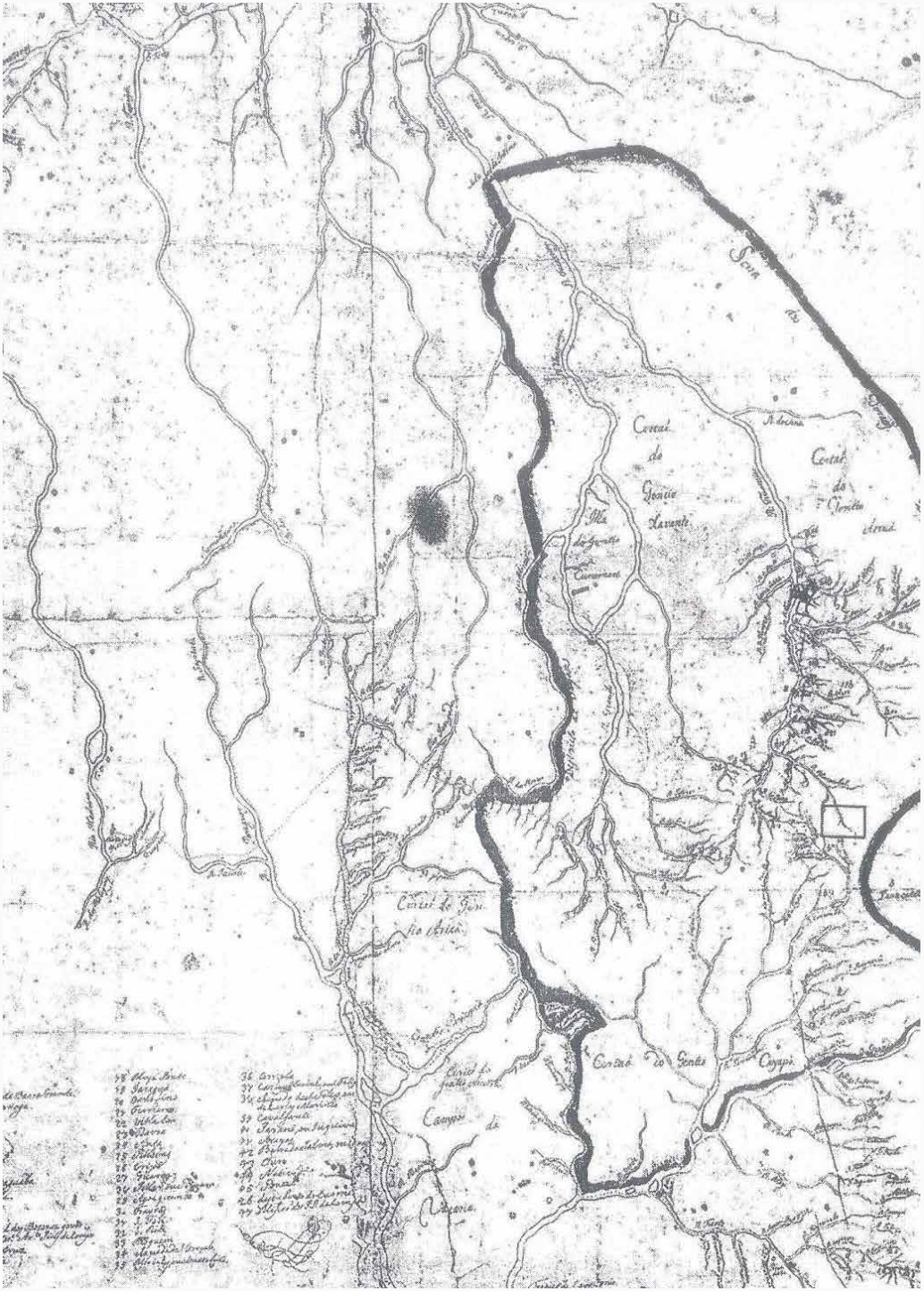

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The Relationship between Circulation and Space in Architecture: An Investigation on the Integration of Supermarkets in Shopping Centers

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Abstract

It is aimed to rank the installation forms in terms of the entrance area in terms of which actions should be at the forefront in the organization of the space, and to examine them in order of importance, to analyze and report on the selected shopping centers comparatively. Known as a temporal and perceptual concept that connects the sequences of spaces or different indoor and outdoor environments, circulation is one of the broad and very important issues in architecture and has become a design discipline that must be done within the framework of certain standards. In looking at the cir-culation structure framework, the way it is perceived, its main components, forms, horizontal and vertical planes and phases during use all play an important role in architecture. In this research, the relationship and interaction with the user, functionality requirements and accessibility levels of selected shopping malls in terms of circulation integration, for example; the relationship of the orientation areas from the main entrance of the shopping mall to the supermarket entrances with circulation or the parking area and the circulation line of the users will be. In this research, it is aimed to review the literature, examine selected venues (Kanyon Mall, Zorlu Center Mall) in the context of the principles of the circulation layouts, observe the clarity and perceptibility levels of the venue, document it by taking photographs from the selected places, and examine the examples.

Keywords:

Architectural Space; Circulation; Motion; Supermarket; Shopping Centers.

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Introduction

As one of the most important building components of architectural art from the past to the present, the circulation network system has undergone many changes, whereas new approaches, social behavior and many functional actions, optimal use and visual beauty depending on the user have emerged. It shows differences with circulation derivatives and for the purpose of the space. Examples of these spaces are comprised of residences, commercial areas, shopping malls, office buildings, terminals, and metro stations.

Since ancient times, circulation has been an important factor from the formal, conceptual and semantic context in the design process from the city scale to the building scale, becoming an important structural element that integrates spaces, experiences space as it performs the act of circulation and undertakes the function of transition from space. Concurrently, it is a significant component of the space, affecting its users physically, socially and psychologically in their experience and perception of the space.

It is equipped with interrelated space classes where users in shopping malls perform various and different social activities (socializing areas such as cinemas, cafes, restaurants, fast food and entertainment venues, playgrounds, supermarkets, etc.). With the inclusion of supermarkets, which have become a part of malls, into the circulation system, different requirements have arisen in terms of design discipline and service in these areas. In such venues, the plan layouts of malls are an important and impressive factor. Malls are examined under three main headings in terms of plan layouts (Verdil, 2004).

Bedestens (a word of Persian origin, it is the name given to large dome-covered structures and usually rectangular in plan, built for the sale of valuable goods), appear as traditional shopping venues. What we encounter is the 'cartesan' plan layout. Comprised of shopping blocks in a grid structure and circulation areas following each other rhythmically and occuring within the axis system buildings with this layout are spatial organizations where the shopping action occurs within the space. The second plan layout in the mall design can be defined as 'tree' or 'branch.' These types of shopping structures are referred to by this name because their circulation areas resemble branches that separate from a trunk, while reaching other space patterns from the entrance space. The final plan layout in the mall design is the 'dumb-bell' system based on mutual attraction, which is the most common type in current shopping mall structures. The elements comprised of this attraction system are usually the supermarkets located at the corners or bottom points of shopping malls.

Regarded as usage areas, the circulation line of the supermarkets in the shopping malls and the relationship between the spaces also emphasize the dynamic and statistical relationship of the building and show differences in accordance with its function. Thus, they can separate the usage areas, pass through, or end in it, and can make the venue more defined.

The aim of this research is to define and exemplify the concept of circulation and its types, the compatibility of circulation relations in the context of the spatial setup of the supermarkets within the shopping malls (AVM), the usage percentages of the circulation and access facility, the design disciplines

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for user needs, the design and plan scheme of the supermarkets with the shopping malls. It is aimed to analyze the circulation integration and which forms they are considered as modules on the plan chart.

The meaning of circulation

Architecture is the building element that connects a building or environment to each other and provides circulation, organizes spaces with each other, assumes the function of transition in the inner environment, as well as provides spatial transitions such as roads, streets, streets, atriums, passages, galleries, sofas and halls, and the connection between them.

According to Hasol (1993), the term 'circulation' is defined as "the circulation of users at the building scale and within the space, the vehicle traffic on the roads and the circulation of water in the installation system at the city scale."

Circulation is an integral component of building organization in structure design and is an abstract concept implying the existence of a space and an action (person and time). The circulation percentage determines the maximum use of the building volume and space. (Silviera, 2016).

Circulation should not be considered as just a linking function, otherwise circulation areas will turn into spaces like infinite corridors. The dimensions and form of the existing venue are effective in the design of the circulation area and encourage the users to dynamism and movement. (Ching, 1979).

In the experience of a building, circulation's relationship with the venue, the configuration of the venue with another venue, the relationship of the venue with the structure, the structure with the natural light, the definition of the unit, the balance and hierarchy of the building, the environment of the building and the relationship of the environment with the city on a micro-scale, a concept that adds up to the macro-scale and says there are three main factors in the formation of circulation areas. (Ataoglu, 2009). These factors are listed as follows.

- Physical: (ratio and proportion, scale, illuminated colored texture, composition and climate.
- Socio-Cultural: privacy, hierarchy, tradition and culture
- Psychological: Perception, orientation, movement and intersection

Ala (2002) states the circulation system consists of transportation, circulation and access points, circulation spreading to the building scale, circulation of pedestrians and vehicles at the city scale. He assesses the circulation system at the building scale in the table (Figure 1).

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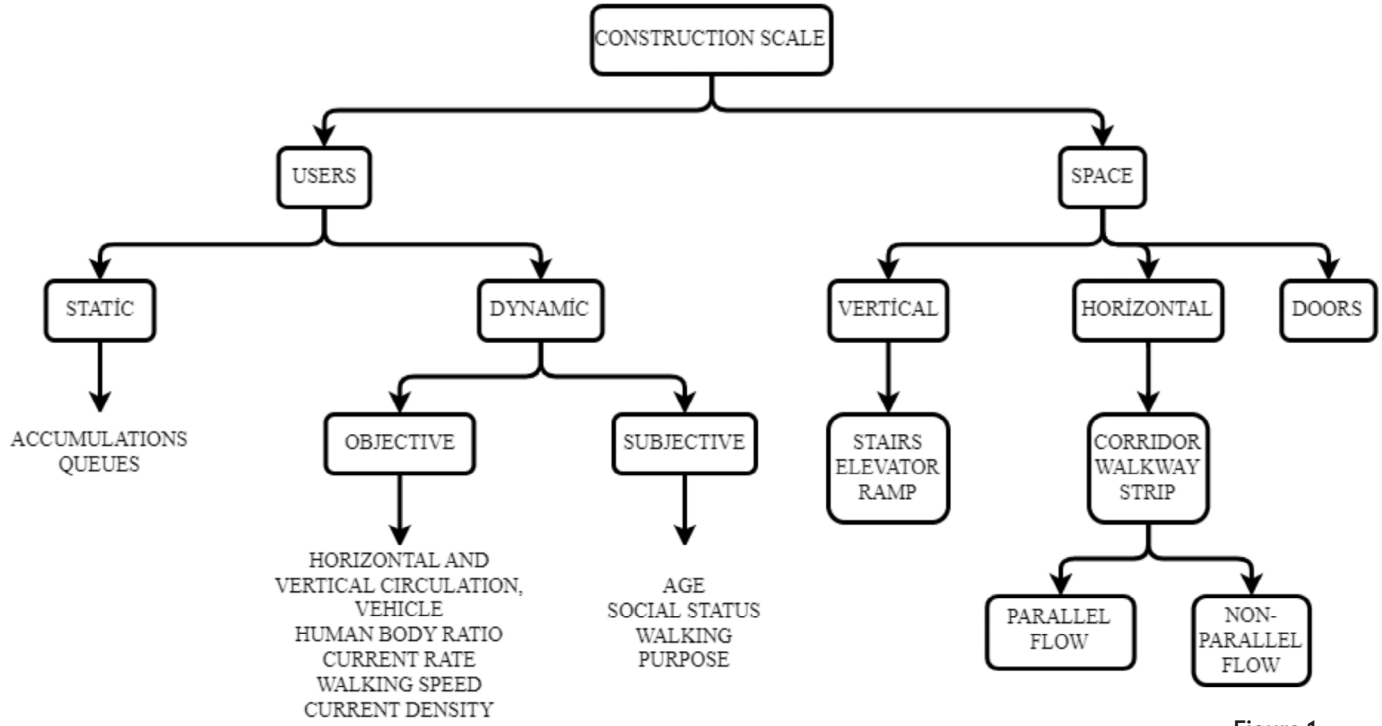

Figure 1. Circulation was taken from the system and rearranged (Ala, 2002).

According Kazanasmaz (2004), the structure elements comprising of the circulation system can be listed as: halls, stairs, ramps, escalators, moving platforms, moncharge and elevators starting from the main entrance door.

Floor differentiation at malls, spatial dimensions, functional reinforcement elements are

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effective in circulation setup and one of the important factors in architectural and interior design for the user to find direction. (Açıcı, 2018).

Vertical Circulation

They are fixed or movable building components designed for users of the existing space to easily access the connection between different heights and vertical movements in the shortest way, and provide the best possible way through stairs, escalators, ramps and elevators. Since the physical environment constituting the actions of the users differs, these building components are based on the fact that the users provide the link between the spaces without tiring, and that they are durable, safe, comfortable and economical.

The concept of circulation is one of the factors that is an architect or designer's most formal, physical and originally artistic phenomenon in the emotional context. When we act upon the circulation tools (vertical or horizontal), it can affect the emotions and orientations of the users (Rockwell, 2018).

Figure 2.
The Roy and Diana Science Center URL-1, 2016

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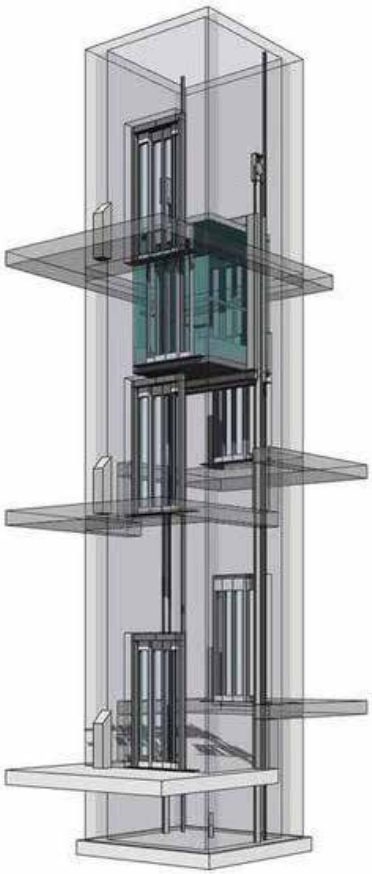

Figure 3.
Elevator detail.
URL- 2, 2021

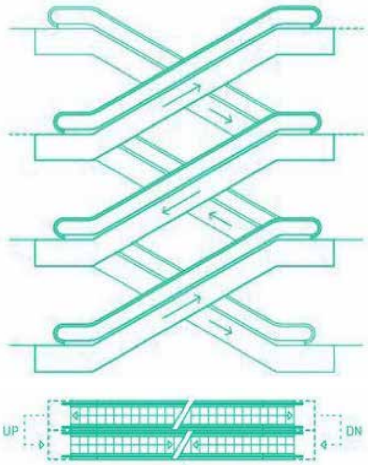

Figure 4.
Dimension guide, escalator
URL- 3, 2021

Horizontal circulation

This constitutes a linear layout since it has the maximum viewing distance from the circulation basic systems (Hillier, 1996). It can follow a direct or random order within the scope of a sequential or axial order. It can be accommodated in various venue organizations, such as wide or narrow, short or long. Linear systems can differ in symmetry in the organization of functional units. (Natapov, 2019).

They constitute building components that provide the relationship and spatial transitions of the spaces on the same floor and its surroundings, with each other and the connection between the atrium, passage, gallery, antechamber, hall, etc. (Ala, 2002).

Minimizing and following the distances in horizontal circulation design is a decisive factor in the building's geometric form and mass. In this type of circulation, the area that users can access and cover, the direction they want to go and the main routes can be divided into different types. Firstly; according to the direction of horizontal or vertical movement, (Direction of movement). Secondly; according to their usage types, public or private places (Type of use: public or private). The third type of use; Frequency of use is common and for emergencies. Finally: it is defined as the usage phase and time period (time of use) (Hamer, 2015).

In the context of the neighborhood principle, venues in the circulation plane can share a common area or be linked and separated into a common area in terms of visual and spatial continuity. Having a linear configuration, the circulation area has the ability to directly associate spaces and link unrelated spaces to each other. (Ching, 1979).

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Figure 5.
Vatican
Museum,
Italy URL-4

Figure 6.
Robbin
Chapel, Japan
URL-5

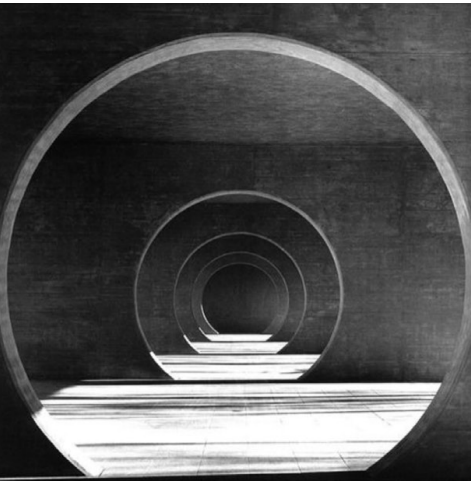

Figure 7. Casa
Rotunda,
Mario Borata,
1969. URL-6

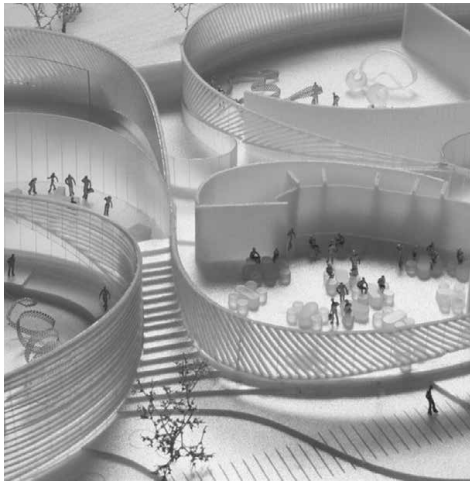

Figure 8. Human Body
Museum, France 2013.URL-7

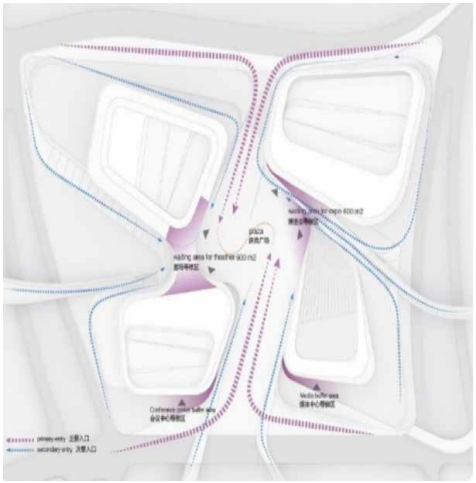

Figure 9.
Plants Fair,
China 2014.
URL-8

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As shown in the Manisor work in Fig. 9, the circulation area can be passed between two spaces, it ends with entering the space, and the atrium space between the two buildings creates and defines the aura of the space by using natural light to create different textures in the space. It also includes the concepts of static and dynamic space, as in Fig. 10, as it functions as a delimiter, a separating plane and links venues between floors, and continues to function as a transition element and enables users to perceive and experience space more clearly (Ataoglu, 2009).

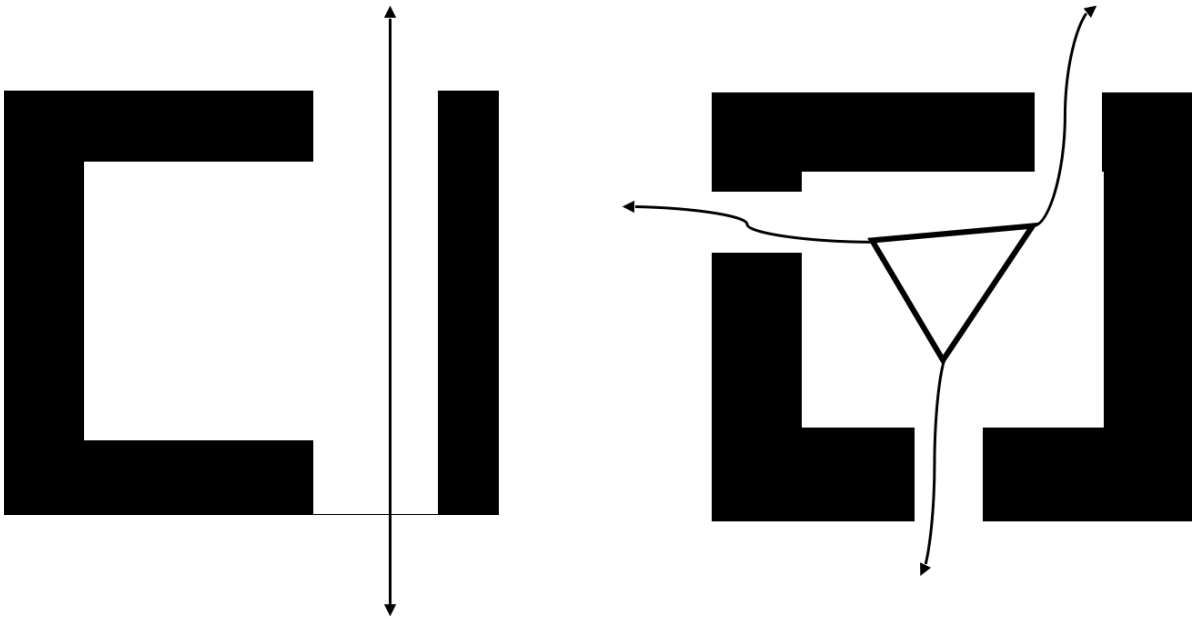

Figure 10. Static and dynamic space. (Ataoglu, 2009)

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Circulation configuration formats

As one of the most important components of the architectural design process, circulation design is listed in five main categories. These configuration forms, the organization and use of space by the users are considered as the most attractive and active area of the built environment (Clarck, 1996).

Configuration styles highlighting the circulation relationship can be defined as linear circulation, central circulation, dual-centered, clustered, nested, concentric, dual-core, and complex. These circulation forms are exemplified by visuals.

Linear Circulation

As the most basic type of circulation, linear circulation can accommodate various spatial features that progress in a linear, sequential manner and extend to an axial order. Linear circulation can be wide or narrow, short or long. Divided into two groups, this circulation system aims to provide a transition to the venue, with the feature of linking the spaces in the first layout. In the second layout, it completes a single space on a linear plane, experienced by the user. Concurrently, linear system functional units may differ as they demonstrate a symmetrical action in a single or multiple circulation organization.

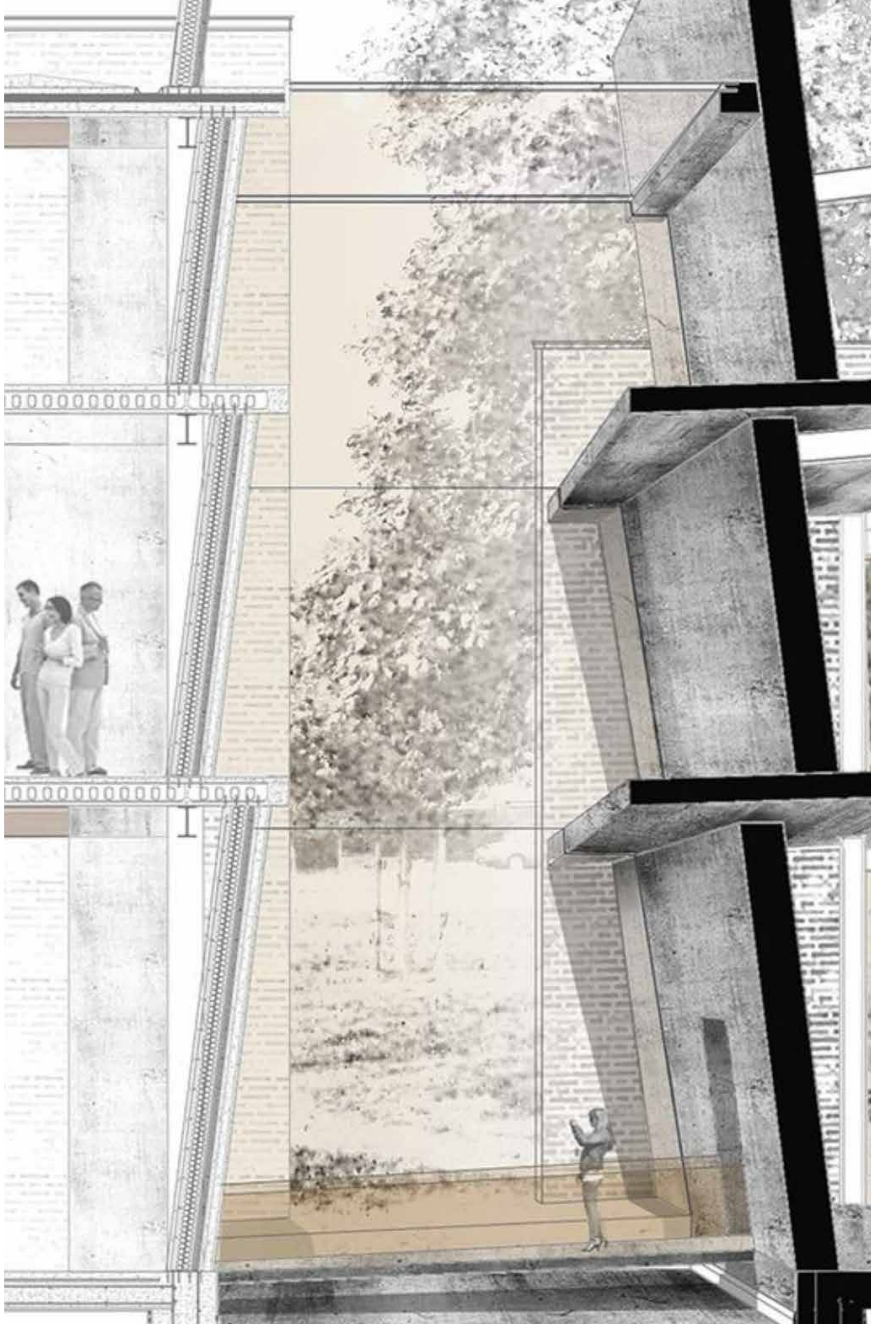

Figure 11. Venue Relation, Cali Manisor, 2017. URL-9

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Figure 12.
Sliska Avenue
Poland.2017.
URL-10

Figure 13.
Sliska Avenue,
Poland. 2017.
URL-11

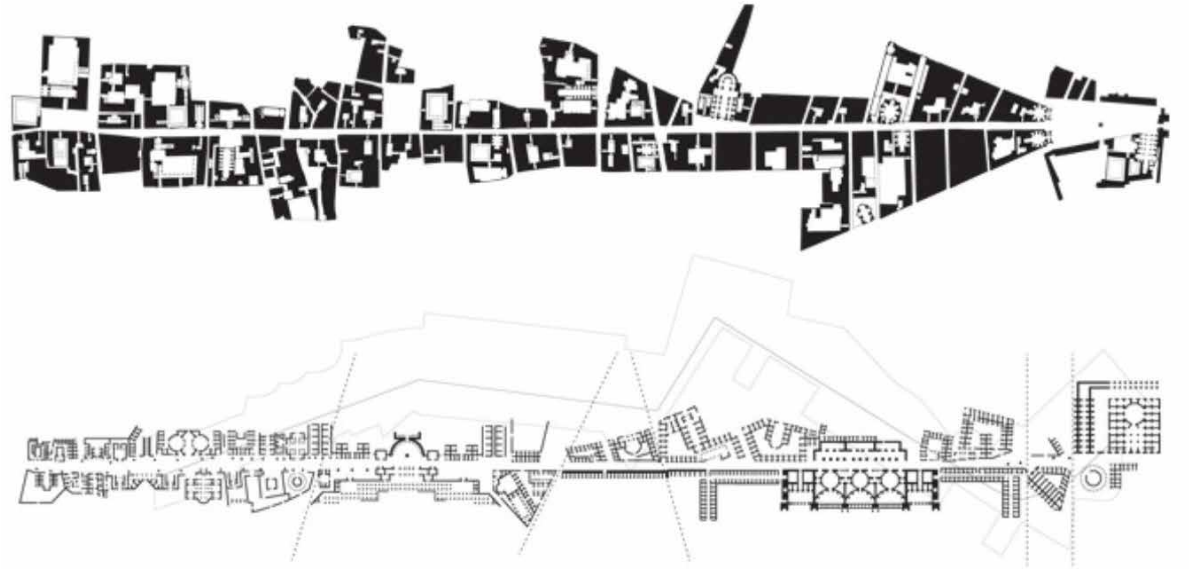

Figure 14.
Formal
analysis.
Urban
diagram,
Bryan Mad-
dock. 2014.
URL-12

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Figure 15.
Lucy Vete.
2017. URL-13

Central circulation

In this type of circulation composition, since it consists of many venues around a central, focal venue, the secondary venues appear equal in terms of their function, form and dimensions. Being integrative, spiraling, collecting and directing, which assumes the function of transition between spaces from the starting point, they provide wide transition areas for users, while having become an important design discipline for them to perceive the space more clearly.

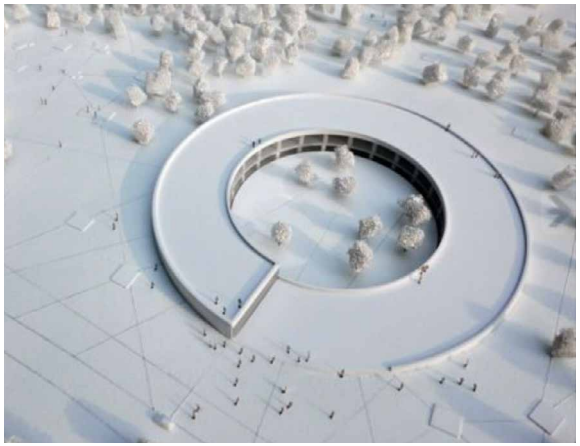

Figure 16.
African - American Cultural Museum. Smith Group.2012. URL-15

Figure 17.
Red House, Canada, 2013. URL-14.

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Figure 18.
French gardens. 17th cent. URL-16

Figure 19.
Burj Khalifa, 2013. URL-17

Nested circulation

Nested circulation configurations are circulation patterns in which each space is sequentially contained within the next and larger unit, so that each unit has a different center.

Figure 20. Belval, Luxembourg. 2018. URL-18

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Figure 21. Arts and Culture Building, Beirut 2009. URL-19

Concentric circulation

Concentric circulation types are defined as configurations in which each circulation area is located in succession to the next larger circulation area, so that each unit has the same center.

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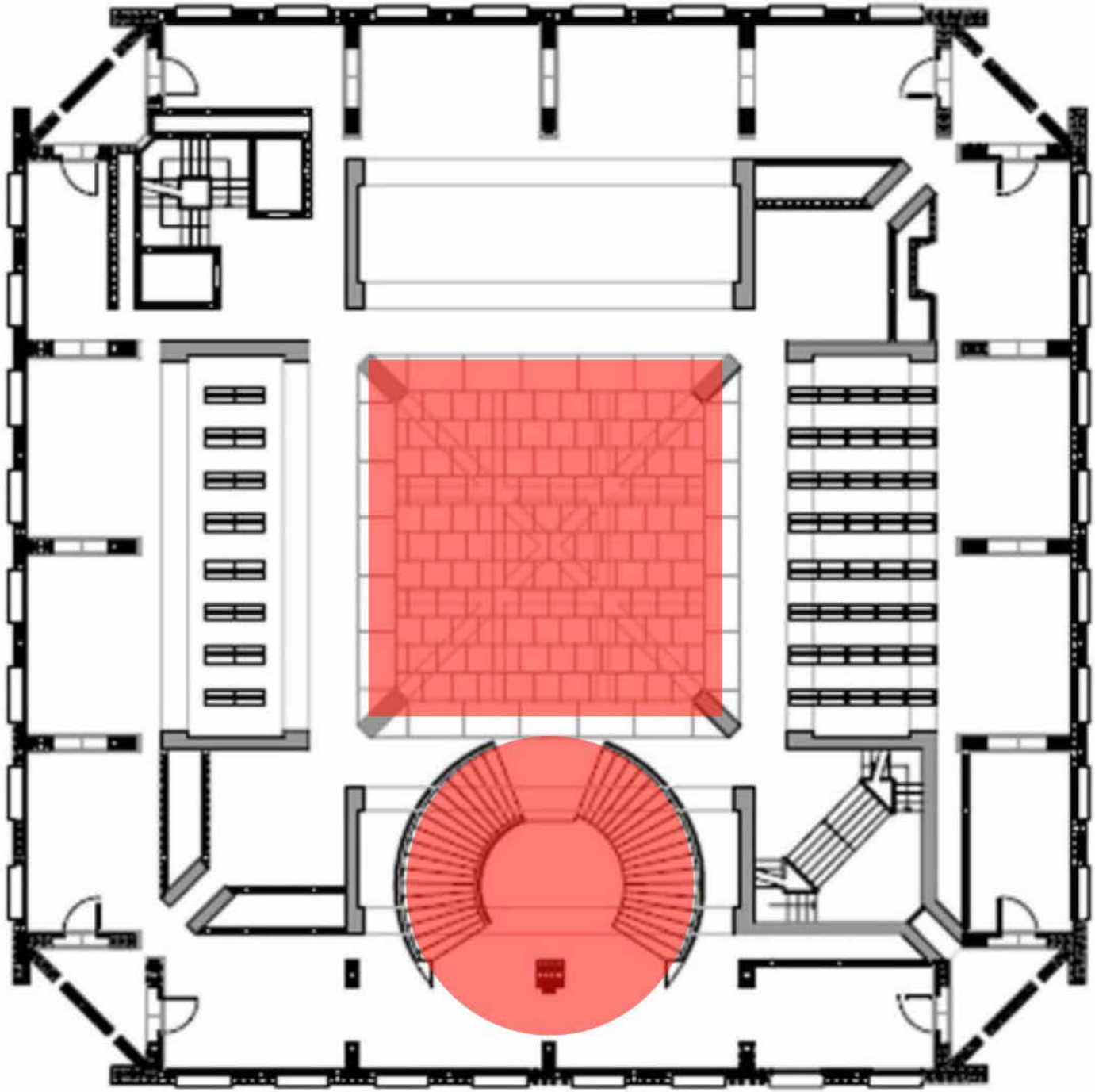

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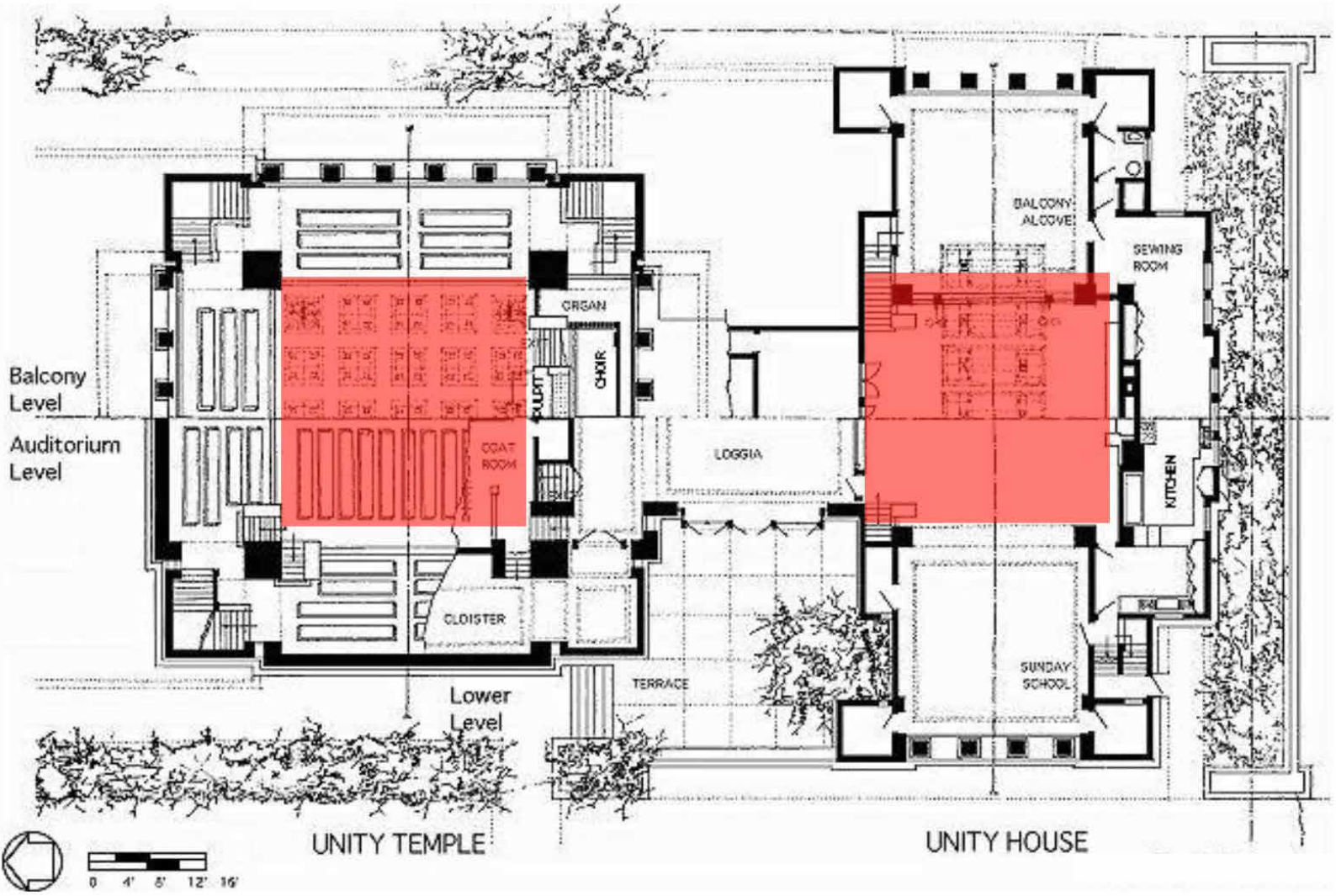
Figure 22.
Exeter Library.
Louis Kahn.
1972. URL-20

Figure 23.
Unity Temple.
F.L.Wright.
1908 URL-21



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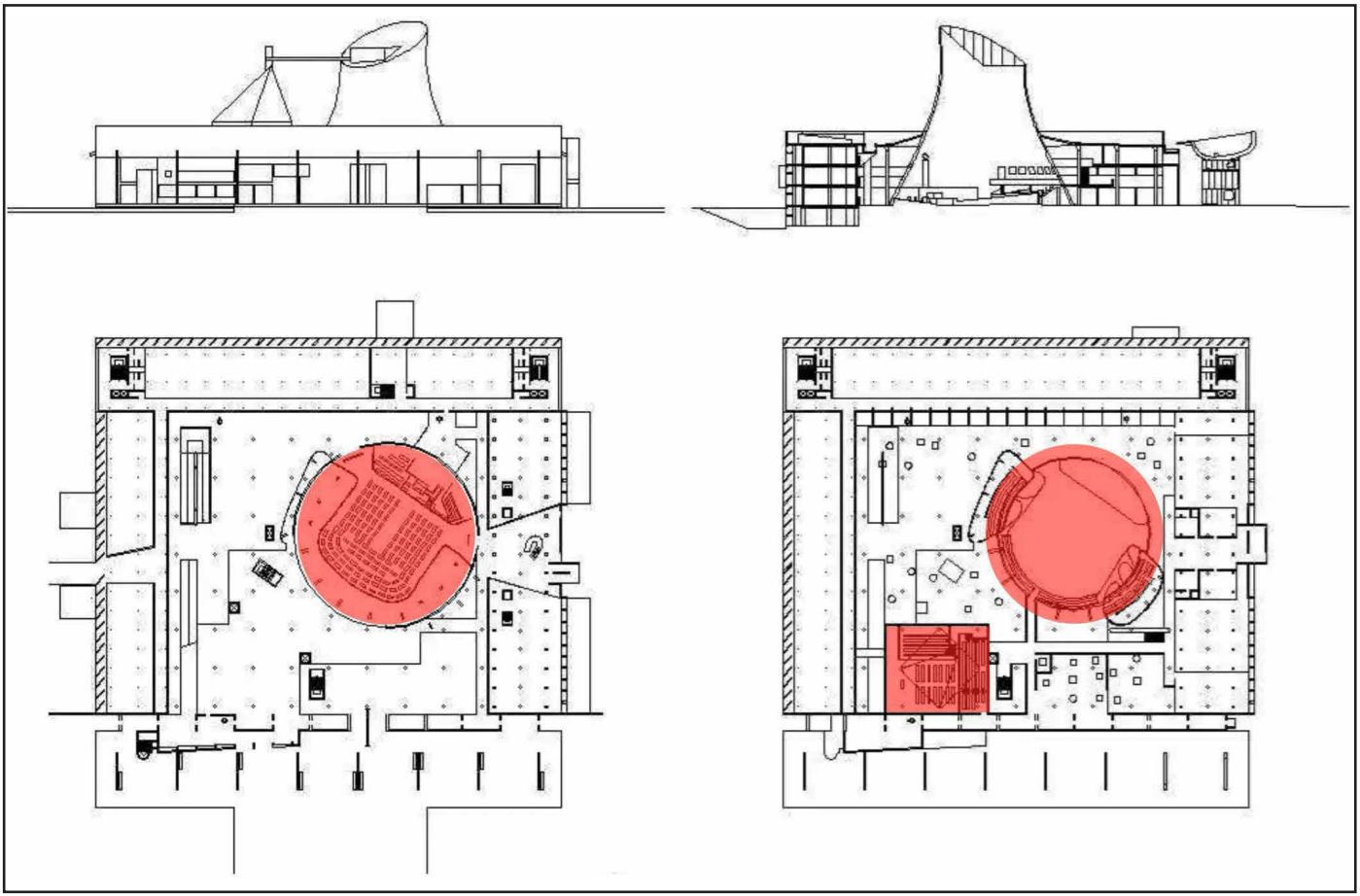
Binuclear circulation

In this type of circulation composition, it provides the link between the components in the inner cores of two equally dominant separate venues with the main use or a bridge, the separated but one-piece form with a single entrance area. As with the Salk Institute, dual-core circulation elements can be arranged in a venue or a void, two different geometries can be drawn up, positive and negative forms can be constructed as a common function and show differences.

Figure 24.
The Place of the assembly, Le Corbusier, URL-22



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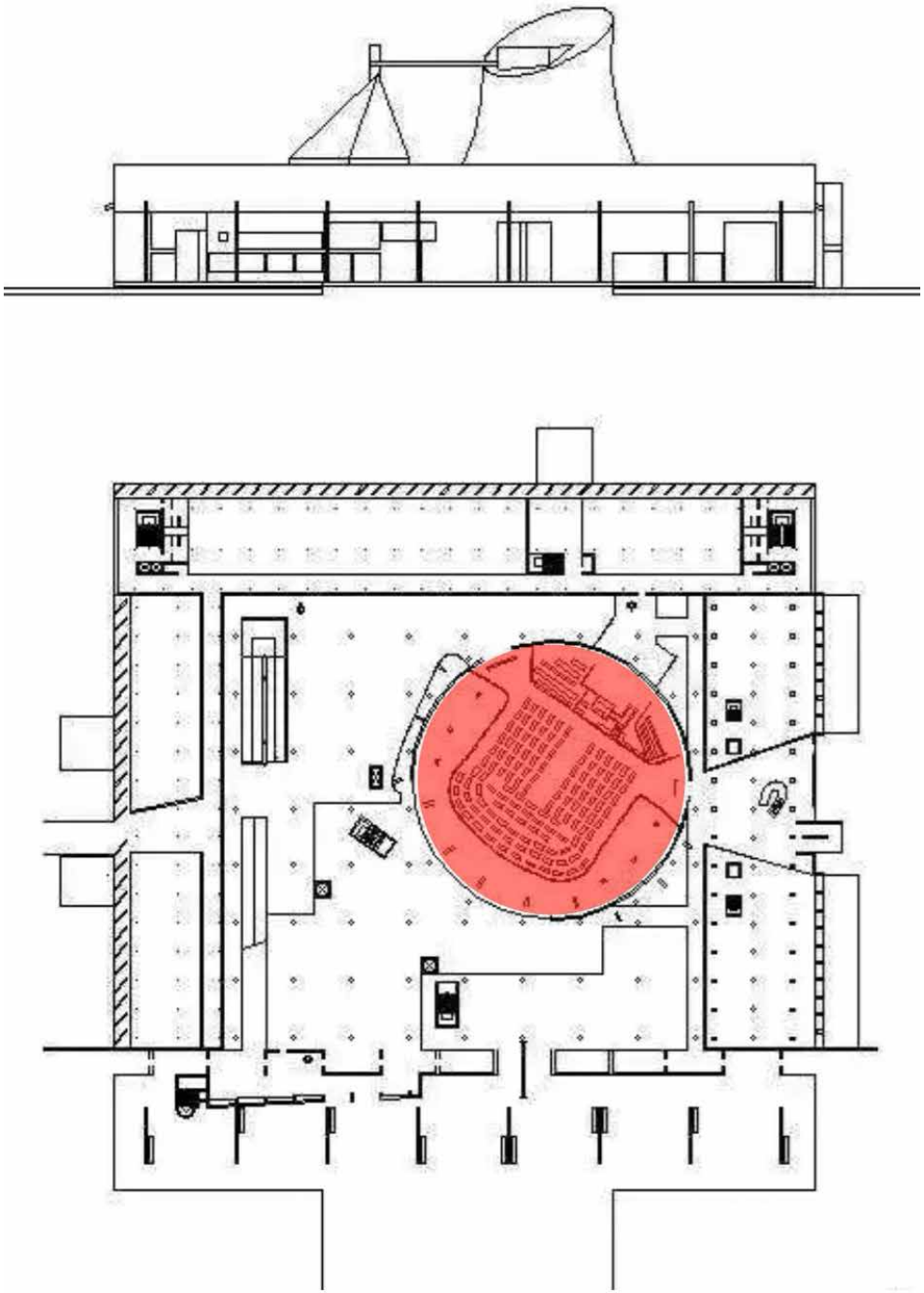

Figure 24.
Excerpt A

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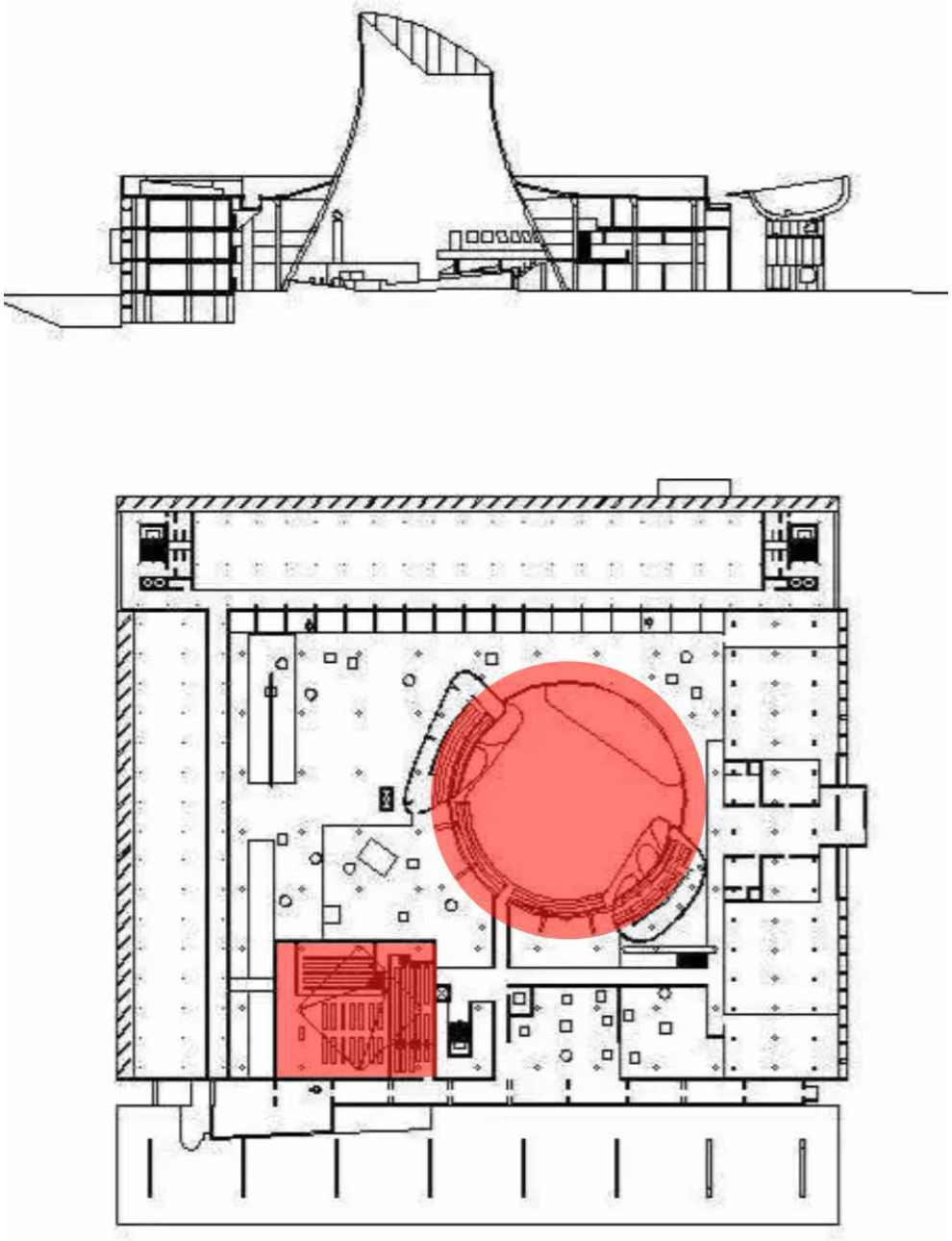

Figure 24.
Excerpt B

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First Case Study: Kanyon Mall

In analyzing the Kanyon Mall, which is an example of urban interior, determining its relation with the city and transportation areas, pedestrian entrance areas, arrival distance to the supermarket area, service areas, parking area, shopping mall as (goods acceptance, storage, distribution and service) plan will be examined. They are shown in different colors in Figures 25 and 26.

Mall plan analysis, placement of spaces and circulation lines are separated. It is observed that it features a central and dual-core approach in circulation design. In this design approach, it provides the transition between venues and enables users to orient themselves to other venues around a focal point.

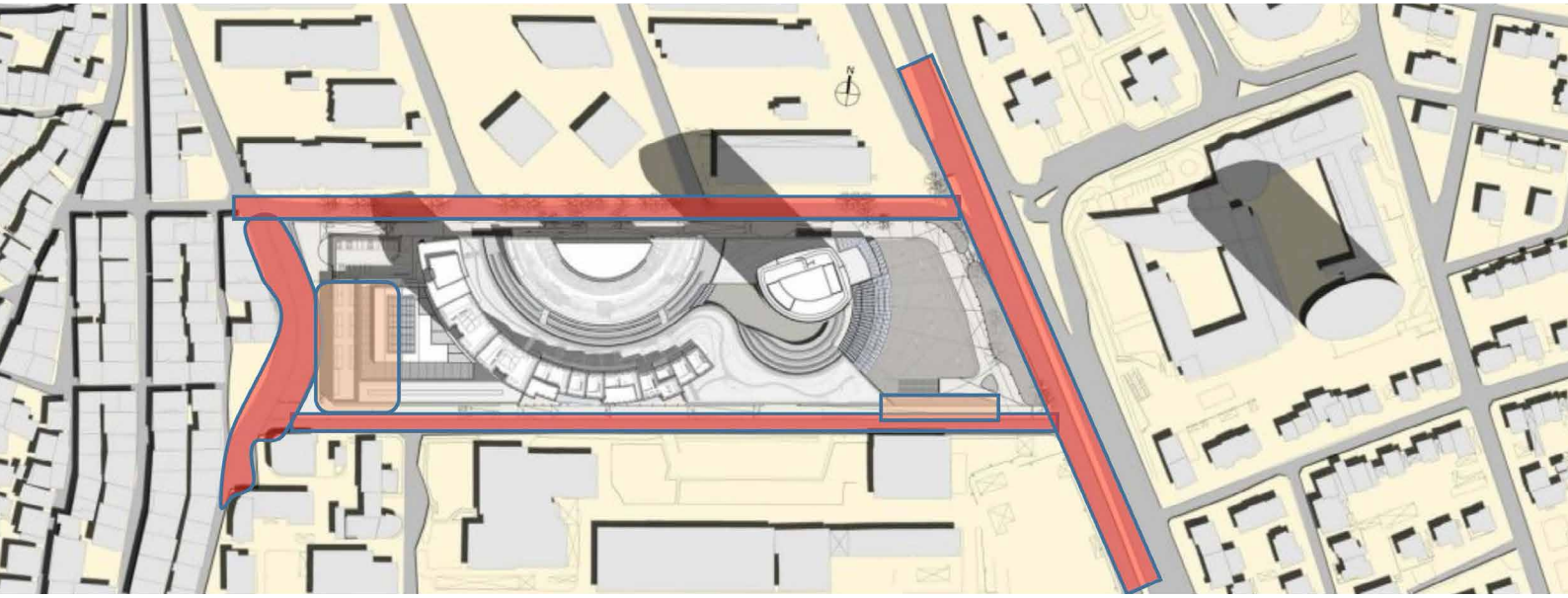

Figure 25. Kanyon property plan and transportation grids. URL-23

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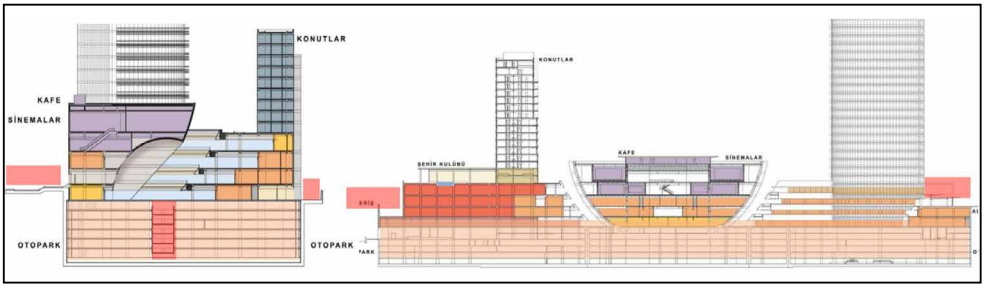

Transport points

Main entrance and carpark area

Figure 26. Kanyon Transport points Main entrance and carpark area, URL-24

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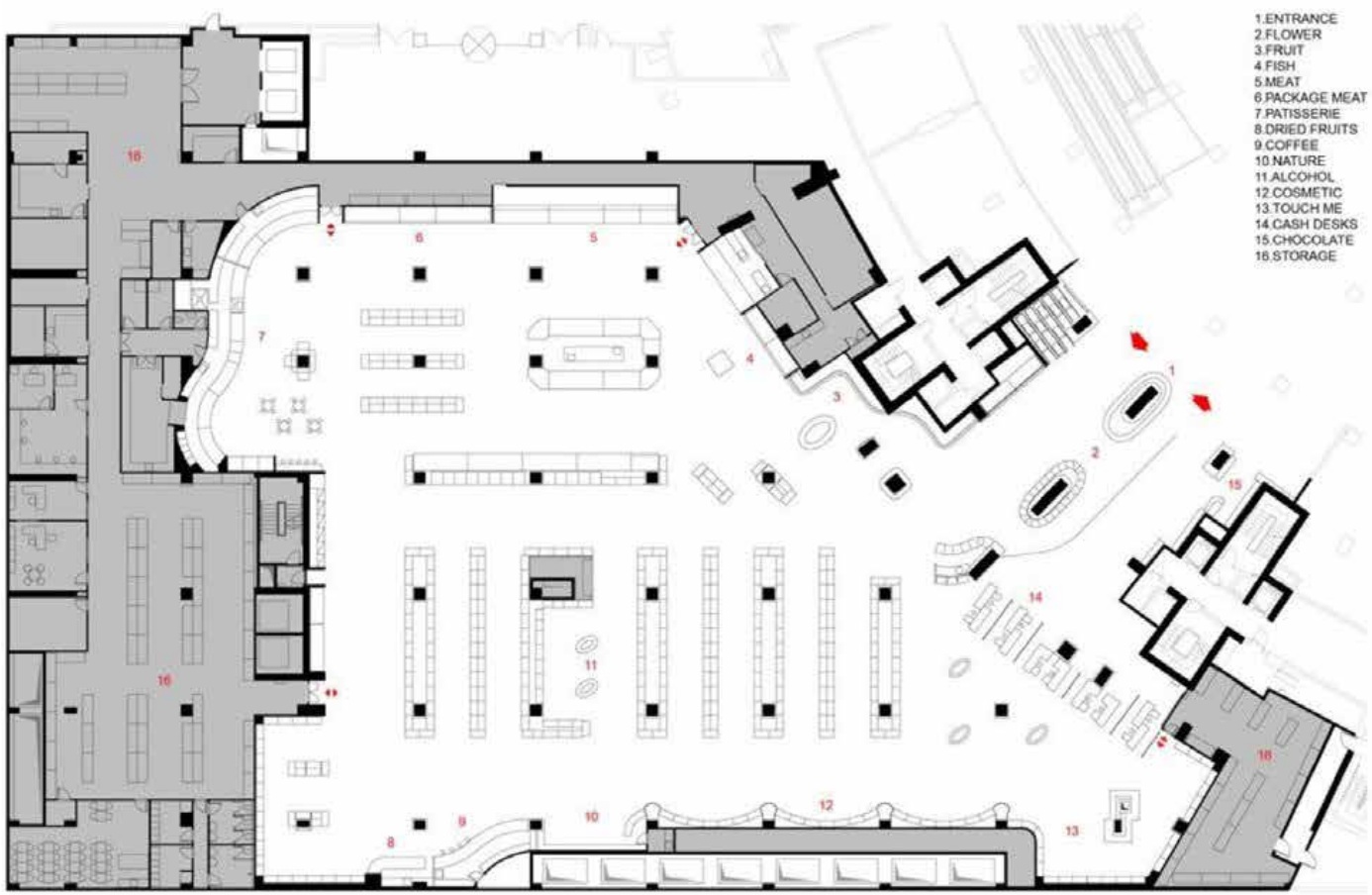

Figure 27.
Muum Arch itects, 2006, URL-25

Figure 28.
Muum Architects, 2006, URL-25

https://doi.org/10.48619/ais.v4i1.683

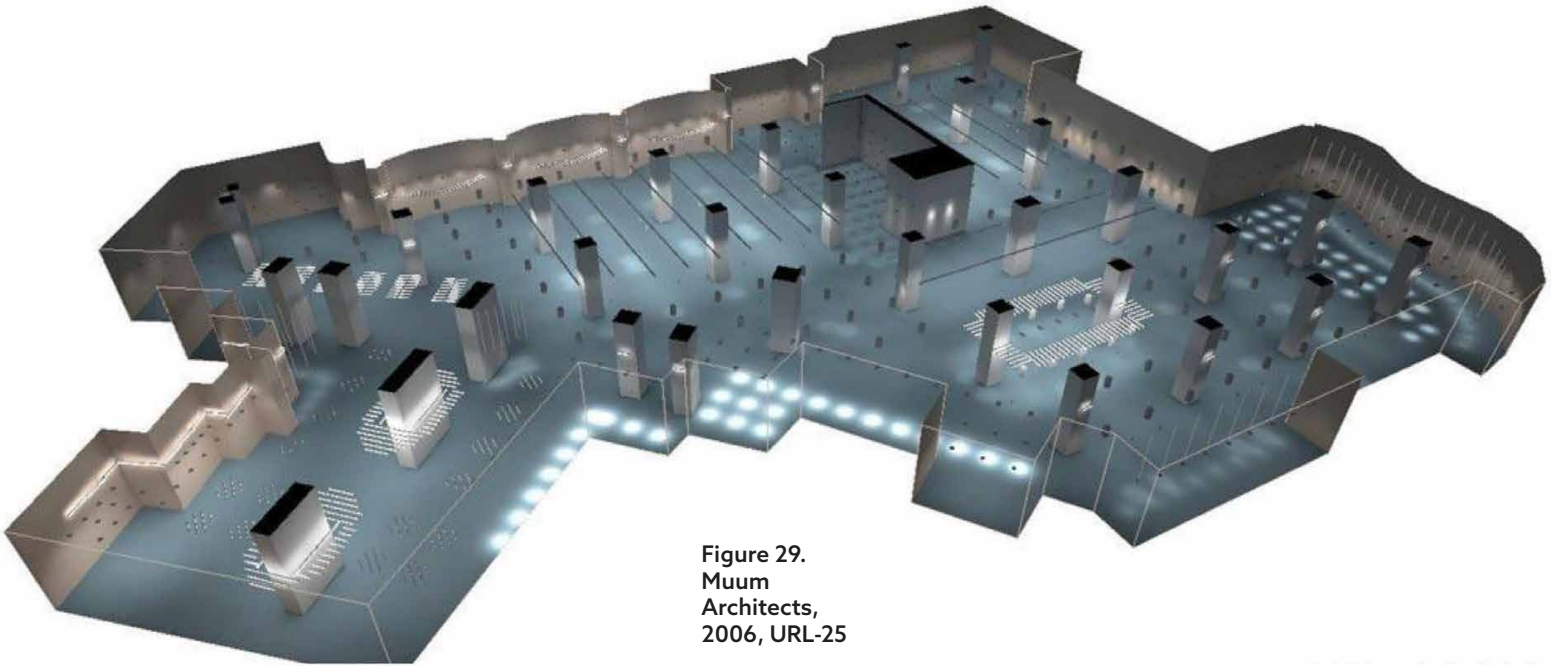

Figure 29.
Muum Architects, 2006, URL-25

The fact the central focal point is radial creates a mutually different action plan and dynamic venue concept. On the other hand, by making use of different vertical circulation tools (elevators, stairs, moving walkways and escalators), a design discipline is discussed in organizing the movements of users between different venues and different floors and experiencing the whole venue. Located within the mall, Macro Center supermarket is an approach made for the users to walk around or directly leave the place, where the indoor and outdoor relationship is established before or after shopping by using the circulation network of the venue.

As First Prize recipient of the 'Retail Renovation in the Supermarket Category' in 2007, Macro Center was designed to allow users to experience the venue and easily access the products, and to be product-oriented. Flexibility and functionality in the venue were brought together and solutions were developed according to demand. Having a linear circulation discipline in the layout and suspended ceiling movements, this space becomes more defined.

The store's needs, such as the car park circulation area, receiving, personnel entry and exit, product storage and distribution, packaging flow through a vertical freight elevator, were all designed in a manner that this bustling activity would not be perceived by the user. Likewise, the user entering via the car park can access the main venue on foot by using the moving walkways and the elevator. Thus, circulation within the venue is provided by means of both the internal and external environment. Studies in this area have been photographed and documented.

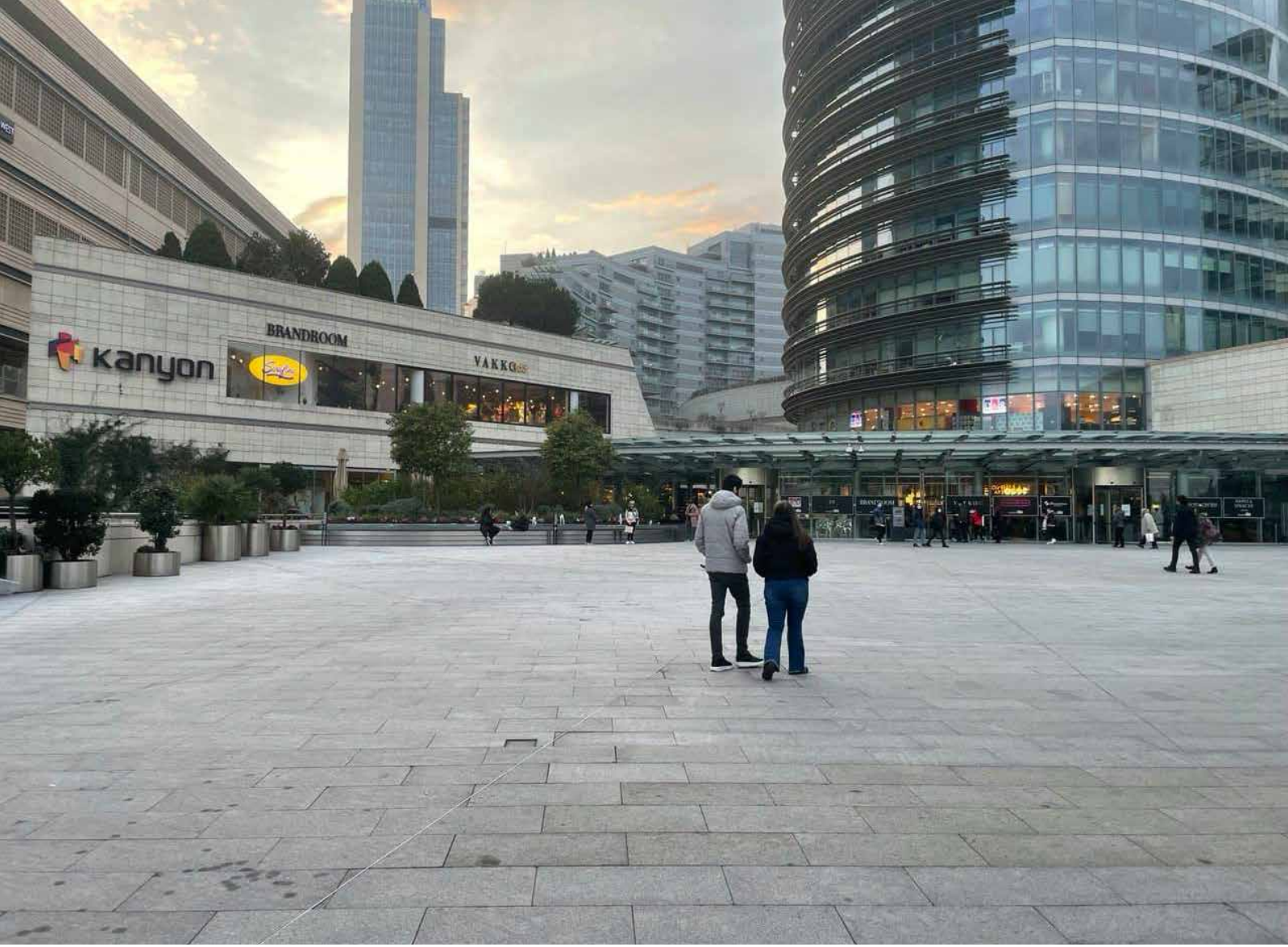

Figure 30. Plan pedestrian circulation area up to Macro Center at Kanyon Mall, Adibi 2022

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Kanyon Mall Macro Center Transportation Line

Featuring double entrances, the Kanyon Mall and Living Center starts from the main entrance door on the main street ground level; pedestrian entrances reach Macro Center, accessing the supermarket from the ground level, via vertical circulation vehicles, (escalators and elevators) to reach the -2 level and the mall's main center circulation line. A walking distance is observed up to the square and the second entrance gate. If users come with private vehicles, they can use the private parking lot in the Macro Center area on p4 level. Users entering from the car park can access the supermarket area directly, thanks to the location of the Macro Center near the parking level.

In an interview conducted with the store manager, the reason why the Macro Center is located on the -2 level is generally because various household appliance stores are located on this floor area and the direct use of the second exit becomes one of the important issues of Macro Center's neighboring department stores are identified as Paşabahçe, Jumbo and Godiva.

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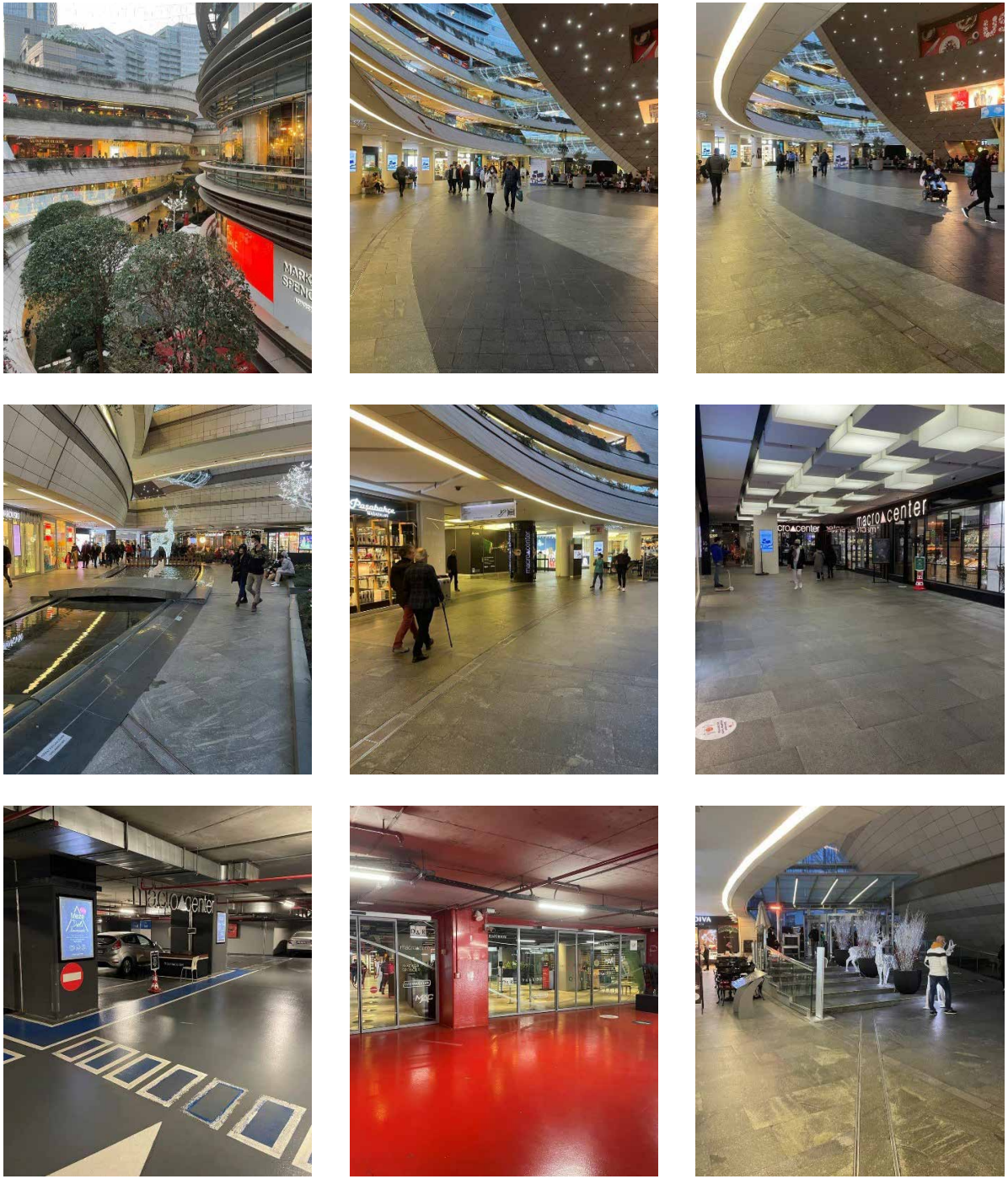

Figure 31. Macro Center parking lot, pedestrian circulation area and second exit point of Kanyon Mall. Adibi 2022

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Second Case Study: Zorlu Center Mall and Wellness Center

In examining Zorlu Center, it features a public space and a complex design, it is generally known as a living urban environment that fulfills social needs and lives. While this complex structure with different transportation routes allows its users to experience circulation and routes in different places, a linear circulation type is observed in the circulation design. There are shops located around the venues with a courtyard layout, promenade and cafe areas in the center area. On the other hand, it provides movement between floors and allows different space experiences, thanks to various vertical circulation mediums (elevators, stairs, moving walkways and escalators).

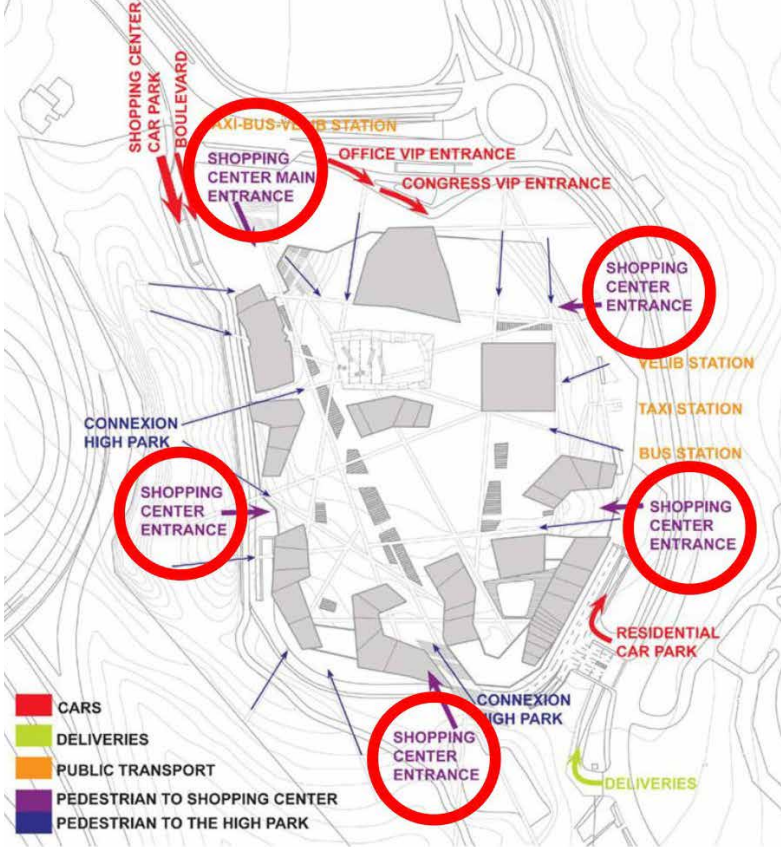

Figure 32.
Zorlu Center, 2013, URL 26-27

Suggestions have been developed to reinforce the shopping mall area, which is divided into different pedestrian and vehicle entrances and floor blocks, as well as the metro connection, the pedestrian approach from the outside and transportation hubs via the Zincirlikuyu Metrobus and Zengintepe Metro Station.

Figure 33.
Zorlu Center, 2013, URL 26-27

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Moreover, the use of the park arranged on the land in connection with public transportation stops in the transition from the Bosphorus Bridge axis to the city make transportation possible.Located on the bridge level of the mall, the way to the Macro Center supermarket are accessed by means of vertical circulation mediums (escalators and elevators), while on the other handproviding access to the garden area. Thanks to the different transportation arteries, the users' experience of the spaces and the separation of different common areas from each other continue their functions independently. Inspired by the urban makeup in the indoor circulation design, its semi-open spaces and courtyards exhibit a relationship of integrity (Tabanlioglu 2013).

Figure 34.
Zorlu Center, 2013, URL 26-27

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Zorlu Mall Macro Center Transportation Line

In analyzing the transportation line and circulation of the Macro Center supermarket situated at the Zorlu Mall, the shopping center is divided into different categories in its spatial organizational structure, it is composed of blocks arranged as separate but linked spaces. In this context, the Macro Center is located on the bridge level. Thus, it is determined as a result of observation that the main venues of the shopping mall and the brand products in the circulation network are not intertwined. Considering pedestrian access routes, it is possible to reach the garden area by walking from the main entrance and proceed directly to the Macro Center, which is in a different space category, via vertical circulation vehicles. When the transportation line of the parking area is examined, the fact that the Macro Center market has its own car park is considered an advantage of this supermarket chain in interviews conducted with shoppers. Thus, users can use both the shopping mall and the Macro Center parking lot, and they can directly access the store area from the parking lot via vertical circulation mediums.

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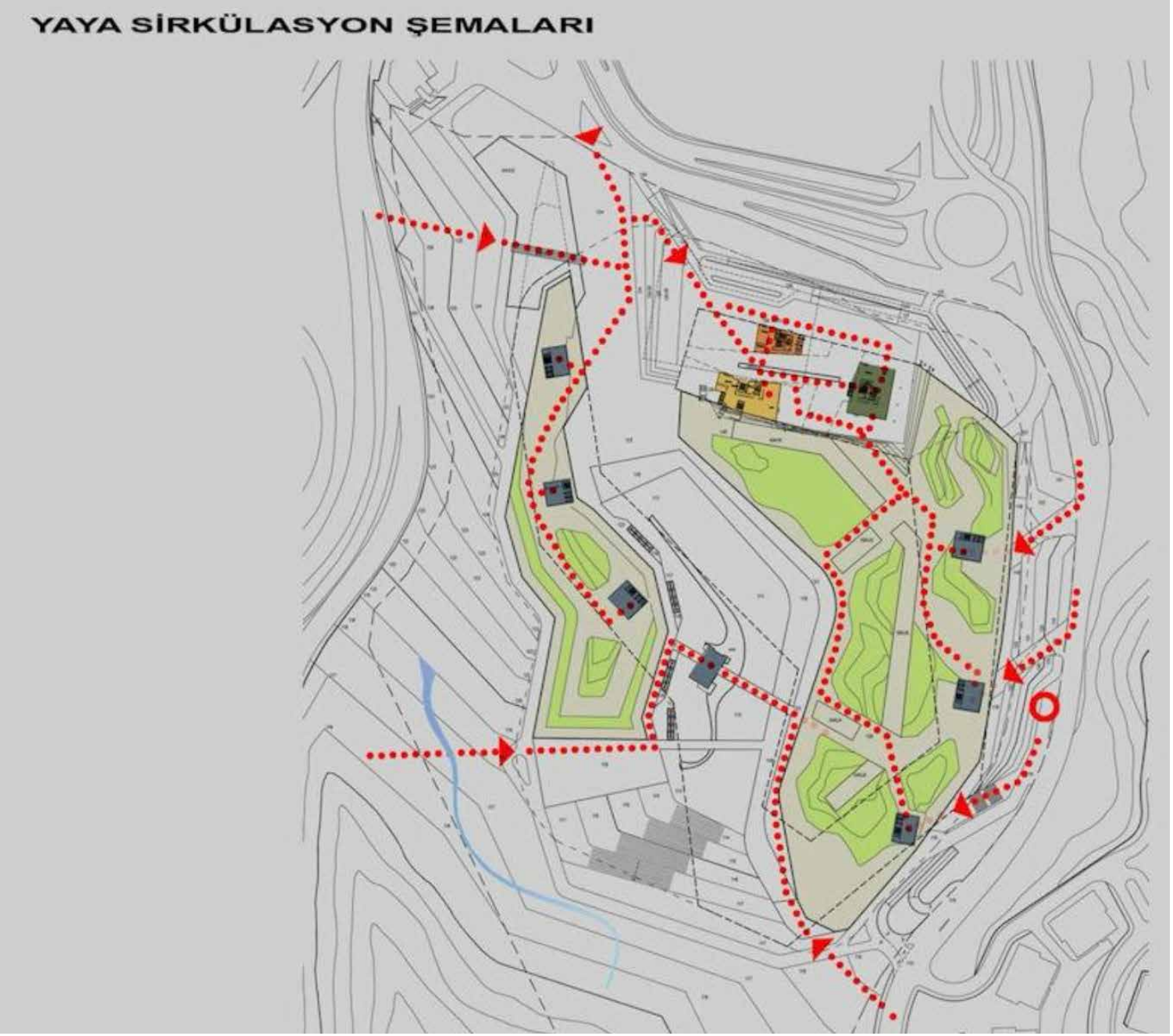

Figure 35. Zorlu Center, pedestrian circulation layout. Tabanlıoğlu Architects, 2013.

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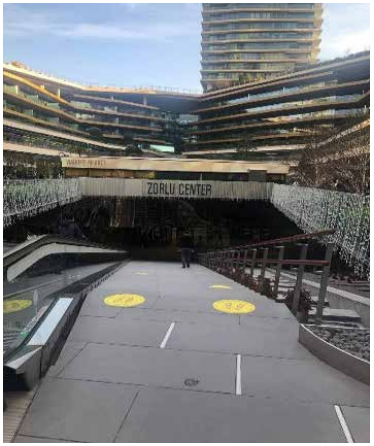

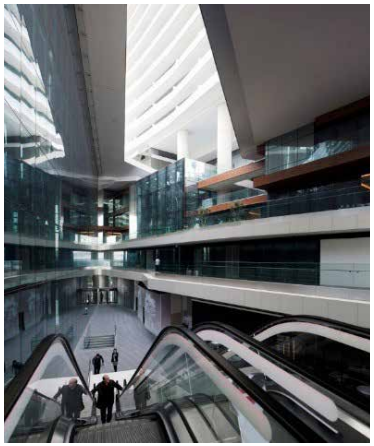

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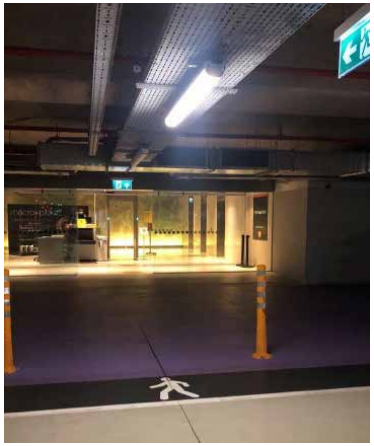

Figure 36. Zorlu shopping mall's Macro Center parking area, pedestrian circulation area. Adibi

Conclusion:

Not only does ensuring the spatial distribution and circulation relationship in shopping malls according to user needs and function provide a different experience for the users in each place, it also creates important effects on the user behavior in this context, circulation efficiency, spatial and visual continuity, time and physical environment.

Gaining sufficient equipment within the scope of circulation definition, types and design elements, gaining a new understanding about the environment, directing users from stagnation to dynamism in line with this information, providing a circulation with a more useful and visual perception at the highest level. In revealing a relationship with the environment and the relations within itself, as well as in circulation design, it is aimed to present innovative ideas in terms of aesthetics, flexibility, comfort and dimensional features.

As a result of examining the two shopping malls; In both shopping centers, it was determined the Macro Center supermarkets are located close to the main venues and user entrances from the car parks. On the other hand, pedestrian access routes can provide access to these venues by using the vertical circulation mediums of both malls and the main circulation line. Since these supermarkets, which are subject to certain restrictions, have limited circulation areas, whereas access to all places of the shopping malls is not allowed after shopping is finished. The mall location discipline criterion obliges these supermarkets in a way that doesn't permit them to disrupt the visual perception, thus preventing said visual perception of the shopping mall from being adversely affected.

As it is forbiden to take photos from the interior on macro center super markets due to the store policy, photos of these spaces could not be taken.

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A cartografia portuguesa como elemento fundante de Brasília: a memória da pesquisa ressignificando o discurso do espaço preexistente da capital

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Resumo

Este trabalho parte da proposição da ressignificação memorial referente ao contexto histórico formador da ideia e produção da cidade capital do Brasil, Brasília. O objetivo foi indicar a riqueza temporal que induziu a ideia de transferência da capital brasileira, deixando o litoral mercantilista em direção ao interior do território, reconhecendo a origem e a evolução dos estudos cartográficos como um dos elementos basilares e fundamentais para o conhecimento espacial e geográfico do Centro-Oeste brasileiro, tendo como justificativas principais a defesa e a ocupação territorial. Também foi objetivo do estudo interpretar, na análise dos fatos, a participação estratégica do Marquês de Pombal, no século XVIII, que possuía uma íntima ligação com os cartógrafos Ângelo dos Santos Cardoso e Tosi Colombina, responsáveis diretos por pesquisarem e realizarem os mapas pioneiros da capitania de Goiás, sítio que sediou a construção de Brasília mais de 200 anos após a inspiração estratégica da Corte portuguesa em reconhecer e indicar a transferência da capital do Brasil para o interior do território. Assim, o artigo, no seu contexto, propõe contribuir para o debate referente à geohistória da cidade de Brasília, ressaltando a elasticidade do campo temporal e espacial que possibilitou a materialização da cidade modernista, tombada como Patrimônio Cultural da Humanidade pela Organização das Nações Unidas para a Educação, a Ciência e a Cultura (UNESCO) em 1990.

Palavras-chave:

Brasil, Portugal, Mapeamento Histórico, Brasília.

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Portuguese cartography as a foundational element of Brasilia city: re-signifying the discourse of the pre-existing space of the capital through the research memory

Abstract

This work starts from the proposition of the memorial resignification referring to the historical context that formed the idea and production of the capital city of Brazil, Brasilia. The objective was to indicate the temporal richness that induced the idea of transferring the Brazilian capital, leaving the mercantilist coast towards the interior of the territory, recognizing the origin and evolution of cartographic studies as one of the basic and fundamental elements for spatial and geographic knowledge of the Brazilian Center-West, having as main justifications the defense and the territorial occupation. It was also the objective of the study to interpret, in the analysis of the facts, the strategic participation of the Marquês de Pombal, in the 18th century, who had an intimate connection with the cartographers Ângelo dos Santos Cardoso and Tosi Colombina, who were directly responsible for researching and producing the pioneering maps of the captaincy of Goiás, site that hosted the construction of Brasília more than 200 years after the strategic inspiration of the Portuguese court in recognizing and indicating the transfer of the capital of Brazil to the interior of the territory. Thus, the article in its context, proposes to contribute to the debate regarding the geohistory of the city of Brasilia, highlighting the elasticity of the temporal and spatial field that made possible the materialization of the modernist city, listed as a Cultural Heritage of Humanity by the United Nations Organization for the Education, Science and Culture (UNESCO) in 1990.

Keywords:

Brazil, Portugal, Historical Mapping, Brasilia.

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Introdução

Inaugurada em 1960, Brasília foi concebida para ser uma obra de Arte Modernista a céu aberto. O Plano Piloto é um exemplo fiel da aplicação do urbanismo moderno. O traçado original e a organização da cidade em quatro escalas — monumental, residencial, gregária e bucólica —, por si só, fazem de Brasília uma cidade única, conferindo-lhe relevância na longínqua história do urbanismo. Além de inovador,

> *Seu urbanismo traduz uma referência ética: o princípio da supremacia do interesse público sobre os interesses individuais, que é representado pela predominância das generosas áreas verdes e livres sobre os espaços privados e edificados. Portanto, as áreas verdes fazem parte do plano urbanístico, têm função ambiental e de lazer e nos ensinam a valorizar o que é público e das futuras gerações...". (Ramos, 2017, p. 225)*

Reconhecida em todo o mundo como exercício do modernismo urbano, pelas inovações de seu conjunto urbanístico e arquitetônico, esta cidade

> *Foi o primeiro bem contemporâneo reconhecido pela Organização das Nações Unidas para a Educação, a Ciência e a Cultura — UNESCO como Patrimônio Cultural da Humanidade, em 1990, pois até àquele momento somente bens seculares ingressavam na lista. Outra inovação: Brasília é a única cidade do século XX tombada pelo IPHAN — Instituto do Patrimônio Artístico Nacional. E mais: está protegida por um tombamento de caráter urbanístico, diferente e mais flexível do que o tombamento arquitetônico usual. A área sob proteção abrange 112,25 km², a mais extensa do mundo enquanto sítio urbano tombado...". (Ramos, 2017, p. 226)*

O contexto formador da cidade de Brasília a insere como a maior expressão da modernidade e representante matriz da genialidade humana para o planejamento de cidades, permitindo ressignificar e dar suporte à amplitude histórica, associada a totalidade geográfica.

Para interligar os fluxos iniciais da cidade às dinâmicas e fluxos internacionais,

> *Holston recupera Le Corbusier ao demarcar o zoneamento modernista (tipologias de atividades e de forma de construção) a partir da consideração de que o planejamento urbano define-se por meio de quatro funções básicas, premissas do urbanismo modernista — "as chaves para o planejamento urbano estão nas quatro funções: moradia, trabalho, lazer (nas horas livres) e circulação" (Le Corbusier, 1957 [1941]: art.77).*

A última função "circulação", estabelece uma comunicação proveitosa entre as outras três. (Le Corbusier, 1957, [1941] apud Oliveira, 2007, p. 42)

Reconhecidamente, Brasília é um invento singular, original e único, um desafio na apresentação de uma nova proposta de viver. Carrega nela razões que diferenciam a cidade das demais, legitimando seu reconhecimento e tombamento como Patrimônio Cultural da Humanidade.

O urbanista Lúcio Costa e o arquiteto Oscar

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Niemeyer participaram do Movimento Modernista brasileiro e conceberam a cidade com características peculiares e excepcionais, registro de um importante momento histórico da arte mundial. Para referendar a importância da cidade enquanto espaço tombado, a filha de Lúcio Costa, fez questão de registrar que

> *a coisa mais importante de Brasília é o simples fato de ela existir. E digo eu: preservar a concepção original do Plano Piloto não é favor nenhum, é um mínimo de respeito ao testemunho vivo da incrível realização da nação brasileira que Brasília significa [...]. (Costa, 2017, p. 102)*

É salutar perceber que, desde a sua concepção e gestação, Brasília resulta de um projeto político marcado, sobretudo, pela intervenção do Estado, que trouxe em seu bojo a utopia do desenvolvimento e da modernidade. Todavia, Brasília é, acima de tudo, uma cidade para uso das pessoas comuns que nela trabalham, circulam, habitam e se confrontam, sendo então produto direto da ação humana e representante da história de seu tempo.

É interessante a percepção referente à contextualização memorial da cidade e sua importância, reconhecida na pesquisa como 'representante da história de seu tempo', porém é notória a carência de fatos empíricos complementares e autenticadores, a fim de nutrir e dar robustez científica à história oficial dessa importante cidade, capital do Brasil e para todo o mundo, superando personificações e interesses, mitos e subjetividades em seu contexto explicativo temporal.

Assim, é fundamental para a proposta do artigo trazer à tona a participação na amplitude histórica da cidade, os geógrafos e cartógrafos, o português Ângelo dos Santos Cardoso e o italiano Tosi Colombina, considerados "criadores" da cartografia do Brasil Central e do Mapa da Capitania de Goiás, sítio que recebeu e assentou a cidade de Brasília. Cita-se ainda Sebastião José de Carvalho e Melo, o Marquês de Pombal, estadista, Primeiro-Ministro e reformador de Portugal, que, entre 1750-1777, através de suas reformas, visando reconstruir e desenvolver Portugal, intensificou a pesquisa nas terras coloniais, com o intuito de tomar possessões e garantir riquezas para a manutenção da Coroa.

Dessa forma, foi objetivo deste estudo indicar a riqueza temporal do assunto e propor amplitude histórica à criação da cidade de Brasília. Também se apresenta como objetivo do estudo interpretar, na análise dos fatos, a estratégica participação do Marquês de Pombal já no século XVIII, por sua ligação com os cartógrafos mencionados, responsáveis diretos por pesquisarem e realizarem os primeiros mapas da Capitania de Goiás. Reconhece-se assim que, com o auxílio do método geográfico de pesquisa em campo e da evolução dos estudos cartográficos, foi possível acolher elementos científicos basilares e fundamentais para o conhecimento espacial (geográfico) do Centro-Oeste brasileiro e do objeto do artigo, a Bacia Hidrográfica do Lago Paranoá (BHLP) no Distrito Federal.

Como hipóteses norteadoras, partimos da premissa de que o ato estratégico político de séculos atrás, conduzido pela Coroa portuguesa, na figura do Marquês de Pombal, com o intuito de pesquisar, conhecer e apropriar do campo do Centro-Oeste brasileiro, foi o fluxo inspirador para a condução da concepção em transferir a capital brasileira para o interior. Procuramos através desta reflexão

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contribuir para o contexto da geohistória da criação da cidade de Brasília, ampliando seu referencial histórico científico, enquanto totalidade espacial.

Também partimos, como hipótese de trabalho, da premissa de que é necessário perceber que a cartografia desenvolvida no Centro-Oeste do país foi o elemento geográfico científico responsável por iniciar na região o conhecimento real e empírico da paisagem. Realça-se assim, o pioneirismo da pesquisa em campo, sendo objeto de referência para o reconhecimento e análise local, que possibilita muito tempo depois, a implantação da moderna capital, Brasília, interligando todo o país a região central do Brasil, que até então tinha pouquíssima representatividade para a nação.

É perceptível, na interpretação da história oficial da cidade, a carência científica, agudizada pelo fato da exacerbação da personificação de políticos, em detrimento dos fatos e fenômenos contribuidores vindos do Velho Mundo, por via da Revolução Industrial e do discurso da modernidade, também fundamentais para o contexto formador de Brasília.

Memorial da cidade: preexistências históricas e estóricas de Brasília

Como parte crucial ressalta-se aqui a condição de poder intelectual e científico de Portugal, a fim de contextualizar e ambientar ações e imbricações da nação portuguesa, juntamente com os 'personagens' Ângelo dos Santos Cardoso, Francesco Tosi Colombina e Sebastião José de Carvalho e Melo, o Marquês de Pombal.

Na interpretação histórica havia, por parte de Portugal, desconforto em relação ao problema cultural de distanciamento da nação comparado a outras metrópoles europeias, "ante o quadro da miséria intelectual, política e econômica resultante da obra purificadora" (Sérgio, 1985, p. 30). É usual para o processo explicativo que isto se deve, em boa medida, ao fato de Portugal ser um país de pouca envergadura territorial e geograficamente estreme, e ao mesmo tempo um Estado-nação, cuja identidade e interesses se construíram, em parte, por contraste com a Europa continental.

Na tentativa de amenizar maiores perdas de riquezas e poder de influência, buscou-se em Portugal, "na verdade, estrangeiros e 'estrangeirados' que procuraram arrancar-nos ao nosso Isolamento. Foi, em Castela, a dinastia francesa e os seus homens; e foram, entre nós, os 'estrangeirados' de que se serviu a vontade cega de Pombal". (Sérgio, 1985, p. 30)

A intervenção renovadora dos estrangeirados, percebida como ajuda à estagnação científica se fez necessária, já que

> *Portugal e suas colónias formavam (...) um sistema fechado, em que a metrópole, parasi- tando, pudera viver no isolamento em relação às idéias que animavam a Europa. A grande maioria da Nação, que estava integrada nesse sistema, detestava esses homens de superior cultura, esses pioneiros de uma idéia nova, a quem apodava de 'estrangeirados'. (...) (A estes se deveu, em suma, tudo o que se fez de bom em Portugal nos reinados de D. José e D. Maria I, e no Brasil no tempo de D. João VI). (Sérgio, 1985, p. 121).*

Além disso, a carência já secular de quadros

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técnicos agravara-se com a Sagrada Inquisição que desmantelou o quanto havia de disponível nas escolas portuguesas, obrigando o reino a se valer de profissionais católicos de preferência de Estados italianos que não fossem filo-espanhóis. Técnicos do reino de Nápoles, como também espanhóis, franceses, holandeses e ingleses protestantes, estavam por isso excluídos. (Fontana, 2004, p. 14)

A carência de técnicos e de produção científica entre os portugueses ocasionava incômodo, pois era fato saber que a metrópole portuguesa era escassa em recursos e dependente de sua principal colônia na América. Porém, pouco se sabia sobre as riquezas e farturas no vasto e ainda desconhecido "território brasileiro", sobretudo nas áreas distantes do litoral, no interior do país. Lourenço resgata o período de isolamento português, dizendo ser

> *relativamente recente, mas inegável, constituindo quase uma fractura da nossa imagem cultural, o sentimento de exílio, de distanciamento e, sobretudo, de autêntico e mórbida complexo de inferioridade em relação a uma outra Europa que, na esteira das descobertas hispânicas, iria reforçar a sua revolução cultural — burguesia empreendedora, reforma religiosa, especialização científica — com a exploração económica sistemática dos nossos espaços extra-europeus. A estagnação ibérica é um facto incontestável, mas só o romantismo e, sobretudo, a segunda revolução industrial lhe conferiram, no plano estritamente cultural, essa conotação deprimente, esse sentimento de desvalia que o Portugal e a Espanha dos séculos XVII e XVIII não viveram em termos de tão dramático ressentimento e hiperbólico fascínio. (Lourenço, 1988, p. 26).*

O sentimento e o silêncio de desvalia que assolava Portugal foi despertado com o fim do reinado de D. João V, iniciando a regência do sucessor D. José I e de seu Secretário de Estado, passando ao posto de Primeiro Ministro, em 1750. Sebastião José de Carvalho e Melo foi condecorado alguns anos depois como o Marquês de Pombal.

Pombal foi o reformador de Lisboa, estadista de ideias progressistas, controverso, porém bastante atento às novas exigências no campo do conhecimento e responsável direto em indicar melhor rumo para o país em meio a ascensão europeia. É verdade também que Portugal já recrutava especialistas do continente europeu, antes mesmo da chegada à América. Em 1317,

> *o soberano português, Dom Diniz, recorreu ao almirante genovês Emanuele Pessagno e a outros oficiais da frota da República Soberba para criar a Marinha do Estado do Reino de Portugal. Em 1500, é Dom Manuel I que solicita a banqueiros e empresários privados das Repúblicas de Florença e de Gênova o co-financiamento da expedição de Pedro Álvares Cabral e das sucessivas missões navais no hemisfério Sul do Novo Mundo, comandadas, em 1501-1502 e em 1503-1504, pelo florentino Américo Vespúcio. Nos séculos XV e XVI a Cartografia obteve expressivos avanços em decorrência da necessidade de registrar informações preciosas para os navegadores, e também assinalar em mapas as novas*

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terras que iam sendo descobertas.

Dessa forma o Brasil foi beneficiado, muito antes da sua descoberta, com a utilização de mapas produzidos em suas diversas fases, contribuindo para formar um rico acervo integrante da Cartografia Histórica do Brasil. (Cintra & Costa, 2011, p. 02).

Nota-se que a política de conquista de territórios e o desenvolvimento da cartografia aconteceram quase concomitantemente. Do ponto de vista historiogeográfico as duas dimensões são complementares e interdependentes e têm como ponto de origem os ditames do período moderno.

É possível afirmar que a prática portuguesa em atrair estrangeiros capacitados para missões de reconhecimento geográfico e de indagação das riquezas das suas colônias, consequentemente estimulou para que Portugal encetasse os trabalhos necessários para contar com uma cartografia mais acurada e confiável. Seguindo a lógica de absorção de cooperadores estrangeiros desde o século XVI,

D. João V, Rei do império português, através de Sebastião José de Carvalho e Melo, mais tarde Conde de Oeiras (06/06/1759) e Marquês de Pombal (18/09/1770), valeu-se mais uma vez dos italianos, na forma de cientistas, matemáticos, astrônomos, geógrafos, médicos e engenheiros para levantar pontos com longitude para a confecção de melhores mapas. Foi por esse motivo que vieram ao Brasil os chamados padres matemáticos, de diversas nacionalidades, com predomínio de italianos [...], mas também portugueses. (Cintra & Costa, 2011, p. 2).

Durante o comando regente do Marquês de Pombal foram produzidos muitos estudos e mapas da principal colônia portuguesa, o Brasil, com novo padrão de qualidade e complexidade. Entre os cientistas e especialistas contratados pelo então secretário de Estado, Sebastião José de Carvalho e Melo, sob orientação do primeiro governador de Goiás, Dom Marcos de Noronha, o Conde dos Arcos, Tosi Colombina foi enviado ao Brasil de 1743 a 1753, como oficial engenheiro militar, geógrafo, cartógrafo e projetista de estradas. É bastante provável que a indicação do genovês Tosi Combina,

tenha sido feita pelo matemático e engenheiro de Módena, Domenico Vandelli, e, com maior probabilidade, pelo geógrafo Michelangelo Blasco, para colaborar com a Corte de Lisboa na execução imediata de projetos pioneiros que abririam as portas para as grandes fronteiras ainda inexploradas no interior do Brasil colonial. (Fontana, 2004, p. 18).

Para contextualizar o fato, Maggiarotti afirma que

Para reforçar a equipe de engenheiro chefiada no Brasil por Michelangelo Blasco, foram mandados outros técnicos, dos quais se têm apenas breves informações: sabe-se assim que, entre esses técnicos, estava Francesco Tosi Colombina, que, por volta da metade do século XVIII, entrara a serviço de Portugal [...] Dele se conserva um mapa (três folhas de 0,507 por 0,717) sob o título de "Mappa do Brazil desde S. Paulo até à embocadura do Rio da

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> *Prata", dedicado a Thomé Joaquim da Costa Corte Real. O papel manuscrito em branco e preto parece ter sido datado de Funchal, em 09 de dezembro de 1756. (Maggiarotti, 1939, apud Fontana, 2004, p. 16)*

É interessante ressaltar que no exercício de comparação de datas, algumas confusões podem surgir e muito possivelmente diferenças entre anos, porém tratados com a margem segura de 01 a 05 anos de diferença nas datas fatais ao objeto do artigo. Na análise do seu manuscrito de 1753 entregue a coroa portuguesa, o Cartógrafo Tosi Colombina "afirma que estava no Brasil havia dez anos, portanto desde 1743. Nesse período, promoveu expedições militares que levaram sucessivamente à descoberta de ouro e diamantes em Pedras Brancas e na aldeia de Tibagi, no Paraná". (Fontana, 2004, p. 18).

Com efeito, Francesco Tosi Colombina é personagem presente na história da cartografia brasileira, por ter sido atribuído a ele grandes descobertas e interpretações geofísicas e sociais do território, explorando e registrando em mapas as primeiras impressões da região Centro-Oeste do Brasil. É dado a ele o postulado de primeiro realizador do mapa da Capitania de Goiás; é importante observar que este foi o sítio que deu condições para que a cidade capital do Brasil, Brasília, pudesse ser pensada, planejada e construída, mais de 200 anos após haver o primeiro levantamento geográfico e cartográfico da região central do país, propondo e sugerindo que a história da cidade seja ampliada em interpretação científica e nutrida pelo traço memorial as vezes ainda velado. É possível crer que o cartógrafo genovês, já na época, tinha consciência de sua contribuição para a política e estratégia que seu mapa representava, pois ele,

> *dá uma primeira visão física e uma efetiva interpretação das dimensões territoriais do Brasil colonial na metade do século XVIII [...] Sua obra, portanto, traduz-se numa moderna descrição geofísica, geoeconômica e geoadministrativa do Brasil da época, tendo como fulcro o sito topográfico que corresponde hoje à região de Brasília e do Distrito federal. (Fontana, 2004, p. 22-23).*

Ao retomar a história inicial sobre os reais interesses da coroa portuguesa e da criação do primeiro mapa da Capitania de Goiás, com o intuito de conhecer, ocupar e dominar as riquezas das paisagens brasileiras, além de oferecer

> *ao governo colonial um sistema de transporte terrestre de minérios e pedras preciosas, a ser integrado ao sistema de transporte fluvial, permitindo assim o fluxo das riquezas minerais do interior do Brasil para portos no Atlântico. [...] Convém, todavia, considerar que não interessava ao Governo colonial facilitar meios de transporte, tendo em vista o contrabando de ouro e diamantes já então praticado em larga escala naquelas vastas regiões. (Fontana, 2004, p. 23).*

No decorrer do assunto é notória a contribuição do avanço cartográfico no Brasil e para a metrópole portuguesa, motivada pela participação estrangeira de Tosi Colombina. Interpreta-se na análise que Portugal em muito se beneficiou com a política iluminista do Marquês, buscando conhecer, de fato, o território colonial a ser consumido e melhor

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cuidado. Além de cumprir a meta de reformular e reconstruir a capital Lisboa, assegurando para todo reino, o controle das riquezas e das decisões do Brasil, "atendendo às exigências de organização e de estabilização da economia da exploração minerária e da colonização sistemática dos novos territórios do Brasil, conforme diretrizes da Reforma Pombalina" (Fontana, 2004, p. 23).

Como hipótese geral, se destaca o estratégico ato conduzido pelo Marquês de Pombal em fomentar a pesquisa de campo e a confecção de mapa no espaço central do Brasil, como ato político de séculos atrás, pioneiro em fundamentar estudos científicos na região central do Brasil, visto na pesquisa como fluxo geográfico científico inspirador do pensamento em transferir a capital brasileira para o interior brasileiro, contribuindo para o contexto memorial e geohistórico da criação da cidade de Brasília, ampliando assim, seu referencial histórico enquanto totalidade espacial dinâmica.

Também, se confirma como verdade para o artigo que a cartografia foi o elemento e ferramenta "geo-científica" responsável por iniciar na região central do Brasil o conhecimento real e empírico da paisagem, introduzindo assim, o pioneirismo da pesquisa em campo, sendo objeto de referência para a ciência geográfica e para o reconhecimento e análise local, possibilitando, a muito tempo depois, a implantação da moderna capital Brasília, hoje tombada como patrimônio mundial da humanidade, justamente por sua complexidade moderna.

O pioneirismo e a sustentação da ideia de transferência da capital colonial para o interior do Brasil são ainda fatos abertos na história de Brasília e do Brasil, dando a cidade uma vaga impressão memorial e científica, ainda amarrada em subjetividades e mitos políticos. Parecendo ser somente fruto da idealização política local e ainda, completamente desassociada ao contexto geográfico internacional no acúmulo do tempo.

Para corroborar o anseio da pesquisa, sintetizando a missão atribuída a Tosi Colombina no Brasil é fundamental reconhecer, respondendo nossa hipótese, que talvez seja esse o ponto histórico matriz, que lança a origem da ideia de transferência e construção da capital da colônia no interior do Brasil, pois "conceitualmente, a primeira ideia profética, o apoio técnico e a sugestão ao Reino português da necessidade de interiorizar a capital do Brasil colonial, deslocando-a do Rio de Janeiro para o interior da grande colônia americana". (Fontana, 2004, p. 36).

É fundamental ressaltar que o nascimento da cartografia explicitando as características da região, além de servir como ferramenta de auxílio para o desejo de domínio do colonizador, permitiu claramente, planejamentos e ocupações confiáveis, evitando maiores despesas e prejuízos para Portugal. Também serviu como mola propulsora para a saída da inércia do desenvolvimento cartográfico local, como o amparo geográfico determinante e fundamental para a ocupação do interior do território brasileiro.

O auxílio cartográfico indicado no mapa de Tosi Colombina, entregue em 06 de abril de 1751 ao governador da Capitania de Goiás, Dom Marcos de Noronha, o Conde dos Arcos, foi considerado eficiente e detalhista em informes físicos necessários e ideais para o objetivo de ocupação maiores com características

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urbanas avançadas, visto que

> *As informações detalhadas e pioneiras, contidas em seu primeiro mapa, proporcionaram a Lisboa a motivação lógica para transferir, do Rio de janeiro para o interior, a capital da colônia, para lá onde nasciam e nascem os grandes sistemas hídricos brasileiros. Desenhou substancialmente o que se define como o escudo hidrogeológico do Planalto Central Brasileiro, a 1200 metros do nível do mar. (Fontana, 2004, p. 36).*

Sofrendo o impacto da busca de signos no tempo, a pesquisa se fortalece como peça arqueológica, colando fragmentos de fatos e fatores históricos contribuidores para responder as nossas questões iniciais e também, servir como ferramenta para pesquisas futuras, a fim de propor e contribuir para elevar o debate sobre a cidade de Brasília, tendo como princípios norteadores a Geografia e a História como ciências complementares.

Para referendar a imbricação do contexto geohistórico/memorial defendido no artigo, considerando a história da cidade de Brasília associada aos avanços da sociedade em tempos diversos, faz-se necessário identificar aqui o sítio urbano que a cidade de Brasília ocupa atualmente. Por representar em localização o recorte exato identificado em mapa, já no século XVIII, em 1751, assinado por Francesco Tosi Colombina.

É interessante perceber que umas das principais informações geográficas definidoras para impulsionar a transferência e a construção de Brasília foi justamente a satisfatória explicação sobre a fartura do sistema hídrico do lugar. Informação essa já disponibilizada no primeiro mapa oficializado da região detentora do sítio de acento da capital do Brasil, oficializado em uma primeira análise como sendo de Tosi Colombina. Serviu de modelo e guia interpretativo geográfico da região de Goiás para outras expedições de especialistas que seguiram, ao longo do tempo, com o objetivo em transferência da capital para o interior do país.

Vale ressaltar que mesmo 143 anos após o primeiro mapa da Capitania de Goiás ser entregue ao governador da região, seguindo ordens e orientação da coroa portuguesa, foi ele o ponto científico inspirador e norteador para novos estudos na área pretendida. Em 1894 um dos participantes, o especialista, médico da Expedição Cruls, apresentou relatório indicando a localização da área para a construção de Brasília, relatando a importância e a disposição que Tosi Colombina desempenhou sua missão para Portugal e para o Brasil. Para ele, Tosi

> *Era considerado como homem de ideias revolucionárias e brilhantes, por haver concebido aquela estrada carroçável, ou seja, para veículos de rodas, que ligaria Santos a Cuiabá, portanto, da costa atlântica brasileira ao Mato Grosso, onde novas trilhas estavam sendo abertas pelos bandeirantes, ou seja, bandos de aventureiros armados que agiam como exploradores e conquistadores privados contra índios e jesuítas em áreas desconhecidas, contestadas ou claramente pertencentes ao domínio espanhol. (Fontana, 2004, p. 26).*

Na análise dos fatos, apesar de tardio, é justíssimo reconhecer e apropriar da importante contribuição dos estudos cartográficos na

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Capitania de Goiás para a evolução urbana em direção ao interior do território brasileiro, reconhecendo na figura do genovês Tosi Colombina um personagem determinante para a geografia do Brasil e de Portugal. E assim, consequentemente, como estudioso e pesquisador de enorme importância e envergadura para o contexto memorial e geohistórico da cidade de Brasília.

Porém, com o intuito de nutrir o assunto buscando ampliar o referencial histórico que impulsionou o pensamento de transferência da capital brasileira, é legítimo apresentar a participação e contribuição do pesquisador, geógrafo e cartógrafo, português, Ângelo dos Santos Cardoso, como um dos expoentes e pioneiros da cartografia do Brasil Central, atendendo também, as ordens estratégicas da coroa portuguesa, sendo ele um importante secretário da capitania goiana e auxiliar direto do governador Dom Marcos de Noronha, o Conde dos Arcos, além de influente agente fidedigno do Rei e do Marquês de Pombal.

Sobre a indicação e posse de Sebastião José de Carvalho e Melo, o influente secretário e compatriota, parabeniza em carta do século XVIII, em pleno interior do sertão brasileiro.

> *vou por Letra aos pés de Vossa Excelência; ainda que a minha mayor furtuna, e honra seria fazelo pesoalmente, estribado sempre porem naquele/profundo respeito, e acatamento, que á de tempo taõ antigo traz a origem, que/ o bj ectiv amente tiv e, e dev o à S ua Excelentíssima Pesoa; mas sempre com a Sustada, e duvidoza rezolução, de que me seja contada por temeridade esta determinação; eu/ative quando soube a estimável, agustoza noticia, de dar a Vossa Excelência o parabéns/ por carta, da acertadisima eleição que o nosso soberano fizera de nomear/a Vossa Excelência seo Secretário de Estado, emprego ainda que infeior aos altos merecimentos de que Vossa Excelência se orna, sempre venturozo para a Monarchia, de ter hum Ministro tão destinto que a derija. (Arquivo Histórico Ultramarino apud Vieira Júnior; Schelee & Barbo, 2010, p. 1945).*

Tem início o ofício que o secretário de governo da capitania de Goiás, o português Ângelo dos Santos Cardoso enviou a Sebastião José de Carvalho e Melo, Secretário de Estado (1750), o futuro Conde de Oeiras (1759) e Marquês de Pombal (1769). O Registro documental, que compõe o acervo referente à Capitania de Goiás, está guardado no Arquivo Histórico Ultramarino (AHU), e tratando-se de relatório sobre a região, escrito em 1755.

Cumprindo a missão de informar, dentre outras coisas, o registro documental

> *menciona os aspectos gerais da ocupação e formação territorial, os problemas existentes, comenta sobre a povoação e a participação eclesiástica. A elaboração de relatório sobre a capitania cabia ao secretário de governo, funcionário nomeado pelo rei, geralmente bacharel, que assessorava diretamente o governador, sendo responsável pelos trâmites burocráticos do governo, ou se ja, toda a documentação emitida e recebida pela autoridade administrativa da capitania. (Vieira Júnior, Schlee & Barbo, 2010, p. 1946).*

Com o objetivo de lançar luz a personagens

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velados e pouco valorizados na memória da ocupação do interior brasileiro, cumpre-se aqui a satisfação científica e histórica, contextualizando, para o Brasil, Portugal e Brasília, a importância e o legado do agente português.

Ângelo dos Santos Cardoso, dirigiu-se provavelmente à região de Goiás entre os anos de 1745 a 1749, cumprindo ordens do Rei José I, acompanhando o governador D. Marcos de Noronha, o Conde dos Arcos, o primeiro a exercer o cargo na recente capitania independente de São Paulo. Ângelo foi nomeado secretário do governo, integrando a comitiva principal do novo governador. Chegou à capital Vila Boa, hoje Goiás Velho no dia 6 de novembro, onde redigiu o termo de posse em cerimônia realizada dois dias depois.

Assim,

> *Aos 8 dias do mês de Novembro de 1749, nesta vila Boa de Goiás, nas casas da câmara dela, na presença do senado da câmara da mesma vila e povo dela, sendo aí lida a patente real com que S. M. faz e nomeia governador e capitão-general destas minas ao Ilm.o Exm.o Sr. D. Marcos de Noronha, em virtude de que tomou posse do mesmo governo. De que fiz este termo, em que assinaram o dito Ilm.o Exm.o Sr. governador e capitão general e oficiais da câmara. – E eu Ângelo dos Santos Cardoso, secretário do governo, o escrevi e assinei. – D. Marcos de Noronha. – Ângelo dos Santos Cardoso. – Agostinho Luiz Ribeiro. – Manoel da Silva. – Inácio Barbosa da Silva. – João Ferreira Barros. (Alencastre, 1979, p. 88).*

Nota-se que, quando Ângelo dos Santos Cardoso escreveu o relatório em 1755, já se encontrava no sertão goiano há seis anos. E nesse tempo já havia percorrido a capitania de modo a construir suas impressões. O geógrafo português menciona em documento, que

> *Conheceu um especialista em cartografia, cujo nome não cita, que teria viajado pela capitania e elaborado a primeira representação cartográfica de Goiás, com os arraiais e os caminhos. Ângelo Cardoso atesta ainda que o mapa foi enviado em 12 de maio de 1750 ao diplomata Alexandre de Gusmão, certamente com o objetivo de fornecer informações sobre as ocupações ocidentais da colônia, principalmente àquelas situadas além do Tratado de Tordesilhas. A ampliação do conhecimento geográfico da colônia ajudava a garantir os interesses de Portugal diante da Espanha, principalmente quando se tratou da demarcação dos limites coloniais na América do Sul durante a articu- lação do Tratado de Madri, assinado em 1750. (Vieira Júnior et al., 2010, p. 1946).*

O amparo do Arquivo Histórico Ultramarino (AHU) de Lisboa brindou a pesquisa em registro documental, em um hipotético encontro entre dois dos três personagens que são objeto do artigo proposto. Acredita-se ser uma prova de que os pesquisadores foram contemporâneos em seu tempo e muito possivelmente foram parceiros complementares de seus trabalhos individuais. Prosseguindo em seu relatório, Ângelo dos Santos Cardoso menciona a presença na Capitania de Goiás do cartógrafo, engenheiro e geógrafo Francesco Tosi Colombina. Assim, esclarece Bertran que

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"Colombina era um entre tantos outros italianos que trabalharam para Portugal com o objetivo de propor mudanças estruturais na colônia, e que, oportunamente, passaram a tentar enriquecer no Brasil". (Bertran, 2000, p.56). Ao serviço do Conde dos Arcos, Tosi Colombina chegou a Goiás, encarregado de levantar informações sobre a capitania e

> *a registrar em um mapa, tarefa que realizou e entregou ao governador em 6 de abril de 1751. Portanto, o Mapa geral dos limites da Capitania de Goiás feito pelo engenheiro italiano Francisco Tosi Colombina, foi elaborado um ano depois do mapa enviado por Ângelo Cardoso (Vieira Júnior et al., 2010, p. 1946).*

Para confirmar o fato, Ângelo dos Santos Cardoso relata que, Colombina, sabendo da existência do mapa da capitania de Goiás, solicita uma cópia a ele. Tal momento pode ser interpretado como o ponto de busca empírica, mostrando ser esse o pico histórico ainda a ser compreendido. Em documento, relata o português Ângelo que

> *Na mesma conjuntura que eu chegue a esta Vila/Em companhia do Senhor General Gomes Freire de Andrada, também veyo hum Italiano/ por nome Francisco Tosi Columbina, na cometiva do ouvidor/novo Agostinho Luiz Vieira, que Vinha então para esta Comarca; o qual/ Columbina dahy a quazi hum anno, foy em companhia do mesmo Ouvidor correr/a Comarca; e levou ordem do Senhor Conde dos Arcos General desta Capitania, para hir observando as alturas dos Arrayaes, e situações da mesma Comarca; pela curiozidade que se lhe descubrio, de ser enfarinhado em Geografia; pedio-me o referido Columbina, a cópia do Mapa, que eu já antecedentemente/tinha na mão, de que havia remetido o original para a Corte a Alexandre de Gusmão, e dele se vales para formar outro com pouca diferença, excepto em alguma exacção das alturas dos grãos, em que ficavão os Arrayaes, e algum rio, ou citio que descobrio de novo; este Mapa que fez o tal Italiano, seria vezivel a Vossa Excelência; o que talvez não escaparia à Sua penetrante prespicacia, se por acazo o conversou, que Columbina peca alguma coiza em visionário. (Arquivo Histórico Ultramarino, 2018, pp. 02-03)*

Vê-se que a solicitação de Tosi a Ângelo foi prontamente atendida pelo secretário de governo da capitania. Tal ação nos leva a interpretar que o mapa oficial reconhecido de autoria de Tosi, foi realizado através de uma reprodução ou cópia do documento anteriormente enviado a Alexandre de Gusmão por Ângelo dos Santos Cardoso.

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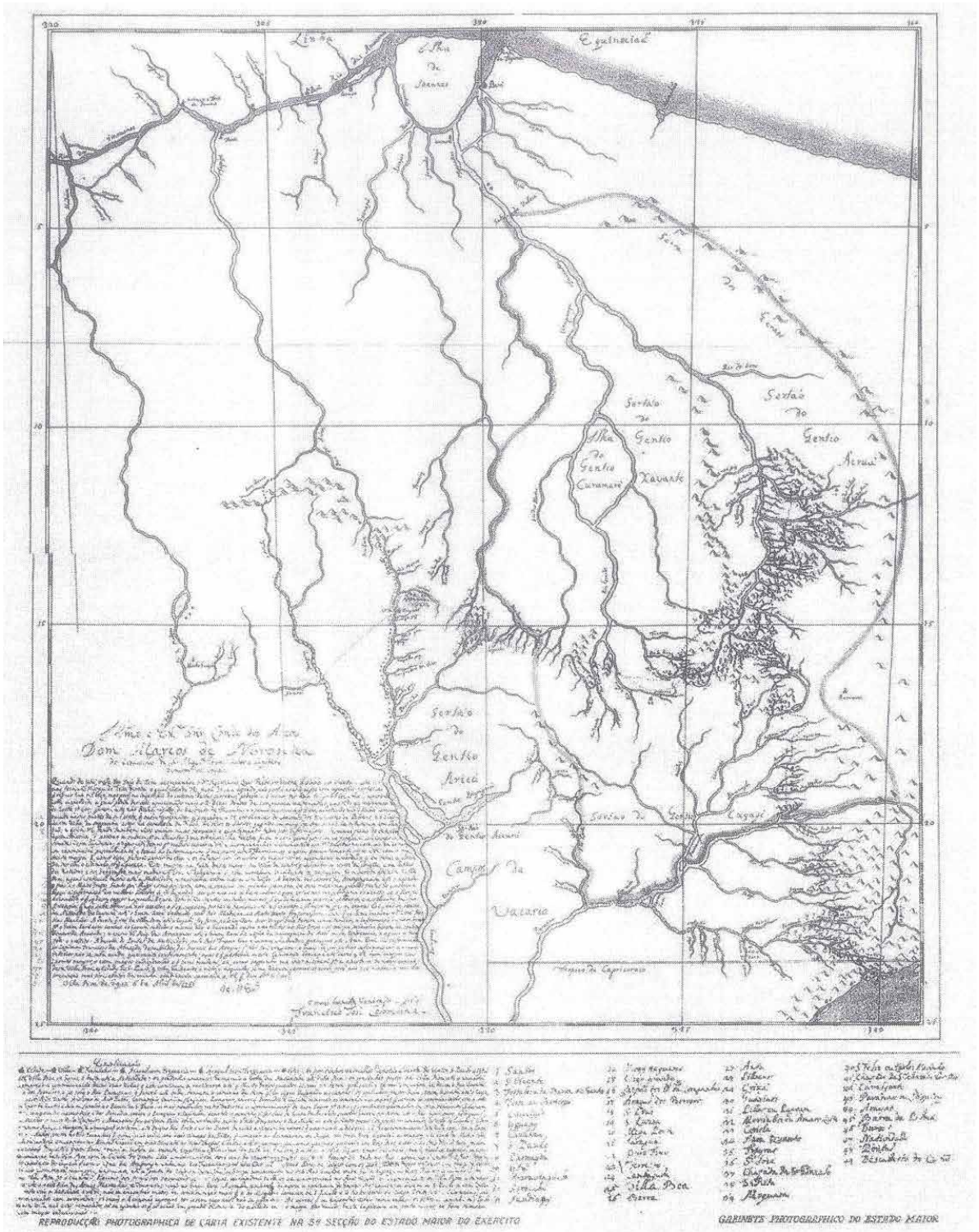

Figura 1

O mapa oficialmente reconhecido como o pioneiro da cartografia na região, Mapa dos Goyases, Tosi Colombina, de 1751.

Fonte: COLOMBINA. Mapa Geral da Capitania de Goiáz. 1751.

Manuscrito. Desenho em Nanquim. Dimensões: 53,5 Cm x 77 Cm. Arquivo Histórico do Exército.

No contexto interpretativo do assunto imagina-se que o genovês se lançou em viagem de reconhecimento pela Capitania de Goiás, coletando informações de viajantes e sertanistas, tendo como base para sua orientação, além de seus conhecimentos pessoais, possivelmente o mapa esboçado por Ângelo dos Santos Cardoso.

O mapa assinado por Tosi Colombina, de 1751, (Figura 01 e depois ajustado Figura 03), é considerado e reconhecido pela historiografia como a primeira representação cartográfica do atual estado de Goiás, confrontando fatos históricos legítimos e comprovados, como sugere o relatório atribuído a Ângelo dos Santos Cardoso (figura 02), encontrado em acervos documentais da Biblioteca Nacional do Ministério das Relações Exteriores e do Arquivo Histórico Ultramarino de Lisboa.

Assim, nos parece que

> *o relatório de 1755, elaborado por Ângelo dos Santos Cardoso, sugere a necessidade de um reexame das interpretações produzidas. O documento traz novas possibilidades, pontua novas descobertas e indica novos esclareci- mentos. O primeiro questionamento que deve ser feito é: Onde estaria o primeiro esboço cartográfico da capitania de Goiás? E o mapa que Ângelo Cardoso enviou a Alexandre Gusmão? (Vieira Júnior et al., 2010, p. 1946).*

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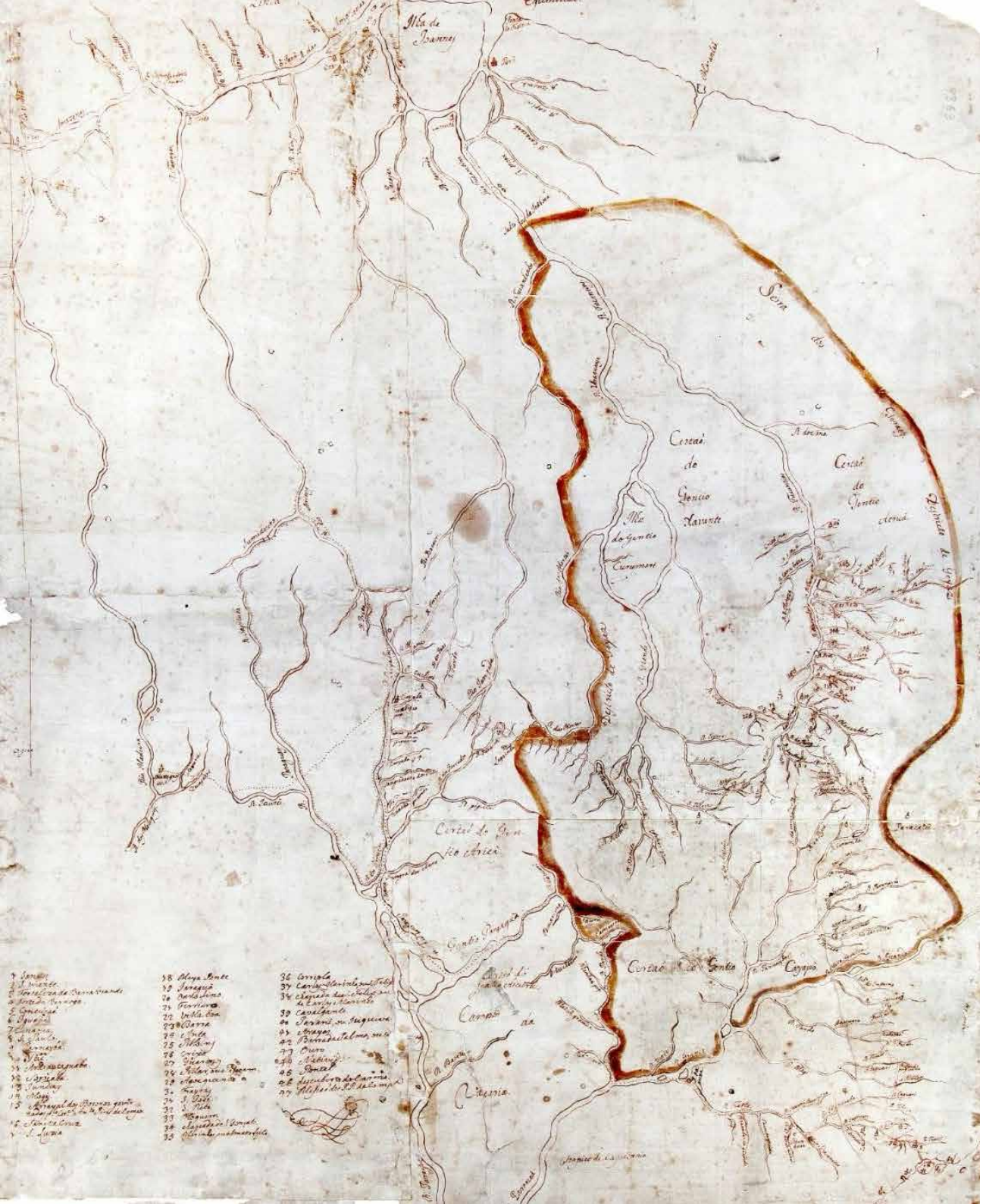

Figura 2

'O Primeiro e mais ajustado' Mapa dos Goyases, de 1749 – 1750, atribuído ao português, Ângelo dos Santos Cardoso.

Fonte: Mapa da Capitania de Goiáz. "O primeiro e mais ajustado que la apareceo ate aquele tempo, e o menos distante da verdade da destrebuiçao desta Comarca, e seos Arrayaes, mostrando o camo. que vem da Vila de Santos a esta capital e daqui ao Cuyabá, Mato Groso, Rio da Madeira, té o do Amazonas". 1750. [ca. 1: 4.750.000].

Manuscrito. Desenho em Nanquim. Dimensões: 62 x 50 Cm. Mapoteca do Itamaraty. (Texto transcrito do próprio documento).

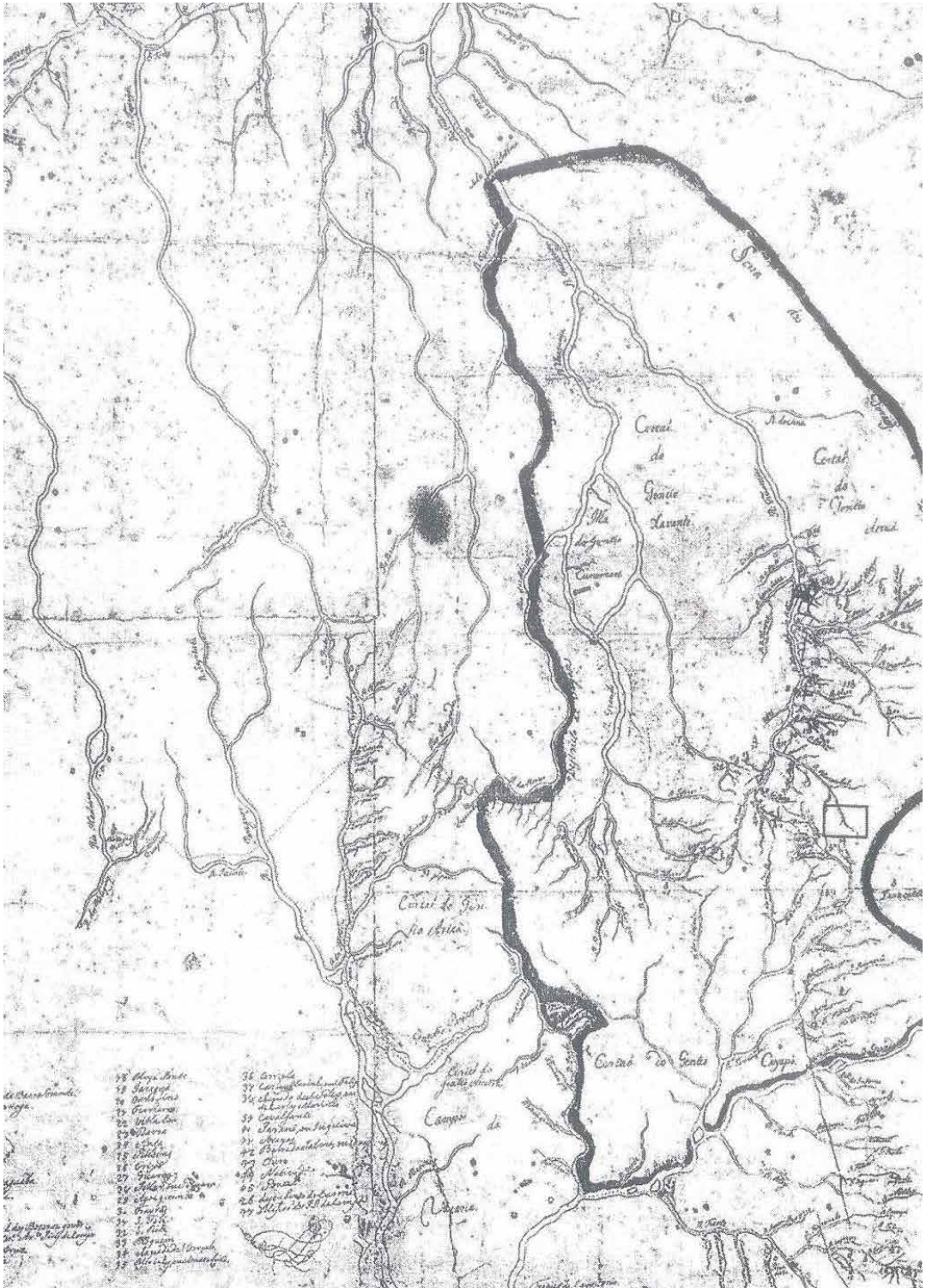

Figura 3

O Primeiro e mais ajustado', de 1749 – 1750, atribuído ao português Ângelo dos Santos Cardoso, já com a indicação do sítio do futuro DF do Brasil.

Fonte: Ângelo dos Santos Cardoso, Mapa da Capitania de Goiáz. "O primeiro e mais ajustado que la apareceo ate aquele tempo, e o menos distante da verdade da destrebuiçao desta Comarca, e seos Arrayaes, mostrando o camo. que vem da Vila de Santos a esta capital e daqui ao Cuyabá, Mato Groso, Rio da Madeira, té o do Amazonas". 1750. [ca. 1: 4.750.000].

Manuscrito. Desenho em Nanquim. Dimensões: 62 x 50 Cm. Mapoteca do Itamaraty.

Compreende-se que era de importância estratégica para Portugal conhecer e dominar as características e riquezas naturais da principal colônia, interessado em descrever as possibilidades da paisagem cartografada, bem como a estrutura da ocupação colonial necessária à Coroa. Este hábito já era exercido desde o século XVI, pela prática da sistemática atualização das cartas- padrão, onde cartógrafos, durante as viagens, registravam os aspectos geográficos gerais, como: hidrografia, caminhos, rotas, portos, ocupações humanas e outros.

Dessa forma, para referendar a importância dos pesquisadores estrangeiros no Brasil, o artigo reconhece que o mapa geral dos limites da Capitania de Goiás, elaborado pelo geógrafo italiano, em 1751, é considerado pela historiogeografia como o pioneiro documento a mostrar os limites de Goiás, impactando diretamente em transformar a região em capitania em 1748. Data que pode indicar a existência de um mapa anterior atribuído oficialmente a Tosi Colombina. No confronto de ideias e documentos,

> *Quanto ao fato de ser consagrado por diversos historiadores como o primeiro mapa da Capitania de Goiás, não se pode desconsiderar o ofício do português Ângelo dos Santos Cardoso enviado ao Marquês de Pombal, em 1755, e que contradiz a versão usual. Cardoso informou ter repassado a Tosi Colombina, a pedido, cópia de seu mapa da Capitania de Goiás, cujo original havia anteriormente enviado a Alexandre de Gusmão. (Vieira Júnior et al., 2010, p. 1946).*

O percurso histórico que interliga os personagens, objeto do artigo, responsáveis pelo desenvolvimento cartográfico da região, levanta ainda dúvidas e requer confirmações referente ao seu pioneirismo, enquanto realizadores do primeiro ensaio de mapa para a região central do Brasil.

Porém, como esse não é o objetivo do artigo, ressaltamos e percebemos que a contribuição e a importância dos pesquisadores, geógrafo e cartógrafo, Ângelo dos Santos Cardoso e Francesco Tosi Colombina, vão muito além do simples fato em confirmar quem foi o 'primeiro' a cartografar a região, com a clara missão em interpretar e ocupar a paisagem central do território brasileiro. E sim pelo considerável fato em reconhecê-los como propulsores para o advento da cartografia na região e no país, contribuindo para a leitura e interpretação da geografia local e sobretudo por apresentar e consolidar a cartografia como elemento geográfico fundante e fundamental para o conhecimento, ocupação e exploração das paisagens, fomentada pelo principal método de análise espacial, a pesquisa de campo. Segue assim, indicação do infográfico geohistórico (Figura 04).

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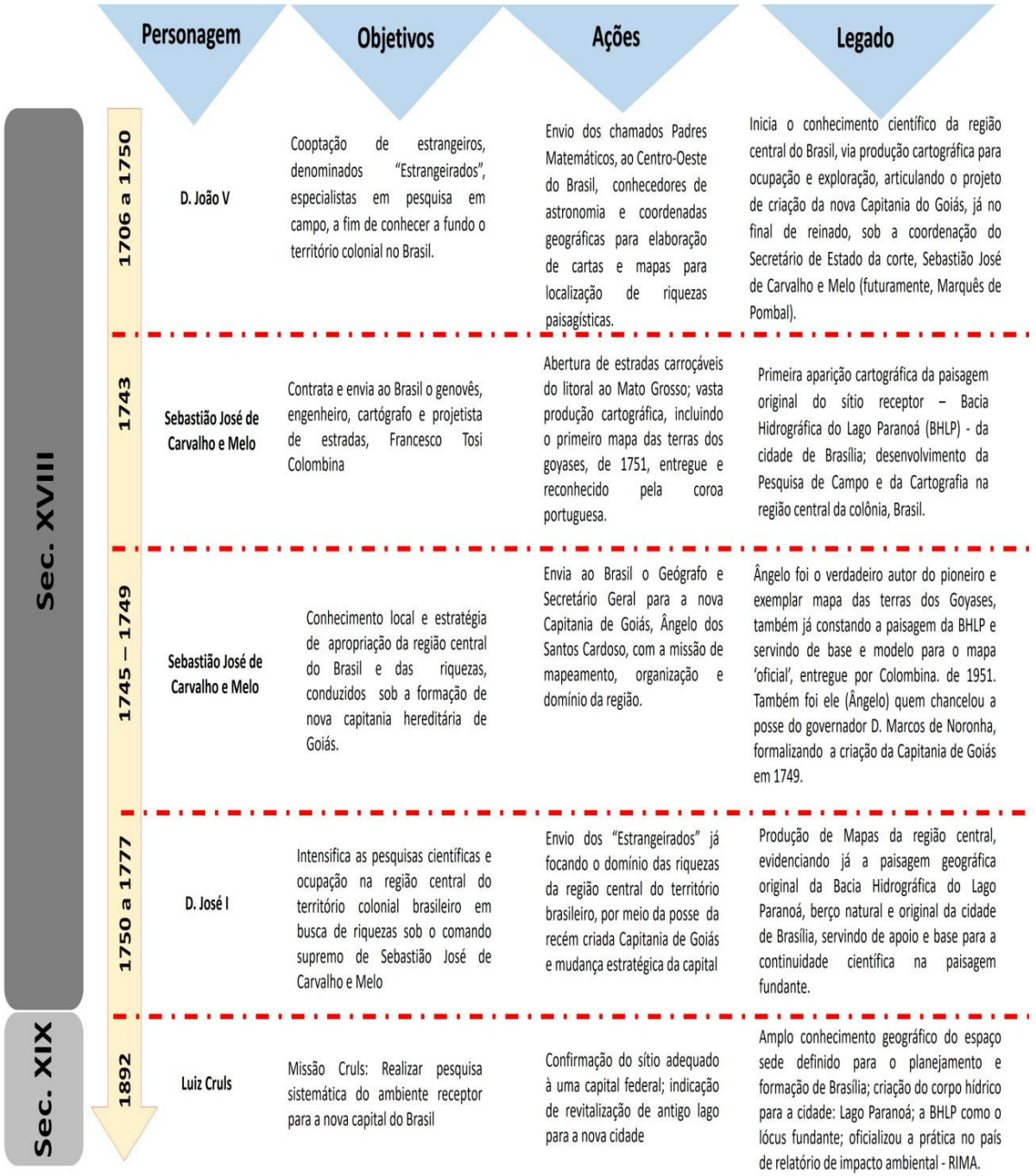

Figura 4

Infográfico Geohistórico do Espaço Sede: BHLP Paisagem Original de Brasília — Distrito Federal.

Fonte: elaboração própria.

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Fatores e razões para a possibilidade estratégica do pensamento em transferir a capital do Brasil para o interior da nação, pelo Marquês de Pombal

O Marquês de Pombal transformou-se na maior figura do império português, devido ao seu desempenho na condução da reconstrução de Lisboa, abalada por um terremoto seguido de maremoto, em 1755. A sua disposição e pronta ação o credenciou a receber a total confiança do rei D. José I, que o havia nomeado como Secretário de Estado dos Negócios Interiores do Reino, tendo a complexa missão em reconstruir a capital e reorganizar fluxos de desenvolvimentos à toda a nação.

O trabalho de recuperação da cidade e de reestruturar o império seria uma tarefa árdua, já que o ouro brasileiro minguava, devido ao desleixo e falta de cuidado com as riquezas da principal colônia portuguesa, o Brasil. Na concepção de Pombal, era necessário que a colônia superasse a casta de nobres e a existência da poderosa ordem religiosa dos jesuítas.

Para Sebastião José de Carvalho e Melo, a destruição da capital portuguesa deu a ele

> *a oportunidade de transformar Lisboa numa cidade moderna, depois de recusar imediatamente a proposta de abandonar a cidade e fundar uma nova capital, mais a norte. Menos de um ano depois, parte da cidade estava já reconstruída, embora a reconstrução total se prolongasse pelas próximas décadas. A Baixa Pombalina, com as suas linhas de edifícios e ruas em grelhas perfeitamente definidas e planeadas, é ainda hoje a maior marca da baixa lisboeta. Além disso, os novos edifícios construídos foram concebidos para aguentar futuros sismos, tornando-se os primeiros edifícios com construção antissísmica do mundo. (Calandreli II, 2015, online).*

Pela sua rapidez na reação e total dedicação à causa do Rei D. José I, que sempre o apoiara, mostrando satisfação e espanto com as capacidades do seu ministro, concede-lhe novos poderes, transformando-o em algo parecido com o que muitos definiriam, em pouco tempo, como um "ditador". Dentre as inúmeras dificuldades de Portugal, durante o período de reconstrução, destaca-se o desespero da tentativa do Marquês em querer tornar o país em uma nação dedicada às ciências mecânicas, visando avançar tecnologicamente e assim, direcionar maior aproximação aos vizinhos que já apresentavam superioridade nesse campo. Com efeito,

> *a política de dar imensos subsídios, ao longo de vinte anos para que emergisse entre a sua gente um parque manufatureiro, sofreu rotundo fracasso. Os lusos, sem demonstrar nenhuma inclinação pelas coisas da técnica — disponível entre os ingleses — estavam condenados à lavoura, à marinhagem ou ao sacerdócio, não ao mundo da ciência e dos grandes empreendimentos fabris. Esta foi a principal razão, de exclusivo motivo cultural, para a ausência lá de uma sociedade voltada às coisas do engenho tecnológico e do moderno consumo, como ocorreu nos anos seguintes no restante da Europa. Portanto, foram de menor monta os possíveis impedimentos do Tratado*

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de Methuen, assinado em 1703, que desestimulava a indústria de panos em Portugal, forçando-os a importá-los da Inglaterra (Calandreli II, 2015).

Em relação ao Brasil, a administração colonial devia ter sempre como meta a geração de riquezas para a metrópole. Esse princípio não mudou sob a administração de Pombal. O regime de monopólio comercial, por exeplo, não só se manteve como recrudesceu. Foi inclusive acentuado para se obter maior eficiência para a administração colonial.

Muitas são as razões para que a nação portuguesa olhasse com preocupação para o desconhecimento das potencialidades dos domínios coloniais da Coroa. É que tal descuido poderia acenar e representar, para outras potências de exploração colonial, desinteresse, incompetência administrativa, revelando fragilidades diversas aos concorrentes vizinhos, podendo atrair confitos de interesse, notórios combates e, consequetemente, perdas territoriais e de riquezas naturais diversas.

Vale acrescentar que, no período vigente, predominavam antagonismos e disputas, especial- mente com Espanha, ainda reflexo da divisão da América colonial, definida pelo Tratado de Tordesilhas, em 1492. Nesse contexto, a política de ocupação do território em direção às proximidades da linha imaginária de Tordesilhas eram fundamentais e estratégicas para responder aos anseios da corte. Inibir a aproximação da concorrente Espanha era o objetivo e maior preocupação, justificando a necessidade de conhecer e apropriar-se dos espaços a Oeste do território colonial, a fim de credenciá-los definitivamente como posse de Portugal.

Assim como já apresentava de forma clara a dependência dos recursos produzidos no Brasil, visto como impulsionador para os anseios do desenvolvimento de Portugal. Portanto, conhecer o ambiente natural e suas possibilidades era o desejo de primeira ordem.

É correto afirmar que foi o Marquês de Pombal quem intensificou a primeira abertura de Portugal à cultura europeia, recebendo influência tanto do Iluminismo, como da filosofia e das Letras, quando criou o grupo dos 'estrangeirados', ou seja, aqueles que se identificavam e estavam em sintonia com a nova mentalidade em busca de conhecimento, originando a nova ordem moderna no velho continente.

Antecipadamente, os monarcas portugueses perceberam a importância estratégica em buscar pela correta informação da detalhada representação das condições geográficas dos territórios pertencentes aos seus domínios. Com efeito, reconheceram que a ascensão portuguesa dependeria das riquezas extraídas de terras longínquas, ou seja, buscar "o necessário conhecimento sobre o espaço demarcado de exercício de poder, o qual pode estar integralmente sob seu efetivo controle ou conter partes que constituem objeto de seu apetite territorial" (Moraes, 2005, p. 51).

Já por volta de 1417, semelhante objetivo estratégico de dominação territorial, havia sido gizado pelo "Infante D. Henrique (1394-1460) que criou em Sagres, no sul de Portugal, e em Lagos, Nigéria, centros de coleta de informação a respeito do conhecimento náutico e centros de coleta de informação a respeito do conhecimento náutico e cartográfico" (Moraes, 2005, p. 51).

A informação exata que se exigia dos exploradores nos centros de coleta de informações,

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fez com que a ciência cartográfica evoluísse em qualidade, atingindo considerável nível de precisão, inacreditável para a época. Este avanço científico contribuiu para alavancar a série de descobrimentos e a decorrente constituição do império português. Da simples descrição dos roteiros costeiros passou-se a produzir documentos espacialmente abrangentes, de leitura e interpretação mais complexas, como as cartas de navegação e mapas.

No caso do Brasil e, particularmente da região central do país, onde se localiza o quadrante ideal e adequado para receber a capital federal os limites e as divisas territoriais representadas nos mapas, sempre seguiram os preceitos de interesses do Império lusitano na sua principal colônia nas Américas, uma vez que

> *nasceram antes da constituição do povo e tornaram-se elementos para fundar um povo.Aqui as fronteiras foram geradoras do povo brasileiro e os mapas foram importantes elementos para referendar esse processo. Dessa forma, a cartografia do território da América portuguesa pode ser considerada a certidão de batismo do povo brasileiro. Como toda certidão de batismo — que vem antes de a criança ter consciência de uma identidade e história pessoal — aqui o mapa batizou um povo e influenciou seu crescimento, forma identitária e sua territorialidade. (Silva, 2018, p. 13)*

Vale, por isso, a reflexão de que é possível compreender que, no caso específico do interior central do Brasil, a perspectiva da leitura espacial do ambiente, possibilitou a análise da paisagem através da cartografia nas preexistências de Brasília, mostrando que, do território gerado pelo mapa contribuiu para a formação identitária brasileira no centro regional da nova nação que se consolidava.

Assim sendo, percebe-se no decorrer do tempo, desde o século XVIII, que o conhecimento da paisagem local ganhara densidade empírica, com o mapeamento da região, já seguindo o fluxo científico geográfico, contribuindo, assim, para novos estudos e para a apropriação do espaço nas novas terras de Goiás. De certo modo, a cartografia produzida localmente, de intenção portuguesa, antecipou a ocupação colonial no centro do Brasil, gerando o território da Capitania de Goiás, base natural e sede da paisagem da Bacia Hidrográfica do Lago Paranoá, reconhecida na pesquisa como proeminência geográfica da paisagem original referência para assentar o projeto urbanístico moderno para a criação da nova capital.

À guisa de conclusão

Para referendar as hipóteses do artigo, é fato que alguns estudiosos do assunto afirmam que Tosi Colombina é considerado por muitos como o autor do primeiro mapa cartográfico da Capitania de Goiás. Cintra e Costa enfatizam que "não há dúvidas ter sido ele o primeiro a enxergar as vantagens de uma longa estrada, ligando as regiões mais afastadas do Oeste brasileiro até ao Porto de Santos" (Cintra & Costa, 2011, p. 5) e acrescentam ainda que "Embora seu projeto não tenha dado certo, a sua ideia e o seu mapa teriam influenciado estadistas europeus, como o Marquês de Pombal e Lord Pitt, os quais por outras razões teriam pensado na criação de um grande império sulamericano com uma capital no interior do país" (Cintra & Costa, 2011, p. 5).

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De notar que a tese apresentada sobre a influência dos estudos cartográficos da capitania de Goiás sobre "estadistas europeus, como o Marquês de Pombal", além de realçar o fato de o mapa de Tosi já indicar as nascentes do Planalto Central do Brasil, pode funcionar como um basilar indicativo de possibilidade de instalação de uma capital sob os domínios coloniais.

Mesmo com escassa literatura produzida sobre o assunto, já é de conhecimento geral que existiram outras cartas e mapas anteriores ao do genovês Tosi Colombina produzidos na região central da colônia. Dessa forma, é intenção do artigo contribuir para lançar luz sobre a participação do pesquisador português Ângelo dos Santos Cardoso, emissário da Coroa portuguesa, que teve a nobre missão de conhecer a geografia do interior brasileiro, para assim, analisar e fundar em 1749, a Capitania de Goiás, ocupando o cargo de secretário e de primeiro auxiliar do governador local.

Mesmo sendo de caráter tardio, é necessário e justo reconhecer, à luz da pesquisa, a contribuição de Santos Cardoso como personagem de relevância geohistórica para o contexto memorial de transferência da capital do Brasil para o interior brasileiro e, consequentemente, para o planejamento e formação da cidade de Brasília.

Na análise dos fatos, o artigo contempla a busca por nosso objetivo principal que é de interpretar a estratégica participação do Marquês de Pombal, já no século XVIII, por sua ligação com os cartógrafos Ângelo dos Santos Cardoso e Francesco Tosi Colombina, responsáveis diretos por pesquisarem e realizarem os primeiros mapas da Capitania de Goiás (ver anexo D), sítio que sediou a construção de Brasília há mais de 200 anos, após a inspiração estratégica da corte colonial. Reconhece-se, assim, a origem e evolução dos estudos cartográficos, como elemento científico basilar e fundamental para o conhecimento espacial e geográfico do Centro-Oeste brasileiro.

O artigo acolhe também as hipóteses apresentadas, identificando o ato estratégico político de séculos passados, conduzido pela Coroa portuguesa, na figura do Marquês de Pombal, a fim de pesquisar, conhecer e apropriar do campo do Centro-Oeste brasileiro, que resultou no fluxo inspirador para a condução do pensamento em transferir a capital brasileira para o interior. Isto contribuiu, assim, para o contexto da geohistória da criação da cidade de Brasília, ampliando seu referencial histórico-científico, enquanto totalidade espacial.

Também se confirma como verdade possível a premissa de que é necessário perceber que a cartografia desenvolvida no Centro-Oeste do país é o elemento geográfico científico responsável por iniciar na região o conhecimento real e empírico da paisagem. Introduzindo assim este pressuposto, o pioneirismo da pesquisa em campo, objeto de referência para o reconhecimento e análise local, serve de base a novas pesquisas, possibilitando após muitos anos, a implantação da moderna capital Brasília, interligando todo o país à região central do Brasil, até então de pouquíssima representatividade para a nação.

A escolha de uma linha de estudo interdisciplinar nos orientou enquanto prática metodológica, reconhecendo a importância fundamental da cartografia e da pesquisa em campo para o conhecimento geográfico,

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enquanto ferramentas de reconhecimento do espaço e das paisagens. Procurámos cumprir, de forma complementar, a análise geográfica necessária para o contexto e contribuição científica para a formação urbana da capital Brasília, hoje tombada com o referência de Patrimônio Cultural da Humanidade, por sua complexidade moderna.

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An Interview With Charles Waldheim: Landscape Urbanism Now

Meg Studer

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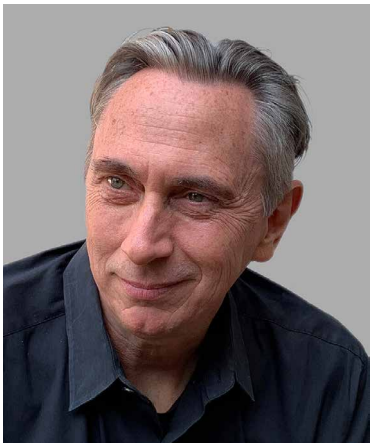
"With the birth of these new technologies and these new economic processes, one sees the birth of a sort of thinking about space that is no longer modeled on the police state of urbanization of the territory, but that extends far beyond the limits of urbanism and architecture... It was not architects, but engineers and builders of bridges, road, viaducts, railways, as well as the polytechnicians — those are the people who thought space... the technicians or engineers of the three great variables — territory, communication and speed."

— Michel Foucault, "Space, Knowledge, and Power" [1]

"Anybody wanting to grasp the originality of the era (20th century) has to consider [together]: the practice of terrorism, the concept of product design, and environmental thinking. With the first, enemy interaction was established on a post-militaristic basis; with the second; functionalism was enabled to re-connect to the world of perception; and with the third, phenomena of life and knowledge became more profoundly linked than ever before. Taken together, all three mark an acceleration in "explication." In other words: the revealing-inclusion of the background givens underlying manifest operations."

— Peter Sloterdijk, "Gas Warfare—Or the Atmoterrorist Model" [2]



Charles Waldheim

John E. Irving Professor of Landscape Architecture

Co-Director of the Master in Design Studies

The High Line, New York City. Image courtesy of Jim Corner Field Operations.

https://scenariojournal.com/strategy/the-high-line-section-1/

https://www.fieldoperations.net/home.html

Preludes and Positions

At the dawn of the 21st century, landscape urbanism draws together the infrastructural intensities of "territory, communication, and speed" and the "explicit" deployments of ecological efficiencies. Current projects —like that of Clare Lyster, Alan Berger, Pierre Belanger, Keller Easterling, Infranet Lab, and RVTR — elaborate on the divergence of information flows and production chains [3]. Their analysis —of resource/waste webs, the spatial dross of consumption sites, and hybridized highway proposals —asks how, where, and what forms of aggregate agency and intervention might be grounded in today's urban logistics.

At the same time, the research of those in geography and the social sciences, such as John May and Ulrich Beck, explores how the tools and techniques of environmental planning— satellite/Landstat infrared imaging, serial and statistical simulations —have evolved out of the atomic arms race and military models of risk [4]. Their excavation of MERC origins asks how our construction of ecology and

https://www.rvtr.com/

https://landsat.gsfc.nasa.gov/

environment, as epistemological and material formations, can balance social intimacy, economic development, and a bio-political potential for annihilation. Focused more widely than on "landscape" or "urbanism" specifically, landscape urbanist research has staked out these recent and broader spatial concerns for its discourse of design.

Throughout this period, Charles Waldheim has been a strong advocate for landscape urbanism. The current chair of landscape architecture at the Graduate School of Design (GSD) at Harvard and former dean at the University of Toronto, Charles' Landscape Urbanism Reader (2006) was instrumental in the articulation and promotion of the approach through the voices of practitioners [5]. Since then, his own articles and his advisory role on the GSD's New Geographies Series (with Bruno Latour, Antoine Picon, and others) have engaged the adjacent fields of history of science, political and economic geography, sociology, and architecture in this complex spatial research. Thus, between discourse and deployments, Charles' guidance and support has contributed to the emergence of landscape urbanism as a platform and "glocal" manifestation from which to query the territorial intensities, socio-economic flows, and environmental entanglements of globalized, capitalist governance and development.

https://www.gsd.harvard.edu/

https://www.daniels.utoronto.ca/

I sat down with Charles to discuss how current events, in politics and economics, were inflecting and resonating with landscape urbanism's operative models of environment and urbanism.

Megan Studer: I'd like to start by looking at the state of landscape urbanism today and how it differs from its initial formulations. A lot has happened—predatory real-estate and international high finance have mutually imploded, austerity has stalled and slowed the flow of resources and commodities, governments in general have been unable or unwilling to be the consumers of last resort (Keynes), and so on. How do you think the recession has refined the focus, alliances, and goals (if there are goals) for landscape urbanism and its relationship to capitalist development?

Charles Waldheim: Embedded in the origins of landscape urbanism is this idea that it applies or has relevance in places that are growing rapidly, but also in places that are shrinking rapidly. From its origins landscape urbanism has been a response to structural economic conditions, and while it's true that the context for urbanization is very different now than it was in 1996 or 2006, the basic structural conditions haven't really changed. I would argue that, in spite of the economic crisis, we still have the same global system—in a different phase. Because landscape urbanism sought to deal with both shrinkage and growth, it aspires to offer a response to the economic dynamics of the last forty years and to the embedded or structural crises of advanced or late capitalism.

MS: From 2008 on, the bandwidth (less lending, collapse of the credit market, and general poor conditions for speculation on top of the strain on public resources due to loss of tax-base and increased spending on unemployment, etc.) has shrunk for the extremes of accelerated growth and speculative developments of western real-estate finance. Can you think of particular projects or research initiatives that deal with that narrowing of bandwidth in general?

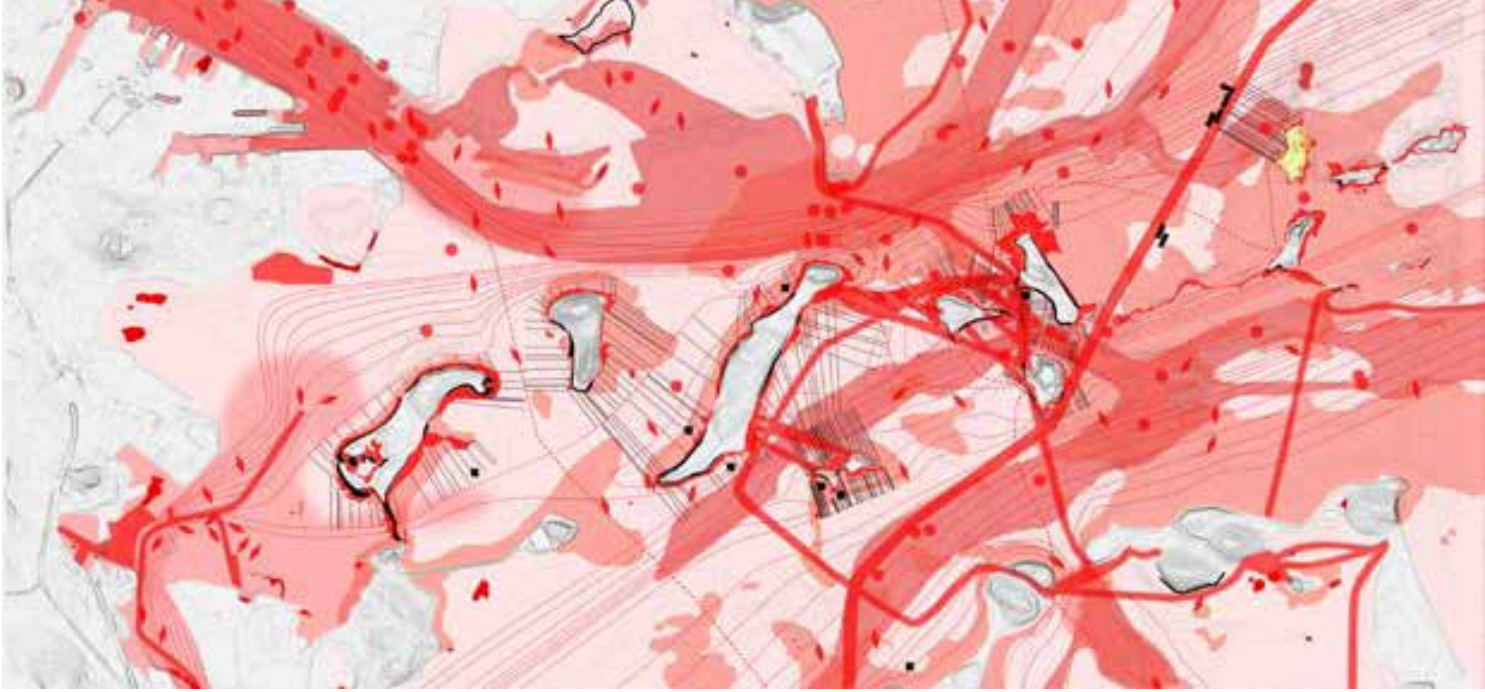
CW: I'd say projects or case studies in landscape urbanism are continuing apace, albeit modulated by economic conditions. Let's look at New York or Toronto as examples. Park building, and the idea of park building, as a centerpiece of urbanism is continuing as a centerpiece; its aspirations are maintained. But it's true that the driver of urban development has changed its tempo. I think it's a cyclical as opposed to a structural change. On the other hand, there may be a third issue at stake: we've talked about shrinkage; we've talked about growth. But the "informal"—the

informal economy or the informal sector—has received increasing traction in recent years. In the original manuscript of the Landscape Urbanism Reader, we proposed a section of the book that dealt with the informal city, but it was deemed too far ahead of our audience to be viable. Today, we can say that the informal is clearly a topic that has grown in relevance and deserves further attention.

MS: Spain is a great example of stable economies showing their cracks. Spain was both a functional member of the EU that we understand now was surviving on debt (much like Greece) and has always had a very active informal, tiered economy. Within architecture and landscape, Keller Easterling's writings ("Tomato World" within Enduring Innocence) have explored how the Spanish market's attempt to take advantage of ideal solar exposure, to catalyze Mediterranean trade and intensive agriculture, amplified the underlying social structures of irregular development—triggering informal work, massive (illegal) migrant labor, and even informal settlement, i.e. exaggerated strains of "under" development.

Now, given the recession, what was formerly buried in Keller's acute examples of error or systemic exacerbation is seen on the surface of European economic structures and normative development. Is the LU's interest in the "informal" driven by using it as an index of emergent (capitalist) use of externalities, secondary ecological flows, and resource manipulation, i.e. a key to the cracks and limits in those systems or some other relay between ecological efficiency and the aggregate "masses"?

CW: To the extent that landscape urbanism is a set of practices, then it is not connected to one particular culture or geography. It is available to various contexts and, if urbanism is the expression in space of relationships of capital or power, then any shift in the relationship of the structure of capital or power will impact urbanism. That said, I think that landscape urbanism continues to be of value because of its unique ability to reconcile contemporary economic systems with the underlying ecological conditions in which urbanism is situated.



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underworld/

Underworld, networked corridors in Boston, project by Allison Dailey, Harvard GSD student.

From its origins, landscape urbanism aspires to build an understanding of urbanism in which the ecological forces and flows that support urbanism are considered as part of the city as opposed to external to it.

MS: There are a lot of things that have been at the edge of the landscape urbanism research agenda. Some examples that come to mind are the Canadian oil sands mining; the logistic maneuvers of the Arab spring, like the Suez canal strikes and their impact on US/Chinese trade-routes or US/Middle East trade-routes; and the tsunami/nuclear crisis in Japan, including their single-stream, modernism approach to fail-safe mechanisms.

So, there's been a lot of topical and timely interest in energy ecologies and energy resource management. So many of these have been showing up in the news and yet I'm not sure that I'd say they belong within an "urbanism" category. As someone involved in and supportive of this research, what sort of descriptor might you give these operational tactics, strategic strikes, or incidents in energy management?

CW: I think that one of the more interesting areas for research for landscape urbanism today is the question of energy, resource extraction, production, and flows in relationship to urbanism. From its origins, landscape urbanism aspires to build an understanding of urbanism in which the ecological forces and flows that support urbanism are considered as part of the city as opposed to external to it. This offers a response to and critique of older models of urbanism in which the city is distinct from the countryside or the continent. Often, in those old models, energy, as well as water and food and other sustenance, are viewed as externalities to the city problem, which made the city vulnerable. If landscape urbanism wants to reframe that model and place urbanism in relationship to those flows, it makes sense that there's been quite a lot of interest in energy in schools of design and current discourse, finding ways to think about energy production in relationship to urbanism. Our challenge is to find models in which both the questions of sustainability and the renewability of energy sources can be explored, while also looking to reform and improve the global systems of production and distribution.

The prospect of finding renewable resources of energy and their impact on the city is one of the most interesting lines of work today. This past summer, the Bauhaus Institute in Dessau organized a summer school focused on the question of energy landscapes, and in many schools of design, GSD included, we're looking at studios and research projects

about renewable energy and technologies, but also thinking about energy more akin to agriculture—it is both renewable, locally sourced, and embedded in our cities as opposed to external to them. I think the topic of renewability does a couple of interesting things: Unlike our current dependence on vast reserves of coal or our global system of oil production, refinement, and distribution, renewable energy sources have a series of local impacts, a very different logic at many levels in terms of their production and distribution.

For example, wind and solar and hydroelectric based energy production: While they can be thought of as large mono-functional engineering systems, they can be thought about instead as distributed, embedded, highly localized conditions where each house or each block or each urban system are essentially both producing and consuming and feeding a larger system of supply and demand—which is a very different logic than the logic of consumption at the heart of our cities today. And if that research and practice continues, at the rate that it has, I think we'll be seeing a very interesting approach to urbanism than the current consumption system that is externally extracted, refined and pumped in, where the entrained energy, waste implications, and carbon implications are viewed as external to the city.

MS: In many ways there's an echo of that in Geddes' valley section and how MacKaye develops that profile for Western Massachusetts in the use of lumber, timbering, and water power from the valley to Boston itself. [See Benton MacKaye, "The New Exploration: Charting the Industrial Wilderness," in Survey Graphic 7 (May 1925: 153-157), reprinted

in Planning the Fourth Migration, ed. Carl Sussman. (Cambridge: MIT Press, 1976)] **How do you think that those shifts toward a more decentralized and localized energy economy will tie into the logistics that have developed through the divergence of industrial production and information production? For example, if we have more localized energy production, what types of formal echoes might appear in other consumption trends and values?**

CW: I think it's a really interesting question, especially if we include agriculture and sustainable food practices in landscape urbanism conversations. The model many are looking at in terms of both energy and food production is one in which renewability and sustainability are the goal. One of the implications is that latitude matters in a way that it hasn't for the fossil fuel economy—for example, the north of Africa has enormous solar potential, as does the south of the US; at the same time, the North Sea and Massachusetts have a lot of wind—the latitudinal and geographic distinctions, among many others, enable the production of energy locally and will have an effect on patterns of urbanization.

Your reference to MacKaye and Geddes is apt and has relevance for landscape urbanism: Landscape urbanism is both a continuation of and dependent on the legacy of regionally informed planning practice, but it is distinct from the genealogy in a couple of ways. The genealogy of Geddes, MacKaye, and even McHarg, and other Anglo-Scottish, regionally-informed planning practitioners, produced a world view that has been quite important to the formation of landscape architecture, landscape planning, and landscape urbanism.

Where we differ is that they tended to be too invested in geological determinism; that is, either through empirical observation or by way of an evangelical zeal, urbanism was meant to be an expression of geological determinants, in the moralizing sense of McHarg used it. I think those lines of regional planning overstated the centrality of production and distribution of material resources, and they missed entirely the rise of consumption. And I think it's like other forms of modernist planning in the west, where they thought

urbanization would be largely driven by arable land, water resources, and certain resources predisposed to support urban populations, and [instead] patterns of urbanization are led by patterns of consumption and lifestyle. So, that is the important distinction where geology matters and geography matters, but they're not ultimately determinant in the sense that many modernists hoped they

MS: They also take production to be consumption, shortening transit to the closest available market and expecting stable production cycles. They miss out on the nuances of fiscal capital (futures, speculation on supply and demand) as well as the different "speeds" and revised distances of multi-modal modernity. That or they take them as a negative. They miss tarrying (to play with, to mess about, to plumb their variables through experiment and observation) with them as a system that's in place.

CW: I find much of the cultural disposition of landscape architecture, in its western origins, in Europe and North America; presume geological determinism as a default condition or as a desirable condition. I have enormous respect for the work of Geddes, MacKaye, and especially McHarg, particularly his desire to articulate ecology in service of planning. But unlike McHarg, our condition today is that while we have an abundance of ecological and scientific knowledge to inform planning, we seem to lack the political and economic models to plan our cities with that knowledge. McHarg and many of his modernist colleagues missed the rise of consumer markets, the political backlash against top-down planning, and the decentralization of decisions about urbanization.

Streamlines
by Stoss LU.

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Unlike our current dependence on vast reserves of coal or our global system of oil production, refinement, and distribution, renewable energy sources have a series of local impacts, a very different logic at many levels in terms of their production and distribution.

MS: Well, let me weave back a bit to the German context. They have been incredibly forward thinking and progressive on sustainability, but they've also been heavily state-subsidized. How do you see that model transferring to the privatized Anglo-American context?

CW: Landscape urbanism in America was stimulated in part by interest in brownfield sites, declines in industry, abandoned territory, and, in my own work, in places like Detroit and trying to come up with a model that could account for its de-development. We were really pleased that the Graham Foundation for Advanced Studies in the Fine Arts, in Chicago, funded that research on Detroit, but it was a tiny privately financed philanthropic undertaking. It was only when the German federal government and Cultural Ministry funded Shrinking Cities from a very high level that it began to have more traction as a research topic and a potential site of praxis.

http://www.grahamfoundation.org/

The topic was always there, but the availability of this information, its dissemination, and the perception of its utility was changed dramatically by this funding and sponsorship. I think that one of the reasons the Germans took it up so explicitly was its applicability to issues and relevant challenges they were facing (East German de-densification).

MS: So instead of seeing the state as directly funding projects, it's the discursive contribution. You can court anyone, anywhere, as long as they can understand the conceptual contributions made by these various lines of research and researchers?

CW: Well, there is a distinction to be made between research, the production of knowledge, and the making of projects. They're not the same thing, but they inform one another. And it's true that in the North American context, urbanization—its deterioration and shrinking population and moments of explosive growth—the dominant drivers tend to be private actors. I think it has been that way for a very long time and I don't see it changing anytime soon. And so when you look at the exemplars of abandonment and decay—cities like Detroit—what you see are a series of private decisions being made that aggregate spatially. In that space, the public sectors and the universities have an important role to play. Having said that, I think private capital and private housing are likely to continue to be the dominant forces in growing cities. Look at the recent landscape urbanist projects in New York and Toronto for example. They tend to depend on robust population growth and demand for housing and upon fairly well developed capital markets; and they tend to be a combination of private development, brownfield remediation, and some form of political leadership.

MS: So how do you see landscape urbanism working in something like a Chinese context [of centralized governance and massive state funding for development], as opposed to the aggregate and distributed agency found within growing US and European contexts?

CW: I would say that much of the North American work has been at the scale of the remediation project—not quite a district scale—and this gives a certain size and scale to the typology. The scale and pace of urbanization in China is obviously very different, and it's not surprising given the number of the cities that they're building that they

have some of the most interesting large scale experiments in landscape urbanism, for instance, the recent landscape urbanist projects in Shenzhen. But I think outside Shenzhen, across China there are many interesting examples of attempts to develop a model of urbanism in which ecological function and health can be embedded in or more integrated within the shape of the city, in spite of the enormous environmental, human rights, and political challenges that they continue to face.

MS: Okay; instead of steering towards resource conflict and scarcity which are the drivers behind many of the flows we see today, let's move towards the scalar importance of landscape urbanism as a systematic practice, and how you see that relating to the current architectural interest in alternate units/scales of "environmental" development. Are there scales, particular materialities, or particular quantities or qualities you see each of these disciplines addressing?

CW: Over the long view, most innovations or paradigm shifts within urbanism tend to address a set of questions, a set of scales, a set of tools or methods particular to the place that they are responding to and, as a result, often end up working at very different scales.

So the origins of landscape urbanism, in landscape planning in the 1920s—coming out of regional planning, coming out of landscape architecture—led to questioning which scale is operative. Look at planning today as it operates in the context of China, at the particular scale where it seeks to be broadly synthetic and more inclusive. Urban design, as opposed to planning, as it emerged in the 1950s and 1960s here at Harvard, emerged to deal with the large project or the singular institution and its growth in the context of urban fabric. The European city under post-war reconstruction was one of its central topics, and so urban design and planning are different scales.

Landscape urbanism starts with a formal analysis that is informed by the regional history of ecological planning, analyzing the scale of the watershed, and the particular scale of the ecological system. However, the scale of intervention is different, and this is where landscape urbanism differs from regional landscape planning. So, while landscape urbanism studies the region or the valley section or the watershed, it takes that knowledge and applies it at the scale of the large building project—its sites of intervention. These tend to be the sites that are available in economic and industrial transformation—which in the North American and European context tend to be sites that are smaller than the city, but at their largest can become a district.

This speaks to landscape urbanism's interest in ecological drivers, in the context of our current economic structure. And our economic structure tends not to produce comprehensive planning. All differences aside, this is a generalization—especially in North American and European contexts where urbanization tends to be planned and regulated to some level—but [landscape urbanism] is really project-driven, and therefore tends to occupy and develop sites that become available through an economic transition from industrial to post-industrial. And that can be slightly confusing at times, given the heritage of regional planning and study of regional ecology—but intervening in the system need not occur at the scale of the entire system or the entire city.

MS: And how would you differentiate an infrastructural urbanism from landscape urbanism? Do you see them as parallel?

CW: In the course of the last fifteen years, landscape urbanism has come to be relevant in a number of different contexts. I think it has become clear now that it is a body of practice, a set of strategies for doing work, and a way of thinking. Ecological urbanism is best understood as both a continuation of landscape urbanism's aspirations as well as a critique of its dependence upon landscape and all the baggage that it brings. It would be fair to say that ecological urbanism aspires to a broader conceptual approach to a range of questions about the city from sustainability through architecture and design at various scales. I think what we have now is emerging through the umbrella of ecological urbanism which extends from the olfactory sensations and sense of the city to an understanding of energy and ecological flows. A broad theoretical framework for thinking about the city as an ecological construct and concept; and within that, landscape urbanism is a maturing body of practice that's available to put into use. Ecological urbanism is a logical extension of landscape urbanism; it is the same project, rendered through more precise terms. A part of what ecological urbanism does is expand the palette of precedents beyond landscape architecture to embrace the phenomenological and experiential sense of the city all the way to sustainability at the scale of architecture.

Meg Studer is a designer, researcher, and visualization dilettante (see Siteations) whose work focuses on two strains of infrastructural thought. One, the territorial traces and impacts of post-war communications arrays and two, the operation and maintenance "ecologies" underlying seemingly static public works. In the forthcoming Third Coast Atlas, her data-driven mappings of Robert Smithson's Concrete Pour, "Collapsing Divides," draw out the productive agency of Smithson's entropic materiality and its engagement with McLuhan's theories of "electric immersion." Her excavation of road salt procurement logistics, "NaCl:Operations Enabling Erasure" was recently displayed at Columbia University's Studio-X in New York and featured on BLDGBLOG and Edible Geographies. (A version of the is project is forthcoming on this site). Current projects include exploring Walter di Maria's engagement of atomic test sites, satellite imaging, and nascent petrol politics in the 3 Continent series (abandoned, 1969-71) and the on-going spatial overlays, energy implications, and secondary resource strains of Pennsylvania's competition between natural gas fracturing/refining and long-wall seam mining.

Trained in architectural histories and theories, modern art criticism, and landscape architecture and regional planning, Meg holds master's degrees from the Architectural Association in London and Columbia University, as well as a master's of landscape architecture from the University of Pennsylvania. She is currently an associate at Stoss Landscape Urbanism, where she co-leads animation, research, and production teams on projects as diverse as planning Detroit shrinkage to designing Flanders interpretive routes.

Charles Waldheim is the John E. Irving Professor of Landscape Architecture and Chair of the Department of Landscape Architecture at Harvard University's Graduate School of Design. His teaching and research examine the relationships between landscape and contemporary urbanism. Read his complete bio here.

https://www.siteations.com/

https://www.gsd.harvard.edu/landscape-architecture/

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https://www.aaschool.ac.uk/

https://www.columbia.edu/

https://www.upenn.edu/

Notes

Note [1]: Interview with Paul Rabinow, translated by Christian Hubert, "Space, Knowledge, Power" originally appeared in *Skyline*, March 1982 and was reprinted in the Foucault Reader, ed. Paul Rabinow. (New York: Random House, 1984) 244.

Note [2]: Part of his larger "Spharen" research project, Peter Sloterdijk's text, *Terror from the Air*, was originally published as *Luftbeben* (Frankfurt: Editions Suhrkamp, 2002). This section of the introduction is from its translation, by Amy Patton and Steve Corcoran, *Terror from the Air* (Los Angeles: Semiotext, 2009) 9.

Note [3]: Articles under Charles Waldheim's editorial or advisory purview (not a complete bibliography):

Clare Lyster, "Landscapes of Exchange," in *Landscape Urbanism Reader*, ed. Charles Waldheim. (New York: Princeton Arch. Press, 2006) 219-238.

Alan Berger, "Drosscape," in Landscape Urbanism Reader, ed. Charles Waldheim. (New York: Princeton Arch. Press, 2006) 197-218.

Charles Waldheim and Alan Berger, "Logistics Landscape," in *Landscape Journal*, vol. 27, no. 2 (Fall 2008): 219-246.

Pierre Belanger, "Synthetic Surfaces," in *Landscape Urbanism Reader*, ed. Charles Waldheim. (New York: Princeton Arch. Press, 2006) 239-266.

Pierre Belanger, "Power Perestroika." in *New Geographies 2: Landscapes of Energy*, ed. Rania Ghosen. (Hong Kong: Harvard/Regal Printing, 2009) 119-124.

Keller Esterling, "Cable." in *New Geographies 1: After Zero*, ed. Stephen Ramos and Neyran Turan. (Hong Kong: Harvard/Regal Printing, 2009) 62-78.

(Infranet Lab) Lola Sheppard and Mason White, "Meltdown" in *New Geographies 1: After Zero*, ed. Stephen Ramos and Neyran Turan. (Hong Kong: Harvard/Regal Printing, 2009) 130-137.

Charles Waldheim, "Urbanism After Form" in *Pamphlet Architecture 30: Coupling*, eds. (Infranet Lab) Neeraj Bhatia, Maya Przybylski, Lola Sheppard and Mason White. (New York: Princeton Arch. Press, 2011) 4-5.

(RVTR) Geoffery Thuen and Kathy Velikov, "Conduit Urbanism" in *New Geographies 2: Landscapes of Energy*, ed. Rania Ghosen. (Hong Kong: Harvard/Regal Printing, 2009) 83-96.

Note [4]: All articles under Charles Waldheim's editorial or advisory purview

(not a complete bibliography, especially givens Beck's formulation of Risk Society originated in the 1980s):

John May, "The Becoming Energetic of Landscape," in *New Geographies 2: Landscapes of Energy*, ed. Rania Ghosen. (Hong Kong: Harvard/Regal Printing, 2009) 23-32.

Ulrich Beck, "Rick Society's Cosmopolitan Moment," in *New Geographies 1: After Zero*, eds. Stephen Ramos and Neyran Turan. (Hong Kong: Harvard/Regal Printing, 2009) 24-25.

Note [5]**:** Charles Waldheim, ed., *Landscape Urbanism Reader* (New York: Princeton Arch. Press, 2006) 219-238.

Roundtable discussion: progress of urban informatics in urban planning

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Abstract

With the rapid development of computer technology, urban informatics, as a new discipline in the field of urban planning, has gradually attracted academic attention. The rise of urban informatics puts new pressures on urban planning, but it also provides a new perspective of analysis. This paper is a summary of a panel discussion among scholars in urban informatics held at the 2020 International Association for China Planning (IACP).In this context, the panel outlines the definition of urban informatics, and the difference between urban informatics and urban analytic and computing, and found that urban informatics pays more attention to end user. This indicates that urban informatics has been more than a supporting role in urban planning or design, and is increasingly integrated with urban planning. The panel also discusses the connotation of urban informatics and its wide application in practice, and illustrates with examples. At the same time, the

https://doi.org/10.1007/s44243-023-00014-x

team identifies the difficulties of its development mainly reflected in the two aspects of resources and talents, and the learners of urban planning discipline have natural advantage in learning urban informatics. Finally, the panel discusses how to improve teaching, and concludes that the promotion of good cases, discipline integration, training data thinking rather than focusing too much on methods and other concepts.

All in all, this panel's report contributes to the wider discussion about the role of urban informatics plays in urban planning.

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Introduction

The discussion of definitions and roles of urban informatics is important (Biloria, 2018). In the field of computer science, information science consists of information system and information technology, including information recording, calculation, analysis, storage and retrieval (Mikhailov, et al., 1967). The application of information science in urban planning has a long history (Pan et al., 2020), and there are a lot of practices of using urban information to develop research. Urban information can be categorized into urban governance, community life, industry and public service (Yifan and Xiaoqing, 2020).

There is no unified definition of urban informatics, some scholars viewed it as "the seamless transition between visible and intangible infrastructure" (Foth, 2011), or an extension of the "big data" (Schintler, 2017), and other scholars thought that the field is "the information technology application in urban areas" (Thakuriah et al., 2017). Chinese scholars proposed that informatization can form a high-quality driving system of the city, and the smooth flow of logistics, resource, and human between the functional nodes of the cities; optimize and improve the allocation of environmental resources and public services such as transportation and employment. This will give the city more flexibility in space and elements, and enhance the city's overall carrying capacity. Most of the existing literature on urban informatics focus on urban computing, computer science and technology, and then explore, describe, predict, and explain city phenomena to a certain extent. Kontokosta (2018) describes urban informatics as the study through a data science framework of urban sensing, data mining, modeling (and analysis), and visualization in order to understand the phenomena while advancing solving urban problems in specific domains with computational science methods. Some scholars believe that urban informatics is the extension of some technologies, and do not consider it as a whole with more technologies.

To this end, a panel at the 2020 International Association for China Planning (IACP) meeting convened to interrogate issues in urban informatics. To guide the panel, we posed a few core questions that help to structure an inquiry into the structure and the future of urban informatics:

> *1. In the information explosive era, city research is inevitably utilizing the contents and methods of informatics. In this context, what's your definition of urban informatics?*
>
> *2. What role could, or should, urban visualization and informatics play in the creation of new urban knowledge? Traditional urban informatics plays a supporting role in urban planning. Now it has richer content. What's the role of urban informatics play in current urban planning in your opinion?*
>
> *3. Regarding the contents of urban informatics: Urban Sensing. Data visualization, Urban big data and CIM, could you choose one or two aspects to discuss the status, opportunity, challenge and relationship with urban planning?*
>
> *4. In what areas of urban research are attempts at urban visualization and informatics most likely to succeed and be the most impactful?*

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5. How should urban visualization and informatics be incorporated into the urban planning and design? What institutional changes should be made to improve the research of urban visualization and informatics?

6. What forms of education and training are needed to make students aware of urban visualization and informatics issues?

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In the information explosive era, city research is inevitably utilizing the contents and methods of informatics. In this context, what's your definition of urban informatics?

Xinyue Ye: It is necessary to give a definition of informatics first. Traditionally, informatics consists of information system and information technology in the field of computer science. It includes data, modeling, calculation, visualization, decision-making system, optimization, etc.. Informatics is a relatively comprehensive system that summarizes data collection, data simulation and visualization, and integration with hardware. Over the past ten years, urban informatics has gradually emerged due to a deeper understanding of people, and we can understand the interaction between people and the environment better, especially the built environment. With urban informatics, we can better understand how cities operate in the above-mentioned technological cluster, and better facilitate cities to achieve sustainable development.

In addition, the definition of urban informatics varies due to the different understandings of different disciplines. Scholars majoring in computer science pay more attention to the understanding of data, while urban planners pay more attention to the application of knowledge, such as scholars at Texas A&M University using new knowledge to guide communities in how to deal with disasters and improve their operational capabilities.

Xiaoru Yuan: In terms of intuition, urban informatics and bio informatics have some similarities. It has never been data-driven or data-centric, and now more data-driven forms are slowly appearing. Bio informatics can be extended to solve biological problems, bring related applications and corresponding technologies. By analogy, urban informatics may also have a similar definition. Not only urban planning domain but also many traditional majors are becoming more incorporated with informatics.

I strongly agree with the view that urban informatics pays great attention to the end user, and emphasizing users distinguishes urban informatics from other definitions of computer science or social science.

Wenwen Zhang: Many scholars in the field of computer science are also engaged in urban analysis and related studies. Then what are the advantages of urban planning scholars who want to conduct urban informatics research in their disciplines? I think we should pay attention to public end-users. As urban planners, we should utilize planning knowledge to promote policy making and public fairness. Taking a project as an example, the computer science scholars I worked with were willing to optimize the division of school districts by developing an optimization model. However, dividing school district in the United States is affected by social and political factors. These aspects are beyond the consideration of people who have never studied urban planning.

Therefore, in the field of urban informatics we should focus on the following aspects: policy making, powerful machine learning and advanced mathematical models, data security and the bias from the model results.

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Chenghe Guan: Urban informatics should be explained more deeply under the existing definition. It includes three aspects of participants, place, and technology in urban informatics.

First of all, participants can be explained by stakeholders in urban informatics Participants include not only individual, but also different institutions or industries. In addition, a single participant or person can assume multiple roles. Therefore, this is a fundamental and new interpretation of people in the city, which considers the existence of multiple dimensions in a more understandable way.

Secondly, place emphasizes spatiality. In the context of urban informatics, the built environment and the natural environment are more accurate, and the two are connected to each other without clear boundaries.

The third is technology. The essential change is not the technology itself. Urban technology and the city as an organic structure follows multiple urban spatial laws. We should merge the technological change with the essence of urban systems. For example, many scholars engaged in computational analysis and urban science have been working on the new urban order induced by innovative technology. If we sort these out clearly, we will be able to understand urban informatics better.

Fan Zhang: Compared with the concepts of Urban Data Mining and Urban Computing, urban informatics covers a wider range and emphasizes the contents of urban information, urban data infrastructure, data acquisition, data platform construction, data-driven intelligent decision-making, implementation, and evaluation. Urban informatics can be defined relative to geo-informatics and traditional urban studies. So on the one hand, compared with geo-informatics, urban informatics focuses not only on static physical spaces, but also on dynamic spatial interactions, understanding of time processes, social relations in social spaces, and virtual cyberspace containing social media behavior, etc. It also includes a more important interactive mechanism between urban physical space and social media space, such as how epidemic information and even rumors affect people's travel behaviors. On the other hand, the definition of urban informatics is relative to urban study. Urban informatics not only pays attention to urban issues, but also pays more attention to intelligent policy making, and refined evaluation of policy effectiveness.

Ying Long: Urban informatics has different meanings in different times. A lot of information and technology have profoundly changed individuals, society, space, and the operation of cities. Therefore, in the past years, in addition to urban study and planning and design supportive work, our laboratory also paid attention to the emergence of "new cities". I believe this is very important in terms of methodology, technology or engineering, and it will also have a profound impact on the entire society and the city, and even reshape or redefine it.

We can understand urban informatics from two aspects. One is to use information to understand traditional city, and the other is how to learn the changed city. Through investigation, we found that each industrial revolution has profoundly changed the city. In fact, data analysis and data visualization are just two aspects of this transmission, I urge everyone to attach importance to whether it is possible to study new cities.

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Chao Liu: Many literature believe that urban informatics is a seamless transition between visible and invisible infrastructure in cities, or the extension of big data, or the application of information technology to urban areas. I think these kinds of understanding are too narrow. Urban informatics should not only include data technology, but also include responses from urban planning and management.

My preliminary conclusion is that it can be regarded as a discipline that uses a comprehensive method to perceive the city in information perspective, collect and process data information, and use the data information to conduct study and practice on planning issues. Urban informatics can be divided into 4 directions: urban sensing, urban big data, City information modeling (CIM), and urban data visualization. In the future, more directions may be included along with the development of urban planning discipline and information technology.

What role could, or should, urban visualization and informatics play in the creation of new urban knowledge? Traditional urban informatics plays a supporting role in urban planning. Now it has richer content. What's the role of urban informatics play in current urban planning in your opinion?

Fan Zhang: Regarding the role of urban informatics in the creation of urban knowledge, I think that the massive urban data and new data mining methods are opening up possibilities to deeply understand cities. For example, in the process of observing the expansion and growth of different cities, although the geographical and population conditions of the cities are not consistent, there are some universal laws, such as the sub-linear relationship between urban population growth and infrastructure, super-linear relationship between urban population growth with economy or technology, etc. As the data we obtain becomes increasingly richer in time and space, we have the opportunity to discover the consistent laws at different scales, and to verify some hypotheses about city understanding derived from physics, ecology and other complex sciences, and form new knowledge. It is the contribution of urban informatics to the creation of new knowledge in urban theory, helping us understand cities better.

In practice, also the level of contribution to urban planning, urban informatics put particular emphasis on the construction of data infrastructure, that is, to actively and customizedly collect the needs of the city and residents through the construction of data collection platform, and assist in planning and places-making. At MIT Senseable City Lab, we developed a project in cooperation with the Paris bus system in recent years, which is to observe how Paris residents use the curb, and the types of activities in this area by installing cameras on buses. We use computer vision to identify and classify, and conduct spatio-temporal analysis of streets with Paris's bus network. This is one aspect of it. It is through active data collection and customized data platform to assist planning and design.

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Chenghe Guan: I'd like to talk about one of the three most basic domains just mentioned, which are participants or stakeholders. We should not treat 600 million people living in rural or non-urban areas in China as individuals, but as families or collectives and communities with inherent social structures. Correspondingly, due to the typology of the built environment, the idea of digital urban platform and pre-cast construction are easier to achieve in townships and villages, comparing that in the larger cities. We can learn how to use urban big data to know when people in villages need to change their living environment, or when their family structure changes. It is a comprehensive system to effectively solve their long-term lifestyle problems, for example, through a data platform, rather than simply providing them with what they need at the moment.

If we use this urban data platform in other countries, such as using collected data to observe park activities, stakeholders will become park users of the urban land system. It is difficult for everyone to tell whether they are park users or not, and we always face the challenge of incompleteness of data collection. Taking a step back, there will always be a bottleneck when we obtain data. These bottlenecks make the city operation not efficient even if urban information is available. The biggest barrier is that city information cannot be communicated and exchanged. When our research results are combined with the results of others, we may find that we need to recalculate the model. Therefore, if it can be unified, big data can then be truly applied to cities.

Wenwen Zhang: At present, the most commonly used theory in transportation planning is the application of machine learning to improve the prediction accuracy of existing models, interpret able machine learning to identify the impact of nonlinear relationships on transportation demand, and agent-based simulations to predict the impact of traffic technologies that have not been widely used on future cities, and to solve the research barriers due to the lack of user preference data. I think another contribution of big data and urban informatics is to make some national-scale models which can be better developed. The previous data was more fragmented, but now comparable models between cities can be established, such as Google Street View.

For data visualization, I think there are two main aspects of applications. On the one hand, it can effectively communicate with the public using the visualizing results during public participation, so that they can agree with your model and support your planning decisions. On the other hand, for researchers, data visualization can make the black-box model more effective.

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Xiaoru Yuan: Visualization is not limited to conveying information, it will have many different functions. For example, it can help making decision, especially if the model is still iterating, optimizing, or there is no complete analytical expression in mathematics. In this case, visualization can extend our brains and hands, and can powerfully expand people's cognitive and analytical capabilities. In addition, from the perspective of public understanding and communication, the public needs to associate with the data or the information behind it directly, and establish a corresponding feedback mechanism so that the public can participate in. It requires us to have good methods and media, and to add some points that may be missed from a single perspective.

There is still a considerable gap between the backgrounds of urban planning and computer science researchers in study and practice. Replying on personal efforts is not sufficient, and there needs to construct a collaborative mechanisms. How to promote the in-depth interdisciplinary studies to output giant influences and practical guidance is a research question.

Xinyue Ye: We have conducted research and practice on urban visualization from three aspects. The first is to challenge the computing limits. We built a system to observe the mobility anywhere in the city without worrying too much about computers' calculating capability. Our second idea is how to provide data to the local community in an easily understandable way, including social media data, POI data, and demand data of the community. We put all these data in a visualizing system. The third idea is to collect data in places where there is limited data.

So the purpose of visualization has changed from dealing with massive amounts of data to considering who are still outside the massive data, and finally achieve the goal of community wellness and fairness.

Chao Liu: Big data and CIM in urban informatics is now a research focus in China and the world. Data visualization is also important to urban planners. Scholars in urban planning and urban study have the advantages of better aesthetics and understanding of three-dimensional space. Therefore, we have competitive edge compared to CS experts in visualization. However, the visualization technology is complicated, urban planners engage less in model building and more in model application.

I wish we can develop a platform easy to use such as CAD and break the technological barrier. Then urban planners will engage more actively in this field.

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Regarding the contents of urban informatics: Urban Sensing. Data visualization, Urban big data and CIM, could you choose one or two aspects to discuss the status, opportunity, challenge and relationship with urban planning?

Xinyue Ye: In the first project I did in Texas A&M University, I set up an intelligent project of "preventing the city from being flooded" and gathered scholars from different major such as architecture, landscape, planning, and soft engineering. For example, we used a photo of a building as the starting point, allowing scholars to point out whether the building meets the flood control requirements from different perspectives. Therefore, we established a system and a huge knowledge graph on this basis, linking the visible content in the map with the remote sensing, socioeconomic factors, and urban policy factors behind it.

Since it is not possible to mark all pictures, we rely on the rich professional knowledge of teachers from multiple disciplines to build a cold-start. we kept collecting data to make the project more intelligent. Finally, if you input a picture into our system, the system will tell you whether the design meets the flood control standard. It will also mark the design problems on the picture. This makes it possible for teachers to show students whether a plan is reasonable or not without exhaustive design cases during class. More importantly, relying on such a project, the scattered knowledge can be linked to achieve interdisciplinary cooperation.

Xiaoru Yuan: This topic contains two possibilities. One is that the demand is strong and the resource allocation is sufficient, but the people who are doing it are not capable enough. It may also be that we have demands but there are not enough resources. Generally speaking, if we want to succeed and have a systematic development in a certain field, this requires sufficient talents and resources, and it goes beyond personal behavior.

For example, Chinese Academy of Sciences is building News Science, to combine new information technology with traditional humanities. This requires the design of corresponding institutions or mechanisms. The technology may not be the most important here, but the difficulty lies in the entire mechanism and whether there is enough power input. So the key point is there are enough resources and attractive enough to talents.

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Wenwen Zhang: There are more barriers in practice, mainly in resources, laws and regulations. On the one hand, there is a barrier of institutional resources. For example, in the United States, the support of the planning department is relatively insufficient, and the existing infrastructure is relatively old. Many things that can be made theoretically have little space for practical applications. In the absence of data sharing mechanism, the combination of databases is difficult, and especially in urban data. Therefore, we still need to invest continually to support data-driven development. China has done better than the United States in this aspect, such as supporting the development of data cities and government big data platforms.

On the other hand, the standardization of data sharing, data privacy and other related laws are not yet complete, which is also one of the barriers. For example, the urban sensing topics that we have studied a lot are not operational in many cities in the United States. But when these are gradually established and improved, the application prospects are still very bright.

Chenghe Guan: We need to know who the decision makers are. Under universal conditions, this may be difficult to make clear. We went to Accra, the capital of Ghana in Africa, to explore how to provide them with information when they are start with. The former mayor said that there were many problems to be solved in the local area, but planners were unable to provide data, and even if they had data, It cannot be easily understood by decision-makers and cannot be integrated into local planning and design. Another example is the evolution of population migration in China. I think that if we analyze it with big data, we can see neighbor relations, cultural relations, and immigration relations. These are what we can show to local decision-makers as planners. This requires a lot of effort beyond platform building, but if we combine informatics and planning together from a non-standard perspective, perhaps we can do better.

Regardless of the differences in the definition of urban informatics within different disciplines, the panel believes that the most important thing is the consideration of end users and the care for the community. Panelists consistently suggested that without sufficient resources, talents, institutional guarantees, and platform construction, it is difficult for urban informatics to achieve substantial development. Although urban planning scholars have advantages in this regard, they cannot succeed by relying solely on individuals. In addition, the panel believes that based on the understanding of the connotation and significance of urban informatics, related practice and education should promote each other. Cooperation between disciplines is one of the ways to develop urban informatics, and the data thinking of participants should be cultivated.

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Fan Zhang: Data mining or visualization can be roughly divided into two stages in urban study from facts to insights. First of all, discovering the facts is the early approach we use big data. For example, simply using the location and time information of vehicles to understand the peak travel periods of different streets can help us understand the formulation of urban traffic policies. But now we hope to use shallow information to build in-depth understanding and insight such as job-housing balance, pollution emissions, health issues, group segregation, or even the problem of unequal distribution of resources. This is a process from the use of big data and facts to insights.

Our requirements for big data are far from being satisfied with the facts, and the bias of big data may lead us to reveal a kind of bias. Therefore, if we want to better integrate data into planning and design, we need to add better insights to data mining. In practice, we need to strengthen the understanding of the business, in research, we need to combine real research questions and theory with data.

Ying Long: We believe the good studies should be problem or question oriented. The integration of urban informatics territorial spatial planning is relatively easier, what urban informatics can do has been done ten years ago, but the engineering integration is still going on. Yet the integration of urban design and urban informatics is more difficult. Therefore, at the research level, our laboratory is more inclined to design the human-based scale, or the superhuman-based scale.

For urban informatics, being planners and designers are not the only way for us to have a social impact and improve the quality of life. Therefore, we not only focus on planning support or design support. We are also exploring other ways to improve the quality of life.

Chao Liu: A fundamental change has quietly occurred in China. It is very important that some academic leaders who have seen the feasibility in a optimistic perspective. For example, when Prof.Long came back from the UK, he quickly made this subject very influential. In addition, Academician Wu Zhiqiang of Tongji University, as the helm of the entire discipline, is leading intelligent planning research and education.

Ying Long: Therefore, in the case of late development in China, if some people at the helm can push this direction, it will make changes faster. This is one of the reasons why China's urban informatics is relatively prosperous at this stage. In the future, in-depth discipline cooperation will be even more important.

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In what areas of urban research are attempts at urban visualization and informatics most likely to succeed and be the most impactful?

Chao Liu: I taught a course of Urban Data Informatics and Visualization this semester. Before the course started, I did a questionnaire. The feedback from the students was that nearly 100% of them needed this kind of knowledge, but they were hesitant to learn it because they didn't have a programming background. So I conducted heuristic teaching, including inviting scholars to present at class and simple programming teaching. These are some of my explorations this semester.

Although this course has only one credit, it is effective and receive positive feedback from students. The final course project was to use the COVID-19 data to do visualization and data analytic. Most students could fulfill the requirement of the course.

Fan Zhang: We will employ many interdisciplinary methods in our research and education, for example, AI is increasingly used to solve problems. However, we need to use these tools in a standard way. From my perspective, three aspects might be importance in student training. The first aspect is urban econometrics. During the paper review process, I found that many statistical methods were not used correctly, such as ignoring various endogenous issues, and discussing causal effects from a regular correlation analysis. The second aspect is machine learning. We often use one set of data to predict another. However, how to construct a training set, how to verify whether it is over-fitting, and whether the model has really learned knowledge from empirical research. These issues haven't received enough attention. Good visualization can tell the story more clearly and thoroughly, and good visualization can even save a relatively ordinary research. In terms of student training, these can be solved through training.

Wenwen Zhang: The uncertainty of the majors faced by students in the department of urban planning is particularly obvious. Many students hesitate to switch to computer science. Therefore, it is important to understand the demand for student skills in the market. It is not realistic to convince students to study urban informatics if we do not know the needs. In addition, the hardware must be improved. It is difficult for students to run on their own computers when teaching big data. These two are relatively big challenges. Others such as how to motivate students are also very important.

Ying Long: My course covers big data and city planning, city models, new city science, and smart cities. I have always called for understanding of the city to be more important, and then the analyzing method. In addition, I am willing to let my students develop critical thinking. For example, Jacobs is also criticized by many people. And I hope students will not be too conservative. Urban informatics is unstoppable, so embracing it is the only choice. Finally, our discipline is too tolerant of the requirements for publishing papers. We must do a good job of exploring knowledge in research in order to better convey the content and experience to the students.

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Xiaoru Yuan: Learning visualization is not about learning related technologies and applying them, which will make results similar. If above concept is taught to students, it will greatly damage students' thinking and analyzing ability. For example, some textbooks talk about technology in different categories at the beginning, which will make students think that only the application of technology is enough, but they do not understand where the technology comes from, and eventually students will find that they cannot treat visualization in a rigid manner. So in the teaching, we should first understand the essence is the training of thinking ability and analytical ability.

Good visualization is not complicated or cool visualization. The key is to have a systematic understanding of data, content of tasks, and comprehensive user analysis, and method matching follows by. The urban planning background may help in visualization. There is a possibility to share some relevant and good teaching cases to improve the construction of students' overall thinking ability. After the students have this ability, what work they will do in the future becomes less important. And teaching should be targeted, focusing on the construction of thinking ability for undergraduate teaching, professional training for graduate teaching, and critical thinking for doctoral teaching.

Xinyue Ye: First of all, I think the best thing teachers teach students is to cultivate students' curiosity and initiative, so that they will be willing to explore the boundaries of subjects. Secondly, we need to think from the perspective of students and appreciate their strengths. The happiest thing to be a teacher is to grow up with students simultaneously and find how you change students. At the same time, students can change you too. In addition, every week I will organize some of my collaborators in different majors to discuss together, including students and teachers, which is a way for students to learn better.

Finally, we should have great confidence. In 2001, Michael Frank Goodchild, an Academician of the American Academy of Sciences and the father of geographic information science, established Space Social Science Center. He hopes to use this platform to cultivate non-geographical students to learn spatial analysis, which is an ambitious investment. We should train more people in other disciplines, courageously cooperate with other disciplines, and let them grow up. The prosperity of the urban informatics does not depend on one discipline, but requires multiple disciplines to recognize the importance of this matter.

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ChengHe Guan: The problem we encountered was to attract students' interest in city information and city data visualization. Unlike other schools, NYU Shanghai has just established a major in urban studies. In terms of size, it is not comparable to other already mature schools and majors. But at the same time, we also have the advantages of "small" and "new", and we can adapt to market demand and the needs of future students for employment and further education more quickly. My requirement for students is to learn more about the trends and basic courses of other related majors on the basis of traditional theories and professional courses. I suggest that they choose a major and a minor. Such as data science and computer science, urban economics, or more specific directions, such as urban simulation and prediction, urban social relationship networks, etc. In addition, I encourage students to have a broader thinking and a more top-down perspective on urban issues. In terms of practice, I suggest that you can apply what you have learned to different fields related to different cities, rather than just learning in one direction.

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Conclusion and future directions

Regardless of the differences in the definition of urban informatics within different disciplines, the panel believes that the most important thing is the consideration of end users and the care for the community. Panelists consistently suggested that without sufficient resources, talents, institutional guarantees, and platform construction, it is difficult for urban informatics to achieve substantial development. Although urban planning scholars have advantages in this regard, they cannot succeed by relying solely on individuals. In addition, the panel believes that based on the understanding of the connotation and significance of urban informatics, related practice and education should promote each other. Cooperation between disciplines is one of the ways to develop urban informatics, and the data thinking of participants should be cultivated.

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Authors' contributions

Liu Chao, Ye Xinyue, Yuan Xiaoru, Long Ying, Zhang Wenwen, Guan Chenghe and Zhang Fan conceived the study and wrote the manuscript. All authors have read and agreed to the published version of the manuscript. The author read and approved the final manuscript.

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All data generated or analyzed during this study are included in this published article in the reference section.

Declarations

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