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The Configurational Analysis of the Ultra-Modern Shopping Centre in the Urban Restructuring of the Mediatized Era:

A Study of Ultra-Modern Centre Based on the Method of Space Syntax

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ABSTRACT

In contemporary cities, where a growing irregular, fragmented and multiscalar urban development is accompanied by the progressive digitalisation of the retail sector, shopping centres have developed an ultra-modern paradigm that increases their relevance in the daily practices of the public. This paradigm has an ambivalent character: while enhancing the lived experientiality and relationality of the modern mall, it subverts its spatial logic by opening up its introverted configuration. We hypothesise that the configurational subversion of the ultra-modern mall is only apparent since its actual implementation would undermine the urban inversion *(Dovey) necessary to sustain its essential character:* enchanting otherness *(Ritzer).* Based on Foucault's heterotopia and Dovey's inverted city theories, this paper conducts a configurational analysis using the Space Syntax methodology on one representative case, Ocean Chengdu Taikoo Li: one of the most renowned shopping malls of the new open and integrated types in China. Axial, visual, and justified graph analyses are used to determine the relative degrees of spatial connectivity, visibility, and depth. A three-dimensional application of the Space Syntax model is developed and tested on the multilevel spaces of the case study. Findings validate our hypothesis and show the effectiveness of the 3D application. Evidence of the syntactic configuration of the new type of mall confirms that the subversion of its configurational inversion is a strategic deception: the cunning reconstruction of the traditional open fabric of central Chengdu has an introverted *ringiness* and enclosing perviousness that viciously reaffirms the Gruen transfer logic of its predecessor.

KEYWORDS

Shopping malls, Heterotopias, Urban inversions, Space syntax, 3D configurational analysis

1 INTRODUCTION

1.1 Background

In recent years, the growing irregular, fragmented and multiscalar urban development and the progressive digitalisation of the retail sector have brought forth a profound transformation of the commercial centres.

The latest type of shopping malls has increased its sociospatial relationality to maintain its primacy in public and civic practice and discursive relevance in people's daily life. The paradigm of the modern mall, which used to provide interminable shopping and entertainment opportunities (Goss 1993), has generated an ultra-modern variant that focuses on consumer sovereignty and identity politics, providing "seductive, interactive museum and social arena experiences" (Gilboa and Vilnai-Yavetz 2013, p. 255). The new model privileges practices of socialisation, recreation and cultural exchange, countering the social and spatial disconnection generated by the abstract and despatialized modern shopping centres (Manfredini 2017).

However, the relationality offered by the ultra-modern mall is still based on the promotion and exploitation of practices of conspicuous consumption (Ritzer 2005) that threaten the development of a cohesive, inclusive and participatory society. The expansion of the scale and complexity of its form and functions is coupled with the improvement of strategies to enchant the public and deceive its primary goal: total commodification for economic extraction. The increase of the capacity to simulate civicness by contriving "to be a public, civic place even though it is private and runs for-profit" (Goss 1993, p. 40) with idealised "liminal and transactional forms" (p. 25) makes it an ultimate simulacrum: *the antagonist double of the dissolving city* (Manfredini 2019).

1.1.1 New Shopping Malls and Public Daily Life

In modern shopping malls, spaces are closed, diverse and artificial. They maximise consumption by fragmenting and segregating urban networks (Robins 1993, Goss 1993), minimalising interaction between unacquainted consumers or between them and the physical space (Abaza 2001, Goss 1993, Stillerman and Salcedo 2012). By contrast, the ultra-modern mall creates a space both open and integrated, physically, cognitively and socially. It fosters relationality by conflating social amenities of various kinds, including non-commercial services, public recreational facilities and powerful digital infrastructures (Shim, Santos, and Choi 2013, Manfredini and Jenner 2015). Abundant open spaces, streets and squares, green spaces, public institutions, public art and gathering places promote visitors' spatial appropriation and interaction. The expansion of both material and immaterial social infrastructure includes large swaths of everyday public practices and fosters the engagement of visitors with its constructed social, physical and cognitive spatialities. A highly performative digital environment with state-of-the-art equipment, services and support fosters a fully interactive mobile Internet consumer experience (Ioniţă 2017, Benson et.al 2010).

Importantly, as a civic simulacrum, the ultra-modern mall enables people to walk on "historical" main streets, eat "veracious" local food, merge into "local" community and experience "authentic" regional art while assimilating the newest lifestyle to gain social status and prestige, satisfy most of their everyday material and immaterial desires in both actual and extended realities without the need to go anywhere else. A relational consumption where (pseudo)civic identity is abundantly profused elevates the utilitarian and hedonic material consumption of the modern mall to symbolise (post)modern civility: a deterritorialised urbanity of an abstractive constant present in fully mediatised transductive sensitivity (Manfredini et.al 2015, Manfredini 2017, 2022).

1.1.2 Malls as Heterotopias and "Inverted City"

The transformation from modern to ultra-modern mall appears to produce open and socially interactive realms (Manfredini 2017), both physically and digitally. The *precinct mall*, its quintessential representation, is a large, porous, and fully open pedestrian space where gates are removed, central atria turned into squares, corridors into open lanes, and a digital atmosphere seamlessly integrated with that of the open parts of the city (e.g., with uninterrupted navigation systems and street views). The precinct mall does not have hard territorial markers that identify its territory and induce people to consider it a private space.

However, the precinct mall's openness and integration may not be as effective as it appears. The imperative capital reproduction logic, which moderates shopping malls' design and management, requires the maximum control of customers to make up for the loss of shopping revenues (shrunk by e-commerce) by financialising the resultant activities of encounter, socialisation, and leisure (Goss 1993, Dovey 1999). Nevertheless, increasing patronage and customers' consumption requires conciliating control with customer attraction and satisfaction: a conundrum that can only be solved by constructing a dominant narrative. The abstraction of the open city and the creation and imposition of its simulacrum as normative reality constitute the format that the ultra-modern precinct mall has adopted to implement to create docile and self-disciplined customers (Dovey 1999, Manfredini 2019).

For example, in the digital space, technology, equipment and services are used to enhance the emplaced publicness of the mall, while data sourced from people's connectivity and interaction are used to strengthen their control. The customer/subject is made into an "algorithmically resolved identity, where control is focused on profit and drives granular analysis to identify profiles and predict opportunities" (Manfredini 2022, p. 118). Public activities and spectacles are designed to form a participatory ambience, where sharing images, comments, and links on Internet platforms gain attention and add value to the malls (Manfredini 2017). What appears to make malls open and free is moderated by multiple layers of control hidden by hedonic atmospheres, festivals, and spectacles that distract the customer by making the city akin to a holiday destination (Bryman 2004, Manfredini 2019).

Understood as heterotopias (Foucault 2008) that "invert the city" semantically and syntactically (Dovey 1999), ultra-modern shopping malls appear as places with peculiar functions of compensation and illusion that result from mirroring the very precise kind of public space that they supplant and negate. By analysing the transition from modern to ultra-modern malls, the remaining of this paper investigates the emerging characteristics of heterotopic inversion of the new apparatuses for controlling and rerouting the re-associative demand of people and places, focusing on the complex systems designed to deliver central public space through deceptive transductive and immersive experiences.

1.2 Problem Statement

Shopping malls have undergone significant changes in form, structure, functional organisation, and strategic management. Empirical studies on ultra-modern malls show how their new form of social and cognitive heterotopian inversions use functional and spectacular means to produce simulacra of the city proper that further the separation and alienation of people from their communities and contexts. The urban form of these simulacra mirrors the structure of traditional central urban spaces (Boyer 2008), providing interlacing pathways that enhance social and spatial connectivity. Their digital infrastructure facilitates people's association and interaction. Nevertheless, as these malls become progressively popular, larger and mediatised, they increase people's displacement, segregation, self-discipline, and control.

The evolution of their configuration into open and connective precincts appears inconsistent with their segregational polarisation of civic functions and conflation of civic meanings. Thus, the new type of shopping malls shows an ambivalent character: while enhancing the lived experientiality and relationality of its modern type, it subverts the spatial logic of that type by opening and integrating its introverted spatial configuration. A configurational analysis of spatial connectivity, integration, and depth can shed light on this contradiction, but it has not been performed yet.

1.3 Research Hypothesis and Questions

Drawing upon Bill Hillier's work (Hillier 1996, Hillier and Hanson 1984), we assume that the social logic of place consistently subsumes the functional, cognitive and configurational dimensions of space by inscribing the transformations of social structures and practices. We submit that in the ultra-modern mall, configurational strategies and tactics of spatial inversions are integral to the functional and cognitive ones that, as described in the literature, further develop the characteristic spatial inversions of the modern mall. Thus, this paper hypothesises that the configurational subversion of the ultra-modern mall is only apparent since its actual realisation would undermine the 'urban inversion' (Dovey 1999) necessary to sustain its vital 'enchanting otherness' (Ritzer 2005). Based on heterotopia and inverted city theories, we maintain that the space syntax methodology can detect significant elements of the new spatial structure and show how this articulates the advanced simulative capacity of the new civic socio-

spatial simulacrum to continue influencing people's behaviours and promote conspicuous consumption.

To verify whether and how such configurational inversion has occurred, this study analyses the spatial structure of the new mall, seeking to answer the following question:

1) Has the configurational inversion of ultra-modern mall developed *spatial patterns* that transform the heterotopian character of the modern mall consistently with the evolution of their functional and cognitive determinants?

If the answer is positive, the research also seeks to answer the following sub-questions:

2) What are the characteristics of the new pattern of *spatial integration*?
3) What are the characteristics of the new pattern of *spatial connectivity*?

2 LITERATURE REVIEW AND METHODOLOGY

To address the above research questions, this paper firstly constructs a theoretical framework around the notions of *heterotopias* and *inverted city* to interpret the segregated and simulated spatialities of the ultra-modern mall. Secondly, it presents an empirical study on a representative case that uses the space syntax theory and methodology to unveil the features of the spatial structure of the ultra-modern mall. Eventually, it evaluates the results of the analyses to validate the above hypothesised configurational inversion.

2.1 Literature Review

To frame the interpretation of the above-mentioned studies that describe how the functional and symbolic spatial integration of the hyper-modern mall is actually increasing its segregation and produces emplacements performing antagonist civic doubles of the city itself, this study elaborates upon the Foucauldian theory of *heterotopia* and its elaboration by Kim Dovey around the notion of *inverted city*. On the one hand, the theory of heterotopia (Dehaene and Cauter, 2008) helps to understand the new malls as urban enclosures developed to provide compensatory and illusory conditions through an oppositional mirroring of a selected reality beyond their walls, the civic space. The activation of Foucault's (1975) *genealogical perspective* unveils the logic by which a positive development can hide insidious increases of subjection.[1] The complementary Deleuzian (1992) work on the *society of control* helps recognise the underlying robust, deceptive simulation supported by expert machines for total control that reinforces the imbalance of power relations and fragments our society (Deleuze 1992, p. 3-7).

[1] In Foucault's (1975) theory, no matter how the appearance of things changes, the core purpose of the things remains and might become more efficient to be achieved. For example, when the punishment transformed from public execution to enclosed prison, he critically noted that, "to punish less, perhaps; but certainly to punish better" (Foucault 1975).

On the other hand, Dovey's theory of "inverted city" (1999) helps elaborate upon the notion of heterotopia for the study of the modern shopping mall. Postulating that the mall is an illusory reflection of the idealised city and society in real-world (Boyer 2008), Dovey (1999, p. 123-138) develops an effective operationalisation of this concept articulating the urban inversion as a combination of configurational (syntactic) and performative (semantic) elements.

These two aligned theories can provide a deep understanding of how the ultra-modern mall cunningly dissimulates the subversion of the oppositional relationship between the public and private spheres of the city.

2.1.1 Shopping Malls as Heterotopias

In the book *Heterotopia and the City: Public Space in a Postcivil Society*, Dehaene and Cauter (2008) introduce the Foucauldian notion of heterotopia by stating that it "describes a world off-centre with respect to normal or everyday spaces, one that possesses multiple, fragmented, or even incompatible meanings" (p. i). The concept of heterotopia combines the words *hetero* (other) and *topos* (space) to address peculiar real spaces within worlds that mirror yet distinguish themselves from what is outside them. Heterotopias are real spaces that constitute a sort of counter-emplacements: effectively realised utopias in which the real emplacements, all the other real emplacements that can be found within the culture, are simultaneously represented, contested, and inverted (Foucault 2008, p. 17). Heterotopias are enclosures that fragment the context in which they are located and exist throughout our contemporary world (Dehaene and Cauter 2008, p. 5).

Foucault (2008) asserts that heterotopias open an *unreal space* where "I see myself … I am over there, there where I am not, a sort of shadow that gives me my own visibility, that enables me to see myself there where I am absent" (p. 17). M. Christine Boyer (2008, p. 53-74) adds: "They are illusory spaces and counter-sites related to all the other spaces they contest: thus a mirror [that] reflects the context in which I stand yet contests it" (55). From this perspective, shopping malls can be seen as mirrors of our society and city: emplacements dominated by the absence that reflect people's daily life and community, including their economic, social, cultural and political activities and conflicts (Muzzio & Muzzio-Rentas 2008, p. 139).

One of the six principles of heterotopia outlined by Foucault (2008) strongly applies to the spatial structure of the mall. It addresses the peculiar "system of opening and closing that both isolates them and makes them penetrable" (Foucault 2008, p. 21). Granting access to the *mirror*, there are openings that "conceal curious exclusions. Everybody can enter into those heterotopian emplacements, but in fact, it is only an illusion: one believes to have entered and, by the very fact of entering, one is excluded" (Foucault 2008, p. 21). Shopping malls' welcoming entrances clearly separate them from the surrounding urban space: by providing easy access to their realms, they

not only admit to a detached reality but also lead to complex systems of pathways that disable the wayfinding to navigate out of them.

Malls are "urban otherness" where the ordinary meets the extraordinary by establishing conditions that are typical of heterotopias: simultaneity, juxtaposition, ambivalence, and dispersion (Foucault 2008, p. 21). Simultaneity and juxtaposition are identified by David Graham Shane (2008, p. 262) as properties that shopping malls have to collage time and space at will. The ambivalence is discussed by Walter Benjamin (1937) regarding the spaces of consumption preceding the malls that used to support the urban dreamworld of the bourgeoisie: a 'phantasmagoria' fed by advertising and marketing promotions, creating a frenzy of consumption and commercial fetishism about objects of desire. (Benjamin 1937, p. 77-88). Ambivalent dispersion is outlined by Shane (2005) as the capacity of enclosed malls to dominate the city by swiftly transforming their systems of relationships within their networks. Transport infrastructures enable to operate enclaves that are bordered organisational devices to integrate themselves in the city. These enclaves are connected by armatures: linear organising devices, such as highways.

Malls are urban elements disconnected from their environment that supplant the diffused systems of public urban amenities scattered throughout the territory of the traditional city (Manfredini, 2019). Their heterotopian condition, as elaborated by Foucault in '*The order of things*' (1970), "dissolve[s] our myth" and "destroy[s] 'syntax' in advance … [razing] that less apparent syntax which causes words and things (next to and also opposite one another) to 'hold together'" (Foucault 2008, p. 17).

2.1.2 Shopping Malls as 'Inverted Urban Public Space'

Kim Dovey's (1999) theory of the inverted city integrates Foucault's thought of heterotopias that enables us to analyse shopping malls as other places of illusion that mirror the real spaces. Dovey interprets shopping malls as spaces that subvert the relationship between private – the mall – and public – the city proper – urban spaces. He maintains that this subversion is both configurational and semantic, and results from their articulated historical development. Shopping malls emerged in the 1950s to provide services to people living in distributed and car-based suburbs by creating pedestrian densities through a coupling of two modern retail environments: the arcade, as a space of flow, and the department store, as the attractive magnet (Dovey 1999). Configurationally, this coupling was based on the 'dumb bell' syntax with magnets – *anchors* – at either end of the arcade – *handles* (Dovey 1999). The principle of the structure was that the anchors draw customers into the system and generate a density of pedestrians by ensuring that there are no dispersions (i.e. economic dead ends). This effect is reinforced by providing access from the exterior (i.e. the car park) to the anchors through the arcade. This increases the centrality of the aisle, making it the control space of the system (Dovey 1999).

As the mall grew larger, its structure was articulated by interlacing multiple dumb-bells. The more complex the network of intersecting aisles is, the greater the introversion becomes. Multiple entries were introduced to the outer segments of the aisles – sometimes even directly to one of the anchors. The deeper one penetrates the mall, the more the space becomes *ringy* with tightly interconnected isles producing overlapping movement loops (Dovey 1999). The ringy heart is the most significant structural development of the simple dumb-bell, since it creates a space with a high level of permeability and a sense of urban centrality that, as noted by Jane Jacobs' (1965), is positively correlated with street life. The events and spectacles staged in the mall – its major adjacent attraction – are usually located in this area. This system heightens the rental value of the leasable areas as it extends the time consumers spend in the mall and the potential to seduce the passing consumers into impulse consumption (Dovey 1999). As Dovey (1999, p. 126) maintains, the enticing system of pathways is key to the urban inversion since they are no longer the shortcuts that sustain the urban arcade; instead, they become detours in which urban public life has been recreated and shifted to private space. The open encounter of the permeable street network has been enclosed under conditions of a controlled encounter. However, in reverse, the large lump development of the mall generates impermeability at the urban scale. The aisle is no longer the linear integrating element that improves connectivity but rather the core element of an enclavic and city-antagonist centre. The shopping centre, started as compensation for the sketchy configuration of the city, has reversed the logic of urban connectivity and become an urban heterotopia with an illusory centre that enhances the overall spatial fragmentation.

2.2 Methodology of the Empirical Study

To examine the spatial structure of the ultra-modern mall and validate its hypothesised contradictory configurational inversion, this research implements the space syntax method (Hillier et.al 1976) to analyse the connectivity, integration and depth of a representative case study. Space syntax is a theory that addresses *The Social Logic of Space* (Hillier and Hanson 1984) and a set of analytical, quantitative, and descriptive tools for the analysis of the layout of space in buildings and cities initiated by Bill Hillier and Julienne Hanson (1984, Hillier 1996). This theory focuses on the relationships between the arrangement of space and the possibilities and patterns of movement through it, arguing that a spatial layout or structure results from and has a great impact on human social activities. Its application provides an effective way to quantify urban morphology features, detect spatial relationships and record movement and interaction within cities and buildings (Hillier 1996).

The methodology of Space Syntax has several analytical models and tools to detect these relationships, such as axial analysis (Hillier and Hanson 1984), visual graph analysis (Turner 2003) and justified graph analysis (Hillier and Tzortzi 2006). It links physical space with people directly, assuming that people tend to move in lines, perceive the built environment through *visual fields*, and gather and interact in *convex* enclosed spaces (Karimi 2012). The flexibility of these means makes them suitable for analysing the precinct mall, a hybrid space in which the

critical interior elements, the isles, have been transformed into exteriors, from both the perspectives of its urban and inner sub-spaces relations.

3 CASE STUDY AND DATASETS

3.1 Introduction of Taikoo Li

As a representative case study of the ultra-modern precinct mall, this paper uses Chengdu Taikoo Li: one of the most advanced malls in China. Located in Chengdu City, Taikoo Li is an open-plan, low-rise and lane-driven shopping centre of approximately 114,000 square meters, developed by two Hong Kong companies of Swire Properties and Sino-Ocean Group. It was opened in 2015 and marked as the five-star shopping mall in China in 2019. The project is located at the core of Chengdu's commercial and retail area bordering Chunxi street, the most popular commercial pedestrian street in central Chengdu. Its accessibility is very high as it is near the Chunxi station, a central interchange station of the subway system, and three primary urban arteries surround it with multiple bus stops. Its distinction chiefly relies on the ancient Buddhist Daci Temple, a famous protected historic site first built in the third century AD situated at the mall's centre, and on its theme, the traditional Sichuan architecture.

According to the designer Dr Hao Lin of Oval Partnership Ltd (2016), Taikoo Li was conceived as a bustling urban lifestyle hub. Its lanes, courtyards and plazas where visitors can enjoy truly unique shopping and leisure experiences, redefine a historical neighbourhood in Chengdu's downtown, acknowledging the history and character of the city.

Taikoo Li has three storeys in total. Its low density, atypical in China's commercial developments, can be attributed to the presence of the eminent Temple complex. Respecting the heritage's prominence and morphology is a central goal of the urban conservation and regeneration project. The development embraces the logic of conspicuous consumption to make the shopping mall viable and make the most of the limited commercial surface. It appeals to customers' willingness to acquire goods of higher quality and price than necessary to gain status and eminence by creating a unique and memorable environment where building typology, urban morphology and spatial configuration guarantee high identity, character and sense of place.

3.2 Configurational Analysis of Taikoo Li and Surrounding Urban Contexts

Taikoo Li was designed to redevelop a historical urban context by integrating newly built commercial buildings with the conserved Daci Temple and the set of six adaptively reused buildings and ancient lanes associated with the temple. Architect Hao Lin (2016) define it as urban regeneration and strategic conservation project. Its master plan delineates an interwoven

set of lanes, squares, streets, alleys and courtyards that connects the surrounding environments, closely mirroring the traditional urban structure of Chengdu (Chao 2018). Unlike traditional modern malls, Taikoo Li does not have entrances gates. By granting unrestricted access to the public, its semi-public space blurs the boundary between private and public realms, which is also what the designer aimed for: *a more open, inclusive, public and settlement-type* urban space that provides a mixed function of shopping, dining, drinking, entertainment, live performance, hotel accommodation and workplace (Lin 2016).

Figure 1: The axial map analysis of Taikoo Li with its surrounding urban spaces

A basic axial analysis (figure 1) using space syntax software confirms this integration with the surrounding urban fabric showing the level of integration of its 17 entrances from outside urban public spaces. Figure 1 shows several orange and red sightlines (the warmer the colour is, the more integrated the space is) extending from Taikoo Li, indicating that its spaces can be seen from afar and easily accessed. This integration seems to facilitate the orientation of people to the mall as those who are walking or driving on the nearby streets could quickly notice it and find their ways to go there without any difficulty. This phenomenon indicates the effectiveness of the openness of this mall to the urban public space. It not only counters the physical enclosure of the modern mall, but also reverses its negation of visual integration with the surrounding environment. Certainly, this increases the capacity of the mall to attract people from densely populated areas of cities, drawing more customers to consume.

3.3 Configurational Analysis of the Open Space of Taikoo Li's Ground Floor

Using the Depthmap software, we have analysed the integration and connection of the inner pedestrian sub-spaces of Taikoo Li by, firstly, considering the sub-spaces of its three levels

(underground, ground and second floor) individually; then, assessing these spaces as a whole and detect the spatial configurational characteristics three-dimensionally.

The outcome of convex space and connection analysis of the ground floor's sub-spaces is shown in fig. 2, with colours representing the integration degree of each sub-space (the warmer the colour is, the more integrated the space is), with dots and lines indicating the connections between these sub-spaces (the dots are symbols of each sub-space and the lines between them mean they are connected). The graph indicates that the inner pedestrian sub-spaces are highly connected, and there are nearly no dead ends in these pathways. The most integrated sub-space is located in the central area of the shopping mall, near the Daci Temple, and is closely connected with many other pedestrian pathways. Notwithstanding the straightforward and convenient access through the 17 entrances from urban public streets, it turns out to be rather difficult for people to come out of the shopping mall once they enter it. Nearly every sub-space is intersected with several other sub-spaces, and people may get easily lost. In this interlaced spatial structure, people could always keep going forward to the next pathway in the mall, which is surrounded by many attractive shops and new commodities. Customers may become distracted from finding the sense of orientation as they are seduced by the spectacle of shows and commodities when exploring the pathways.

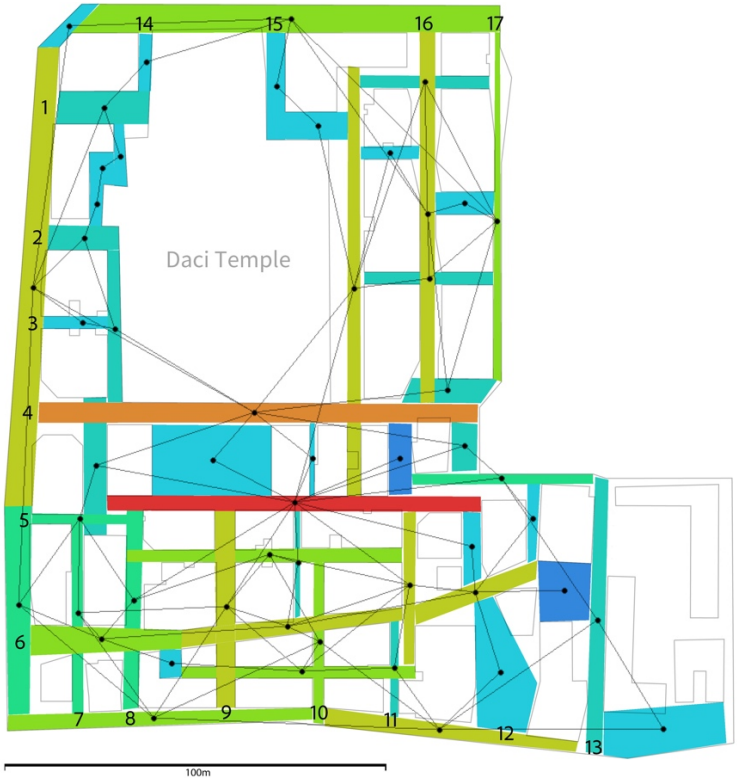

Figure 2: The convex space schema and connection analysis of the ground floor of Taikoo Li

The justified graph analysis of the ground floor's sub-spaces of Taikoo Li is shown in fig. 3. It indicates that the overall spatial structure is not deep, as the deepest sub-space could be accessed with merely three steps from the outside public spaces (figure 3). Compared with Changsha IFS shopping mall, another famous shopping centre in China, whose deepest sub-space on the first

floor must be accessed through eight steps from the entrances (figure 4), Taikoo Li has a significantly shallower structure, indicating the intention of the designers to ease customers' movement and spatial legibility. On the contrary, the inner configuration of Taikoo Li (figure 3) becomes more permeable and ringy than Changsha IFS shopping mall (figure 4) as people penetrate the mall: the connections between sub-spaces on the same level of depth in Taikoo Li are far more than the IFS, which again confirms the syntax of the *inverted city* described by Dovey (1999). This permeability or ringiness provides people with many alternative paths for circulation in the mall, offering them an enhanced sense of vibrant public life.

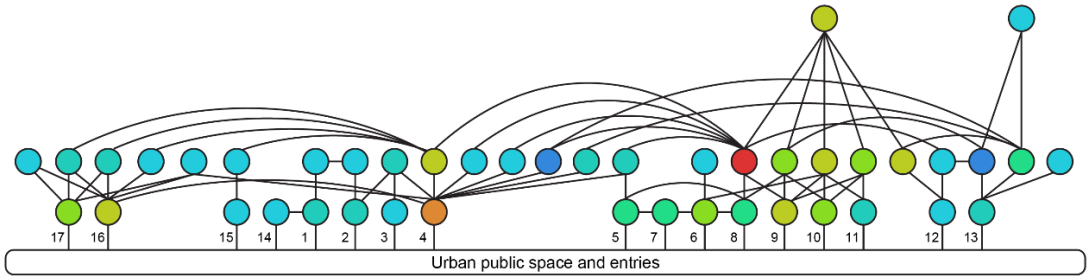

Figure 3: The justified graph analysis of the inner pedestrian sub-spaces of Taikoo Li on the ground floor

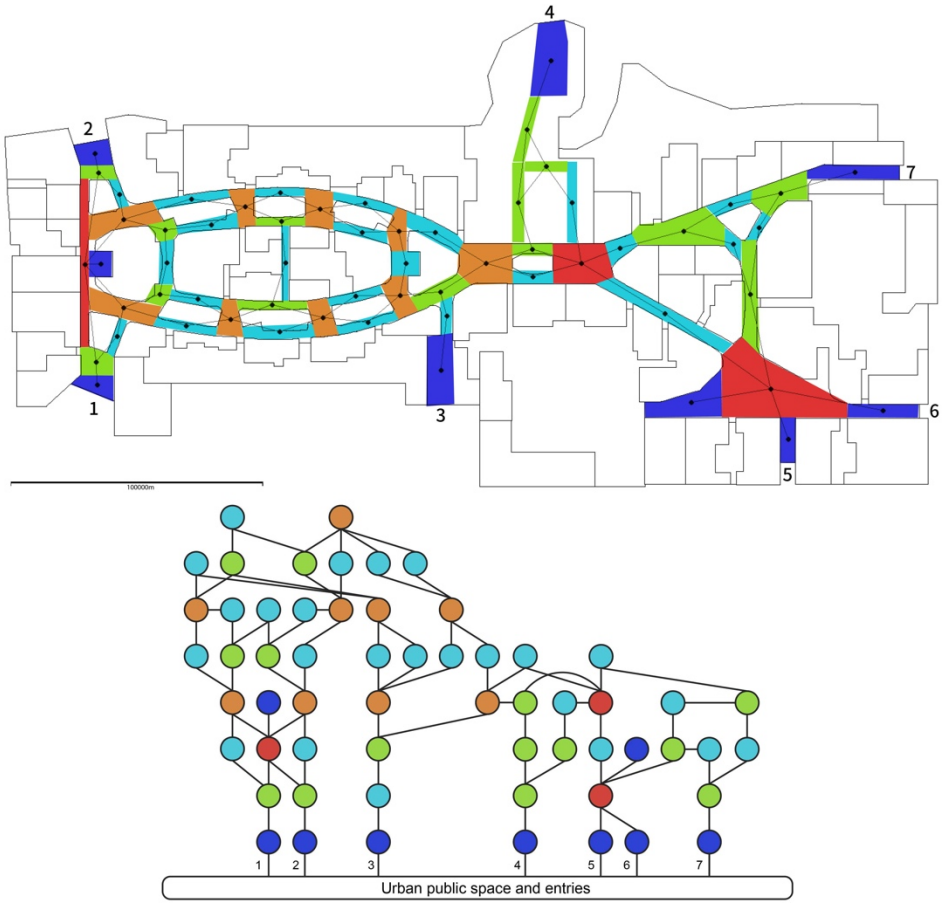

Figure 4: The convex space schema and justified graph analysis of the ground floor's sub-spaces of Changsha IFS shopping mall

An interesting similarity between Taikoo Li ultra-modern mall and Changsha IFS is that, even if there are many circulation pathways at their central sub-spaces, the shallowest segments, where customers enter from the car park or urban streets, primarily maintain a linear syntax (figure 3,

4). It is because these shallowest segments are generally marginal to the dominant modes of economic life and the encounter within the mall; thus, their use is to provide the shortest cut from the surrounding urban public streets (Dovey 1999). These findings on the spatial configuration of Taikoo Li reveal a contradiction between the ambition of this ultra-modern mall to integrate itself into the city and the necessity to make it harder to leave. The simple provision of increasing detours towards the centre does not seem sufficient to achieve the goal that makes people stay in this place to fulfil their needs in nearly every aspect of everyday life, to become (or replace) urban public space for everyone (Lin 2016). The shallow spatial structure complements this strategy, enhancing wayfinding and allowing quick access to every store to regular affluent customers with very little disposable time. With mere three levels connected by multiple escalators and stairs (15 in total), customers could quickly get to their destinations.

Figure 5: The Visual Graph Analysis of the ground floor sub-spaces of Taikoo Li

The configurational shallowness has also been verified by the Visual Graph Analysis (VGA) of the ground floor's spaces of Taikoo Li (figure 5). The outcome shows the view field connections between pathways in a range of colours. The warmer colour means the sub-space has a wider view field of its surrounding environment, which could make people sense the mall's spaces better and find their direction more easily. Fig. 5 indicates that the warm-coloured sub-spaces are in relevant small quantity, and they are mainly located in the outside entrances of Taikoo Li or the intersection sub-spaces of its inner wide pedestrian pathways. On the contrary, the cold-coloured sub-spaces are in large quantity and distributed in most branch pathways in the shopping mall's interior, which indicates that they have narrower view fields and fewer visual connections with other pathways. So, once people enter the shopping mall's interior pathways, the view fields get shrunk, and it becomes rather hard for them to identify the surrounding environment and very easy to get lost. As customers go deeper into the mall's interior, the pathways become more permeable and intersected. This configuration ensures large pedestrian flows for the shops located in the deep positions of the mall's spatial structure. According to

Dovey's theory of 'inverted city' (1999), it avoids the situation that most people are assembled in some central spaces while the off-centre shops have rather few pedestrian flows, which diminishes the interests of both the shops and malls.

The articulation between spatial orientation through legibility (enabling consumers to find their way to particular shops) and disorientation through complexity (inducing people to get lost in their way and stay as long as possible to make impulsive consumption) in Taikoo Li is not simple. To find a balance between them, Taikoo Li implemented two different pedestrian systems in its inner sub-spaces. Firstly, it differentiates the scales of its inner pedestrian spaces into several levels to make people could sense the main and branch pathways according to their width. Secondly, it designed two different lifestyle shopping routes for customers. One is the *fast walking route*, which connects the subway station and main urban roads, ensuring that people could easily come there to buy things and then quickly leave. The other is the *slow walking route*, which is designed for people to wander aimlessly and make detours to spend time slowly. According to the architect Lin (2016), the "Fast Lane" incorporates luxury brands and high-end contemporary fashion while the "Slow Lane" comprises a line-up of outdoor diners, alfresco cafes and lifestyle stores, delivering diverse shopping and spatial experience to visitors. In spatial layouts, the fast life route is in the shallow part of the whole structure, more connected to urban public transportation, and the slow life route is in the deep part of the whole structure, more segregated from urban contexts and quieter for people to enjoy their life, particularly in the proximity of the Daci Temple.

3.4 Configurational Analysis of the Open Spaces of Taikoo Li's Second Floor

With the Depthmap software, the research also conducts the convex space analysis and visual graph analysis (VGA) of the sub-spaces of Taikoo Li's second floor, whose results are shown in fig. 6. In the graph, the rectangles with oblique lines represent the escalators or stairs from the first floor, which are identified as independent convex spaces.[2] The second floor's spaces are composed of three semi-autonomous parts (a central area with left and right wings), each with one or two main connectors, which can be seen from the left graph in fig. 6. At the same time, the VGA analysis (figure 6) shows that these main pathways also have long view sights, and most of

[2] Note: This paper does not count the elevators as convex spaces in this space syntax analysis of the first floor. Because the fundamental basis of the convex map and justified graph analysis is the principle that people tend to walk based on their view sights across the spaces, but in field investigates, the author found that the elevators (6 in total) are usually inconspicuous in the walls beside the shops, which are hard for people to notice from a far point in one empty convex space while the escalators and stairs (15 in total) are relevantly larger and obvious and people could see them from a far distance and walk there to go upstairs. According to onsite observations, escalators and stairs are primary ways for most people to get to the first floor, so ignoring the elevators would not make great influences on the results of the analysis.

the intersection sub-spaces have a broad view field, which demonstrates that people could easily find the way to their destinations.

Unlike the spatial structure of the first floor (figure 2), which has many alternative interlaced pathways and does not have distinct dominant main roads, the spatial structure of the second floor (figure 6) is much simpler in a hierarchical relationship, and people could quickly identify the main roads and branch pathways. So, this spatial configuration of the second floor enables people to have a clearer directivity in wayfinding and sight viewing of the spaces.

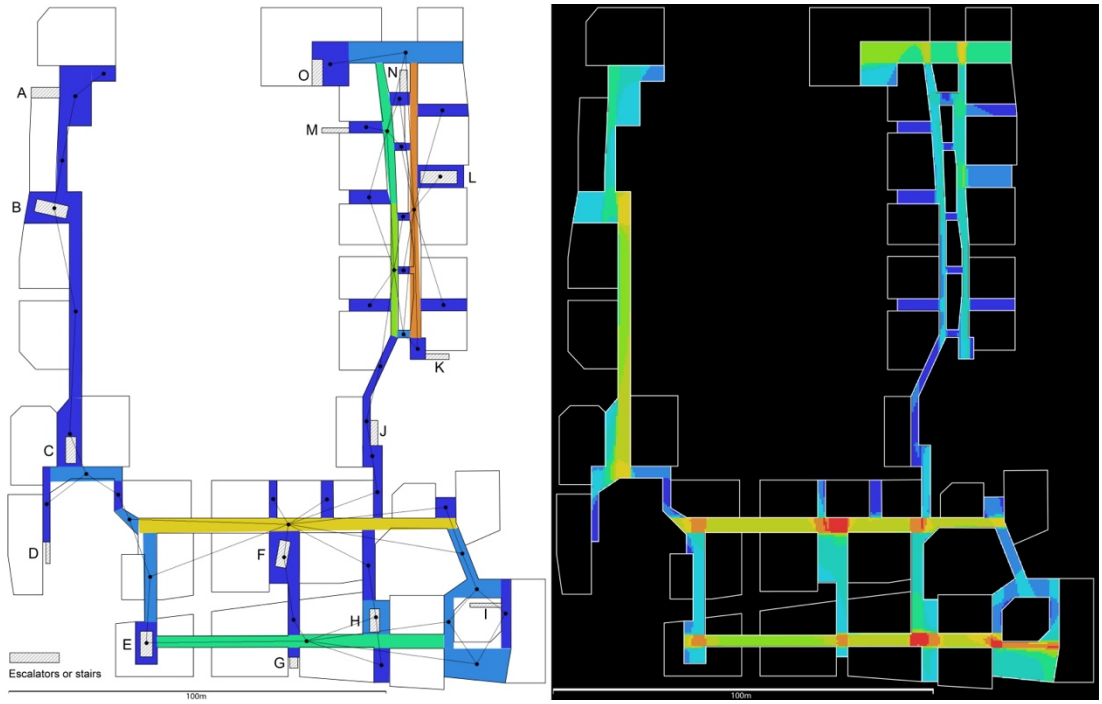

Figure 6: The convex space schema and VGA analysis of the second floor of Taikoo Li

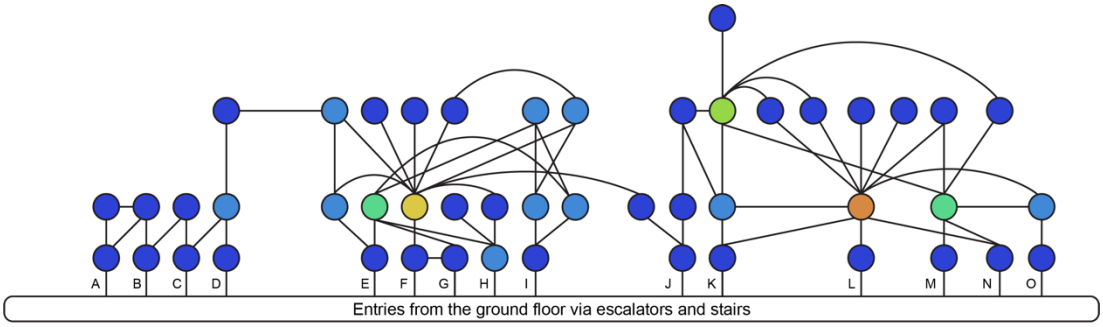

Figure 7: The justified graph analysis of the inner pedestrian sub-spaces of Taikoo Li on the second floor

The justified graph analysis of the sub-spaces of the second floor is shown in fig. 7. It indicates that the total depth of the whole spatial structure is a little deeper than the first floor as it has four steps in total. Nevertheless, it performs rather shallow in general, as most sub-spaces of the second floor could be accessed within three steps starting from the escalators or stairs connected to the first floor. One important difference is that the relationship between sub-spaces of the second floor is more linear as people could quickly identify their place and find their way. In contrast, the relationship between sub-spaces of the ground floor is more ringy or permeable

(Dovey 1999), which not only could make people encounter each other more often and have a better sense of public urban street life (Jacobs 1965), but also could make people get lost in their direction.

3.5 Configurational Analysis of the Connections Between the Open Spaces on Three Levels

One shortcoming of the justified graph analysis of the sub-spaces of the second floor (figure 7) is that despite the escalators or stairs being the same with each other, they actually do not start at the same level of depth in the integrated spatial structure of the sub-spaces of the first floor. That is, different escalators or stairs are located in different sub-spaces, and they may sit in different levels of depth in the justified graph analysis of the ground floor (figure 3). People can access some escalators or stairs just at the very entrances of Taikoo Li, while some escalators or stairs require people to go through one or two steps of other sub-spaces from the urban public streets in order to get there. To look at the overall spatial configuration of this ultra-modern mall, the paper needs to consider the sub-spaces of the three levels comprehensively and three-dimensionally.

Chengdu Taikoo Li shopping mall has two levels above the ground and one level underground. Indeed, the first and second floors are the main areas of the shopping mall, while the underground level has only a few shops and a small area of sub-spaces but contains an independent entrance on its left side connected to the interchange station of subway line 2 and 3. To make the analysis more objective and convincible, the research also considers the underground floor's sub-spaces, even though its area and pedestrian flows are much smaller than the above two levels.

Although the space syntax methods are originally developed to analyse spaces on one single plan, this paper experiments with a way to detect the relations between spaces in multilevel environments by using the Depthmap software. The basis for the three-dimensional convex space analysis' reasonability and feasibility is that the Depthmap software conducts the analysis and calculates the outcomes only through the relations between different spaces and considering each of the convex spaces merely as a dot (figure 2), which means the shape and orientation of the convex space would not affect the analysis outcome. So, we could turn the spaces of one level from the plane graph into the axonometric graph and add other levels to its above or below. Then we can draw the convex spaces individually on the separate levels and conduct the analysis of them as a whole by making connections between different levels through the escalators and stairs accordingly.

Using the Depthmap software, the paper conducts the integration and connection analysis of the three levels' spaces of Taikoo Li separately and three-dimensionally, and the outcomes are shown in fig. 8. Firstly, the mall's three levels were drawn axonometricly and placed on the same plane.

Then convex spaces of each level were drawn individually, and their nodes connected with edges were added manually (the vertical lines in figure 8 right represent the connection through the escalators or stairs).

The left graph in figure 8 shows that the convex space analyses conducted separately on each level are the same as the outcomes conducted with their own separate plans (as in figures 2 and 6), which proves the hypothesis above that the deformation of the shapes does not change the outcomes. Then, by adding the vertical connections between three levels through the convex spaces with escalators or stairs, the research analyses the connections between spaces of three levels as a whole and the outcome is shown in the right graph in fig. 8.

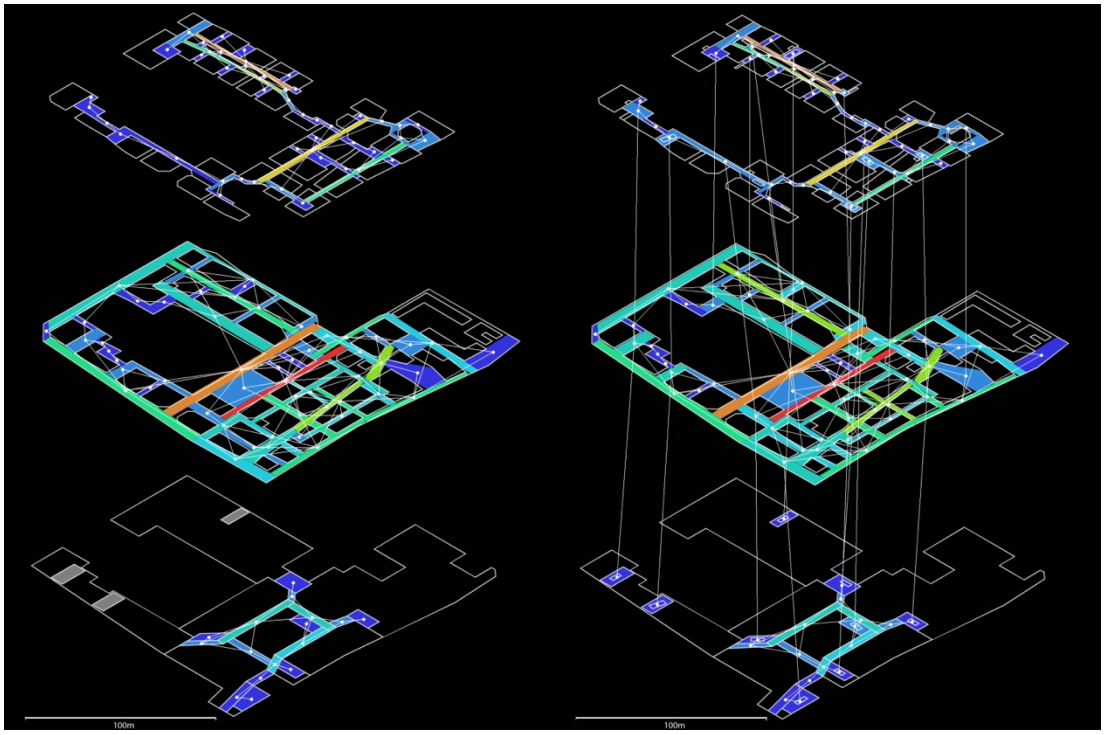

Figure 8: The convex space schema of three levels of Taikoo Li separately and three-dimensionally

As most of the pedestrian flows on the second floor and underground level are coming from the escalators or stairs, the numbers and locations of these vertical transportations are essential to the economic interest of the mall. Considering the depth of the spaces of escalators and stairs on the first floor, the research made a justified graph analysis of all the spaces situated on the three levels, and the result is shown in fig. 9.

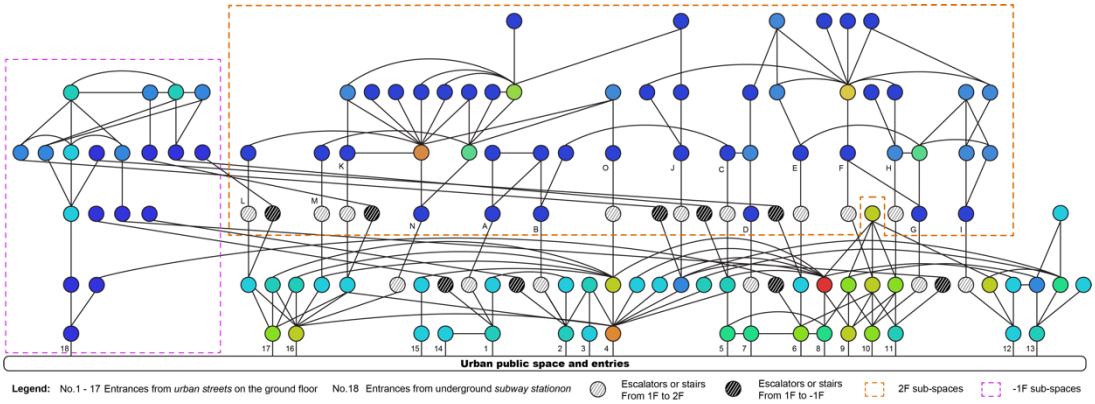

Figure 9: The justified graph analysis of three levels' sub-spaces of Taikoo Li

According to the convex space analysis of the second floor's sub-spaces in fig. 6, Taikoo Li has 15 (marked as A-O) escalators and stairs to connect the first and second floor and these escalators and stairs are mainly located in the intersection spaces of the first floor. The integrated justified graph analysis (figure 9) indicates that the escalators and stairs can be divided into two groups, which are located at two different levels of depth in the spatial configuration of the ground floor. Most (9) of them are located in the deepest segments of the first floor, which means people have to pass through at least two sub-spaces in order to get to the escalators or stairs. This phenomenon embodies the configurational inversions of malls by turning shortcuts into detours to make people stay as long as possible in the mall and pass as many sub-spaces as possible. However, to ensure the economic life of stores on the second floor and avoid the situation that few people come to the second floor as it becomes too hard and inconvenient to get there, a specific precinct with destination venues (e.g., restaurants) was created. To facilitate access to this precinct, a set of escalators and stairs (6 in total) are made to connect it with the shallowest spaces of the first floor (figure 9), which could make people easily perceive them and quickly get into the second floor.

From the integrated justified graph analysis, we can also see that most of the second floor's sub-spaces are located at a relatively shallow depth of the whole spatial structure, compared with the individual justified graph analysis of the second floor (figure 7). In fig. 9, it is easy to find that the connections between sub-spaces on the second floor are more linear, while the connections between sub-spaces on the ground floor are much more ringy and permeable, which reveals two different strategies of the mall to control people's behaviours through its spatial configurations.

3.6 Configurational Analysis on the Degree of Integration of Multilevel Spaces Three-dimensionally

A critical shortcoming of the above convex space analysis (figure 8) on the connections between the sub-spaces of the mall's three levels is that the outcome only shows the one-step connection analysis (i.e., considering only the value of adjacent sub-spaces), not considering the further connections between one sub-space and all the other sub-spaces of the entire system. Therefore,

to analyse the overall degree of the integration of one sub-space in the whole spatial configuration system three-dimensionally, the research runs the axial graph analysis based on the connections between all the sub-spaces in the mall and the result is shown in fig. 10.

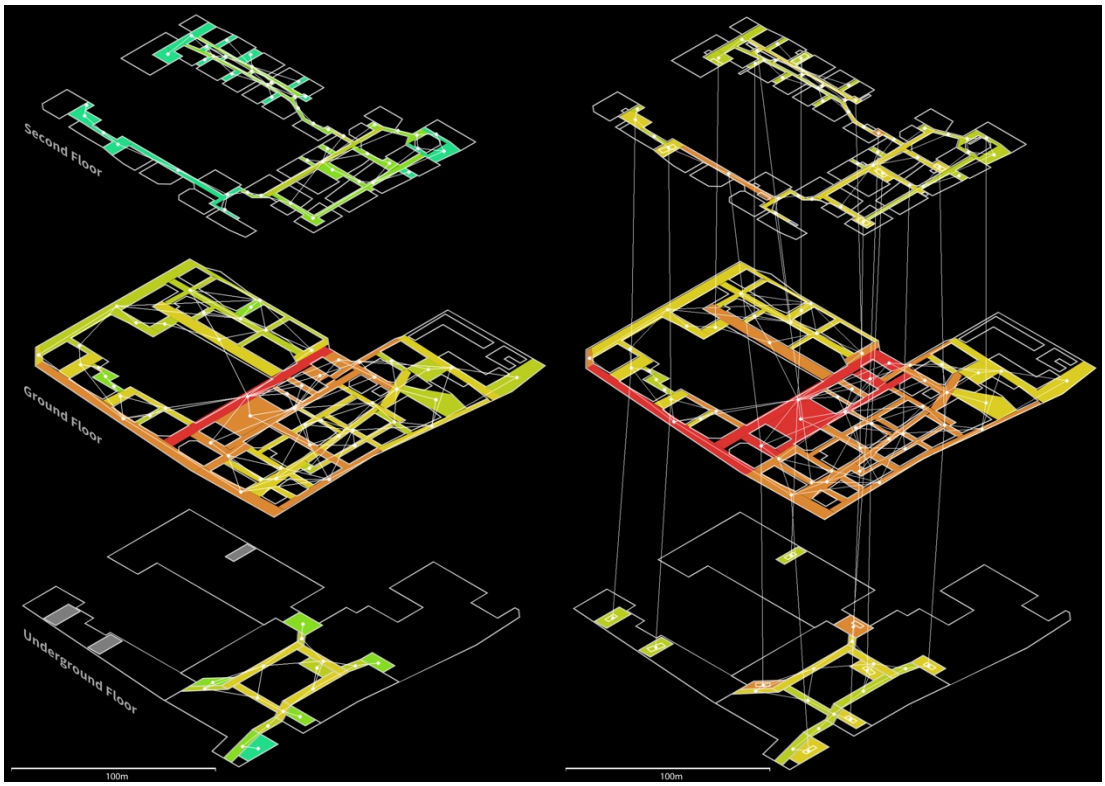

Figure 10: The integration graph analysis based on all the connections of sub-spaces of Taikoo Li

With the Depthmap software, the research analyses the integration of sub-spaces in the whole spatial configuration by considering the total depth of one sub-space to all the other sub-spaces on three levels, both separately and three-dimensionally and the outcomes are shown in fig. 10. The left image shows the analysis done floor by floor, while the right is the combined analysis. The comparison of the graphs shows that:

1) The two results are different.

2) The three-dimensional analysis indicates a nuanced integration of the entire system, better reflecting its ringiness, which could not be reflected in only one level's analysis. For example, the combined analysis shows that the sub-spaces of the ground floor are more integrated than the outcomes in the single plan analysis of the ground floor, which only calculates the connections between one level's spaces.

3) The three-dimensional analysis detects the mall's intention to differentiate the importance of different areas by their spatial configuration. For example, on the ground floor, the lower central part integrally becomes distinctly more integrated than the upper part in the combined analysis, while in the separate analysis, the difference is not that great. This is because most of the escalators and stairs to the second and underground floors are located in

the lower central region of the first floor, which could only be detected in the three-dimensional analysis.

4) The three-dimensional analysis substantially changes the second and underground floors' integration and segregation patterns. In these two levels, the original most integrated sub-spaces keep high integration still. However, some lowly integrated sub-spaces invert from one dead-end, highly segregated sub-space into the most integrated, after adding the connections between them and other levels' sub-spaces through the escalators or stairs, which could never be shown in only one level's space syntax analysis.

Finally, the whole integrated analysis of all the sub-spaces of the three levels indicates that the most integrated sub-spaces of the mall are located on the lower middle part of the ground floor, at the mall's core, facing its most prominent element, the Daci Temple. On the one hand, this result validates the theoretically anticipated outcome about the most integrated spaces in the mall (this also corresponds to the evidence on space crowding found during field observations, which are not discussed in this paper). On the other hand, it again reflects that the spatial configuration of a mall would undoubtedly affect people's movement in spaces, and the ultra-modern shopping malls are making good use of it to discipline customers' behaviours to make more economic interest from them.

4 CONCLUSIONS

Based on theoretical and empirical analyses, the findings of this study confirm our hypothesis that ultra-modern malls maintain the impermeable spatial configuration of modern malls by producing a new kind of configurational inversion. The subversion of the configurational inversion, obtained by replicating the open and integrated structure of the traditional fabric of central Chengdu, appears as a cunning deception: although it becomes more open, physically and visually, its configuration substantially offsets such changes. This effect results from the combination of cunningly conceived spatial integration and depth. The total depth of its spatial structure is shallower than other malls, but its sub-spaces have a peculiar isotropic ringiness that distracts and disorients the visitors. Even though it seems that the new type of shopping mall has become more open and public to the citizens, the control over people's behaviours still holds strong or becomes even more potent, as it guides people's movement through the elaborately designed spatial configuration and physical properties like width. Confirming the genealogical theory of Foucault (1975), the "improved" ultra-modern malls' intention of control becomes more hidden and harder for people to perceive or detect because the patterns of spatial relations are so innate to our existence that they form part of the apparatus we *think with*, rather than *think of* (Hillier 1996).

The ultra-modern mall also remains its heterotopian characteristics. As an other space, it continues to segregate people both from the urban public streets and from each other in the mall's

interior. It keeps providing people with the illusions of public spaces and the sense of daily public life and social community. It becomes better at mirroring the spatial structure of the urban streets and making people encounter each other to create a sense of daily public life in the private space. It constructs a sophisticated simulacrum that gives people the illusions of publicness, ordinariness and sociability while it deceivably mirrors the spatial structure of the urban streets into an antagonist double of the city itself that affirms itself as the symbol of modern civility and, normatively, makes people encounter under the commodifying logic of conspicuous consumption. The shortcuts for people to quickly pass through the mall invert instantly into detours once people enter the mall, and as they gradually go deeper inside the mall, it becomes harder for them to get out of it. This indicates that the configurational inversion (Dovey 1965) derived from the modern mall is still maintained in the ultra-modern type. Many characteristics remain unchanged in the mall's core as the essential principle, and the meta-purpose of the mall is always to make economic profits from the customers rather than operate for the public interests of the citizens, which separates them distinctly from the genuine public sphere. However, to attract more people, they gradually become semi-public spaces or disguise themselves as pseudo-public spaces by making the spatial configuration more open or conducting more public activities.

Ultra-modern shopping mall has evolved to create a whole-day city-centre with shopping, cultural, lifestyle and entertainment experiences by providing everything a modern consumer could possibly need or want while maintaining the intimate feel of a public district. The purpose is to attract and retain consumers as long as possible, provide an illusion of civic community life, and control them to consume as much as possible. The structural characteristic plays a vital role in this illusion and control, as Hillier and Hansen (1985) argue that exterior and interior spaces have a fundamental difference in that interiors are far more deterministic of behaviour and encounter, with greater capacities for control and social reproduction.

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