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Original Article

"Social Cohesion and Urban Transformation in Heritage Cores: A Spatial-Demographic Study of Jaipur's Walled City"

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Abstract *- The geo-social planning of the walled city of Jaipur is deeply intertwined with its historical and architectural heritage. This meticulously designed city meets the overall needs of its inhabitants while embodying the cultural values of the time. The city's urban layout, based on the concepts of Hindu cosmology, has a network of carefully planned streets, public spaces, commercial setups, residential blocks of varied scales and typologies that not only serve practical purposes but also reinforce the city's cultural identity and imageability. Despite its distinguished plan form and spatial organization, particularly at the mohalla level, which has aided in long-term cultural resilience and social cohesiveness, it is still not widely studied. Additionally, there is a study gap in our understanding of localized neighborhood dynamics and imageability within the medieval urban centre because most of the work currently in publication focuses on macro-level urban architecture. Based on the available secondary data and field surveys, this paper is an attempt to address these gaps by 1. a study of initial conceptualization/morphology and 2. imageability of the city by a detailed study of its urban form and city structure on varied scales. 3. Study of form, structure and pattern of residential mohallas and concludes that the planning of this medieval city reflected a balanced and harmonious coordination between physical structures, geographical settings, and the strong societal setup, giving it its distinctive shape and form. The study makes a significant addition to both scholarly debate and practical policy frameworks since these comparative advantages provide a reproducible model for urban planners working in heritage zones.*

Keywords *- Imageability, Medieval city, Street system, Social Structure, Urban form.*

1. Introduction: Walled City of Jaipur

The Walled City of Jaipur, established in 1727 by Maharaja Sawai Jai Singh II**,** represents a unique example of medieval Indian urban planning that has adapted over the years while maintaining its core structure and social setup. Designed under the principles of Hindu cosmology and *Prastara***,** which emphasizes the use of cardinal directions and grid layouts with its street pattern firmly designed in a rigid gridiron pattern, Jaipur is a fine and well-known example of a planned city in the Indian subcontinent.

The city was founded as the new capital of the Dhoondhad Kingdom, addressing the needs of a rapidly growing population and the water scarcity faced by the original capital, Amber, a hill city. Located to the south of Amber, Jaipur sits in a valley and plains beyond the surrounding hills, in the eastern part of present-day Rajasthan. It is bordered by hills on three sides, with the Nahargarh Hills to the north, which host the Jaigarh Fort and Amber Palace. Bengali Hindu Architect Vidyadhar Bhattacharya planned Jaipur for an area of 481 hectares, which later expanded to 670 hectares, encompassing the city's walls. This historical overview provides a glimpse into its origin and development as a planned, fortified city. The basic idea involves a 3x3 grid with streets or pathways as grid lines. However, the city of Jaipur does not strictly adhere to a regular *Prastara* plan**,** particularly in its northern and north-western boundaries, which are irregular in shape [1].

Over time, Jaipur's urban morphology has undergone significant transformation due to socio-political changes, modernization, and economic developments. The rigid grid pattern that initially defined the city began to blend with more organic, unplanned growth, particularly in areas surrounding the walled city. [1] Areas outside the boundary wall started developing. The evolution of neighborhood structures and residential buildings within the city, especially the havelis (traditional courtyard houses), has contributed to changes in the spatial organization, as these were also modified (within the limits of development control guidelines) to suit changing

lifestyles and population densities. [2] Jaipur's historical core has, however, retained its medieval charm while expanding into a bustling urban centre, with morphological shifts driven by both internal pressures and external influences such as tourism and commerce. [3]

This paper narrates the detailed profile of the Jaipur walled city to summarise the story of its conceptualization and imageability. This involves studying how the city's form and social structure evolved and gave an image to the city. The latter part of the paper details the form, structure and pattern of residential mohallas and concludes that the planning of this medieval city reflected a balanced and harmonious coordination between physical structures, the natural environment, and the societal setup, giving it its distinctive shape and form.

By demonstrating the social logic embedded in overall conceptualization, planning and developing a mohalla-based living, this study aims to explore the science of traditional community-based planning concept through the lens of socio-spatial theory.

Detailed data on the physical dimensions of the road network, street system, and the neighbourhood chowkdis, as well as the distribution of the built and unbuilt data, have been collected for the research. For the morphological study, drawings covering the entire walled city area made by the British Government and the Jaipur royal family trust were procured and analyzed. In these drawings, building blocks, the number of floors and land use of the buildings are earmarked, which can further be utilized to study the changes incurred over the years. The second stage of data collection was done from archives of Jaipur Nagar Nigam Heritage and through GIS mapping of certain selected chokdies with the aim of mapping the existing scenario of form, structure and pattern of residential mohallas.

This study offers a critical micro-scale viewpoint by examining the spatial organization and social logic of mohallas within individual Chowkris, whereas earlier research on Jaipur has primarily focused on its gridiron plan, architectural landmarks, and macro-level morphological change. This paper presents a thorough knowledge of how caste-based and occupationally linked communities contributed to a durable urban structure through the integration of historical mapping, GIS analysis, and field surveys. It provides fresh perspectives for modern urban policy that seeks to strike a balance between conservation and development by applying Kevin Lynch's theory of imageability to the medieval city in a grounded, empirical way.

This study's relevance is much more crucial in the quickly urbanizing world of today. The social structures of historic cities like Jaipur have been significantly impacted by modernization and the related processes of commercialization, infrastructure development, and demographic changes. Once closely connected by caste, occupation, and kinship, traditional neighborhood-based life is gradually giving way to nameless, diverse populations with tenuous social bonds. Rising property values, redevelopment driven by tourists, and insensitive urban policies are all posing a danger to the mohalla system, which was once the centre of social cohesiveness and cultural identity.

The study advances knowledge of how heritage cities can adapt without losing their sense of community and inherent identity by looking at how Jaipur's historical spatial and social systems have changed and adapted to these forces. This reaffirms the necessity of heritage-sensitive planning that combines urban change with social sustainability.

1.1. Research Methodology

To achieve thorough spatial and sociological insights, this study's multi-stage data collection process used both primary and secondary sources. Archival research was used to get the first data, which included records from the Jaipur Royal Family Trust and old maps from the British colonial era. These maps offered comprehensive information about the original topology of the city, including street hierarchies, land uses, and building footprints. Secondary data from the Special Area Development Plan and the Jaipur Nagar Nigam were also examined to comprehend current changes in land use and administrative borders. Street widths, plot dimensions, and building heights were measured physically during structured field surveys in a few chosen chowkris as part of the primary data-gathering process. GIS-based spatial mapping and photographic documentation aided in these surveys. Triangulation was used to compare field observations with archive data and official government records in order to validate the results and guarantee reliability. To cross-verify the physical arrangement, historical changes, and sociocultural narratives connected to each mohalla, key informant interviews were also carried out with locals, government representatives, and heritage planners. Road hierarchies, building densities, and residential block sizes could all be precisely calculated thanks to the quantitative spatial analysis made possible by the use of GIS technologies and AutoCAD. When combined, these techniques helped to provide a solid knowledge of the shape and purpose of Jaipur's historic urban fabric.

2. Historical Setup

The territory that is now Jaipur was historically referred to as Matsya Desh, a region associated with the Virat Kingdom in the Mahabharata**.** King Virat, who ruled this area, was a prominent figure during the epic, and the region has deep historical and mythological roots. The Kachwaha Rajput clan, which later ruled Jaipur, claims descent from Prince Kusha**,** son of Rama, a significant lineage in Hindu

mythology. [1] The region was later called Rajputana. It consisted of several princely states, the most prominent being Mewar, Marwar, Amber (Jaipur), Kota, Bundi, Bikaner, Jaisalmer, and Alwar. Each state was ruled by a Rajput clan and had its own political system.

The British East India Company, after taking control over Rajputana by defeating Maratha and Pindari forces in the early 19th century, turned the region into a collection of princely states under indirect British rule. Rajput rulers continued to hold power, but they operated as subordinate allies of the British Empire until India's independence in 1947. The state of Rajasthan was officially formed on 30th March 1949, when the princely states of the Rajputana Agency under British rule were integrated into the newly formed Indian Union. Jaipur, already a prominent city and a major princely state, was selected as the capital of the newly created state of Rajasthan due to its strategic importance, central location, and historical significance. It is also the largest city in Rajasthan and serves as its political, cultural, and economic hub. [3]

2.1. Geographical Settings

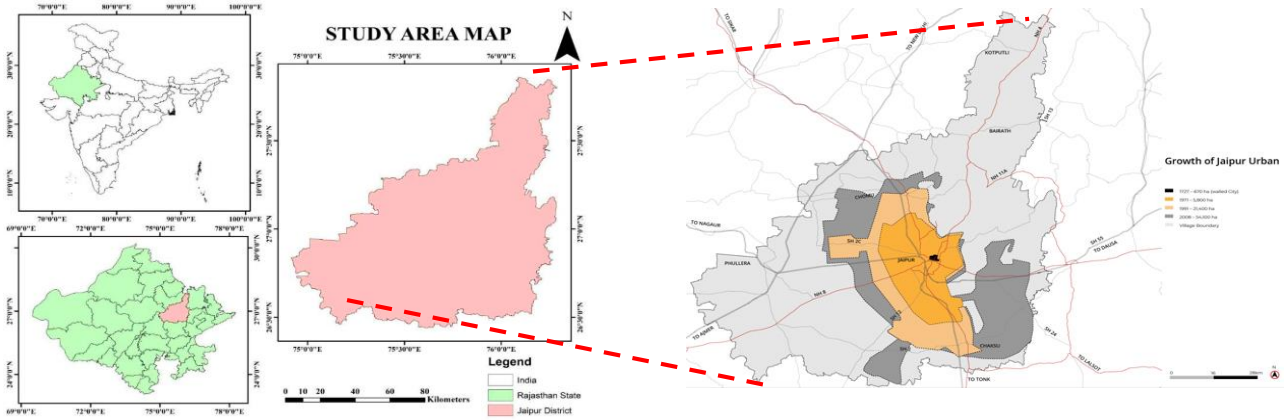

Fig. 1 Geographic setting of the Walled City of Jaipur, Rajasthan

Source: Author, Census 2011

The walled city of Jaipur is located at coordinates 268°55′ N 75°49′ E at an average elevation of 432 m. [4] It lies in the eastern part of Rajasthan, within the Banas River basin, and is part of the state's eastern plains. (Figure 1) The region is traversed by several seasonal rivers, with the Banganga and Bandi rivers being particularly notable. Historically, the area now known as the Jaipur district was referred to as Dhoondhar, which roughly corresponds to the modern districts of Jaipur, Dausa, and Tonk. [5] Geographically, Jaipur district is bordered to the north by Sikar and Mahendragarh (in Haryana), to the south by Tonk, to the east by Alwar, Dausa, and Sawai Madhopur, and to the west by Nagaur and Ajmer. The Aravalli hills surround the eastern and northern parts of the district, adding to its topographical diversity. The Banganga and Sabi rivers play an important role in the region, with Ramgarh Dam on the Banganga providing drinking water to Jaipur's old city. One of the significant natural features in the district is Sambhar Lake, the largest inland saltwater lake in India, known for producing high-quality salt. This lake holds historical, economic, and ecological significance, contributing to Jaipur's distinct natural heritage.

The city of Jaipur is geographically enclosed by the northern Aravalli hills, which feature mountain peaks and water bodies. This natural boundary is reinforced by historical fortifications, including Nahargarh Fort, Jaigarh Fort and Garh Ganesh, located to the north and south of Galtaji. Together, these forts created a defensive perimeter around the city, providing strategic protection and a defined urban boundary. This fortification system was integral to the city's design and security, further enhancing its defence capabilities. These hills and fortifications served a defensive purpose and contributed to the city's unique landscape and historical significance.

2.2. Planning Concept and Morphology of Walled City

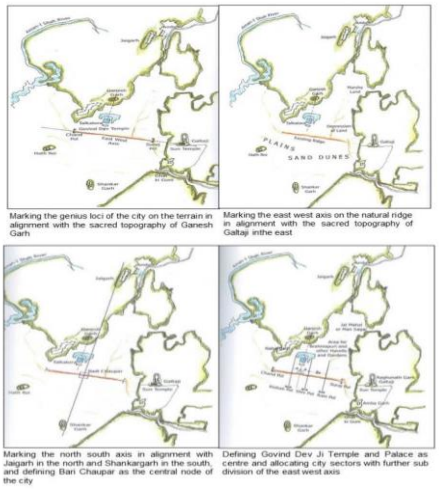

Fig. 2 Conceptual sketches showing the planning of jaipur city

Source: Princely Terrain: Jaipur, Amer and Shekhawati

The Nahargarh hills in the north, with their distinct faunal shape, played a crucial role in directing the conceptualization of Jaipur, restricting its development to the south of Amber. (Figure 2) The city was conceived on a fertile plain surrounded by hills to the northwest and east, creating a natural defence on three sides. This geographical advantage was complemented by the strategic planning undertaken by the Rajput kings of Rajasthan. Their vision for the city combined the use of natural landscapes with human-made fortifications, making Jaipur not only a well-protected city but also a highly functional urban settlement within a defensible boundary.

Fig. 3 Conceptual and layout plan of the walled city of Jaipur
Source: City Palace Museum, Jaipur

According to a royal record, Jaipur was initially designed in a rectangular shape, divided into nine blocks to symbolize the nine treasures (Nidhis) associated with the mythological god of wealth, Kuber. However, due to the presence of a hill, there was no room for the ninth Nidhi within the city's main layout, so it was placed just outside the square on the eastern side in continuation with the other blocks. (Figure 3) The city's major roads were designed to intersect at right angles, with three roads running north-south and meeting the 3.5 km-long east-west axis. Three major intersections within the city—Badi Chaupad, Choti Chaupad and Ramganj Chaupad—were formed by these roads. (Figure 11) The city was also fortified by a 20-foot-high and 9-foot-thick wall. It could be entered through seven key gateways: Dhruvapol to the north, Gangapol and Surajpol to the east, Rampol, Sanganery Gate, and Ajmeri Gate to the south, and Chandpol on the western side.

2.2.1. Social Profile

Sectors or residential areas (*chokdies)* of the city were organized according to the socio-economic statuses of its residents. Neighborhoods were divided by caste, including areas like Brahmanpuri (for Brahmins), Kumaravas, Maheshwarivas, Chinpavas, and Telivas. This created a caste-based spatial organization within the city. [11] The layout of Jaipur reflected this structure, with Brahmins (priests) residing in the north, Kshatriyas (warriors) in the east, Vaishyas (merchants) in the south, and Shudras (laborers) in the west. (Figure 3) This arrangement was clearly expressed in the city's nine distinct divisions, each associated with a particular caste group. Such spatial segregation had a lasting impact on Jaipur's social and physical fabric.

2.3. Conceptualization and Development of the Walled City in Phases

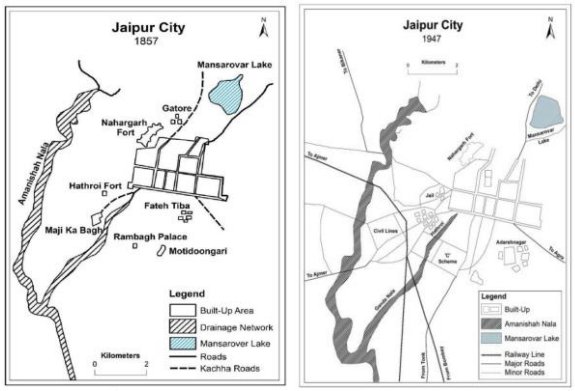

Fig. 4 Map of walled city of Jaipur showing morphological development outside the walled city in the years 1857 and 1947
Source: City Palace Jaipur.

2.3.1. Morphology Over the Years
From 1727 to 1800

The construction of bazars, havelis, temples, and other ritual monuments started in the 18th century. The width of paths or streets in the city was predetermined based on their usage and importance. The intersections of the primary streets were carefully designed, and large public squares were formed, known as Chaupads. These squares functioned as important public spaces, marketplaces, and hubs of social and cultural activity.

During this period, the establishment and development of Jantar Mantar by Sawai Jai Singh II was done, which became a significant hub for astronomical activities under Jai Singh II's rule, and the city of Jaipur as a whole flourished during this period. Parallel to these scientific advancements, Jaipur's urban and social structure was carefully organized, influenced largely by its merchant classes. Residential sectors like The Modikhana Chokri and Visheshwar Ji were established by wealthy Jain and Hindu merchants. The Johari Bazar area, particularly near Chowkri Ghat Darwaza, developed as a center for artisans, merchants, and workers, fostering economic vibrancy. The Chowki Ramchandra Ji area enclosed numerous temples and Havelis, constructed by the king, his queens, and noble families, indicating the strong presence of the elite in certain parts of the city. Meanwhile, the Sireh

Deorhi Bazar side reflected a royal touch, while craftsmen and royal staff resided mainly in the city's eastern and north eastern quarters. The area known as Topkhana Hazuri, irregular and sandy, became a place for factory workers, reflecting the city's growing industrial base.

Brahmapuri colony, to the north of Purani Basti, was specifically developed for Brahmins from Prayag (modern-day Allahabad), whom Jai Singh invited to perform the Ashwamedha Yagya in 1734. (Figure 3) Brahmapuri thus became the residence for the royal priests and other Brahmins, cementing the role of religious and scholarly groups in the city's social fabric.

A few patches outside the walled city were also earmarked and developed in the same timeline. Areas like Nawabpura and Jalupura, located in the western part of the city, were constructed to house the Meenas (an indigenous tribal community) and sweepers. Fateh Tiba was developed to the south of the city, while Badanpura and Khatik Mandi were established in the east. These areas cater to different occupational groups, including the Khatik (butchers), who reside in Khatik Mandi. This planned segregation of communities into distinct localities helped in organizing the city's workforce and facilitated the management of trade, industry, and social services. (Figure 4)

From 1801 to 1900

This period was marked by the construction of several iconic structures, such as the Anand Bihari Krishna Temple, the Hawa Mahal, and the Brijnidhi Temple, all of which were built around 1790 A.D. under Sawai Pratap Singh. These structures, with their intricate designs and grandeur, added to Jaipur's architectural heritage. Ram Singh's reign saw the construction of several significant civic and architectural projects, such as the Ram Bagh Palace, Ram Niwas Garden, Mayo Hospital, Civil Lines, Railway Colonies, and roadways. Many of these developments occurred outside the walled city, as the central city had been fully developed, and the suburbs began to grow. These suburban areas, such as Civil Lines and Railway Colonies, were built to accommodate local officers and railway workers, marking Jaipur's expansion beyond its historical confines. [6]

1901 Onwards

During the late 19th and early 20th centuries, Jaipur underwent significant modernization, urban expansion, and industrial growth. Under the reign of Sawai Madho Singh II, several transformative infrastructural projects were undertaken. One of the most important developments was the construction of a metre-gauge railway line, spanning 118 km from Sanganer to Sawai Madhopur, which facilitated easier movement of goods and people. The Jaipur Shekhawati Railway was also constructed, covering about 108 miles, further enhancing connectivity.

This period of expansion coincided with the reign of Sawai Man Singh II, during which the municipal area of Jaipur expanded from 4.83 km² to 40.23 km². In 1935, the first major step toward housing the common people outside the city walls was taken. This marked a shift in the urban fabric of Jaipur as more residents, businesses, and industries began to settle outside the historical walled city. Further developments in the city's industrial sector included the establishment of Sanganer and Sitapura Industrial Areas in the southeast and the Malviya Industrial Area, all strategically arranged along the railway lines, forming a network to support economic activities. The creation of New Colonies in 1946 provided additional residential space, and the locality was later handed over to the municipality for maintenance, formalizing its integration into the broader urban landscape of Jaipur. The area enclosed by the city walls (parkota) was termed the walled city area. This period of urban expansion was a critical phase in Jaipur's transformation from a historically significant walled city into a modern, industrially vibrant centre. [9]

3. Imageability and Urban Form: The Distinct Character of Jaipur's Walled City

3.1. Existing Urban Profile

Fig. 5 Jaipur city plan and land use map of walled city of Jaipur
Source: Special Area Heritage Development Plan (SAHDP) 2041

The walled city of Jaipur, which was designed with 60,000 people living in an area of roughly 6.75 square kilometres and was built on a gridiron layout, may be the only city in India still able to meet the demands of modern on-road vehicle stresses. (Figure 5) With a population escalation to 6,31,297 (Census 2011), [10] it displays the extraordinary futuristic planning approach of the Maharaja of that time, reflecting astronomical skills and a unique urban form. Administratively, Jaipur Municipal Corporation (JMC) was created on the basis of the 74th Constitutional Amendment Act to administer the walled city area of Jaipur, within the Municipal limits. After Jaipur was proclaimed the capital of the state of Rajasthan on March 30, 1949, it was legally renamed a Nagar Committee in 1869, a Municipal Board in 1938, a Municipal Council in 1944, and finally a Municipal Corporation in 1992. In 2020, Nagar Nigam Jaipur was further split into two main sections, with the walled city region falling under the purview of Nagar Nigam Jaipur Heritage (NNJH). The Walled City region under NNJH includes 30 wards. [11–13]

Table 1. Existing land use data of the walled city of Jaipur [10]

S. No.	Existing Land Use structure	Area in Hectares	Percent (%)
1	Residential land use	418.03 hectare	62%
2	Commercial land use	17.92 hectare	2.7%
3	Religious land use	0.64 hectare	0.1 %
4	Industrial land use	0.58 hectare	0.1%
5	Public/ Semi-Public land use	37.71 hectare	5.6%
6	Tourist Facilities Land Use	0.29 hectare	0.04%
7	Governmental land use	4.21 hectare	0.6%
8	Recreational land use	12,77 hectare	1.9%
9	Parks & Open Spaces land use	4.44 hectare	0.66%
10	Circulation land use	66.22 hectare	9.8%
11	Public Utilities land use	5.35 hectare	0.8%
12	Water Bodies land use	6.09 hectare	0.9%
13	Land use Mixed	99.76 hectare	14.8%
Total		674 hectare	100%

The Walled City of Jaipur was once intended to be a futuristic city with mixed-use residential and commercial buildings, as well as public and utility spaces and expansive open areas known as Chaugan and Chaupad.

Since its founding in the 18th century, the city's form and shape have essentially been the same. But over time, the character of land use has changed in some way. Unlike the original idea of putting residential clusters in the middle of each block and markets along the street, the use of buildings and land has gradually changed to become more commercialized in tandem with the residential use (Table 1).

3.2. Imageability of the Walled City

The image of a place often extends beyond reality and may become increasingly misleading, either positively or negatively, despite significant changes, alterations, and transformations in its overall structure or culture over time. Planners, as manipulators and shapers of the physical environment, are primarily concerned with extending agents of interaction. [7] They aim to capture the attention of observers and shape their perceptions by influencing imageability, creating a shared mental picture carried by a large number of inhabitants, while often overlooking individual differences. [8] In broader terms, the image of a city is shaped by people's selective impressions, simplifying and generalizing patterns of orientation. [9] These patterns may revolve around focal points, be divided into named regions, or be connected through remembered routes.

This resonates with Kevin Lynch's classification of image elements in urban environments, categorized into five major components: Paths, Edges, Districts, Nodes, and Landmarks. [10] These elements have been continuously studied and referenced by numerous researchers.

Urban form generally refers to the physical layout and structure of the built environment. It consists of visual images of cities, experiences, emotions, memories of places, intellectual constructs, and thoughts rooted in the realm of art and humanities. It encompasses all urban elements, including built-up areas and their design, which influence character and identity, urban layout and street design, subdivision patterns, and the relationship between public and private spaces. [11] It also includes the interaction of activities within centres, towns, open spaces, recreation areas, and green spaces.

3.2.1. Elements of Imageability

Maharaja Sawai Jai Singh Ji, the city's founder, is the source of its name. Situated on a tiny plain, it is encircled by hills on all sides save the south, with forts at key locations. The Nahargarh Fort is located at the northwest extremity of the ridge, approximately 5,000 feet above the city, while the mountain dips northward toward Amber. The city is surrounded by a stone wall that is 20 feet high and 9 feet thick on average.

Path- The Street System or the Connecting Spines

In terms of perceptibility and orientation, Jaipur's path system aligns well with the principles set out by urban theorist Kevin Lynch, particularly his concept of urban imageability. The city's organized grid pattern and use of key streets as axes create a mental map that allows for easy navigation. (Figure 6) This meticulously planned system reflects practical considerations for ease of movement and commerce, as well as symbolic and ceremonial aspects that aligned with the city's status as a royal capital.

The city has a remarkable regularity in the width of its streets. The plan is conceptualized along major roads following natural slope running from west to east from the foothills of Nahargarh till that of Galtaji at an angle of almost 15 degrees. [5, 6] This is further divided by three roads, perpendicular and equidistant to each other, forming various nodes and squares termed Chaupar. [14] It is organized in rectangular blocks and split into six equal sections by cross streets. Narrower alleys then intersect these sections at regular intervals.

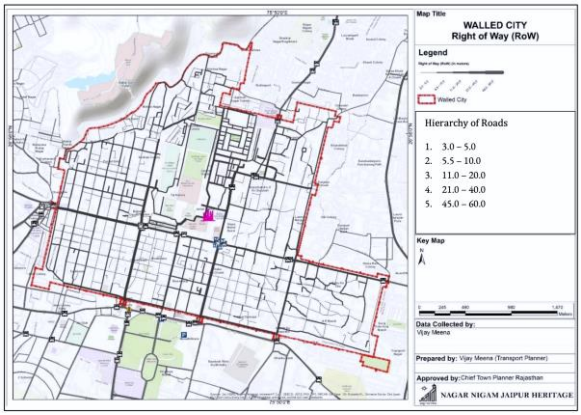

Fig. 6 Hierarchy of roads, walled city of Jaipur
Source: Nagar Nigam Jaipur Heritage

At the heart of this design are the main axial roads, or Rastas, running EW and NS, which form the primary routes of movement throughout the city. These roads, such as Johari Bazaar, Tripolia Bazaar, and Kishanpole Bazaar, are wide, approximately 111 feet, and serve multiple purposes. (Figure 8) On a practical level, they are essential for trade and public movement, facilitating the transport of goods and people. However, these broad streets also serve ceremonial functions, with royal processions and public festivals being an integral part of city life. The 55 feet wide secondary streets are intersected by the 27 1/2 feet wide internal streets or raasta, and eventually end up in the gallies of width 13 feet (Figure 7), ensuring efficient navigation and spatial organization, reflecting a clear understanding of urban dynamics by the planners. [7] Since the approximate distance between all of the sub-sector roads mostly depends on the sizes of the plots that are available, the overall distance between roads is greater in the south-eastern chowkries, where the houses were granted to Kshatriyas and vaishyas (traders), because of the larger plot sizes. However, because of the smaller land sizes in the western chowkries, where the craftsmen were positioned, the subsector roads were closer together.

Fig. 7 Internal Tertiary streets inside chokdies

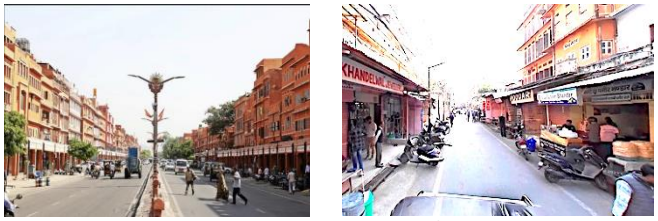

Fig. 8 Primary and secondary roads of the walled city

The systematically designed street system of the walled city forms a very important element of imageability as majorly all the streets are named after the type of occupation that has been adopted by the people living in that chokdi or cluster or after the caste majorly associated with them, like thatheron ka raasta, Maniharon ka raasta, etc. [15]

The arrangement of living spaces in every residential block reflects the local and occupational context, yet the interconnected areas created are a result of the broader urban layout. Interestingly, every house with an entrance on the same galli belonged to a single residential Mohalla. (Figure 9) This ultimately established a sense of belonging and a distinctive community identity.

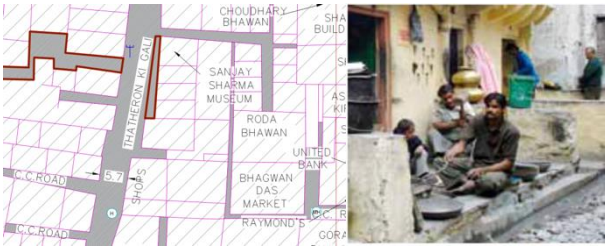

Fig. 9 Thathers can be seen working at Thatheron ka Gali inside Chokdi Modi Khana
Source: author

Edges: Boundary Wall (Parkota) and Facade (Baradari)

Linear elements of the urban setup are generally perceived as the path or the edges by any observer. These are defined as the edge lines or the boundaries between any two elements or path and can be penetrated through any form of objects like perforations, design breaks, etc. [7] In the case of walled city, it majorly comprises of the parkota or the fortification which is a 3-meter thick and 6-meter-high masonry wall and the hills on other sides act as the man made and natural edge respectively. The facades are the pink linear walls of bazaars along main roads on both sides. [16] Along major roads, they are characterized by the '*baradari'* or the shaded walkways of bazaars. (Figure 10) This arrangement eventually results in forming a strong indicative horizontal line along the major roads on all sides. Having a strong monotonous character in terms of colour and form, it maintains a uniform facade, giving a bold identity to the place.

Fig. 10 Facade of Johri Bazar, showing linear arrangement and uniform character of shops, Jaipur

Nodes: Chaupads

Points that act as a focus along the paths are considered as Nodes of the city. They are the strategic spots of entry/exit and junctions, mainly the breaks in the spines of transportation, causing a large gathering or catering to the needs of multiple observers at one point. The gateways and chaupad of the walled city are the strategic reference points and act as nodes for the city.

Chaupads of the walled city are the major cross sections or chowks on the major roads that were mainly designed as public squares and had step wells to supply fresh water through underground channels running along the secondary and primary roads. They had a width that was three times the width of Main Street (324 feet). Over the years, they were converted into landscaped chowks and act as an extended marketplace. Three such major junctions forming chaupars are choti chaupar, badi chaupar and Ramganj Chaupar. (Figure 11) They are formed by the intersection of perpendicular roads to the main axial road that runs from two different ends of the city, which runs along the EW direction (Chandpole to Surajpole).

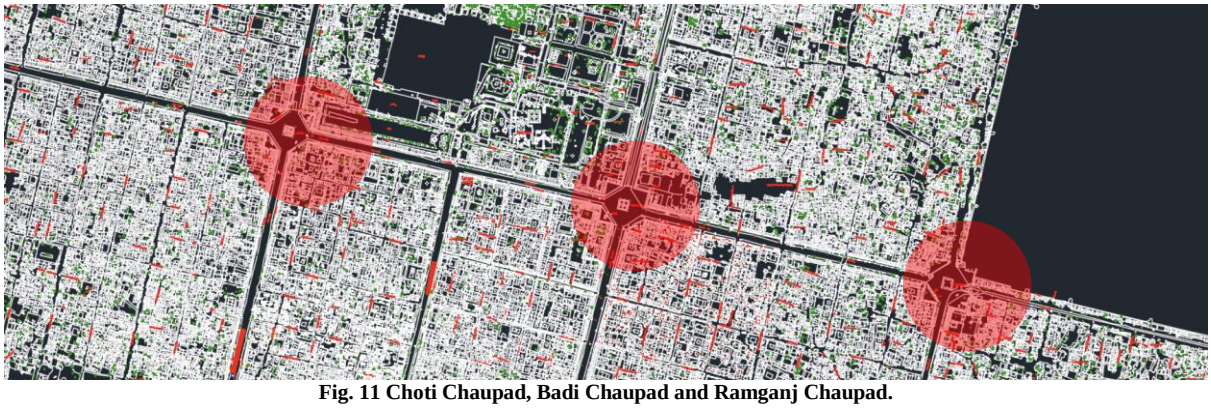

Fig. 11 Choti Chaupad, Badi Chaupad and Ramganj Chaupad.

Certain minor chowks in the city, like Jaleb chowk, Subhash Chowk, Chandni Chowk, etc., are formed by the cross section of main and sector roads generally inside the chokdies.

Landmarks

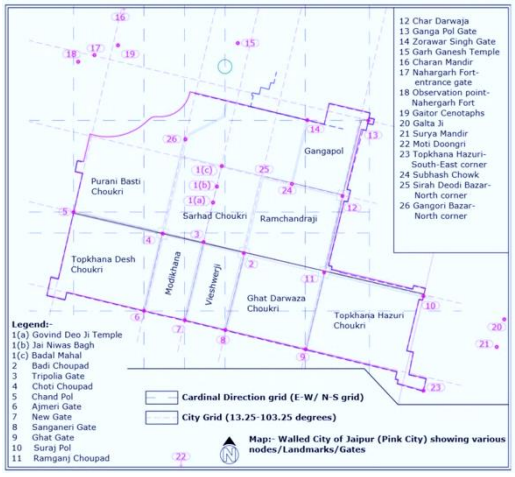

Fig. 12 Location of major landmarks marked on the plan of the walled city

Source: [18]

They are responsible for giving identity to a place by acting as a major point of reference. Major landmarks of the walled city are the Amber and Nahargarh forts, Hawa Mahal, Govind Dev Temple, and many more, which are strategically placed to act as monuments of reference and direction. (Figure 12) The Tal Katora tank, which is surrounded by a stone wall, is located to the north of the palace. Past it is the Raja Mãl-kã-talao, which is roughly 100 acres in size and has crocodiles. Sawai Jai Singh's observatory is one of the state's most fascinating artefacts.

Certain Havelies also act as focal points and are named after the famous rich merchants, like Ojha Ji Ki Haveli, etc. There are certain very famous temples and mosques, some historic public buildings like the Rajasthan School of Arts, Town hall, and certain other structures like Sarga Suli, etc, mostly on the major roads, acting as strong icons for the place. Besides this, the Chaupars and gateways have also been considered as major landmarks and strong focal points.

District: Chowkdi

Districts are the distinct sectors within the plan of the city, often characterized by their pattern of land use, economic or cultural distinction. They give texture to the overall pattern of the city.

Districts of walled cities are the residential clusters or the chowkdis, having non-permeable and permeable paths and edges that form a sense of enclosure and direction for the observers. The entire city was divided into nine chowkdis with a grid size of approximately 800m x 800m and strong recognizable characteristics (Figure 3). Chowkdi Sarhad or the Central Square, housing the Temple complex of Govind

Dev Ji and the City Palace, is the largest (900mx1200m) with multiple courtyards and a channelized path of high walls and a system of gateways for the royals and commons. [17] About one-seventh of the city is taken up by the Maharaja's palace and its pleasure grounds, which form an imposing mound in the centre.

All the principal roads that go east-west and north-south form a tight grid that makes up the nine-square Chowkris. (Figure 3). On the basis of GIS mapping, areas of each chowkri are calculated and are given in Table 2.

Table 2. The area of Chowkris of the walled city was calculated using AutoCAD and GIS

S. No.	Name of the Chowkri	Dimensions in Meters	Area in hectares
1	Ram Chandra Ji	720 X 880 Sq M	64.40
2	Ghat Darwaja	800 X 800 Sq M	68.10
3	Topkhana Desh	800X900 Sq M	74.68
4	Topkhana Desh Hazuri	800X1000 Sq M	84.66
5	Ganga Pol	800X515 Sq M	54.48
6	Sarhad (Royal Precincts)	900X1200 Sq M	43.57
7	Vishveshwar Ji	800X400 Sq M	35.00
8	Modikhana	800X400 Sq M	35.00
9	Purani Basti	800X1420 Sq M	113.60
	Total Area of Chowkris – 1665.50 Acres		674.00

Source: Author

Each of the remaining chokdies is designed as a residential neighbourhoods with multiple mohallas within each. They are arranged in a chessboard pattern and segregated by narrow galleries. They eventually form a wider social group or a community based on their caste and profession. Within each mohalla is another cluster of residential units called havelies. (23,24) They are the smallest collective dwelling unit that houses all the members of the family (extended) along with their servants, tenants, and sometimes certain official setups. Depending upon the economic and social condition of the owner, it ranges from single to multiple courtyards, some also having deities in the central area for the community.

The Plan of the Walled City of Jaipur was meticulously conceived and designed by Vidyadhar Bhattacharya with a clear understanding of the form and character of various micro-level elements and components of individual buildings, to macro-level city constituents and components. In order to create an iconic city with its own identity and the distinction of being the most successful and functional city of medieval India in the modern era, every single component of the city form has been assembled into one cohesive whole with a futuristic vision while maintaining its own significance, character, and role to play in the city's identity. Till today, it has been able to preserve much of its cultural identity, character, and form. Not just the physical assets and elements of the city, but the cultural setup and traditions also have an important role to play in the overall image of the city [22].

4. Form, Structure and Pattern of Residential Mohallas

Mohallas are traditional neighborhood blocks, most common in the cities of the north as well as central India. They were an essential element of the city during the Mughal period, mainly for administrative purposes. They have lost their administrative significance, and the clarity of their geographical range and borders is diminishing. Through field surveys, this study uncovers aspects of mohalla spatial formation, including size, boundary shape, street layout, and connects these elements to the historical urban development of the city.

In the case of the walled city of Jaipur, chowkdies were structured as a residential block with multiple mohallas in a broader context. They played a crucial role in the social structuring of the city. Each chowkdi was mainly inhabited by a specific community or occupational groups, thus reflecting a highly socially stratified urban layout. The bramhins, administrators, artisans, merchants, etc, were each allotted with a separate chowkdi, and the layout and spaces within these designated chowkris evolved depending upon their daily lifestyle, activities and interactions. The urban form of each chowkdi thus eventually evolved around path or raasta, galies, temples, havelies and bazaars, reinforcing their community life and social structuring. They created spatial blocks wherein residence, worship, and work coexisted, which fostered strong neighborhood identities.

4.1. Space Formation of Clusters within Each Residential Chowkdi

The internal divisions of the residential chowkdis were first done by dividing them into blocks 50 feet wide, secondary streets or marga running NS. Each of these longitudinal blocks was further subjected to EW aligned horizontal divisions by minor streets or raasta (Figure 13), giving small residential clusters or mohallas of about 50-60 residential households within each chowkri. It formed a strong social entity as the residents who lived in the same Marg generally were from the same caste or social unit and profession. [10]

These divisions, however, varied in count and pattern between the chowkdis and mainly depended on their development order and social distinction. Residential mohallas of Topkhanadesh, Visheshwar Ji and Modikhana,

Purani Basti showed a regular pattern of development compared to that of the others, which had many organic divisions.

4.2. Compactness and Social Structuring of Residential Neighbourhoods

Every residential Chowkdi of the walled city had a very well-laid-out social structure associated with it. This eventually gave texture to its development. A regular gridiron pattern is evident in chokdies of the eastern side of the palace, with either large plots for the merchants and small regular plots for brahmins and administrative officers. On the contrary, a very evident vernacular settlement can be observed in the chokdies of the western sides that housed the workers or people of lower caste.

Fig. 13 Land Use Plan of a residential cluster from Chowkdi Modi Khana.

Source: Drawn through GIS Software, Author

4.3. Residential Quarters

The size and structure of all the residential mohallas or blocks varied depending on the size of the chowkdis. The average size of each residential block inside all chowkri was approximately 1.42 ha, but a considerable variation in the size of individual residential quarters was observed. Residential quarters in Topkhanadesh Chowkdi are believed to follow the city's original planning dimensions [11, 12]. About 54 (42.9%) of the quarters have east-west dimensions between 95 and 100 m, 12 (9.5%) are between 110 and 115 m, and 10 (7.9%) are between 130 and 135 m. There are 12 (9.5%) from 105-115m, 10 (7.9%) from 145-155m and 205-215m, and 40 (31%) from the north-south with dimensions between 65-75m.

Residential quarters of Chowkdi Modi Khana and Visheshwar ji were the largest in size and were given to rich merchants and traders. The basic typology of these units was that of a haveli with single or multiple courts, depending upon the affordability and social structuring. (Figure 14) They were a series of rooms around a central court, with entrances mainly from the narrow gallis. Given the deeper depth of the plots accessible in Johari Bazaar, which is east of the chowkri, the particular haveli design, which consists of three courtyards, is usually seen there. Jaipur has a hot and arid climate because of its geographical location. To combat the harsh sunrays, it becomes evident to design elements to cast shadows and provide shade. The dimensions of the central open space and enclosing heights were therefore determined accordingly.

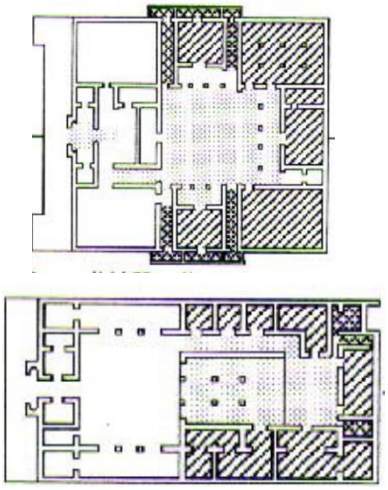

Fig. 14 Havelies of Daroga Ji and Dev Singh Ji at Chowkdi Modi Khana and Visheshwar Ji, categorized by number of courts. [12]

There is not always a greater concentration of big havelis in the western city districts of Purani Basti and Topkhanadesh, which were also developed in the early planning phases. Smaller residential areas result from the greater internal segmentation of the chowkri in Purani Basti and Topkhanadesh in the western part of the city. Apart from residential requirements, they also cater to the needs of commercial shops, community working spaces, and places for regular interaction.

5. Conclusion

The Walled City of Jaipur is a prime example of how social logic and spatial design may combine to produce resilient and culturally diverse urban formations. The results of the study demonstrate the continued value of mohalla-based planning and the integrated street-haveli-temple systems that promote social cohesion, accessibility, and community identity. These observations provide important lessons as heritage towns around the world deal with the effects of migration, urbanization, and commercialization. In the creation of modern cities, urban planners and legislators ought to think about incorporating classical planning concepts like community-scaled neighborhoods, mixed-use zoning, and hierarchical road networks. Policies must specifically place a high priority on maintaining social structures in addition to building heritage, making sure that redevelopment doesn't break up established community networks. Creating inclusive and sustainable conservation strategies can be facilitated by

combining community consultation frameworks with spatial analytic technologies like GIS. In heritage cores, urban redevelopment should actively advance social justice, affordability, and cultural continuity rather than just focusing on aesthetic improvements. The importance of heritage-sensitive urbanism, which engages with the lived realities of space, identity, and belonging and sees past the surface, is further supported by the experience of Jaipur.

Based on the above study, several key observations have emerged:

1. Spatial Configuration and Social Interaction: The spatial geometry of mohallas that are characterized by enclosure, proximity and permeability eventually facilitates interaction and social bonding. These physical patterns can be further analyzed through spatial analysis tools like depthmapx to demonstrate how urban form encourages integration and visual connectivity.
2. Neighborhood Structure as Social Infrastructure: Residential mohallas act as socially cohesive clusters that align built and unbuilt environment with caste, occupational, and kinship networks. This logic of urban area planning supports connected living and a shared sense of place.
3. Planning ideas in contemporary times: In the present era, when planners and policymakers are facing the constant challenge of globalization and conservation, Jaipur stands as an example to learn how connected living works.
4. Policy Relevance of Socio-Spatial Systems: Scientific understanding of traditional planning underscores the need for urban policy to value intangible cultural capital and social networks alongside heritage conservation.

Recognizing the existing social structures, promoting community engagement, and maintaining the spatial organization of mohallas will be crucial for preserving the cultural identity and resilience of the city.

Upcoming development needs to find a balance between innovation and inclusivity, ensuring that the social unity that characterizes Jaipur's historic centre is acknowledged and actively safeguarded.

Way Ahead

Research has been taken forward to examine the relationship between social cohesion and urban planning through a case study of the Walled City of Jaipur, integrating thirty ranked parameters across domains such as civic engagement, equity, trust, accessibility, and resilience.

The Walled City of Jaipur was selected due to its significance as a planned 18th-century city with a strong sociocultural legacy that is now experiencing rapid demographic and functional transitions.

Originally home to caste-based artisan communities under royal patronage, the area has evolved into a dense, mixed-use zone with migrant influx, economic diversification, and growing social heterogeneity.

These shifts directly impact community interactions, spatial equity, and civic engagement, making it a critical site for analyzing social cohesion and urban transformation dynamics.

References

[1] Ar. B. Surya Prakash, and Ar.P. Sitha Mahalakshmi, "Traditional Breathing Spaces in Built Forms-Review and Comparison of Courtyards in Athangudi Village, Chettinad and Contemporary Context," *International Research Journal of Engineering and Technology*, vol. 4, no.11, pp. 361-366, 2008. [Google Scholar] [Publisher Link]

[2] Shipra Goswami et al., "Conceptualising Heritage-Based City Development in India," *Journal of Urban Regeneration and Renewal*, vol. 17, no. 3, pp. 337-349, 2024. [CrossRef] [Google Scholar] [Publisher Link]

[3] Shweta Vardia, Rachna Khare, and Ajay Khare, "*Universal Access in Heritage Sites: A Case Study on Historic Sites in Jaipur, India*, Universal Design 2016: Learning from the Past, Designing for the Future, vol. 229, pp. 419-430, 2016. [Google Scholar] [Publisher Link]

[4] Michael E. Smith, "City Size in Late Postclassic Mesoamerica," *Journal of Urban History*, vol. 31, no. 47, pp. 403-434, 2005. [CrossRef] [Google Scholar] [Publisher Link]

[5] Hina Pathak, and Basheer Khan, "Geography and Topography of the Jaipur City in the Eighteenth Century," *The Scientific Temper*, vol. 13, no. 2, pp. 410-415, 2022. [CrossRef] [Google Scholar] [Publisher Link]

[6] Avinash Kumar Singh, "Morphological and Demographic Characteristics of a Planned City: A Case Study of Jaipur City," *Research Journal ARTS*, vol. 18, no. 1, pp. 145-160, 2019. [Google Scholar] [Publisher Link]

[7] Amita Sinha, and Neha Rajora, "Gaze and the Picturesque Landscape of Amber, India," *Studies in the History of Gardens and Designed Landscapes*, vol. 34, no. 4, pp. 309-322, 2014. [CrossRef] [Google Scholar] [Publisher Link]

[8] SAHDP2041_Draft, Jaipur Nagar Nigam, Dronah, 2024. [Online]. Available: https://pinkcity.jaipurmcheritage.org/PDF/Download/SAHDP_2041_Draft.pdf

[9] Shuji Funo, Naohiko Yamamoto, and Mohan Pant, "Space Formation of Jaipur City, Rajastan, India An Analysis on City Maps (1925-28) made by Survey of India," *Journal of Asian Architecture and Building Engineering*, vol. 1, no. 1, pp. 261-269, 2002. [CrossRef] [Google Scholar] [Publisher Link]

[10] Md. Fuzail Jawaid, Satish Pipralia, and Ashwani Kumar, "Exploring the Imageability of Walled City Jaipur," *Journal of Engineering Technology*, vol. 4, no. 1, pp. 46-52, 2014. [Google Scholar]

[11] Andrew Tallon, *Urban Regeneration in the UK*, 3rd ed., pp. 1-362, 2020. [CrossRef] [Google Scholar] [Publisher Link]

[12] I.O. Merylova, and K.V. Sokolova, "A Human in the Urban Space of the Globalized World," *Anthropological Measurements of Philosophical Research*, vol. 18, pp. 113-120, 2020. [CrossRef] [Google Scholar] [Publisher Link]

[13] Nicola Dempsey et al., "The Social Dimension of Sustainable Development: Defining Urban Social Sustainability," *Sustainable Development*, vol. 19, no. 5, pp. 289-300, 2011. [CrossRef] [Google Scholar] [Publisher Link]

[14] Yosef Rafeq Jabareen, "Sustainable Urban Forms: Their Typologies, Models, and Concepts," *Journal of Planning Education and Research*, vol. 26, no. 1, pp. 38-52, 2006. [CrossRef] [Google Scholar] [Publisher Link]

[15] Manjari Rai, "The Role of Urban Spaces in Creating Socially Cohesive Neighborhoods: The Case of Walled City of Jaipur, India," *ISVS E-Journal*, vol. 10, no. 7, pp. 512-524, 2023. [Google Scholar]

[16] M.F. Jawaid et al., "City Profile: Jaipur," *Cities*, vol. 68, pp. 63-81, 2017. [CrossRef] [Google Scholar] [Publisher Link]

[17] M.F. Jawaid, Satish Pipralia, and Ashwani Kumar, "Review of Environment Responsiveness of Building Regulations in Jaipur," *Journal of Urban Management*, vol. 7, no. 2, pp. 111-120, 2018. [CrossRef] [Google Scholar] [Publisher Link]

[18] Sunil Sharma, Sobhagyawati Gupta, and Rakesh Kumar Sharma, "Decoding Hidden Mysteries in Planning of Jaipur City," *ResearchGate Preprint*, pp. 1-25, 2025. [CrossRef] [Google Scholar]

[19] Giles Tillotson. "The Jaipur Exhibition of 1883," *Journal of the Royal Asiatic Society*, vol. 14, no. 2, pp. 111-126, 2004. [CrossRef] [Google Scholar] [Publisher Link]

[20] D. Walton, S.J. Murray, and J.A. Thomas, "Relationships between Population Density and the Perceived Quality of Neighbourhood," *Social Indicators Research*. vol. 89, pp. 405-420, 2008. [CrossRef] [Google Scholar] [Publisher Link]

[21] Antonio Zumelzu, and Melissa Barrientos-Trinanes, "Analysis of the Effects of Urban form on Neighborhood Vitality: Five Cases in Valdivia, Southern Chile," *Journal of Housing and the Built Environment*, vol. 34, pp. 897-925, 2019. [CrossRef] [Google Scholar] [Publisher Link]

[22] Kostas Mouratidisa, and Wouter Poortinga, "Built Environment, Urban Vitality and Social Cohesion: Do Vibrant Neighborhoods Foster Strong Communities?," *Landscape and Urban Planning*, vol. 204, pp. 1-9, 2020. [CrossRef] [Google Scholar] [Publisher Link]