

Spatial Structure and the Built Form of the Walled City of Lahore: Reading Street Hierarchy, *Chowks*, and *Katraas* as an Organizing System

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Abstract

The spatial pattern of traditional Islamic cities is often perceived as an ad hoc process of development. This study examines the spatial form and fabric of the Walled City of Lahore (Androon Shehr) to identify the principles underlying its apparently complex urban morphology. It focuses on the relationship among street hierarchy, open spaces, residential and commercial blocks, and architectural form, with particular attention to guzars, koochas, galis, bund galis/katras, and chowks. Two guzars—Lohari Gate Bazaar to Lohari Mandi Chowk and Delhi Gate Bazaar to Pani Wala Talab Chowk—are examined alongside Katra Barkat Ali, Katra Sumer Singh, and five representative chowks: Matti, Bokhari, Jhanda, Lohari Mandi, and Wazir Khan. The findings indicate that the Walled City possesses a hierarchical and functionally integrated spatial order rather than an unstructured pattern. Guzars connect major gates and economic areas, while koochas provide access to residential neighborhoods. Galis and bund galis create progressively private and intimate spaces within mohallas. Chowks function as spatial nodes, social gathering places, landmarks, and points of urban permeability. Analysis of building heights and D/H ratios further demonstrates the intimate scale and spatial enclosure of chowks. The study concludes that the Walled City of Lahore represents a pedestrian-scaled urban environment in which movement, privacy, commerce, social interaction, and architectural enclosure are systematically integrated. Its apparently irregular morphology therefore reflects discernible principles of spatial organization rather than spatial chaos.

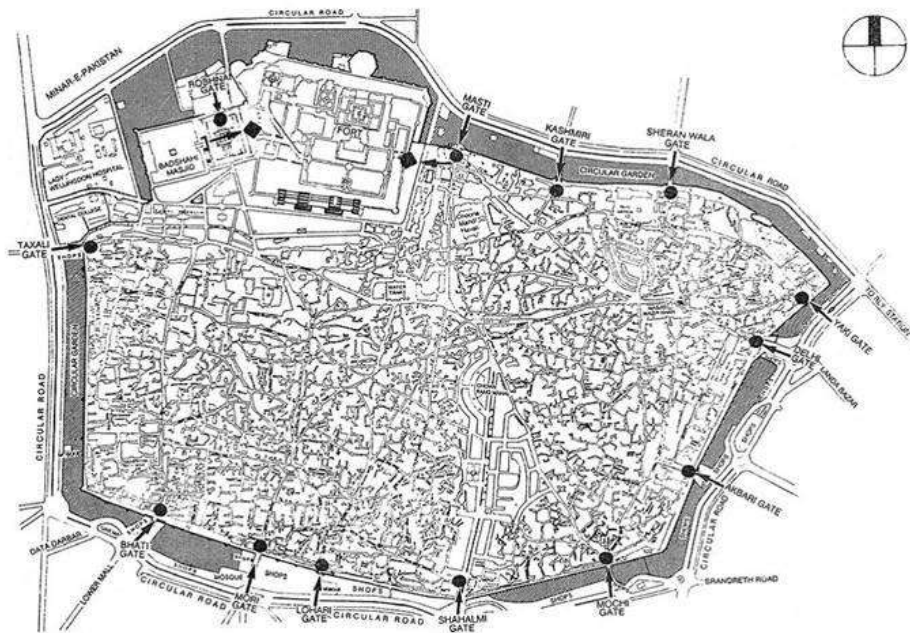
Keywords: Walled City of Lahore; Islamic urban morphology; street hierarchy; spatial organization; traditional urban form.

1. Introduction

1.1 Background

The structure of cities in the Islamic world has morphed and changed like any other city in the world. The external forces that act on any city that has existed over a long span, spreading across centuries, have played their part in cities of the Islamic world as well. Traditional cities in the Islamic world have been shaped, distorted, and reshaped by economic, political, social, climatic, and religious forces, among others. An important consideration when examining any Islamic city is that most of these cities are part of the so-called developing or under-developed world; with population growth, rural-urban migration, high land prices, informal land use, and rising urban densities, the study of their urban form entails a complex web of factors. The initial studies of cities in the Islamic world were undertaken by orientalists who held that Islamic cities possessed an essentially “different” structure of function and placement compared with Western cities, and Islamic art and architecture was for long studied through the lens of Western art theory, giving rise to a particular “Arabian Nights” image of the Islamic city.

This characterization has been challenged directly in the theoretical literature. Abu-Lughod (1987) demonstrated that the very notion of a single, timeless “Islamic city” was constructed by Orientalist scholarship from a narrow set of North African and Levantine cases and then projected backward as a model of outcomes rather than of the historical processes that actually produced urban form. In a similar vein, Hakim (1986) showed that traditional Arab-Islamic settlements were shaped by identifiable, transmissible building and planning principles rather than by spontaneous or unregulated growth, and Bianca (2000) argued that the apparent irregularity of the historic Islamic urban fabric conceals a coherent “deep structure” linking the residential unit, the mosque, and the market. It is against this body of scholarship that the Walled City of Lahore — known locally as Androon Shehr, and affectionately as “Lohr” — needs to be read.



Map of Walled City of Lahore

Figure 1. Map of old city of Lahore Source: Yamane, Shu, Shuji Funo, Hitoshi Ara, Norihisa Numata, and Hidetoshi Osamura. "TRADITIONAL URBAN HOUSES OF LAHORE: A study on the urban quarter of the walled city of Lahore, Pakistan." *Journal of Architecture and Planning (Transactions of AIJ)* 64, no. 521 (1999): 219-226.

Old Lahore is a typical example of an “organic city” or medieval urban form. Islamic cities of this kind are generally thought of as chaotic growth typical of the under-developed world, a perception reinforced by the fact that most researchers writing about them have been Westerners working from a set Hellenistic concept of what “order” in urban form should look like. The traditional street pattern has generally been thought to be tortuous, a labyrinth without rational organization, the product of spontaneous settlement or of gradual encroachment upon an assumed antique grid. An in-depth analysis of the urban fabric of old Lahore reveals that the city did not develop without coherent planning. It is imperative to differentiate the modern city from the old on the basis of its underlying social, religious, and jurisprudential structure: the traditional street pattern in a historic city such as this is not simply the result of organic growth but has its own ordering principles of spatial organization.

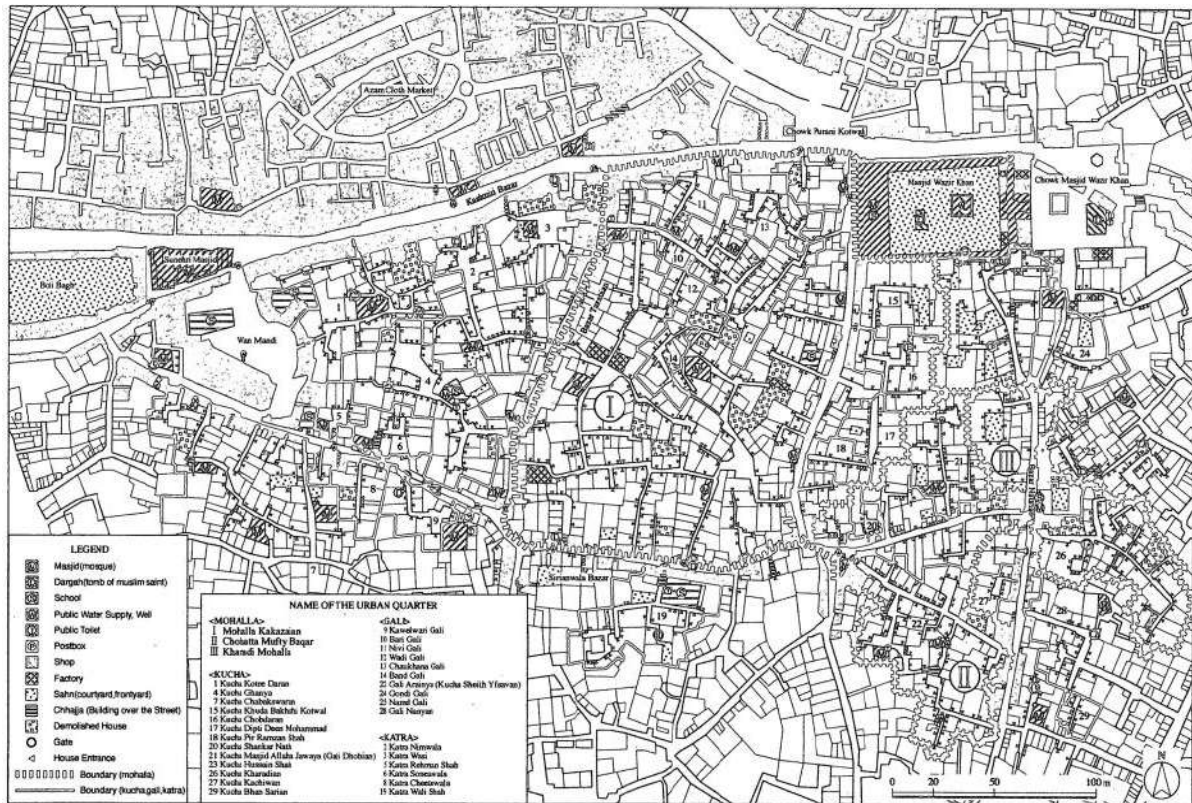


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Figure 2. Detail Map of old city of Lahore Source: Yamane, Shu, Shuji Funo, Hitoshi Ara, Norihisa Numata, and Hidetoshi Osamura. "TRADITIONAL URBAN HOUSES OF LAHORE : A study on the urban quarter of the walled city of Lahore, Pakistan." *Journal of Architecture and Planning (Transactions of AIJ)* 64, no. 521 (1999): 219-226.

The urban form of old Lahore is characterized by densely packed two- to five-storey houses and narrow, winding streets that lead to different areas of the city; these streets are the main structuring devices of the urban picture. At the same time, decaying and dilapidated building stock, improvised new construction, the conversion of residential buildings into workshops, poor solid-waste disposal, ageing water supply infrastructure that has damaged the foundations of historic buildings, exposed electricity wiring, and a disintegrating social structure are eroding the face of this historic quarter. Despite this apparent illegibility, certain structuring components remain clearly discernible. The basic form-endowing elements of the spatial form of Androon Shehr are streets (Guzars, Koochas, Galis, Bund Galis/Katraas), Chowks, Mohallahs, Bazaars, Mosques, and green spaces — of which the present study focuses on the street hierarchy and the Chowks as the principal organizing and socially generative elements.

1.2 Problem Statement

The apparently irregular and labyrinthine urban fabric of the Walled City of Lahore is commonly understood as organic or unplanned, yet its spatial structure contains identifiable hierarchies, relationships, and ordering principles that have not been systematically framed within urban-morphological theory.

1.3 Research Aim

To investigate the spatial structure and built form of the Walled City of Lahore and to identify the spatial principles underlying its street hierarchy, public spaces, residential clusters, and patterns of movement and social interaction.

1.4 Research Objectives

1. To identify the principal components of the spatial structure of the Walled City.
2. To examine the hierarchy and morphology of its street network.
3. To investigate the spatial and social role of Chowks and Katraas.
4. To examine relationships between building height, enclosure, movement, and public-space configuration.
5. To identify contemporary transformations affecting the historic spatial structure.

1.5 Research Questions

- RQ1: What spatial principles structure the apparently irregular urban fabric of the Walled City of Lahore?
- RQ2: How do streets, Chowks, Katraas, Mohallahs, and buildings interact to establish movement, accessibility, privacy, and social interaction?
- RQ3: How are these spatial relationships being affected by contemporary commercialization, redevelopment, and encroachment?

2. Literature Review and Theoretical Framework

2.1 Understanding Historic Islamic Urban Form

The historiography of the Islamic city has long oscillated between two positions. The first, rooted in early twentieth-century Orientalist scholarship, treats the winding street, the cul-de-sac, and the seemingly irregular plot as symptoms of the absence of planning — the accidental outcome of encroachment on a once-regular, classical grid. Abu-Lughod (1987) dismantled this position by showing that the “Islamic city” model was built from a handful of cases and then generalized as an essence, rather than derived from the specific legal, social, and religious processes — property law, inheritance practice, the rights of neighbours — that actually generated urban form city by city. Hakim (1986) provided the corrective empirical base for this

argument, documenting the building and planning principles — rules governing setbacks, rights of way, overlooking, and the resolution of disputes — that were applied consistently, if locally, across Arab-Islamic settlements and that generated their characteristic morphology as an emergent rather than an accidental outcome. Bianca (2000) extended this reading to the level of the whole urban fabric, arguing that the historic Muslim city should be understood as a single interconnected system linking the residential unit, the mosque, and the market rather than as a collection of isolated monuments set within undifferentiated “chaos.” Read together, this literature supports treating the apparent irregularity of the Walled City of Lahore not as evidence of an absent order, but as an invitation to look for the specific, locally generated rules that produced it.

2.2 Urban Morphology, Permeability, and Movement

A second body of theory addresses how street networks structure movement and social encounter irrespective of cultural context. The configurational approach associated with Bill Hillier's space-syntax research — collected in Vaughan et al. (2025) — treats a settlement's spatial layout as a system whose configuration, rather than any single street's individual form, governs patterns of movement, encounter, and route choice; streets that are more integrated into the overall network tend to carry more movement and more strangers, while more segregated streets sustain more local, private, and socially intimate life. This configurational logic is useful for reading the Walled City's street hierarchy: a network in which Guzars are the most through-going and best-connected routes, Koochas provide secondary linkage and route choice, and Galis and Bund Galis are progressively more segregated is, in space-syntax terms, a network already organized by depth and permeability rather than by chance.

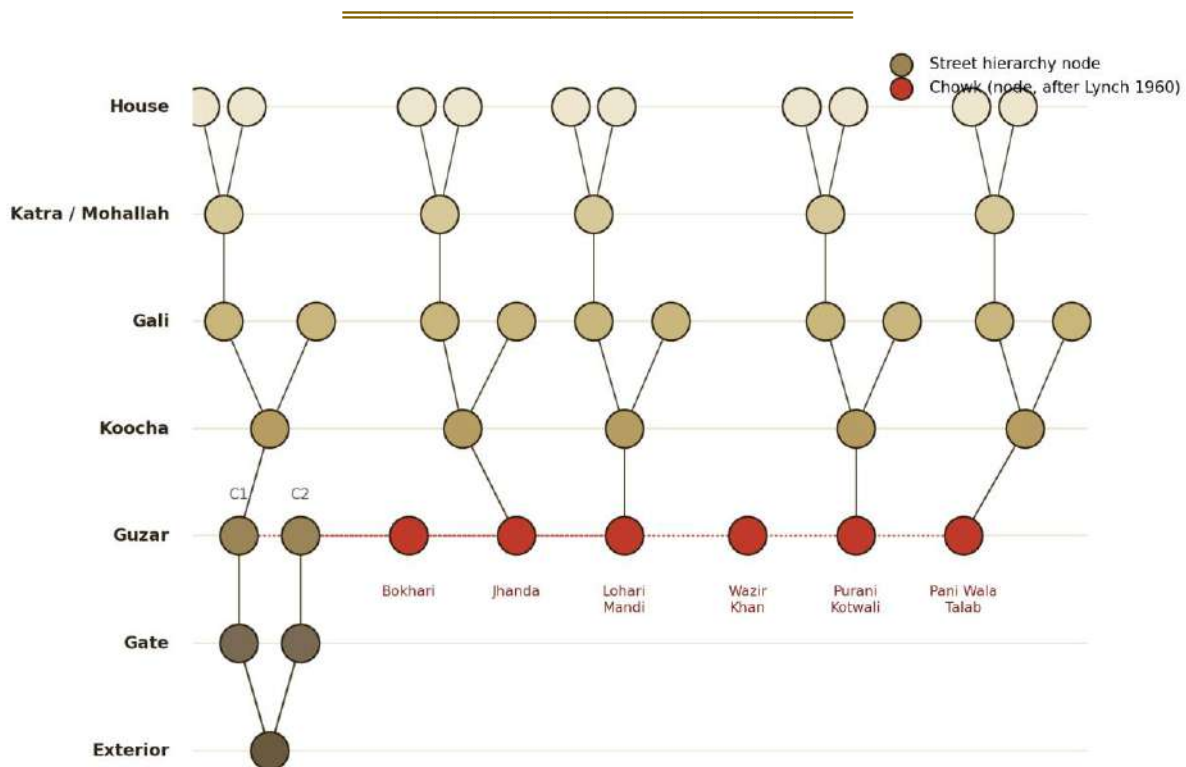


Figure 3. Schematic justified depth diagram of the street hierarchy, illustrating the configurational logic discussed in Section 2.2 (after Hillier, in Vaughan et al., 2025).

2.3 Human Scale and Spatial Enclosure

The scale and enclosure of urban space is addressed most directly by Ashihara (1970), whose distance-to-height (D/H) ratio remains the standard measure of exterior spatial enclosure. Ashihara established that when D/H is close to 1, a sense of proportion and balance is achieved between the openness of a space and the height of its enclosing facades; ratios below 1 produce a more intense, inward-focused environment in which the interaction between facing buildings becomes pronounced, while ratios approaching or exceeding 2 progressively weaken the sense of enclosure. This framework gives a precise, comparable basis for interpreting the intimate scale reported for the Chowks of the Walled City. A complementary and partly corrective position is offered by Hillier's essay "Against Enclosure", also collected in Vaughan et al. (2025), which cautions that enclosure alone does not explain why a space becomes socially generative; a space must also be positioned within the movement network so that it is actually encountered and used. Taken together, these two positions suggest that a Chowk's social significance in the Walled City arises from a combination of dimensional enclosure (measurable through D/H) and configurational position within the surrounding street hierarchy.

2.4 Cognitive Structure and Legibility

The concept of urban features that serve as cognitive reference points has been advanced most notably by Lynch (1960), who proposed that path, edge, district, node, and landmark make up the five elements that contribute towards the creation of the image of the city in the mind of its residents. Of these elements, nodes – points which can be entered by the individual and around which he/she organizes his/her image of the city, including points such as intersections and squares – correlate well with the significance that field observations have assigned to the Chowks of the Walled City in this study: points of convergence of routes, of a change of direction or an opening up of space and around which residents describe “where things are.” Reading the Chowk through Lynch's concept of the node allows the paper to treat its cognitive and orientational role as a theorized category rather than as an incidental field observation.

2.5 The Walled City of Lahore in the Existing Literature

The Walled City of Lahore itself has been the subject of a small but directly relevant literature. Yamane et al. (1998) undertook a detailed morphological survey of the Mohalla-Kucha-Gali-Katra pattern of the Walled City, documenting a comparable street-quarter hierarchy to the one examined here and linking it to the historical settlement of specific castes, religious communities, and professional groups within named quarters. Bajwa and Smets (2013) examined the same urban fabric through the lens of marginality, arguing that the Walled City's spatial structure cannot be separated from the social and economic position of its present-day residents. Sajjad et al. (2020) traced the historical evolution of the Walled City's public squares using cartographic and archival evidence, providing an independent, document-based account of several of the same Chowks surveyed in the present study and a useful check on field-based interpretations of their historic form. On the conservation and policy side, Mumtaz (1980, 1985) produced the earliest systematic architectural account of the Walled City and its rehabilitation needs, while Khan (2019a, 2019b) documented the more recent Master Conservation and Redevelopment Plan and the conservation of the Wazir Khan Mosque and Chowk specifically, giving this study's discussion of contemporary transformation (Section 6.5) an institutional and documentary anchor rather than relying only on field observation. Moffat (2023) situates this conservation practice within the broader intellectual history of architecture in Pakistan.

2.6 Conceptual Framework

Synthesizing the theoretical positions above, the paper adopts the following conceptual framework: the street hierarchy (Guzar → Koocha → Gali → Bund Gali/Katra) structures movement and accessibility and, in space-syntax terms, produces a gradient of configurational depth; this same gradient corresponds to an experiential gradient from public to private space, terminating at the house; Chowks are positioned at points of convergence within this network and function simultaneously as nodes of orientation and legibility (after Lynch), as socially generative spaces whose intimacy is conditioned by their D/H ratio (after Ashihara) and by

their configurational position (after Hillier), and as centres of commercial and social transformation. The resulting spatial character of the Walled City is read as the joint product of these elements rather than of any one of them alone.

Figure 2. Conceptual public-private gradient, with Chowks as nodes along the sequence

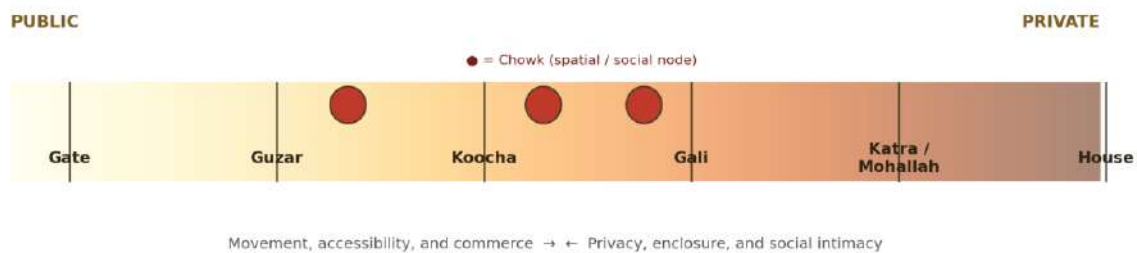


Figure 4. Conceptual public-private gradient of the street hierarchy, with Chowks positioned as nodes along the sequence.

3. Research Methodology

3.1 Research Approach

The study adopts a qualitative spatial-morphological case-study approach, combining morphological analysis in the tradition of Hakim (1986) and Bianca (2000) with direct field observation, physical spatial measurement, mapping, photographic documentation, and comparative case-study analysis. Building height and spatial enclosure were assessed using the distance-to-height (D/H) method established by Ashihara (1970). The approach is deliberately observational and descriptive rather than statistical, consistent with the morphological tradition this paper draws on, and is designed to be reproducible by a subsequent researcher revisiting the same streets and Chowks.

3.2 Study Area

The study area is the Walled City of Lahore (Androon Shehr), enclosed historically by Akbar's fortification wall and organized internally by thirteen gates from which the primary streets (Guzars) originate. The area was selected because its surviving street pattern, despite considerable twentieth- and twenty-first-century alteration, retains a legible hierarchy of primary, secondary, and tertiary streets, together with a functioning system of Chowks and Kutraas, making it possible to examine the relationship between street hierarchy, public space, and built form within a single bounded case.

3.3 Selection of Case Studies

Case studies were selected to represent each level of the spatial hierarchy identified in the field: two Guzar (primary street) segments, two Katraas, and five Chowks of differing type and historical origin.

Category	Case studies
Guzar (primary street) segments	C1: Lohari Gate Bazaar → Lohari Mandi Chowk C2: Delhi Gate Bazaar → Pani Wala Talab Chowk
Katraas	Katra Barkat Ali Katra Sumer Singh (Katra Shah Bukhari)
Chowks	Chowk Matti, Chowk Bokhari, Chowk Jhanda, Chowk Lohari Mandi (junctions of two or more streets) Chowk Wazir Khan (geometric space fronting a historic public building)

3.4 Analytical Parameters

Element	Parameters recorded
Streets	Width, direction changes, connectivity, traffic type, edge functions
Chowks	Dimensions, building heights, D/H ratio, land use, important buildings
Katraas	Form, dimensions, entrances, enclosure, residential organization
Urban fabric	Hierarchy, permeability, movement, public/private transition
Built form	Height, frontage, architectural character
Contemporary change	Encroachment, commercialization, new construction, infrastructure condition

4. Findings I: Spatial Structure and Street Hierarchy

4.1 Overall Spatial Structure

Akbar's fortification wall and thirteen gates organize the space within the Walled City into coherent segments. Major streets originate from these gates and lead into different parts of the city, forming the main commercial arteries as well as the primary structuring devices of movement. The streets of Androon Shehr follow a consistent hierarchical pattern, and this

hierarchy is expressed simultaneously in the relative importance of a street, its width, and the degree to which it marks a transition from public to private space. Four basic types of street were identified in the field: Guzars (primary streets), Koochas (secondary streets), Galis (tertiary streets), and Bund Galis or Katras (cul-de-sacs).

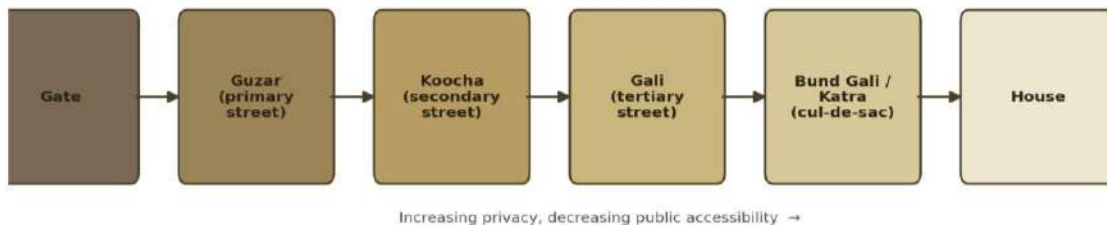


Figure 5. Street hierarchy of the Walled City of Lahore, from gate to house.

4.2 Guzars: Primary Structure

The main Guzars formed a network of routes connecting distant localities to the citadel. As is still observable today, the construction of houses and shops around these routes appears to have begun gradually; over time, a secondary ring of residential Mohallahs and further connecting streets developed, and this process of agglomeration in turn produced further tertiary streets, or Galis, giving access to individual properties. An outer wall with gates positioned at strategic Guzars completed the overall picture.

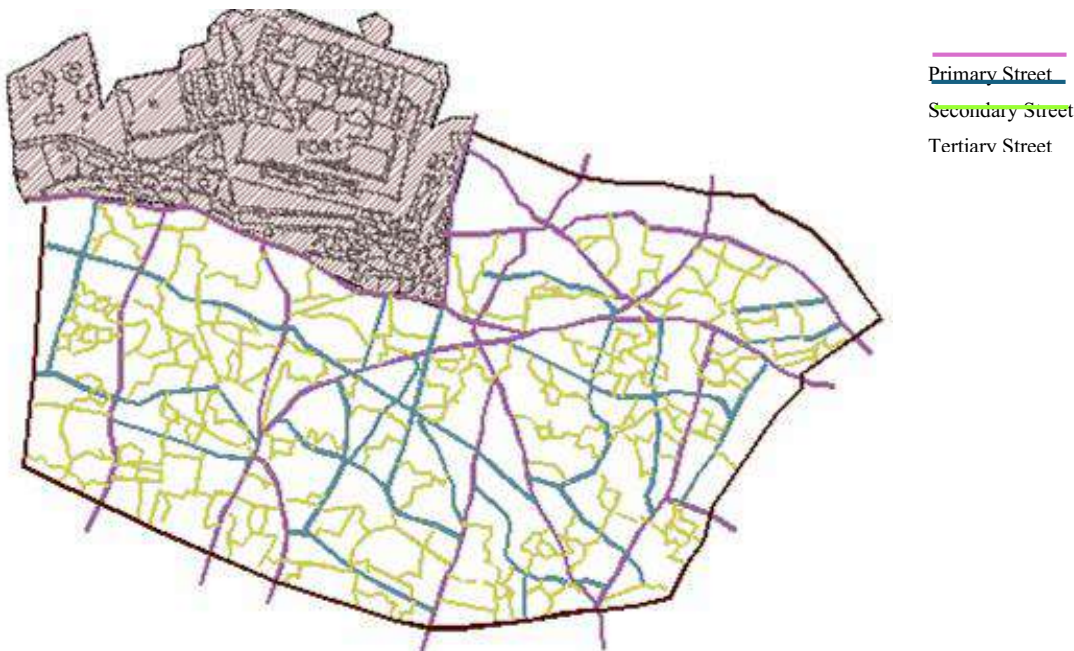


Figure 6. Plan of old Lahore showing the street hierarchy. Source: Dr. Tauseef Ahmad

The main characteristics of Guzars observed in the field are as follows:

- The main streets originating from the various gates are termed Guzars.

- These streets have both ingress and egress and thus function as the main thoroughfares of the city.
- Guzars are interconnected with one another.
- They divide the city into different residential quarters (Mohallahs).
- The main commercial bazaars initially formed on the Guzars and later expanded into wholesale or specialized markets.
- The primary function of the Guzar is to link and delimit the organization of residential quarters; Guzars also act as spines that give coherence to the overall cognitive map of the city and serve as the primary arteries of commercial activity.
- The form of the Guzar is linear but not straight. Guzars divide the city both laterally and transversely and are generally winding, changing direction after every 250 ft or less on average (based on the two Guzar case studies). Their widths vary from approximately 5–6 m and are not uniform along the whole path; the width increases perceptibly on approaching a Chowk.

This last observation is consistent with the pedestrian-scale planning logic identified in the walkability literature: because people are generally unwilling to walk more than approximately 800 m to perform routine tasks, and because normal walking speed is roughly 4,000 m per hour, no two points within a pedestrian enclave should in principle be more than about 12 minutes apart. The location of important elements within the Walled City follows this rule closely.

Case Studies: Guzar Segments

Two Guzar segments were examined in detail: C1, Lohari Gate Bazaar to Lohari Mandi Chowk; and C2, Delhi Gate Bazaar to Pani Wala Talab Chowk.

Case	Width range	Distance between direction changes	No. of direction changes	Important squares on route	Avg. building height (storeys)	Traffic type	Function on edges
C1	10–30 ft (widening to 28–30 ft near Lohari Mandi Chowk)	≈215 ft	Four major axis changes	Bokhari Chowk; Jhanda Chowk; Lohari Mandi Chowk	4	Pedestrian, push carts, rickshaws, tongas	Residential buildings with shops on the ground floor
C2	10–35 ft	≈600 ft	Six major axis changes	Wazir Khan Chowk; Purani Kotwali;	5	Pedestrian, push carts, rickshaws, tongas,	Residential buildings with ground-floor shops in the

Case	Width range	Distance between direction changes	No. of direction changes	Important squares on route	Avg. building height (storeys)	Traffic type	Function on edges
				Sunehri Mosque; Tomb of Malik Ayaz; Nau Gaza Pir; Pani Wala Talab		goods trucks, private cars	initial part of the Guzar; shopping plazas become predominant further along

Both segments confirm the same underlying pattern: The Guzar is linear in overall direction but changes axis repeatedly rather than running straight, and its important squares — Chowks — recur at fairly regular intervals along its length. C2, the longer and more commercially developed of the two segments, changes direction more frequently (six times against four) and passes a denser sequence of named landmarks, consistent with its role as a more heavily trafficked route between two major gates.

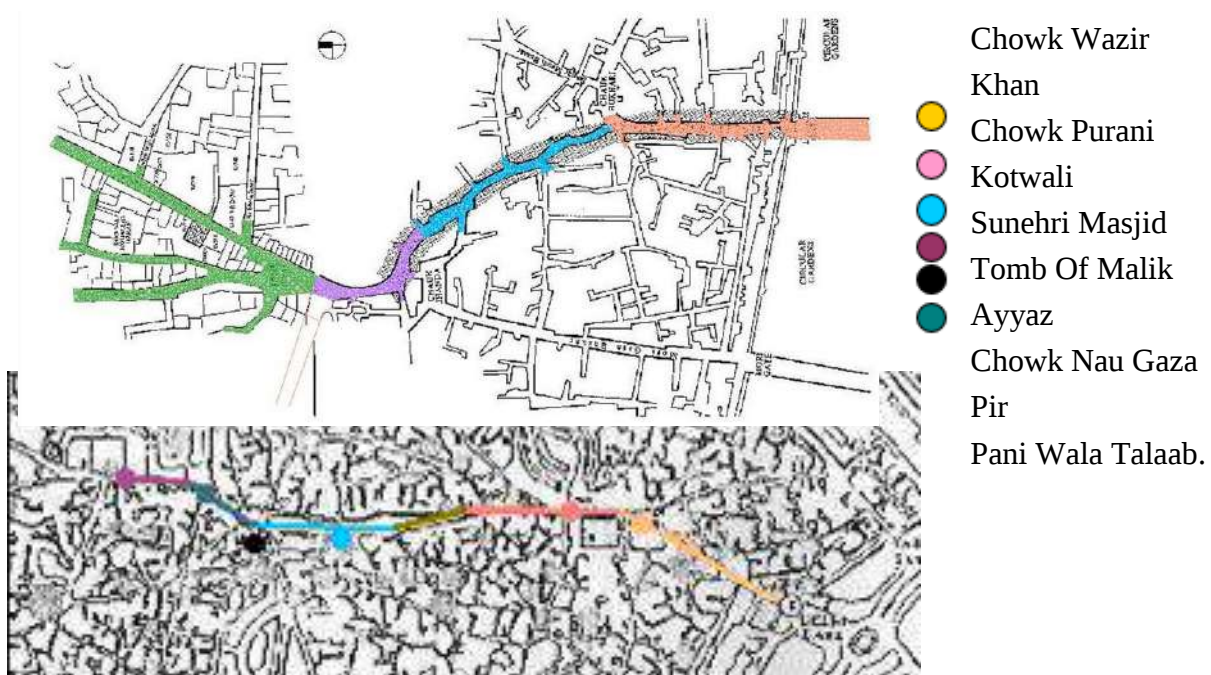


Figure 7 Change in Direction Along Delhi Gate Bazar

4.3 Koochas: Secondary Structure

Secondary streets are again through-routes, generally connecting different primary streets and dividing the residential quarters into smaller parts, the Mohallahs. The local term for these streets is Koocha, meaning a major access route within or adjacent to a Mohallah, including

the buildings fronting it. Koochas are not confined to a single quarter but continue along the same line into adjoining quarters, and they help multiply the route choices available to reach a given destination by increasing the number of paths through the fabric. In the past, secondary streets held only limited commercial activity catering to the Mohallah's own needs; over time, however, an increasing number of Koochas have become commercial corridors, extending commercial activity into the core of the Mohallah they bound and, in the process, eroding the social fabric of the quarter.

Six configurations of secondary street were identified in the field:

1. Linking two primary streets.
2. Linking a primary street and another secondary street.
3. Linking two secondary streets.
4. Interlinking of various secondary streets to form Chowks.
5. Linking a primary and a secondary street while intersecting another secondary street.
6. A secondary street traversing many Mohallahs and joining several primary and secondary streets.

4.4 Galis: Tertiary Structure and the Public–Private Gradient

The tertiary streets, called Galis, are very narrow passages within a Mohallah; they can also link different Mohallahs, but their principal role is to serve the residents of a cluster of houses not directly served by a secondary or primary street. Galis are almost private in character: their extremely narrow, meandering, and often dark lengths discourage strangers from venturing into the domain of the house. Lengths vary from 10–50 ft and widths from approximately 1.5–2 m. Galis take on so many configurations, dictated by local use and site conditions, that it is difficult to define a single type; generally, they are straight or winding, terminating in a T-junction or a small Chowk, and can be short or long, uniform or variable in width, and serve either a small square or a single cluster of houses.

4.5 Bund Galis and Katraas

A cul-de-sac or dead-end street, locally termed Bund Gali or Katra, forms a vital part of the social and spatial structure of the Walled City; no account of the traditional street pattern is complete without it. The term Katra is generally used for a square serving a cluster of houses around it, or an enclosure, though in the Punjab a Katra can equally be a dead-end street serving a group of houses along its edges. Such residential clusters were originally occupied by the families of a single clan or profession; the internal Galis functioned as semi-private space accessible only to residents, and gates were used historically to protect inhabitants at night or in times of insecurity. Many Bund Galis retain such gates today — for example, Goondi Gali in Mohallah Wazir Khan. Although the clan-based system of occupation has largely broken down, and residents in many Katraas are now unrelated to one another, the intimate physical

enclosure of these spaces continues to encourage cooperative social behaviour among neighbours, illustrating how the physical planning of a space can shape a durable social pattern. Cul-de-sacs are generally narrow and short, typically providing access to 10–15 houses, and there is no single pattern governing their point of connection to the wider street system — they may branch from a Guzar, a Koocha, or a Gali.

Case Studies: Katraas

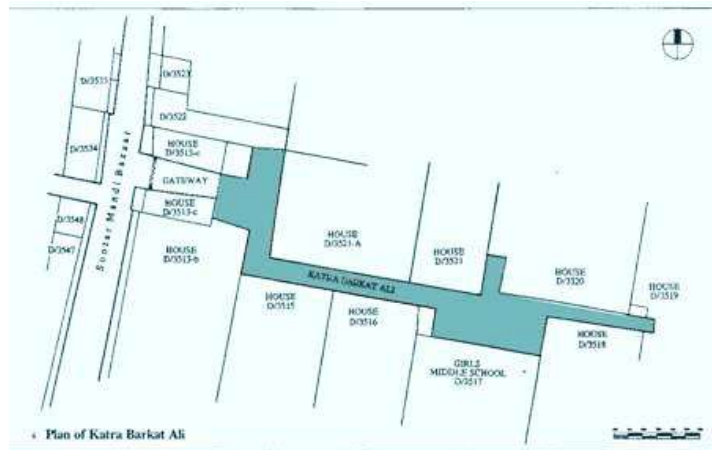


Figure 8. Plan of Katra Barkat Ali Source: Author

1. Katra Barkat Ali is a small cul-de-sac on the first or the two sections of Sootar Mandi Bazaar, approximately 48 m long and covering an area of about 0.125 hectares. Its entrance is marked by a portal formed by a house built directly over the passage, fronted by an impressive nineteenth-century house; ten buildings in total belong to the Katra, one of which now serves as a girls' middle school. The significance of the Katra lies in its closed cul-de-sac form and in the architectural merit of the two buildings at its entrance.

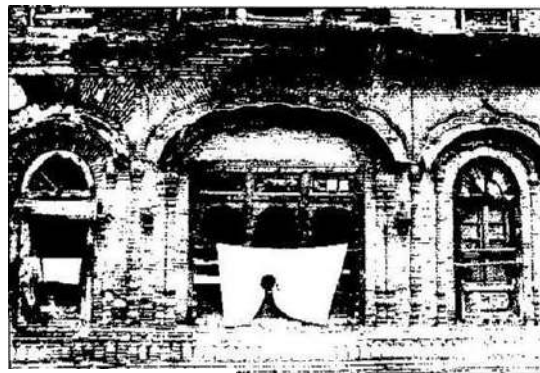
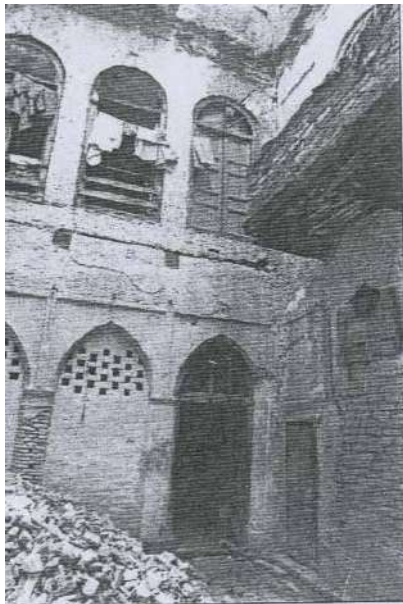


Figure 9. Photographs Katra Barkat Ali

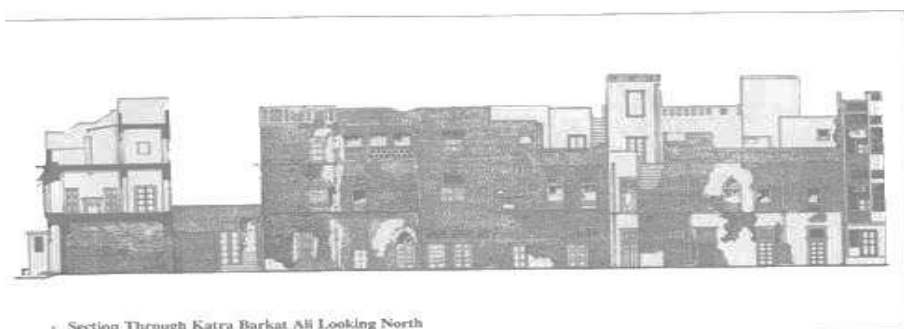


Figure 9. Sections through Katra Barkat Ali Source: Yamane, Shu, Shuji Funo, Hitoshi Ara, Norihisa Numata, and Hidetoshi Osamura. "Traditional Urban Houses of Lahore: A study on the urban quarter of the walled city of Lahore, Pakistan." *Journal of Architecture and Planning (Transactions of AIJ)* 64, no. 521 (1999): 219-226.

2. Katra Sumer Singh (also known as Katra Shah Bukhari) is situated in Gali Dogran on the east side of Lohari Gate Bazaar and is reached through a multifoil arched entrance — the only intact part of the original structure. The Katra is rectangular in form; while the surrounding buildings are now largely new and architecturally insignificant, the entrance still contains grocery shops and a mazar (shrine without a grave) at one corner, commemorating a local saint whose spirit is believed to inhabit a tree growing within the shrine.





Figure 10. Photographs Katra Sumer Singh Source: Author

5. Findings II: Chowks as Spatial and Social Nodes

5.1 Typology of Chowks

Three types of Chowk were identified in the Walled City:

1. The junction of two or more streets.
2. Katraas.
3. A geometrically proportioned space fronting a public or historic building.

Chowks mark a change in direction along a street, or provide a moment of visual respite before the visitor is once again drawn into narrow, enclosing streets; a mosque is frequently placed at an important location on the Chowk.

5.2 Chowks and Spatial Enclosure

The distance-to-height (D/H) method established by Ashihara (1970) was used to assess the enclosure of each Chowk. According to this framework, a D/H ratio at or near 1 achieves a balanced sense of proportion; ratios below 1 intensify the interaction between facing facades and produce a more introverted space, while ratios approaching 2 progressively weaken the sense of enclosure. Table 3 and Figure 3 summarize the D/H ratios recorded for the four Chowks measured as street junctions.

Chowk	Avg. building height	Avg. depth	D/H
Matti	70 ft	60 ft	≈0.80
Bokhari	60 ft	30 ft	≈0.50

Chowk	Avg. building height	Avg. depth	D/H
Jhanda	55 ft	68.5 ft	≈1.25
Lohari Mandi	60 ft	50 ft	≈0.80
Wazir Khan	— (measures 53 m N–S × 47 m E–W; enclosed on three sides)	—	—

Figure 3. Distance-to-height (D/H) ratios of surveyed Chowks

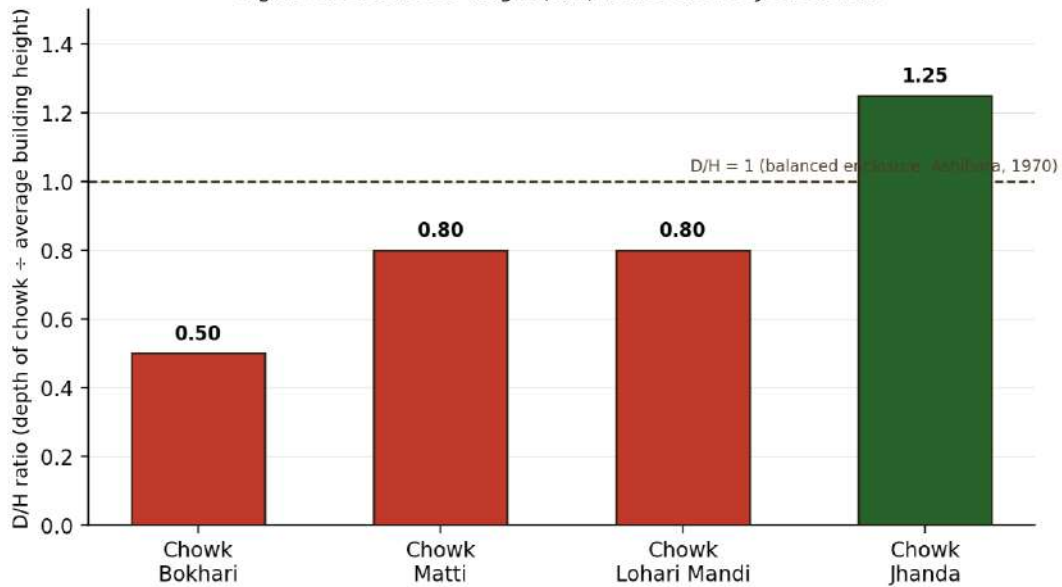


Figure 11. Distance-to-height (D/H) ratios of the four surveyed street-junction Chowks, against Ashihara's (1970) balanced-enclosure benchmark of $D/H = 1$.

With the exception of Jhanda, every Chowk measured as a street junction returns a D/H ratio below 1, indicating a consistently intense, inward-focused, and intimate spatial character. This is in keeping with Ashihara's (1970) description of positive space as space whose vectors focus inward, whose boundaries are clearly determined, and around which order is built toward the centre.

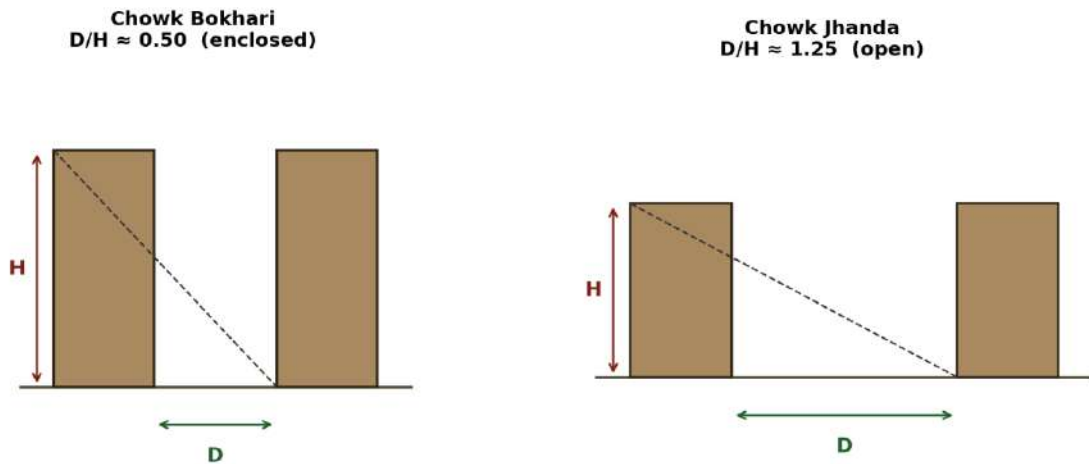


Figure 12. Comparative D/H spatial-enclosure sections for the most enclosed and most open surveyed Chowks (after Ashihara, 1970).

5.3 Chowk Matti

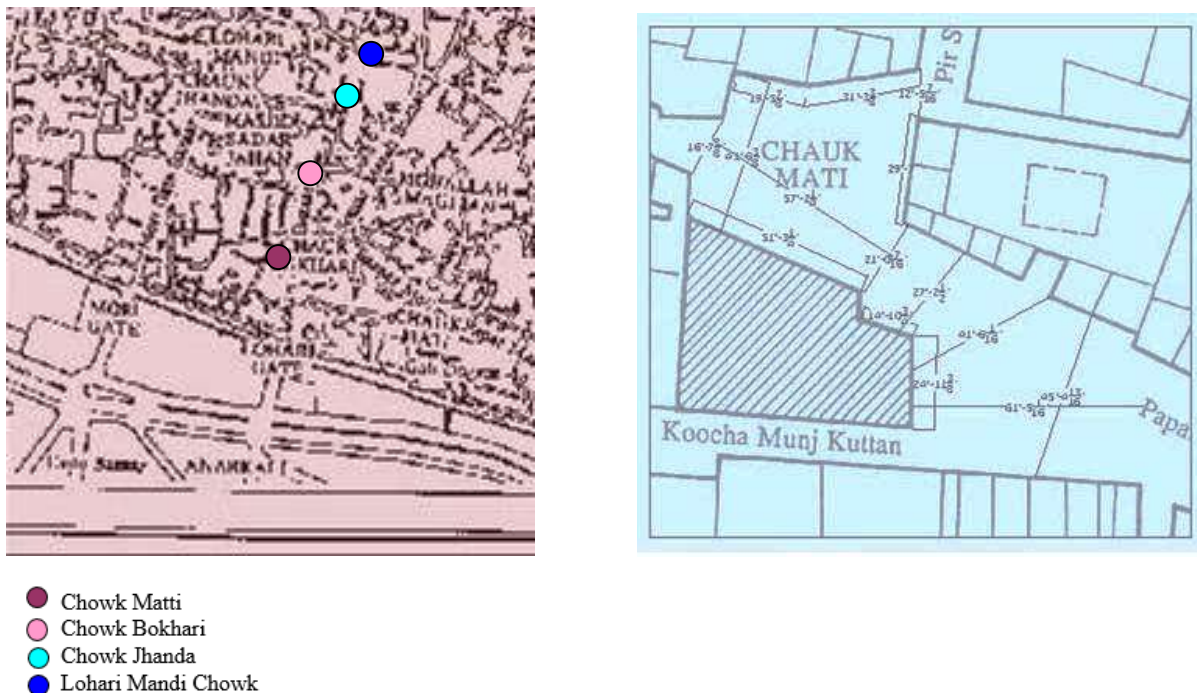


Figure 12. Plan of Chowk Matti Source: Author

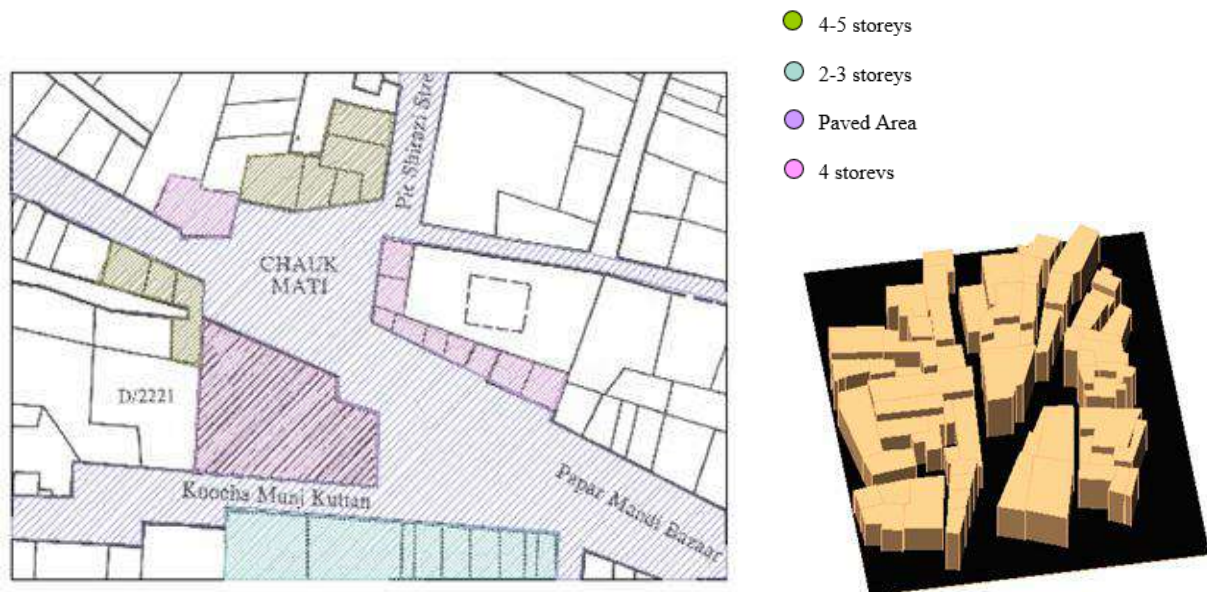


Figure 11. Building Heights at Chowk Matti Source: Author

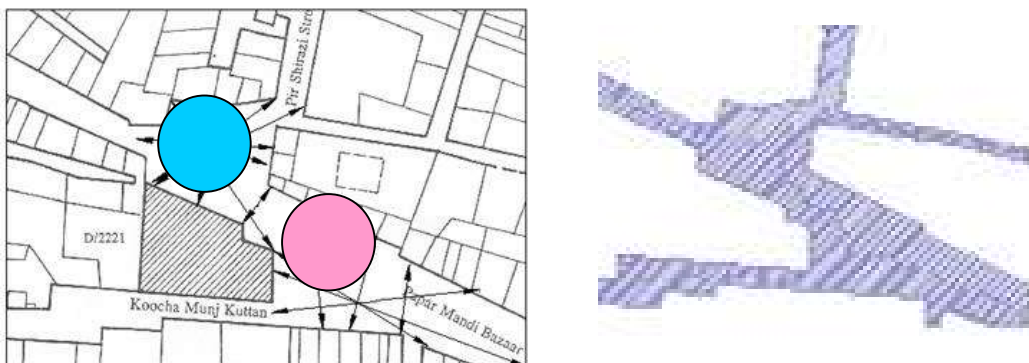


Figure 12. Street Pattern and Demarked Zones at Chowk Matti Source: Author



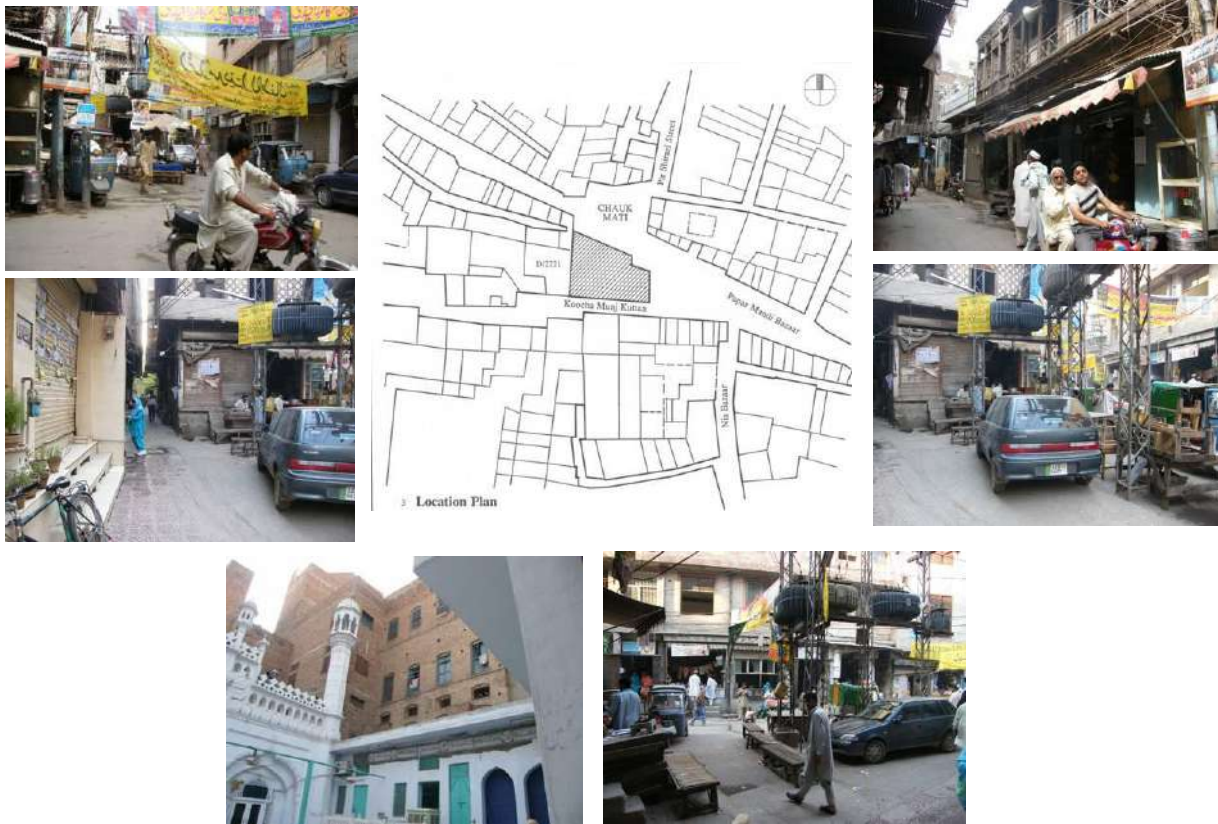


Figure 13.

Photographs of Chowk Matti Source: Author

Chowk Matti lies to the east of Lohari Gate; entering the first right-hand Gali after Lohari Gate and passing through Mohallah Munj Kuttan for approximately 400 ft leads to this open space. Most of the surrounding buildings are four to five storeys high, with lower residential buildings toward Papar Mandi Bazaar; the average building height is approximately 70 ft, giving the space a markedly closed-in feel and, at a D/H of approximately 0.8, an intense environment in which the interaction between facing buildings is strong — though the same enclosure produces useful environmental protection, with tall buildings casting long shadows that provide respite from the summer sun. Land use is a mix of residential and commercial, with a pronounced trend toward commercialization and the construction of new plazas nearer the Chowk, where roads are comparatively wider and proximity to the commercial bazaars is greatest. Important buildings in the vicinity include the Niwin Masjid, Papar Mandi Bazaar, Kocha Pir Shirazi, Sootar Mandi Bazaar, and the site of the now-demolished Haveli Lakhe Shah (demolished 1995). Chowk Matti is atypical in having two distinct wide areas linked by a path, one serving traffic from Papar Mandi Bazaar and the other serving traffic toward Bokhari Chowk from Lohari Mandi Bazaar — the form of the Chowk closely mirroring its function.

5.4 Chowk Bokhari

Chowk Bokhari is the first node encountered travelling from Lohari Gate Bazaar toward Lohari Mandi Chowk, and it also links Chowk Matti and Koocha Pir Shirazi to Lohari Gate Bazaar. Three- to four-storey buildings surround the Chowk, with an average height of approximately 60 ft against an average depth of 30 ft, giving a D/H of approximately 0.5 — by conventional standards a congested urban space, though one whose cognitive importance to residents remains considerable.



Figure 14. Plan of Chowk Bukhari Source: Author

The Chowk now hosts predominantly commercial buildings that were formerly residences; important buildings in the vicinity include a tavela (of which only the entrance and name remain) and several houses with intact historic architectural character. Analysis of sightlines shows that the focus remains consistently inward, with the rounding of corners facilitating both visual continuity and traffic flow; the space itself is essentially a widening at the convergence of several routes, and while new construction has raised building heights above what would once have been a more modest two- to three-storey enclosure, variation in the height of individual buildings still admits light and a degree of spaciousness.

5.5 Chowk Jhanda

Chowk Jhanda occupies the site of an ancient grain market, lying inside Lahori Gate a short distance from the main bazaar and also reachable from Mori Gate; it takes its name from a flag pole bearing a green flag commemorating a local saint, Pir Hassan Shah alias Sheikh Hassu Teli, with a well beneath said to date from the Akbar period. Three-storey buildings, several of Sikh-period date with ground-floor shops, surround the Chowk; the average building height is approximately 55 ft against an average depth of 68.5 ft, giving a D/H of approximately 1.25 — the highest ratio recorded among the surveyed Chowks and one that produces a comparatively open, humane, and friendly spatial character.

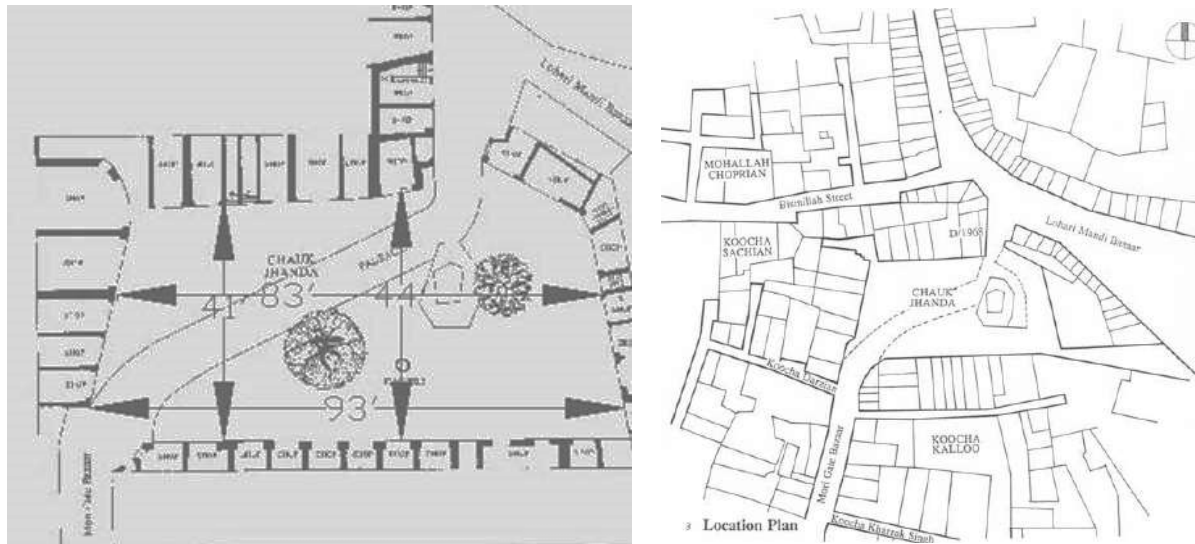


Figure 14. Plan of Chowk Janda Source: Author

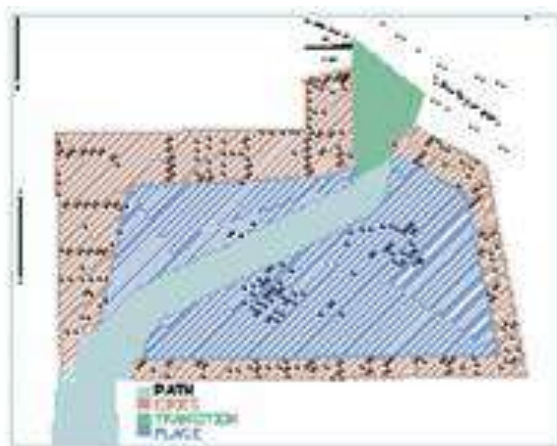


Figure 15. Street Pattern at Chowk Janda Source: Author



Figure 16. Sections of Chowk Janda Source: Yamane, Shu, Shuji Funo, Hitoshi Ara, Norihisa Numata, and Hidetoshi Osamura. "Traditional Urban Houses Of Lahore : A study on the urban quarter of the walled city of Lahore, Pakistan." *Journal of Architecture and Planning (Transactions of AIJ)* 64, no. 521 (1999): 219-226.

Land use includes the historic grain market alongside residential and commercial use, and the route linking Mori Gate Bazaar and Lahori Gate Bazaar curves diagonally through the square from its south-west to its north-east corner. Survey observation of street alignments in this area suggests — cautiously, as an interpretation rather than an established fact — that Chowk Jhanda may represent only a fragment of what was once a considerably larger open square or maidan, a reading given further plausibility by evidence that the area once served as Lahore's central military garrison, which would have required substantial open ground. This interpretation is consistent with the cartographic and archival evidence for the historical evolution of the Walled City's public squares presented by Sajjad et al. (2020), which independently documents the contraction of several historic Lahore squares over time.

5.6 Chowk Lohari Mandi

Following Chowk Bokhari, the second significant Chowk along the same Guzar is Lohari Mandi Chowk. Three- to four-storey buildings surround the space, with an average height of approximately 60 ft against an average depth of 50 ft, giving a D/H of approximately 0.8. Land

use is residential and commercial, and the Chowk serves as the gateway to a number of historic architectural elevations.

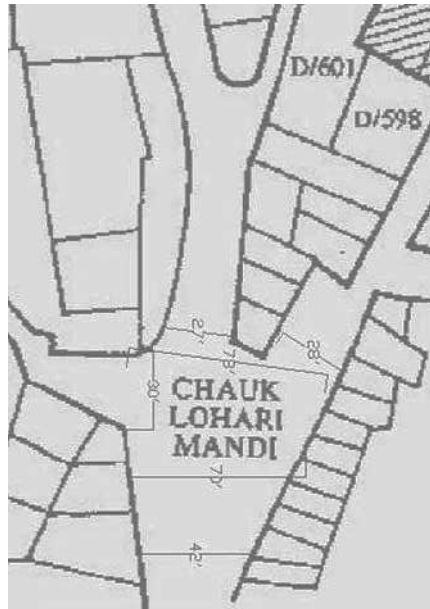


Figure 17. Plan of Chowk Lohari Mandi Source: Author

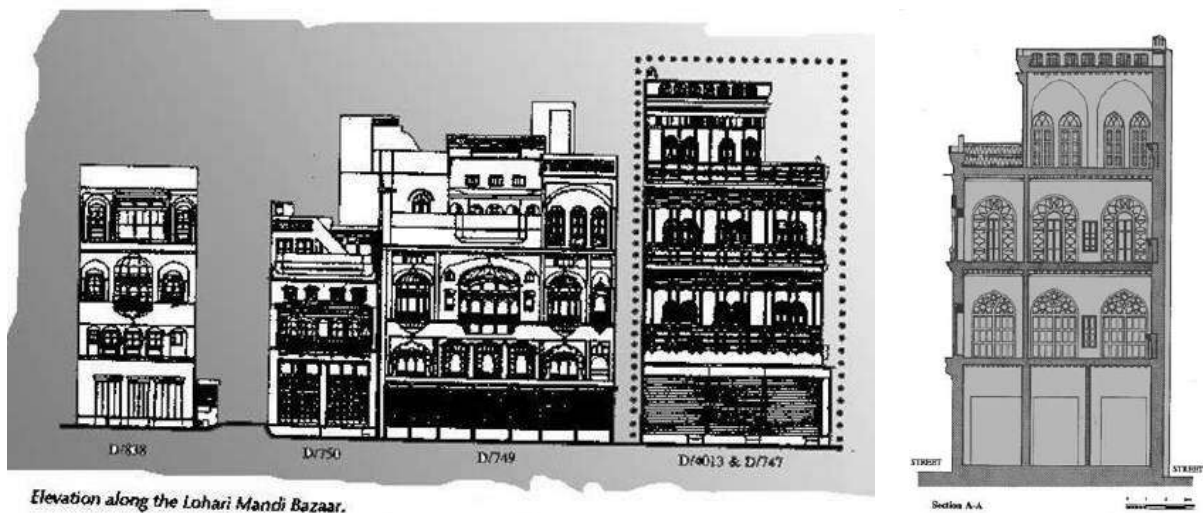


Figure 18. Elevations Along Chowk Lohari Mandi Source: Yamane, Shu, Shuji Funo, Hitoshi Ara, Norihisa Numata, and Hidetoshi Osamura. "Traditional Urban Houses of Lahore: A study on the urban quarter of the walled city of Lahore, Pakistan." *Journal of Architecture and Planning (Transactions of AIJ)* 64, no. 521 (1999): 219-226.

As a node, Chowk Lohari Mandi generates a substantial number of route choices, providing access to both Lohari Mandi Bazaar and Said Mitha Bazaar; the resulting node is not, in the strict visual sense, especially legible, given the number of routes emanating from it and the encroachments that further blur its edges. Its cognitive importance to residents is nonetheless

considerable: interviews conducted during fieldwork indicated that residents commonly describe their location within the Walled City by reference to the nearest such Chowk, consistent with the node function described by Lynch (1960).

5.7 Chowk Wazir Khan

Chowk Wazir Khan is an important element not only of the Wazir Khan Mosque but of the wider area surrounding it, situated on the main east–west thoroughfare running between Delhi Gate and Taxali Gate, with Delhi Gate Bazaar to its east. The Chowk and mosque complex were completed in 1635 and formed the focal point of the then-expanded city, as all of the city's arterial routes converged on it; the site soon became the centre of the city's commercial, social, and political life. The four-court forecourt, known historically as the Jilou Khana and unique in this part of the subcontinent for a mosque of this kind, is a transitional space in front of the mosque more usually associated with palaces and mausolea; considerable secondary building activity, including the palaces of several nobles, took place in the vicinity at the time of construction. The Chowk itself measures 53 m north–south by 47 m east–west and is enclosed on three sides by buildings. Khan (2019b) documents the recent conservation of the Wazir Khan Mosque and Chowk under the Aga Khan Trust for Culture's collaboration with the Walled City of Lahore Authority, confirming both the continuing centrality of this Chowk to the Walled City's public life and the scale of intervention now required to sustain it.

6. Discussion: What Organizes the “Organic” City?

6.1 Irregularity Does Not Equal Lack of Order

The winding streets, irregular plots, and changing street widths documented in Section 4 are not, on their own, sufficient evidence of an unstructured urban environment. The hierarchy of Guzars, Koochas, Galis, and Bund Galis demonstrates a consistent differentiation by movement, access, and privacy, precisely the kind of generative, rule-based patterning that Hakim (1986) documents for Arab-Islamic settlements more broadly and that Abu-Lughod (1987) argues the Orientalist “Islamic city” literature failed to see because it looked for order only in the shape of a Western grid.

6.2 The City Is Organized Through a Public–Private Gradient

The data in Section 4 support a clear conceptual sequence: Gate → Gazar → Koocha → Gali → Kutra/Mohallah → House. Such a sequence reflects a general gradient of increasing spatial privacy and decreasing public access, and it reflects exactly the configurational interpretation of depth and permeability proposed by Hillier as seen in Vaughan et al. (2025): Guzars are the most integrated and connected streets within the network, and Galis and Bund Galis are increasingly segregated streets in terms of their configurational property, which reflects the social property of increasing privacy as observed on site. It seems like the gradient, and not the

existence or absence of particular street types, is the main organizational principle of Walled City's space.

6.3 Chowks Are More Than Traffic Nodes

The cases presented in Section 5 involving Chowks demonstrate how Chowks function as movement nodes, points of orientation, social spaces, spaces of commerce, visual cues, enclosures, and gathering spots. It is the very multiple functioning of such elements that Lynch (1960) describes as the key characteristic of a node in a coherent city that represents a strategically important intersection around which locals build the whole image of the city. The consistent evidence provided by local residents who use the location of the nearest Chowk as a point of reference, rather than street names, for example, is an embodiment of the nodal role of Chowks. This is further supported by the cartographic analysis provided by Sajjad et al. (2020).

6.4 Built Form Produces Human-Scale Space

The D/H analysis in Section 5.2 supports a more specific argument than simply that “small spaces are good.” Rather, the relationship runs: building height, together with street or Chowk dimension and route configuration, produces spatial enclosure, and this enclosure in turn conditions perception and social interaction. Four of the five measured Chowks return D/H ratios below 1, the range Ashihara (1970) associates with intense, inward-focused, socially interactive space; Chowk Jhanda's higher ratio of approximately 1.25 produces, correspondingly, a more open and less intimate character, and this single outlier is instructive precisely because it demonstrates that enclosure in the Walled City is a measurable, variable property rather than a uniform “traditional” given. Read alongside Hillier's caution, in the same Vaughan et al. (2025) volume, that enclosure alone does not explain why a space becomes socially generative, the Chowks of the Walled City appear to derive their social vitality from the combination of measurable dimensional enclosure and their configurational position at the convergence of the surrounding street hierarchy — that is, from being simultaneously well-enclosed and well-connected.

6.5 Contemporary Transformation

The historic spatial structure documented above is under active pressure from commercialization of residential areas, replacement of historic buildings with new construction, encroachment, exposed infrastructure, and the deterioration of the surviving building stock, most visibly at and around the Chowks themselves, where wider roads and proximity to the bazaars make redevelopment most attractive. This is not merely a heritage-preservation observation; it bears directly on the spatial logic identified in this paper. If commercialization changes the function and physical edge of a Koocha or a Chowk, it also has the potential to alter the social and spatial role that space has historically performed — for example, by widening the node's catchment for outside traffic while eroding the smaller-scale,

resident-facing function that gave the space its cognitive and social significance in the first place. Khan (2019a) documents the Walled City of Lahore Authority's Master Conservation and Redevelopment Plan, developed with the Aga Khan Trust for Culture specifically to address this tension between commercial pressure and the preservation of the historic urban fabric, and Khan (2019b) documents its most direct application to a Chowk examined in this study, the conservation of the Wazir Khan Mosque and Chowk. That such institutional intervention is judged necessary at the scale of individual Chowks is itself evidence for the argument advanced here: these are not incidental open spaces but structurally significant nodes whose loss or alteration has consequences for the spatial organization of the city as a whole.

7. Conclusion

7.1 Main Findings

An observable hierarchy is evident in the Walled City in the following two parallel sequences: Gates > Guzars > Koochas > Galis/Bund Galis > Mohallahs/Katraas, and Streets > Chowks > Buildings/Landmarks. In the hierarchy mentioned above: Guzars link the gates to the commercial center of the city and structure its residential zones; Koochas act as the second-order connections and choices; Galis/Bund Galis delineate residential areas of increasing levels of intimacy; and Chowks serve as multifunctional nodes that integrate circulation, cognitive processes, social activities, commercial activity, and built environment enclosure. The D/H ratios for all Chowks except Chowk Jhanda remain less than 1, which shows that the scale of the built environment enclosure is always intimate enough to allow face-to-face social interactions and protect from climatic influences. The distance to basic services never exceeds 800 m / 12 minutes in the Walled City.

7.2 Contribution of the Research

The core contribution of the paper is to rethink the Walled City of Lahore, not as an “organic” or unordered city characterized by the lack of orderliness, but rather as an urban configuration where movement, enclosure, access, privacy, social interaction, exchange, and architecture are spatially interconnected via the spatial relationship along a visible public-private gradient (Gate → Guzar → Koocha → Gali → Katra/Mohallah → House) and via Chowks that serve as nodes both configurally and cognitively while functioning as socially productive enclosed spaces. This interpretation ties together the unique spatial characteristics of the Walled City with well-known theoretical paradigms that were never before combined together to explain this particular urban configuration – Hakim's (1986) principles of generative planning, Lynch's (1960) cognitive nodes, Ashihara's (1970) D/H ratio of enclosures, and Hillier's configurational approach (Vaughan et al., 2025).

7.3 Implications

The findings carry implications for urban conservation and heritage management, for pedestrian-oriented planning more broadly, for the adaptive reuse of historic residential clusters such as Katraas, and for the control of inappropriate redevelopment and encroachment at Chowks, which this study identifies as the structurally most significant — and therefore most vulnerable — nodes in the Walled City's spatial system.

7.4 Limitations and Future Research

This study is subject to several limitations that should be acknowledged. The empirical base is drawn from a limited number of case-study streets, Katraas, and Chowks and cannot be assumed to represent every quarter of the Walled City equally. The method is primarily observational and morphological, without systematic quantitative spatial analysis (such as formal space-syntax modelling of the whole street network) or a structured survey of resident perceptions beyond the informal interview observations reported in Sections 5.5 and 5.6. Historical documentation for some sites, notably the possible former extent of Chowk Jhanda as a larger maidan, remains interpretive rather than conclusively established. Future research could extend this work through GIS-based mapping and formal space-syntax analysis of the whole Walled City network, a larger and more systematically sampled set of Mohallahs and Chowks, and structured resident surveys capable of testing the cognitive-node function of Chowks proposed here on a statistically representative basis.

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