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Urban Blocks in Historic Fabrics: Balancing Preservation and Contemporary Urban Needs

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Research Article

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Posted Date: September 5th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-10564656/v1

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Additional Declarations: No competing interests reported.

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Abstract
The conservation of historic urban fabrics amid evolving contemporary demands presents a critical challenge for cities striving to balance cultural heritage with modernity. This article examines the tensions between preservation and adaptation, focusing on issues such as permeability, crisis management, green space deficits, and social equity in historic districts. Employing a qualitative, descriptive-analytical methodology, the study integrates spatial mapping, case study analysis, and participatory insights to decode morphological constraints and opportunities. In the Fundamentals section, examples from cities such as Isfahan and Yazd, etc. are given. The present article's male example is also with an emphasis on the city of Tabriz. Key findings reveal that rigid preservation paradigms often clash with needs for vehicular access, emergency preparedness, and ecological integration. For instance, Isfahan's Naqsh-e Jahan Square exemplifies adaptive reuse potential, while Yazd's windcatcher-equipped alleyways highlight climate-responsive design. The article proposes adaptive strategies such as retrofitting narrow alleys for safer mobility, integrating pocket parks into dense fabrics, and repurposing monolithic blocks for mixed-use functions to enhance urban resilience without eroding heritage value. These solutions emphasize participatory planning and hybrid design, bridging historic aesthetics with contemporary infrastructure. By framing historic districts as dynamic, living systems, the study advocates for a paradigm shift in conservation practice. It underscores the role of Iranian historic cities as laboratories for innovative urbanism, where tradition and modernity coexist to foster inclusive, sustainable environments. Ultimately, the research contributes a holistic framework for reconciling preservation with progress, ensuring historic fabrics remain vital, accessible, and resilient in the face of 21st-century challenges.

Keywords: historic urban fabrics, contemporary urban needs, permeability, urban block, green spaces, Iranian historic cities.

1. Introduction

The conservation of historic urban fabrics presents a complex challenge in contemporary urban planning, where the imperative to preserve cultural heritage intersects with the demands of modern urban life. As cities evolve, the tension between maintaining the integrity of historic urban blocks and accommodating contemporary needs—such as improved permeability, crisis management, and access to green spaces—has become increasingly pronounced. This article explores this dynamic, focusing on how urban blocks within historic contexts can adapt to meet today's socioeconomic and environmental requirements without compromising their historical value. Drawing on recent academic discourse, the discussion emphasizes the need for innovative strategies that reconcile preservation with urban resilience and inclusivity.

Historic urban fabrics, often characterized by large-scale blocks, narrow alleys, and dense built forms, reflect centuries-old design principles tailored to pre-industrial societies (UNESCO, 2021). These configurations, while culturally significant, frequently conflict with modern urban needs. For instance, the compact morphology of medieval or early modern cities, designed for pedestrian mobility and defense, now struggles to accommodate vehicular access and emergency services. Scholars like Oliveira (2020) argue that such layouts, though emblematic of heritage, exacerbate issues like poor permeability and restricted mobility, hindering equitable access to urban amenities.

A critical contemporary priority is enhancing permeability for both pedestrians and vehicles. Walkability and connectivity are central to inclusive urban design, yet historic districts often feature labyrinthine networks that deter efficient circulation. Research by Gehl and Svarre (2021) underscores the importance of retrofitting such areas with pathways that respect historical aesthetics while improving

navigability. Similarly, integrating vehicular access without disrupting fragile structures requires creative solutions, such as adaptive traffic calming measures or underground routing, as proposed by the Congress for the New Urbanism (2022).

Equally urgent is the need for effective crisis management in historic zones. Narrow alleys and irregular block sizes complicate disaster response, particularly in earthquake-prone or flood-vulnerable regions. Studies by Kamel and Mansour (2023) highlight how unmodified historic districts in the Middle East face heightened risks due to inadequate emergency access. Modernizing these areas demands context-sensitive infrastructure—such as modular firefighting equipment or decentralized rescue hubs—that aligns with preservation goals (FEMA, 2021).

The scarcity of green and open spaces in historic cores further underscores their incompatibility with contemporary urban well-being. While these districts often prioritize built form over public space, initiatives like "green corridors" and pocket parks can reintroduce nature without eroding heritage. Beatley's (2020) concept of "biophilic urbanism" advocates for integrating vegetation into historic masonry, while the European Environment Agency (2022) emphasizes retrofitting plazas as multi-functional civic spaces that serve both ecological and social roles.

Balancing preservation with modernization necessitates rethinking traditional conservation paradigms. Smith (2023) critiques rigid preservation policies that stifle innovation, advocating instead for adaptive reuse and flexible zoning. For example, converting underutilized historic buildings into community centers or green hubs can address spatial deficits while preserving cultural narratives. Such approaches align with the UN's Sustainable Development Goal 11, which champions inclusive, resilient cities that honor heritage (UN-Habitat, 2023).

This article examines these intersections through case studies and theoretical frameworks, proposing strategies that harmonize historical integrity with contemporary urban demands. By synthesizing insights from urban design, heritage conservation, and disaster resilience, it argues for a holistic approach that views historic blocks not as relics, but as dynamic components of evolving cities. The subsequent sections analyze specific interventions, policy recommendations, and community engagement models to illustrate viable pathways for sustainable urban futures.

2. Methodology

This study adopts a qualitative research approach to explore the interplay between historic urban fabrics and contemporary urban needs, prioritizing contextual understanding over quantitative metrics. The methodology integrates three core components: (1) descriptive-analytical methods to systematically document and interpret physical, social, and cultural dimensions of historic districts; (2) spatial and cartographic analysis to decode urban morphology and accessibility patterns; and (3) case study investigations to ground theoretical insights in practical scenarios. By triangulating these methods, the research aims to identify adaptive strategies that harmonize preservation with modernization.

The descriptive-analytical framework combines archival research, field observations, and semi-structured interviews with urban planners, heritage experts, and local communities. Spatial data is derived from historical maps, satellite imagery, and GIS tools to analyze transformations in block structures, street networks, and land use over time. This layered analysis uncovers how morphological traits—such as large-scale blocks in Isfahan or Tabriz and Yazd's organic street grids—constrain or enable resilience, equity, and ecological integration.

Case studies are central to validating the proposed strategies. Iranian cities like Isfahan and Yazd serve as primary examples, selected for their UNESCO-recognized heritage and ongoing struggles with modernization. The case study process involves: (1) site selection based on heritage significance and urban challenges; (2) mixed-methods data collection, including photogrammetry of historic structures, heat mapping of public spaces, and participatory workshops with stakeholders; and (3) critical synthesis of findings through iterative design scenarios. For example, in Yazd, the analysis of windcatcher-equipped alleyways informs proposals for climate-responsive retrofitting, while Isfahan's Naqsh-e Jahan Square inspires strategies to balance tourism and local accessibility. This method bridges

theoretical discourse with actionable urban design solutions, ensuring rigor and relevance in addressing historic fabric dilemmas.

3. Literature Review

The interplay between historic urban fabrics and contemporary urban demands has emerged as a critical discourse in urban planning and heritage conservation. Urban blocks, as foundational units of historic cities, embody cultural, social, and architectural legacies, yet they face pressures from modernization, population growth, and functional shifts. This review synthesizes recent academic debates on strategies to reconcile preservation with evolving urban needs, drawing on interdisciplinary insights from urban design, architecture, and heritage studies.

Defining Historic Urban Blocks and Their Significance; Historic urban blocks are spatial and functional entities shaped by historical layering, reflecting socio-cultural practices and architectural traditions (Bandarin & Van Oers, 2014). Their compact, mixed-use layouts often prioritize walkability and human-scale interactions, qualities increasingly valued in sustainable urbanism (Carmona, 2021). However, their static morphology clashes with contemporary demands for flexibility, infrastructure upgrades, and densification (Talen, 2019). Scholars emphasize that preserving these blocks is not merely about aesthetics but safeguarding intangible heritage and urban identity (UNESCO, 2020).

Challenges in Balancing Preservation and Modernization; The tension between preservation and adaptation stems from structural, functional, and socio-economic factors. Aging infrastructure, incompatible land uses, and rigid regulatory frameworks often render historic blocks obsolete (Rodwell, 2020). Pereira et al. (2021) highlight the paradox of "frozen heritage," where over-protection stifles vitality, while excessive redevelopment erodes authenticity. Climate change exacerbates these challenges, as historic materials and layouts may lack resilience to environmental stresses (Fouseki et al., 2020).

Adaptive Reuse as a Mediating Strategy; Adaptive reuse has gained traction as a sustainable approach to revitalizing historic blocks without compromising their essence. By retrofitting old structures for new functions—such as converting warehouses into housing or markets into cultural hubs—cities can reconcile heritage with modern economies (Douglas, 2020). Case studies in Bologna and Istanbul demonstrate how flexible zoning and incentives for private investment fostered vibrant mixed-use neighborhoods (Calabrò et al., 2021). However, critics warn that adaptive reuse risks gentrification, displacing original communities (Lees et al., 2020).

Regulatory Frameworks and Participatory Governance; Effective governance is pivotal in balancing competing interests. Heritage laws like the Venice Charter (1964) have evolved to embrace context-sensitive approaches, such as the "HUL" (Historic Urban Landscape) paradigm endorsed by UNESCO (2011), which integrates stakeholder participation and spatial analysis (Taylor & Larsen, 2022). Grassroots movements in cities like Barcelona and Kyoto illustrate how local communities can co-create policies that prioritize cultural continuity alongside equitable development (Zhang et al., 2023).

Urban Morphology and Design Interventions; Design strategies must mediate between old and new spatial logics. Some advocate for "critical reconstruction," where new infill projects reinterpret historical typologies through contemporary materials and scales (Krier, 2020). Others emphasize micro-scale interventions, such as pocket parks or permeable facades, to enhance livability without disrupting historic fabric (Moughtin, 2019). Digital tools like BIM (Building Information Modeling) and 3D GIS are increasingly used to simulate interventions and assess their impact on heritage values (Dore & Murphy, 2021).

Socio-Cultural Sustainability and Community Identity; Preservation debates increasingly prioritize socio-cultural sustainability. Historic blocks often host marginalized communities whose intangible heritage—such as traditional crafts or festivals—is as vital as built fabric (Jones & Leech, 2021). In Cairo's Islamic Quarter, participatory upgrading projects preserved both monuments and local livelihoods by integrating artisan workshops into tourism economies (Abdelmonem et al., 2020). Conversely, top-down approaches in Beijing's hutongs have drawn criticism for eroding social networks (Wang & Zhan, 2022).

Economic Viability and Market Pressures; Economic sustainability remains a key challenge. Heritage designation can increase property values, attracting boutique hotels and luxury housing that cater to

global elites (Murray, 2020). To counter this, cities like Amsterdam and Porto have introduced "heritage impact assessments" to evaluate tourism's effects on affordability and authenticity (ICOMOS, 2021). Hybrid financing models, combining public grants, private investments, and crowdfunding, show promise in funding adaptive reuse projects (Throsby, 2020).

Case Studies: Successes and Lessons Learned; Global examples offer insights into best practices. In Quito's historic center, a UNESCO-led initiative combined seismic retrofitting with affordable housing subsidies, preventing displacement while revitalizing public spaces (Fernández-Galiano, 2021). Meanwhile, Singapore's Kampong Glam district illustrates how adaptive reuse of shophouses into creative industries fostered economic diversity (Hee et al., 2020). These cases underscore the need for context-specific solutions and long-term stakeholder collaboration.

Climate Resilience and Historic Fabrics; Climate adaptation poses unique challenges for historic blocks. Retrofitting heritage buildings with energy-efficient systems often conflicts with preservation standards, necessitating innovative compromises (May et al., 2021). In Venice, floating platforms and permeable pavements mitigate flood risks while respecting architectural integrity (Foscari, 2020). Research advocates for integrating traditional ecological knowledge, such as passive cooling techniques, into modern upgrades (Berdanier et al., 2022).

Digital Technologies and Future Directions; Emerging technologies are transforming heritage management. AI-driven tools analyze urban morphology to predict decay patterns, while augmented reality (AR) enables virtual reconstructions of lost structures (Díaz-Andreu, 2022). Blockchain is being explored to create transparent registries of heritage ownership and maintenance records (UN-Habitat, 2023). These innovations, however, raise ethical questions about data privacy and the commodification of heritage (Smith, 2021).

Theoretical Shifts: From Conservation to Urban Regeneration; Scholars increasingly frame historic preservation as a catalyst for holistic urban regeneration. The "heritage-led development" model links cultural assets to broader goals like job creation and social cohesion (Pendlebury et al., 2020). This shift aligns with the New Urban Agenda's emphasis on inclusive, sustainable cities (UN, 2020). Critics, however, caution against instrumentalizing heritage for neoliberal agendas (Zukin, 2021).

Conclusion and Research Gaps; While interdisciplinary research has advanced strategies for balancing preservation and contemporary needs, gaps persist. Longitudinal studies on the social impacts of adaptive reuse, scalable models for climate adaptation, and frameworks for decolonizing heritage narratives remain underexplored (Harrison & Rose, 2023). Future work should prioritize marginalized voices and cross-regional knowledge exchange to foster equitable, resilient historic urban blocks.

4. Theoretical Foundations

4.1. Definitions and Concepts of Urban Blocks

The urban block, as a fundamental unit of city structure, has been conceptualized through diverse lenses in urban design theory. Traditionally defined as a "parcel of land bounded by streets, often containing multiple buildings and public spaces" (Carmona, 2021, p. 45), urban blocks serve as building blocks of urban form, shaping spatial organization, movement, and social interaction. Their morphology—scale, density, and permeability—reflects historical, cultural, and functional contexts, making them critical to urban identity (Bandarin & Van Oers, 2014). In historic fabrics, blocks often exhibit compact, mixed-use layouts that prioritize pedestrian access and human-scale design, principles now championed in sustainable urbanism (Talen, 2019).

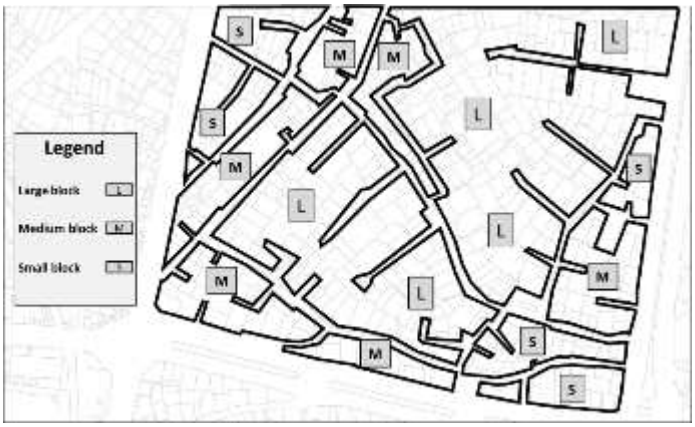


Fig1- Urban blocks in historical fabric in Tabriz

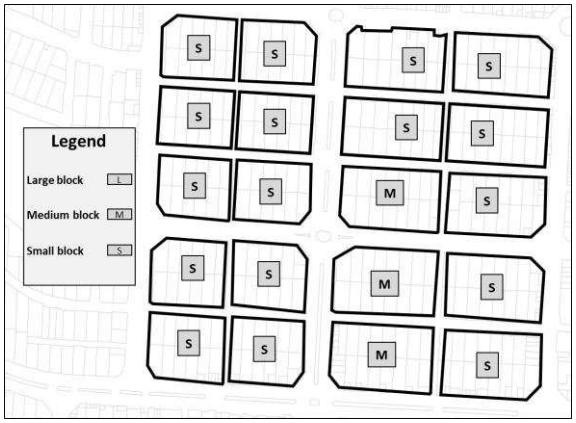


Fig2-Urban block in modern fabric in Tabriz

Urban Block and Superblock; In the Urban Design Dictionary (2000), Robert Kwan defines the urban block as "a spatial unit enclosed by streets, typically containing buildings and open spaces, organized to mediate between public and private realms" (p. 87). Kwan emphasizes its role in structuring urban rhythm, where block dimensions and street interfaces influence walkability and urban vitality. He further distinguishes the superblock (or "super-block") as "a larger, aggregated unit formed by grouping smaller blocks, often designed to prioritize pedestrians over vehicles and integrate shared amenities" (Kwan, 2000, p. 112). Superblocks aim to reduce traffic intrusion, enhance communal spaces, and foster environmental sustainability a concept revived in contemporary car-free urban models like Barcelona's superilles (Muñoz et al., 2020).

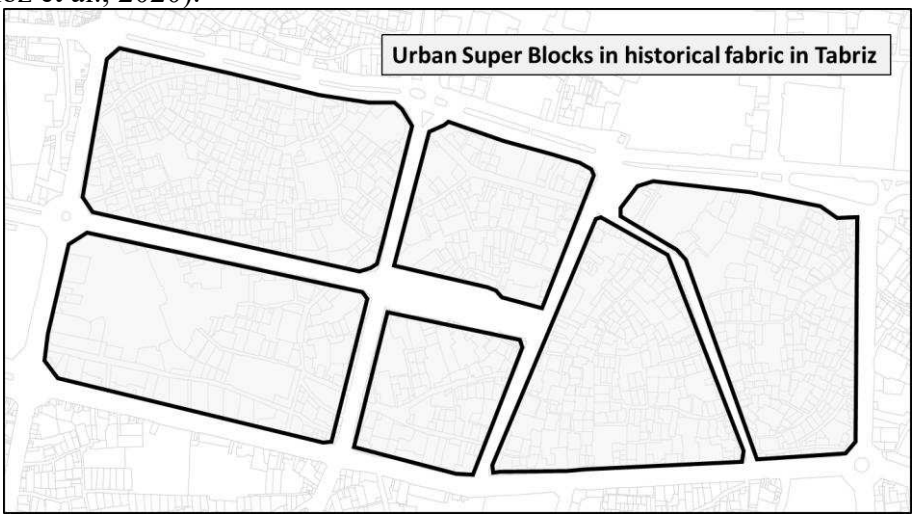


Fig3- Urban Super Blocks in historical fabric in Tabriz

Comparative Perspectives on Urban Blocks Kwan's definitions align with Kevin Lynch's (1960) view of blocks as "the basic matrix of urban legibility," where their repetition creates coherence in the urban fabric. Jane Jacobs (1961) argued that small, diverse blocks cultivate social surveillance and economic vitality, a principle echoed in Kwan's emphasis on mixed-use functionality. However, Kwan's superblock diverges from mid-20th-century modernist superblocks—such as those in Brasília—which prioritized vehicular efficiency over human interaction (Bishop, 2020). This distinction underscores evolving priorities, from functionalism to placemaking.

Morphological and Functional Dimensions; Urban blocks are analyzed through morphological studies, which examine their physical attributes—size, shape, and building typologies—and functional roles. Conzen (1960) pioneered the study of "block plans," linking their geometry to land-use patterns and cultural practices. Moudon (1997) expanded this by correlating block size with accessibility: smaller blocks enhance walkability, while larger blocks accommodate institutional or infrastructural uses. Kwan's superblock integrates these ideas, proposing scaled-up units that balance density with livability through shared resources and reduced traffic (Kwan, 2000).

Contemporary Applications and Challenges; Modern applications of Kwan's concepts address urbanization pressures. In historic districts, preserving traditional block structures often clashes with demands for densification (Rodwell, 2020). Adaptive reuse of blocks, as seen in Bologna's insulae , reconciles heritage with housing needs (Calabrò et al., 2021). Meanwhile, superblocks in cities like Barcelona demonstrate how reconfiguring street hierarchies can reclaim public space and reduce carbon footprints (Rueda, 2021). Critics, however, caution that superblocks risk homogenizing urban diversity if not tailored to local contexts (Zhang et al., 2023).



Fig4- Urban Super Blocks in Barcelona, Spain

Superblocks (Superilles) in Barcelona represent a pioneering urban planning strategy aimed at reconfiguring the city's iconic Cerdà grid to prioritize pedestrian mobility, green spaces, and community well-being. Each superblock, typically encompassing a 3×3 grid of Eixample blocks (approximately 400×400 meters or 16 hectares), restricts vehicular traffic to peripheral arteries, transforming interior streets into multifunctional public spaces. Key benefits include significant reductions in air and noise pollution, enhanced pedestrian safety, and the creation of green corridors that improve urban biodiversity and thermal comfort. By reclaiming 70% of road space previously dominated by cars, the model fosters social interaction, active mobility, and local commerce .Barcelona's superblocks offer a replicable framework for sustainable urban transitions, balancing ecological resilience with the need for inclusive, equitable public space design.

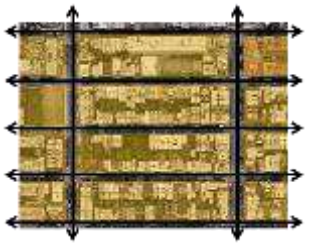
4.2. Typology of Urban Blocks: A Multidimensional Analysis

Urban block typology categorizes urban forms based on their physical, functional, and historical characteristics, offering a framework to decode the complexity of cities. Rooted in urban morphology and design theory, typologies enable planners to analyze how blocks shape spatial experiences, social interactions, and environmental performance. This section explores key classifications, historical precedents, and contemporary adaptations, drawing on interdisciplinary research.

1. **Historical Typologies**: From Medieval to Industrial Eras Historic urban blocks reflect the socio-cultural and technological contexts of their time. Medieval European blocks, such as those in Florence or Bruges, were often irregular and compact, prioritizing defense and localized trade (Conzen, 1960). In contrast, Islamic cities like Fez featured dense, labyrinthine blocks centered around mosques and markets, embodying communal privacy and climatic adaptation (Kostof, 1991). The Industrial Revolution introduced grid-based blocks in cities like New York, optimized for land speculation and mechanized transport (Scargill, 2019). These examples illustrate how typologies encode historical priorities, from security to economic efficiency.

2. **Morphological Classifications**: Grids, Radials, and Organics Morphological typologies categorize blocks by their geometric and spatial properties. Grid patterns—exemplified by Hippodamus' ancient Greek plans or modernist Brasília—prioritize order and navigability (Lynch, 1960). Radial or baroque typologies, such as Paris under Haussmann, use diagonal avenues to emphasize monumentality (Jordan, 2020). Organic blocks, common in historic cores like Istanbul's Sultanahmet, evolve incrementally, resulting in irregular street networks and mixed-use clusters (Moudon, 1997). Robert Kwan (2000) emphasizes that morphology influences microclimate, walkability, and social cohesion, making typology a tool for sustainable design.

3. **Functional Typologies**: Mixed-Use vs. Single-Use Functional typologies distinguish blocks by land-use dynamics. Traditional mixed-use blocks, such as those in Barcelona's Eixample, integrate housing, commerce, and services, fostering 24/7 activity (Marshall, 2021). Single-use blocks, dominant in post-war suburban developments, segregate functions—a practice criticized for eroding urban vitality (Jacobs, 1961). Contemporary trends advocate hybrid typologies, where ground-floor retail complements residential or office spaces, balancing efficiency with sociability (Carmona, 2021).
4. **Superblocks and Contemporary Innovations**; Robert Kwan's concept of the superblock (2000) has inspired modern experiments in traffic calming and communal space. Barcelona's superilles aggregate traditional blocks into car-free zones, prioritizing pedestrians and green infrastructure (Muñoz et al., 2020). Similarly, Copenhagen's "finger plan" uses superblocks to concentrate density along transit corridors while preserving green wedges (Gehl, 2020). These models address 21st-century challenges like climate change and public health, redefining typology as a tool for resilience.
5. **Cultural and Climatic Adaptations**; Typologies often respond to regional climates and cultural practices. In hot-arid regions, compact blocks with narrow streets—like those in Yazd, Iran mitigate heat gain through shade and wind channels (Bianca, 2018). In tropical cities, permeable blocks with courtyards, such as in Singapore's Kampong Glam, enhance ventilation and social connectivity (Hee et al., 2020). Such adaptations highlight the interplay between typology, ecology, and identity.
6. **Digital Tools and Typological Analysis**; Advances in GIS, 3D modeling, and AI enable precise typological studies. Researchers now map block patterns globally using satellite data, identifying trends in sprawl or compactness (UN-Habitat, 2022). Machine learning algorithms classify blocks by morphology, aiding predictive modeling for urban regeneration (Dore & Murphy, 2021). These tools democratize typological knowledge, supporting evidence-based policymaking.
7. **Critiques and Future Directions**; While typologies provide analytical clarity, critics warn against oversimplification. Some argue that rigid classifications neglect informal settlements or hybrid forms (Roy, 2021). Others advocate for "dynamic typologies" that evolve with climate and technological shifts (Rapoport, 2020). Future research must integrate socio-spatial equity, ensuring typologies serve inclusive urban futures.

Typology	Historical Context	Key Features	Case Studies	Strengths	Challenges	Modern Adaptations	Key Reference	Pictures of blocks
Medieval Block	Pre-industrial Europe (e.g., Florence, Bruges)	Irregular, compact layout; narrow streets; mixed-use with courtyards.	Fez (Morocco), Rothenburg (Germany)	High social cohesion; climatic resilience.	Limited vehicular access; low density.	Pedestrianization; heritage-sensitive infill.	Conzen (1960), Kostof (1991)	 Piazza del Campo in Siena- Italy
Grid Block	Ancient Greece (Hippodamus); 19th-century NYC	Orthogonal grid; standardized plots; high land-use efficiency.	Barcelona's Example, Manhattan	Predictable navigation; scalable development.	Monotony; heat island effects in dense grids.	Green corridors; mixed-income housing.	Lynch (1960), Marshall (2021)	 Manhattan urban blocks
Superblock	20th-century modernism (e.g., Brasília); revived in 2020s	Aggregated blocks; car-free interiors; shared amenities.	Barcelona's*superilles*, Copenhagen's Finger Plan	Reduced traffic; enhanced public space.	Requires strong governance; equity concerns.	Smart mobility hubs; climate-resilient design.	Kwan (2000), Muñoz et al. (2020)	 Urban super blocks in Barcelona
Radial Block	Baroque urbanism (e.g., Paris, Versailles)	Diagonal avenues; monumental axes; hierarchical streets.	Paris (Haussmann Plan), Washington, D.C.	Grandeur; efficient circulation.	Disrupts local identity; high infrastructure costs.	Integration with transit-oriented development.	Jordan (2020), Gehl (2020)	 Paris urban blocks

Typology	Historical Context	Key Features	Case Studies	Strengths	Challenges	Modern Adaptations	Key Reference	Pictures of blocks
Organic Block	Incremental growth in historic cores (e.g., Middle Eastern souks)	Irregular street networks; mixed-use clusters; human-scale.	Istanbul's Grand Bazaar, Tunis Medina	Cultural authenticity; adaptability.	Poor sanitation; vulnerability to decay.	Micro-renewal projects; participatory upgrading.	Moudon (1997), Bianca (2018)	 Tunis Medina organic blocks
Vertical Block	21st-century hyper-density (e.g., Hong Kong, Singapore)	High-rise clusters; podium-and-tower configurations; privatized open spaces.	Singapore's Marina Bay, Hong Kong's Mong Kok	Maximizes land use; iconic skylines.	Social stratification; wind tunnel effects.	Green roofs; co-housing models.	Carmona (2021), Hee et al. (2020)	 Singapore's Marina Bay blocks
Eco-Block	Sustainability movements (2010s–present)	Zero-carbon design; permeable surfaces; renewable energy integration.	Masdar City (UAE), Hammarby Sjöstad (Sweden)	Climate resilience; resource efficiency.	High upfront costs; technical complexity.	Circular economies; AI-driven energy systems.	UN-Habitat (2022), Rapoport (2020)	 Masdar City urban blocks

Table 1. Analytical Table of Urban Block Typologies

4.3. Issues and Needs

The interplay between preserving historic urban fabrics and addressing contemporary urban demands is rooted in a complex matrix of spatial, social, and environmental challenges. Historic districts, while embodying cultural identity and architectural heritage, often clash with modern urban priorities such as accessibility, resilience, and ecological sustainability. This section delineates the key issues inherent to historic urban blocks and the pressing needs of contemporary cities, drawing on recent scholarship in urban design, heritage conservation, and disaster management.

1. Permeability and Mobility Challenges; Contemporary urban planning prioritizes permeability—efficient movement for pedestrians and vehicles—to foster connectivity and equitable access. However, historic fabrics, characterized by large-scale blocks and labyrinthine alleyways, often hinder this objective. The compact, irregular layouts of medieval or pre-industrial cities, designed for pedestrian-scale mobility and defense, now struggle to accommodate vehicular traffic and modern infrastructure (Oliveira, 2020). Gehl and Svarre (2021) emphasize that retrofitting these areas requires reimagining circulation networks without erasing historical legacies, such as introducing shared streets or adaptive traffic-calming measures. These interventions must balance heritage preservation with the functional demands of 21st-century cities.

2. Crisis Management in Fragile Contexts; Historic districts face heightened risks during disasters due to narrow, winding alleys and limited emergency access. In earthquake-prone regions like the Middle East, unmodified urban fabrics exacerbate vulnerabilities, delaying rescue operations and evacuation (Kamel & Mansour, 2023). The Federal Emergency Management Agency (FEMA, 2021) advocates for context-sensitive infrastructure, such as modular firefighting systems and decentralized emergency hubs, to enhance resilience. Such strategies must reconcile the preservation of historic morphology with the imperative of safeguarding human lives.

3. Green and Open Space Deficits; The dominance of built mass over open space in historic cores contrasts sharply with contemporary demands for green infrastructure. While dense urban forms once maximized land use, they now contribute to heat islands and mental health strain. Beatley's (2020) concept of "biophilic urbanism" proposes integrating vegetation into historic masonry, while the European Environment Agency (2022) highlights retrofitting underutilized courtyards and plazas as multi-functional green hubs. These approaches address ecological needs while respecting the aesthetic integrity of heritage sites.

4. Large-Scale Blocks and Functional Obsolescence; Monolithic historic blocks, designed for pre-industrial economies, often lack the flexibility required for modern mixed-use development. Their rigid footprints impede connectivity and limit opportunities for infill projects or public amenities. Smith (2023) argues that adaptive reuse—transforming heritage structures into community centers or green hubs—can revitalize these spaces without compromising their historical essence. Such interventions align with UNESCO's (2021) call for heritage to serve as a dynamic, rather than static, asset.

5. Narrow Alleys and Accessibility Trade-offs; The charm of historic districts lies in their intimate, human-scale alleys, yet these same features pose accessibility challenges. Narrow pathways restrict vehicular access for emergency services and deter universal mobility, particularly for disabled populations. Kamel and Mansour (2023) propose selective widening or creating parallel routes for service vehicles, ensuring minimal visual disruption. This underscores the need for nuanced solutions that prioritize inclusivity without homogenizing historic character.

6. Mass-Space Imbalance and Social Equity; Historic urban fabrics often prioritize built form over public space, marginalizing communal gathering areas. This imbalance exacerbates social inequities, as residents lack spaces for recreation or civic engagement. The UN-Habitat (2023) links such deficits to broader challenges in achieving Sustainable Development Goal 11 (inclusive cities). Initiatives like "green corridors" or pop-up plazas, as seen in Barcelona's superblocks, demonstrate how historic areas can reclaim underused spaces for public benefit (European Environment Agency, 2022).

7. Synthesizing Preservation and Innovation; The tension between preservation and modernization demands a paradigm shift in conservation theory. Rigid adherence to heritage protocols risks stagnation, while unchecked development erodes cultural identity. Smith (2023) advocates for "adaptive conservation," which integrates heritage into evolving urban systems through participatory planning

and flexible zoning. By framing historic blocks as living ecosystems, cities can harmonize their past and future, ensuring resilience, equity, and cultural continuity.

Table 2. Issues, Needs, and Strategies in Historic Urban Fabrics

Issue/Need	Description & Challenges	Example Cases	Related Concepts/Theories	Paradox/Contradiction	Intervention Strategies	Key Stakeholders
Permeability & Mobility	Narrow alleys hinder vehicular/pedestrian flow; historic layouts conflict with modern access.	Venice, Italy; Fez, Morocco	Tactical Urbanism (Lydon & Garcia, 2015)	Preserving historic charm vs. ensuring accessibility.	Shared streets, adaptive traffic calming, underground service routes.	Urban planners, heritage NGOs, local communities.
Crisis Management	Poor emergency access due to irregular block sizes and narrow pathways.	Historic Cairo, Egypt; Kathmandu, Nepal	Disaster Urbanism (Kamel & Mansour, 2023)	Protecting heritage vs. ensuring life-saving infrastructure.	Modular firefighting systems, decentralized rescue hubs, retrofitted evacuation routes.	Emergency services, UNESCO, municipal governments.
Green/Open Space Deficits	Dense built forms limit green spaces, exacerbating urban heat islands.	Kyoto, Japan; Old Delhi, India	Biophilic Urbanism (Beatley, 2020)	Historic density vs. ecological and social well-being.	Pocket parks, green corridors, rooftop gardens integrated into historic fabric.	Environmental agencies, landscape architects.
Large-Scale Blocks	Monolithic blocks restrict mixed-use functions and connectivity.	Barcelona's Eixample; Vienna's Innere Stadt	Adaptive Reuse (Smith, 2023)	Preserving heritage vs. enabling economic vitality.	Subdividing blocks for mixed-use infill, converting courtyards into public plazas.	Developers, heritage conservators, urban designers.
Mass-Space Imbalance	Overemphasis on built mass marginalizes public spaces, affecting social equity.	Istanbul's Historic Peninsula	Right to the City (Lefebvre, 1968)	Historic monumentality vs. inclusive public realms.	Pop-up plazas, reclaiming underused alleys for community activities.	Community groups, municipal planners, NGOs.
Preservation vs. Innovation	Rigid conservation stifles innovation; unchecked development erodes heritage.	Amsterdam's Canal Ring; Mexico City Centro	Adaptive Conservation (UNESCO, 2021)	Static heritage vs. dynamic urban needs.	Participatory zoning, flexible heritage codes, hybrid designs blending old and new materials.	Policymakers, architects, cultural historians.

5. Case Study: Tabriz City

Historical Texture of Tabriz

Iranian cities are renowned for their rich historical textures, shaped by millennia of cultural, political, and architectural evolution. These urban centers, such as Isfahan, Shiraz, and Tabriz, reflect layers of pre-Islamic, Islamic, and modern influences, blending Persian traditions with regional and global exchanges. The concept of *bāft-e tārīkhī* (historical fabric) emphasizes the organic growth of cities around central cores like bazaars, mosques, and citadels, often aligned with natural landscapes. Scholars such as Michael Bonine (2020) highlight how Iran's urban morphology was historically designed to foster social cohesion and economic vitality, a theme particularly evident in Tabriz's development.

Tabriz, the capital of East Azerbaijan Province, epitomizes Iran's historical urbanism. Strategically located along the Silk Road, it became a hub for trade, diplomacy, and cultural synthesis between East Asia, the Middle East, and Europe. During the Ilkhanid and Safavid eras, Tabriz served as a political capital, fostering architectural innovations like the *Arg-e Tabriz* (14th-century citadel) and the Jameh Mosque of Tabriz. Its role as a multicultural nexus is underscored by historical accounts of European

travelers, such as Pietro della Valle, who noted its cosmopolitan character (Floor, 2021). The city's layout, with its labyrinthine bazaar and caravanserais, reflects its medieval function as a commercial epicenter.

Tabriz's historical fabric is distinguished by its vernacular architecture, characterized by brick vaults, iwans (vaulted halls), and courtyards adapted to the region's climate. The Tabriz Historic Bazaar Complex, a UNESCO World Heritage Site since 2010, exemplifies this tradition. Covering 18 hectares, it is one of the oldest and largest covered bazaars in the world, integrating mosques, hammams, and madrasas into a cohesive urban ensemble. The bazaar's design embodies the Azerbaijani architectural style, with influences from Ottoman and Central Asian traditions (UNESCO, 2023). Recent studies by Iranian architects, such as those published in *Iranian Studies* (2022), emphasize its adaptive reuse as a living heritage site.

Beyond its physical structure, Tabriz's historical texture is intertwined with its cultural legacy. The city was a cradle of Persian literature, nurturing poets like Shams Tabrizi, whose works influenced Rumi. It also played a pivotal role in Iran's Constitutional Revolution (1906–1911), with its bazaar serving as a site of political mobilization. Anthropologist Nina Glick Schiller (2021) argues that Tabriz's enduring multicultural identity—shaped by Azerbaijani, Kurdish, and Armenian communities—continues to define its social fabric. Annual festivals, such as the Tabriz Carpet Festival, celebrate this heritage, bridging past and present.

Despite its significance, Tabriz's historical fabric faces threats from urbanization, earthquakes, and neglect. The 2020 restoration of the Blue Mosque, funded by the Iranian Cultural Heritage Organization, highlights efforts to balance preservation with modern needs. However, scholars like Ali Mozaffari (2023) caution that top-down approaches often overlook community engagement. International collaborations, such as partnerships with the Aga Khan Trust for Culture, offer promising models for sustainable conservation. As Tabriz evolves, its historical texture remains a testament to resilience, urging a dialogue between heritage and progress.

n this section of the present study, the topic of urban blocks in the city of Tabriz is examined. Given the development of Tabriz across different historical periods, urban blocks have emerged and evolved in diverse forms and patterns. For instance, medieval-style urban blocks (that in Iran called as organic and historical blocks) can be observed in the city's central fabric. The central fabric of Tabriz, particularly the area encompassing the Tabriz Historic Bazaar Complex, serves as a prominent example of organic blocks with a medieval pattern. In this area, blocks are densely structured, characterized by narrow, winding alleys (such as the covered passageways of the bazaar) and mixed commercial-residential land uses. The blocks are generally organized around a central core (e.g., the main bazaar corridors) and exhibit high population and activity density. The bazaar block can be classified as one of Tabriz's historical organic blocks. Similarly, the neighborhood and blocks of Magsoudiyeh also embody these characteristics and are considered part of the city's organic and historical blocks.



Fig5- Organic and historical urban blocks in Tabriz (Left: bazaar blocks/ Right: Magsoudiyeh neighborhood's blocks); Source: Authors

With the onset of modernization during the early Pahlavi era, extensive street-widening projects (e.g., Imam Khomeini Street) and the construction of new squares (e.g., Municipality Square) transformed the structure of historical blocks. This process fragmented large historical blocks into smaller units with more regular geometries. In other words, the central and historical fabric of the city began to exhibit more organized and cohesive blocks. A clear example of this transition can be seen in the Sheshghelan neighborhood of Tabriz, where blocks separated by the construction of Shahnaz Street (now Sharriati Street) display a hybrid of organic forms and linear geometry. For example, in the figure below, Sharriati Street in the city of Tabriz is shown, which is one of the Pahlavi-era street developments in this city. These streets intersect the organic axes and streets of the city, resulting in the formation of blocks with at least one geometrically regular and organized side. Another example is Saat Square in the city of Tabriz, where Pahlavi-era street developments have transformed the historical, organic urban blocks into more permeable, smaller, and geometrically regular blocks.



Fig6- Pahlavi-era street developments and urban blocks in Tabriz (Left: Sharriati street/ Right: Saat Square); Source: Authors

In recent urban developments in Tabriz, grid-patterned and vertical blocks have become dominant, particularly in the eastern and western regions. These blocks, designed to accommodate the growing population and maximize land use efficiency, reflect the high land value within the cultural context of Tabriz's residents. For instance, the Aseman Tower Complex in the El-Goli district exemplifies vertical blocks. Similarly, the block layout of the Valiasr district represents modern grid-patterned blocks, while the Baghmisheh neighborhood combines medium-density grid blocks with mixed educational-residential functions.



Fig7- vertical blocks and Aseman Tower Complex in the El-Goli district in Tabriz

In the northern and southern peripheries of Tabriz, informal settlements with distinct socio-economic conditions are observable. Marginalized areas such as Yakhchal Quarter and Emamieh Quarter are stark examples of irregular, unplanned block formations. These neighborhoods, constructed rapidly with low-quality materials to meet urgent shelter needs, exhibit challenges such as narrow alleys, undersized

plots, and structural instability. Such settlements are highly vulnerable to minor urban incidents or climatic events. For example, in Tabriz's Seilab neighborhood, even minimal rainfall leads to clogged drainage systems and surface water flooding into homes and urban blocks. These blocks typically develop without formal planning, featuring irregular, small land parcels, cramped pathways, and limited access to basic utilities (water, electricity, sanitation).



Fig8- urban blocks in Seilab neighborhood

The urban block patterns in Tabriz reflect layers of historical evolution, urban development policies, and socio-economic pressures. While the historical fabric requires participatory revitalization and reduced demolition, modern blocks face challenges such as social instability (lack of communal belonging) and spatial consumerism. Marginalized areas, meanwhile, demand empowerment programs and socio-physical reorganization. This typological diversity underscores the necessity for context-based development plans in Tabriz's urban planning framework.

6. Discussion and Findings

1. **Characteristics of Suitable Urban Blocks from an Urban Planning Perspective**; Suitable urban blocks are defined by their ability to harmonize spatial efficiency, social equity, and environmental resilience. A key characteristic is permeability, where interconnected streets and mixed-use layouts enhance walkability and reduce reliance on cars (Carmona, 2021). For instance, Barcelona's superilles demonstrate how porous block networks can prioritize pedestrians while maintaining accessibility (Muñoz et al., 2020). Human-scale design is equally critical: blocks with active ground-floor uses—such as shops, cafes, and community spaces—foster social interaction and safety through "eyes on the street" (Jacobs, 1961). Modern planners also emphasize adaptability, where flexible building typologies accommodate evolving functions without compromising structural integrity (Marshall, 2021). Finally, sustainability is embedded through green infrastructure, such as permeable surfaces and vertical gardens, which mitigate urban heat and manage stormwater (Gehl, 2020). These features collectively ensure blocks remain vibrant, inclusive, and future-proof.

2. **Reconciling Density and Livability**; Balancing density with livability is a persistent challenge. High-density blocks in cities like Hong Kong or Mumbai often face overcrowding and inadequate green space, exacerbating social inequities (Roy, 2021). Solutions include vertical mixed-use development, where housing, offices, and amenities coexist in high-rises with shared public spaces, as seen in Singapore's Pinnacle@Duxton (Hee et al., 2020). Additionally, micro-renewal strategies —such as retrofitting underused alleys into pocket parks—enhance livability without displacing residents (UN-Habitat, 2022). These approaches align with the "15-minute city" model, ensuring essential services are accessible within short walks (Moreno et al., 2021).

3. **Historic Blocks**; Decay and Functional Obsolescence Problematic historic blocks often suffer from structural decay, outdated infrastructure, and mismatches between traditional layouts and modern needs. In cities like Cairo's Islamic Quarter or Beijing's hutongs, narrow streets and aging utilities hinder contemporary mobility and sanitation (Wang & Zhan, 2022). Functional obsolescence is also acute in

post-industrial blocks, such as Detroit's vacant factories or Sheffield's derelict warehouses, where monofunctional zoning no longer aligns with economic realities (Calabrò et al., 2021). These challenges are compounded by regulatory rigidity, where heritage protections stifle adaptive reuse (Rodwell, 2020).
4. **Strategies for Re-invention**: Adaptive Reuse and Participatory Governance Adaptive reuse emerges as a cornerstone for revitalizing problematic blocks. In Bologna, historic insulae (apartment blocks) have been repurposed into student housing and coworking spaces, blending preservation with affordability (Bandarin & Van Oers, 2014). Similarly, Lisbon's LX Factory transformed industrial warehouses into creative hubs, reigniting local economies (Pendlebury et al., 2020). Critical to success is participatory governance: in Medellín, Colombia, community-led upgrades to informal settlements integrated infrastructure improvements with cultural programs, reducing crime and fostering pride (Zhang et al., 2023). Digital tools like BIM (Building Information Modeling) further enable stakeholders to simulate interventions and assess heritage impacts (Dore & Murphy, 2021).
5. **Addressing Socio-Spatial Inequities Problematic** blocks often reflect systemic inequities. In Mumbai's slums, high-density blocks lack tenure security and basic services, perpetuating cycles of poverty (Roy, 2021). Re-invention must prioritize social equity through policies like community land trusts and incremental housing upgrades, as demonstrated in Thailand's Baan Mankong program (UN-Habitat, 2022). Meanwhile, historic districts like Istanbul's Süleymaniye face gentrification risks; here, rent control and artisan cooperatives have preserved affordability while attracting cultural tourism (Abdelmonem et al., 2020). Such strategies ensure that re-invention benefits existing communities rather than displacing them.
6. **Synthesizing Innovation and Heritage**; The most successful re-inventions merge heritage conservation with cutting-edge innovation. Amsterdam's De Pijp district, for example, retained its 19th-century workers' housing while introducing smart grids and circular economies (Carmona, 2021). In Kyoto, traditional machiya townhouses now host tech startups, bridging cultural legacy with digital futures (ICOMOS, 2021). However, tensions persist: over-tourism in Venice's historic blocks threatens authenticity, highlighting the need for visitor caps and diversified economies (Foscari, 2020). Ultimately, the goal is to create blocks that are "living heritage"—dynamic, adaptive, and rooted in collective memory.

7. Conclusion

The delicate interplay between preserving historic urban fabrics and addressing contemporary urban needs is not merely a technical challenge but a cultural imperative. Historic districts, with their labyrinthine alleys, monumental blocks, and dense built forms, are repositories of collective memory and identity. Yet, their survival in the modern era hinges on adaptive strategies that reconcile heritage with imperatives such as equitable mobility, disaster resilience, and ecological sustainability. Cities worldwide—from Venice to Cairo—demonstrate that innovation need not erase history; instead, it can breathe new life into aging structures while honoring their legacy.

In Iran, cities like Isfahan and Yazd epitomize this balance. Isfahan's Naqsh-e Jahan Square, a UNESCO World Heritage Site, exemplifies how historic spaces can evolve into vibrant hubs for social and economic activity without compromising their architectural integrity. Meanwhile, Yazd's windcatchers and mud-brick alleyways, designed for passive cooling in arid climates, offer lessons in sustainable design that resonate with modern green urbanism. However, these cities also face pressing challenges: narrow pathways hinder emergency access, monolithic blocks limit functional adaptability, and the scarcity of green spaces exacerbates urban heat. Addressing these issues demands context-sensitive solutions—retrofitting alleyways for safer mobility, integrating pocket parks into historic courtyards, and repurposing underused structures for community needs.

The path forward lies in reimagining historic fabrics as dynamic, living systems rather than static artifacts. By embracing adaptive reuse, participatory planning, and hybrid design, cities can transform preservation from a restrictive obligation into a catalyst for inclusive growth. Iran's historic cities, with their rich architectural heritage, have the potential to lead this paradigm shift, blending tradition with innovation to create resilient, equitable urban environments. Ultimately, the preservation of historic urban blocks is not about freezing the past in time but about weaving its wisdom into the evolving

tapestry of urban life—ensuring that heritage remains relevant, accessible, and vital for generations to come.

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