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ORIGINAL PAPER
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THE FUNCTION OF FENG SHUI'S FIVE ELEMENTS IN ENCOURAGING URBAN PUBLIC SPACE FOR SOCIAL INTERACTION. CASE STUDY: AL-ARABI AND AL-WASHASH NEIGHBORHOODS IN THE AL-MANSOUR DISTRICT, BAGHDAD

Aisha Mohammed Abdulqader[1]✉, Amer Shakir Alkinani[2]✉

[1] ORCID: 0009-0001-0078-9019
[2] ORCID: 0000-0002-4916-1521
[1,2] University of Baghdad
Al-Jadiriyah Complex, PO Box: 47251, **Iraq**

ABSTRACT

Motives: This study examines the integration of Feng Shui principles into urban public spaces to enhance social interaction, livability, and environmental harmony. The case study focuses on the Al-Arabi and Al-Washash neighbourhoods in Baghdad, exploring how spatial characteristics influence engagement and energy circulation (Qi) within the urban network. The motivation arises from deficiencies in connectivity, shading, greenery, and water features, which limit social and aesthetic vibrancy.
Aim: The objectives are to evaluate spatial and social dynamics through the Feng Shui Public-Space Index (FS-PSI), Space Syntax analysis, and resident surveys, and to propose strategies using Feng Shui design proxies to improve energy flow, accessibility, and inclusivity.
Results: Findings show Al-Washash has stronger connectivity, integration, and cohesion than Al-Arabi. Surveys revealed limited greenery, water, and social spaces, consistent with higher entropy and lower controllability. Aligning FS-PSI with spatial metrics confirmed that higher Feng Shui values foster stronger social interaction. Proposed interventions include shaded seating, vegetation, lighting, and water features to strengthen community resilience and environmental harmony.

Keywords: Feng Shui, place energy, public spaces, social interaction, Space Syntax, urban design

INTRODUCTION

Public spaces are fundamental to cities, providing arenas for interaction, cultural exchange, and community building. They enhance cohesion and quality of life, while poor design can discourage engagement and weaken social ties (Bishop & Marshall, 2017; Ujang et al., 2018).

In dense urban contexts, well-designed spaces mitigate isolation, foster inclusivity, and strengthen resilience.

In this study, Feng Shui is approached not as a scientific theory but as a traditional design philosophy and heuristic framework. Its Five Elements – Wood, Fire, Earth, Metal, and Water – represent interdependent natural forces that influence

✉Aaesha.Mohammed1300a@iurp.uobaghdad.edu.iq, ✉Dr.amerkinani@iurp.uobaghdad.edu.iq

spatial vitality (Hong et al., 2007; Xu, 1998). Interpreted as design proxies, Wood relates to greenery, Fire to lighting and vitality, Earth to stability, Metal to clarity, and Water to adaptability. Their thoughtful integration can support social well-being, environmental balance, and community interaction (Zhang et al., 2019).

Global agendas such as the New Urban Agenda and SDG 11 emphasize inclusive, safe, and sustainable environments. Innovative models like the superblock show how calming traffic, expanding greenery, and pedestrian networks can improve urban well-being, particularly for vulnerable groups such as the elderly (Rueda, 2019; WHO, 2007).

This study situates Baghdad's neighbourhoods within that broader discourse. Rather than transplanting Feng Shui, it adapts its Five Elements as measurable indicators for urban analysis. By introducing the Feng Shui Public-Space Index (FS-PSI) and combining it with Space Syntax and residents' perceptions, the research addresses a gap: to our knowledge, no prior study has tested this integration in Baghdad's urban context.

Problem Statement

Urban public spaces are crucial for interaction and livability, yet many remain underutilized. Although Feng Shui is mostly applied indoors, its potential to enrich outdoor sociability is often neglected. The lack of such integrative principles is among the factors contributing to socially lifeless areas. In this study, Feng Shui is approached not as cultural transplantation but as transferable proxies – greenery, water, orientation, and legibility – to interpret and improve spatial vitality.

Research Significance

This study explores how Feng Shui elements can guide interactive public space design by linking environmental qualities to community well-being. Proxies such as greenery, lighting, stability, clarity, and water, when applied contextually, foster healthier living, reduce stress, and enhance social interaction in Baghdad's neighbourhoods. The research contributes by introducing the Feng Shui Public-Space Index (FS-PSI) and combining it with Space Syntax analysis and residents' perceptions.

Research Objectives

The objectives of this research are:

1. Translate the Five Elements (Wood, Fire, Earth, Metal, Water) into measurable urban indicators.
2. Develop and apply a unified Feng Shui Public-Space Index (FS-PSI) to Al-Arabi and Al-Washash for comparative analysis (see Fig. 1).

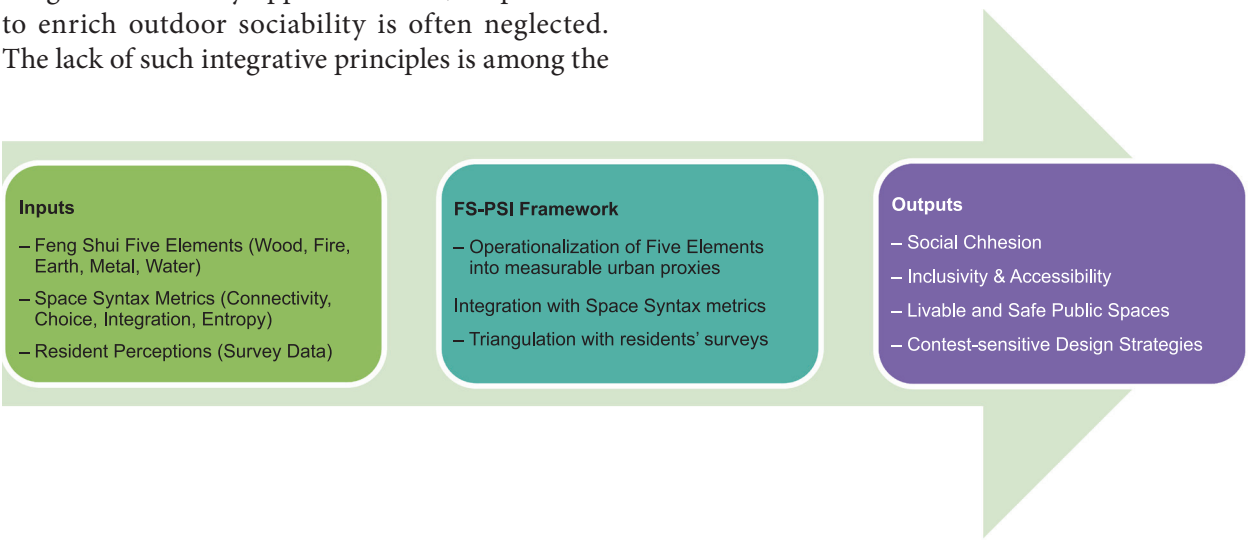

Fig. 1. FS-PSI Framework Integrating Feng Shui Proxies, Space Syntax Metrics, and Resident Perceptions
Source: own elaboration.

✉Aaesha.Mohammed1300a@iurp.uobaghdad.edu.iq, ✉Dr.amerkinani@iurp.uobaghdad.edu.iq

3. Validate FS-PSI by comparing it with Space Syntax metrics and resident surveys, identifying design interventions that strengthen social interaction.

LITERATURE REVIEW

Public spaces and social interaction

Public space is a central element of urban form and a foundation for social cohesion, civic identity, and community well-being. It provides arenas for diverse groups to interact, form ties, and strengthen belonging. The quality of design – especially accessibility, safety, comfort, and multifunctionality – directly shapes the depth of these interactions (Sulyk, 2023; Ujang et al., 2018). Case studies confirm this link: in Kuala Lumpur, social attachment is tied to design quality (Ujang et al., 2018); in Wrocław, barrier-free accessibility was shown to support mobility and interaction (Gabryańczyk & Orlińska, 2019); and in Białystok, access to greenery enhanced livability and well-being (Krzywnicka & Jankowska, 2021).

Urban landscapes must therefore respond to multiple human needs such as safety, comfort, and opportunities for interaction (Matsuoka & Kaplan, 2008). As Sulyk (2023) observes, undifferentiated open fields limit encounters, while designed spaces with vegetation, seating, and shade foster meaningful interaction. Green and blue infrastructure further reinforce sociability and health outcomes (Valente de Macedo et al., 2021). Fig. 2 synthesizes these dimensions (health outcomes, social cohesion, inclusiveness, sense of belonging, and urban design quality) and demonstrates how well-designed public spaces directly strengthen community resilience. Strong evidence also shows that properly designed streets and squares nurture inclusivity and spontaneous encounters, reinforcing the role of public spaces in sustaining cohesive communities (Bishop & Marshall, 2017).

Inclusive and Healthy-Aging Public Space within Global Agendas

At the international level, the New Urban Agenda and Sustainable Development Goal 11 call for inclusive, safe, and resilient public spaces. Age-friendly and disability-inclusive environments have become global priorities as cities face rapid demographic transitions (WHO, 2007). Models such as Barcelona's superblocks illustrate how integrated strategies can enhance mobility, safety, and environmental quality while

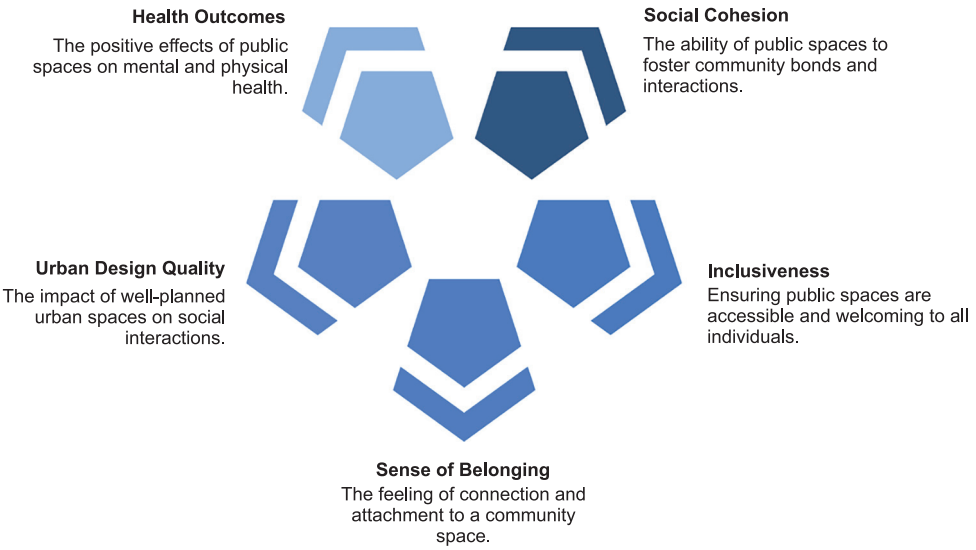

Fig. 2. Public Space
Source: own elaboration.

✉Aaesha.Mohammed1300a@iurp.uobaghdad.edu.iq, ✉Dr.amerkinani@iurp.uobaghdad.edu.iq

safeguarding the well-being of older and vulnerable populations (Rueda, 2019). Blue and green spaces further provide therapeutic benefits, supporting older adults' health, reducing stress, and encouraging social engagement (Finlay et al., 2015).

In Baghdad, however, such models cannot be transplanted wholesale. The city faces distinct challenges – harsh climatic conditions, car-dominated infrastructure, and limited institutional capacity – which constrain direct application. Strategies must therefore be adapted to local traditions and resources, ensuring that inclusivity, elderly well-being, and accessibility for people with disabilities are pursued in contextually appropriate ways.

Feng Shui: Principles and Urban Proxies

Feng Shui, rooted in Sino-cosmology, has evolved from building-scale applications to urban settings, where it balances human activity with environmental cues. Its Five Elements can be reconceptualized as measurable urban design proxies:

1. Wood → greenery, vegetation, and shading.
2. Fire → lighting quality and evening use intensity.
3. Earth → stability of materials, surfaces, and seating.
4. Metal → legibility of edges, circulation clarity, and signage.
5. Water → microclimatic features and water elements.

These proxies provide a structured vocabulary to evaluate public space quality. This study does not treat Feng Shui as cultural transplantation but as an analytical lens aligned with universal qualities – comfort, accessibility, sociability – making it adaptable to global agendas (e.g., SDG 11) and relevant in Baghdad's Islamic urban context.

Research Gap

Most research on public space design remains East-Asia centric, with limited attempts to operationalize Feng Shui's Five Elements into measurable indicators or to test their relevance in Middle Eastern and Islamic contexts. This gap overlooks how adaptable analytical tools can enrich public-space design beyond their origins. In Baghdad, neighbourhoods face social fragmentation, limited green and blue infrastructure, and declining spatial legibility – all of which constrain sociability and livability. Yet, systematic frameworks integrating Space Syntax with Feng Shui-based proxies (FS-PSI) are absent.

This study addresses the gap by applying FS-PSI in Al-Arabi and Al-Washash neighbourhoods and examining its correlation with spatial configuration and residents' perceptions. In doing so, it contributes both to cross-cultural planning discourse and to practical knowledge for enhancing public-space livability in Baghdad.

Design of Public Spaces

Public space is a core element of urban composition, historically forming around open areas (Alzubaid et al., 2018). Beyond physical form, place attachment

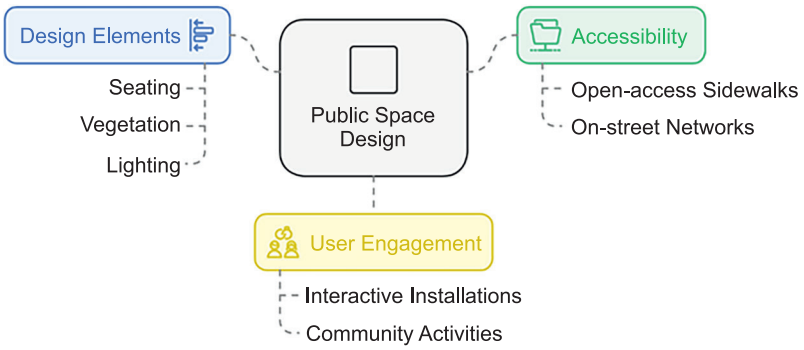

Fig. 3. Interactive design elements in public space – accessibility, greenery, seating, and lighting – that foster social interaction
Source: own elaboration.

✉Aaesha.Mohammed1300a@iurp.uobaghdad.edu.iq, ✉Dr.amerkinani@iurp.uobaghdad.edu.iq

reflects the emotional and behavioural ties between people and their environments (Alrobaee & Al-Kinani, 2019).

Well-designed spaces shape encounters through accessibility, seating continuity, vegetation, lighting, and clear edges. In contrast, undifferentiated open fields limit interaction, while shaded and programmed areas with seating foster sociability (Sulyk, 2023; Ujang et al., 2018). Evidence further shows that higher seating–canopy ratios and spatial legibility extend dwell times and strengthen resilience (Avalone-Neto et al., 2017).

As illustrated in Fig. 3, the interaction of these design elements demonstrates how spatial qualities influence behaviour, encouraging longer stays, comfort, and sociability.

Core concepts of public space design

The design of public spaces rests on five core concepts:

1. Accessibility – ensuring equitable reach through connected networks.
2. Comfort – providing shade, seating, and micro-climatic moderation.
3. Safety – enhancing lighting and passive surveillance.
4. Legibility – maintaining clear spatial organization and signage.
5. Inclusivity – accommodating diverse users across age, gender, and cultural backgrounds.

These principles align with global planning agendas while also revealing local deficiencies. In Al-Arabi and Al-Washash, limited shading, poor seating distribution, and unclear edges undermine place attachment and social interaction.

Accessibility and Inclusivity in Public Spaces

Inclusive public spaces serve as arenas for comfort and communal life, bringing together residents from different social, economic, and cultural backgrounds. Multi-functional environments encourage interaction and place attachment, particularly in culturally diverse settings (Ujang et al., 2018). Functional and aesthetic qualities are also crucial for well-being in inclusive and age-friendly contexts (Senetra et al., 2024).

In multicultural contexts, public spaces can be developed as sites of intercultural programming, although interactions between groups may become racially non-negotiable when spatial infrastructure is inadequate (Ahmadi, 2018). It was found that changes in surveillance, gang presence /sight, and other symbolic presences of different cultural groups were also associated with the act of self-exclusion, which resulted in a declining rate of interpersonal interaction in public spaces (Ujang et al., 2018).

Fig. 4 illustrates the components of inclusive public space – accessibility, safety, cultural diversity, and opportunities for interactions show how collaborative environments foster communication, cultural exchange, and community resilience.

Urban Design Feng Shui philosophy

In this study, the Feng Shui Public-Space Index (FS-PSI) is treated as a complementary framework rather than a replacement for Islamic or modern planning traditions. It provides transferable indicators consistent with inclusivity and livability in the New Urban Agenda (UN-Habitat, 2017). This section reviews Feng Shui's conceptual roots, its role in social interaction, and its relevance to contemporary urban design through the Five Elements.

Feng Shui Philosophy (Concept & History)

Feng Shui is an ancient Chinese philosophy of more than 3000 years, rooted in geomantic traditions and the concept of Qi – the vital energy flowing through landforms and built environments that influences prosperity, health, and balance (Madeddu & Zhang, 2017). It emphasizes harmony between humans and nature, aiming to foster well-being and sustainable environments (Abdulqader & Alkinani, 2025).

The philosophy is structured around the Five Elements – Wood, Fire, Earth, Metal, and Water – as interrelated forces shaping both physical and

✉Aaesha.Mohammed1300a@iurp.uobaghdad.edu.iq, ✉Dr.amerkinani@iurp.uobaghdad.edu.iq

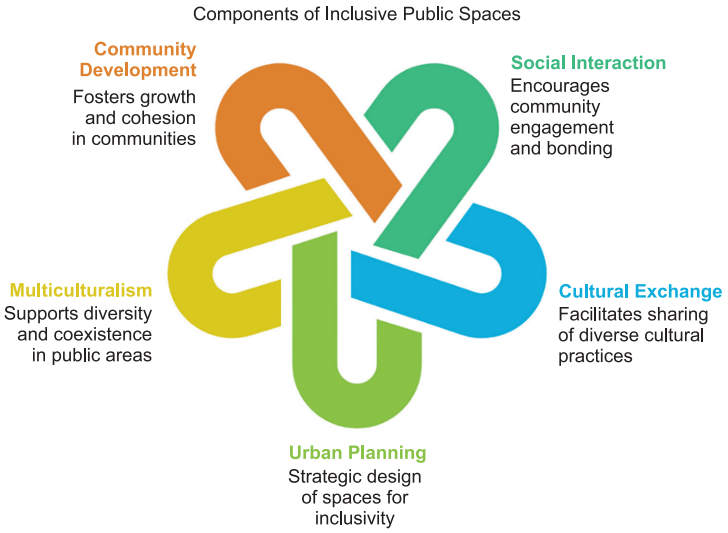

Fig. 4. Components of Inclusive Public Spaces
Source: own elaboration.

psychological aspects of life. In urban contexts, they translate into greenery (Wood), lighting (Fire), durable materials (Earth), legible spatial structures (Metal), and water features (Water) that enrich public space (Chong & Bahauddin, 2017).

Integrating the Five Elements with the concept of Qi provides a coherent framework for urban design. This integration supports vibrant, functional, and balanced public spaces that enhance mental and physical health, stimulate creativity, and strengthen community resilience (Shokri et al., 2023). Fig. 5 illustrates the conceptual framework of Feng Shui philosophy and its Five Elements.

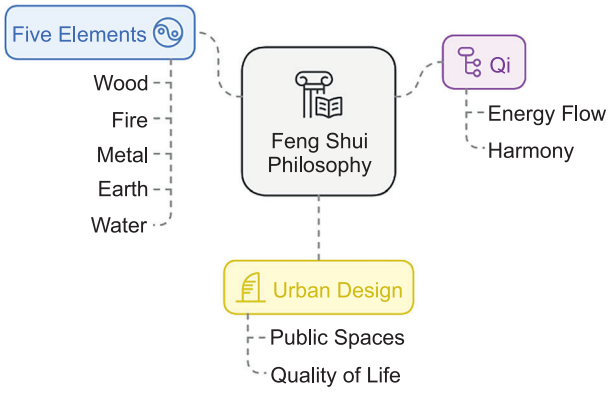

Fig. 5. Feng Shui Philosophy
Source: own elaboration.

Fengshui and Social Interaction

Feng Shui principles in urban design enhance social interaction by maintaining a balanced flow of Qi in public spaces. The Five Elements serve as tangible design proxies: greenery and shade (Wood) foster gathering, lighting (Fire) extends evening use, durable materials and seating (Earth) provide stability, legible circulation (Metal) ensures clarity, and water features (Water) promote tranquility and cohesion (Madeddu & Zhang, 2017). Together, they transform public areas into sociable and resilient environments.

In modern contexts, these principles are integrated into design strategies that support community life, as seen in Shanghai (Guan & Wang, 2023) and Hong Kong, where Feng Shui-inspired renewal projects created open spaces meeting both formal and informal social needs, particularly for the elderly (Yung et al., 2016). Feng Shui's potential lies in guiding people–environment relations through interventions such as seating, pathways, and amenities, which channel flows and encourage balanced social behaviour, reinforcing unity within communities (Shokri et al., 2023).

✉Aaesha.Mohammed1300a@iurp.uobaghdad.edu.iq, ✉Dr.amerkinani@iurp.uobaghdad.edu.iq

Contextualizing Feng Shui in an Islamic Urban Setting

The relevance of Feng Shui in Baghdad can be understood through both Islamic traditions and historical exchanges with China. Islamic cities emphasized orientation and moral geometry, water and greenery as functional–spiritual amenities, climatic moderation through courtyards and shade, and calibrated thresholds between public, semi-public, and private domains to structure social life (Bianca, 2000; Hakim, 1986). These principles resonate with Feng Shui's balance and flow, allowing the Five Elements – Wood, Water, Earth, Fire, and Metal – to be adapted as design proxies such as greenery, light, stability, legibility, and water without contradicting Islamic values. This alignment was further reinforced during the Abbasid era, when Baghdad, as a Silk Road hub, absorbed Chinese innovations in papermaking, astronomy, ceramics, and garden aesthetics, which influenced Islamic architecture and urban design (Bloom, 2001; Elman, 2005; Saliba, 2007). Both traditions shared a concern for harmony between humans and the environment; thus, applying Feng Shui proxies in Baghdad is not cultural transplantation but a continuation of this historical dialogue of ideas across.

Feng Shui in modern city planning

Feng Shui, though rooted in ancient philosophy, has evolved into a tool for designing environmentally and socially sustainable urban spaces. In contemporary practice, it aligns natural and built environments to promote health, livability, and social interaction. Its framework of Qi and the Five Elements – Wood, Fire, Earth, Metal, and Water – provides design principles that improve energy efficiency, reduce stress, and enhance quality of life (Wen et al., 2021).

Unlike conventional Western planning approaches that emphasize efficiency, Feng Shui prioritizes harmony between people and their surroundings, fostering mental well-being and social vitality. In East Asia, urban plans inspired by Feng Shui have been shown to increase social interaction by creating inviting gathering spaces. A clear example is Penang, Malaysia, where Feng Shui-based designs integrated water features and expanded greenery to enhance sustainability while strengthening community cohesion a (Bahauddin & Soon, 2018); this manifested by installing water features and maximizing green areas not only boosting environmental sustainability performance but also achieving social harmony among the society.

It creates spaces that are not only functional but also energetically and spiritually aligned, reinforcing a sense of place, context, and belonging. Overall, Feng Shui introduces cultural and environmental aspirations into modern city planning, producing spaces that are functional, sustainable, and socially cohesive. By incorporating trees, water features, and seating arrangements, it reconfigures dense urban areas into environments that stimulate social encounters and community resilience (Shokri et al., 2023).

For the discussion of beauty and happiness, the principles of Feng Shui are relevant for modern urban planning as they contribute to sustainable and socially cohesive urban environments in many ways. Fig. 6 illustrates how Feng Shui bridges environmental sustainability with social vitality, offering an alternative model that combines ecological balance with human well-being.

While Feng Shui offers a holistic lens that links environmental balance with social interaction, it is not presented here in opposition to Western planning traditions. Modern European practices and designed cities such as Chandigarh (planned by Le Corbusier in India) have also incorporated open plazas, greenery, and natural ventilation to encourage social life. This study, therefore, positions Feng Shui as a complementary framework that enriches, rather than replaces, existing urban design theories.

The Five Elements in Urban Design

Feng Shui translates the Five Elements – Wood, Fire, Earth, Metal, and Water – into practical urban design components that enhance harmony and social interaction.

✉Aaesha.Mohammed1300a@iurp.uobaghdad.edu.iq, ✉Dr.amerkinani@iurp.uobaghdad.edu.iq

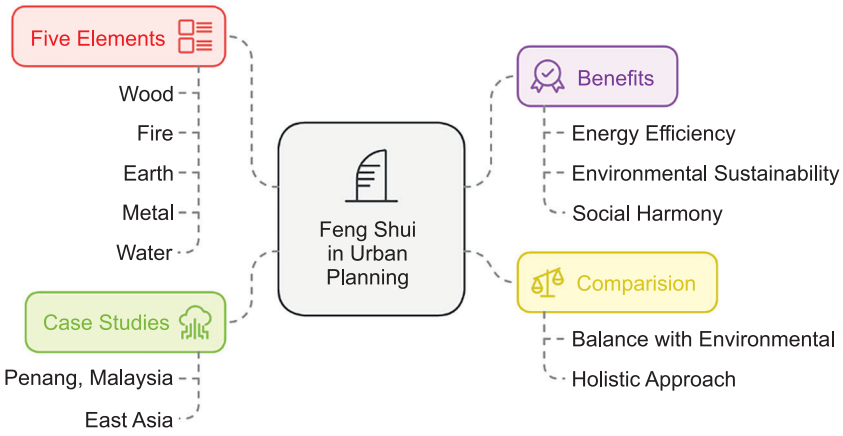

Fig. 6. Feng Shui in Urban Planning
Source: own elaboration.

Wood: Growing and Creation

Symbolized by trees and vegetation, Wood represents creativity and life. Beyond aesthetic value, greenery in parks and tree-lined streets encourages residents to spend more time outdoors, fostering casual encounters and stronger community ties. Studies confirm that green infrastructure improves mental well-being and supports social cohesion, creating settings for relaxation and creative activities (Chong & Bahauddin, 2017).

Fire: Energy and Transformation

Fire denotes energy and passion, expressed through lighting and open spaces that extend activity into the evening. Brightly lit walkways, plazas, and gathering spaces allow for public events and festivals, reinforcing a vibrant urban realm. Conversely, inadequate lighting reduces evening use and limits opportunities for interaction (Madeddu & Zhang, 2017).

Earth: the foundations of stability and nourishment

Represented by materials such as stone, brick, and clay, Earth conveys stability and security. In urban spaces, stone pathways or brick seating create a grounded sense of permanence and safety, encouraging people to socialize with confidence. These durable materials also support sustainability and long-term usability, reinforcing both physical and social stability (Madeddu & Zhang, 2017).

Metal: Clarity and Organization

Metal embodies clarity, precision, and order. In urban design, minimalist structures and clear spatial layouts improve legibility, reduce stress, and facilitate orientation. Research shows that well-organized public spaces are easier to navigate and more conducive to spontaneous communication among users (Chong & Bahauddin, 2017).

Water: Flow and Change

Water symbolizes continuity and serenity, expressed through fountains, ponds, or streams. These elements enhance the sensory quality of public spaces, regulate microclimates, and provide settings for recreation and gathering. Empirical evidence highlights that water features reduce stress, create tranquility, and promote community interactions, strengthening social bonds in dense neighbourhoods (Sedighi & Mollazehi, 2017).

✉Aaesha.Mohammed1300a@iurp.uobaghdad.edu.iq, ✉Dr.amerkinani@iurp.uobaghdad.edu.iq

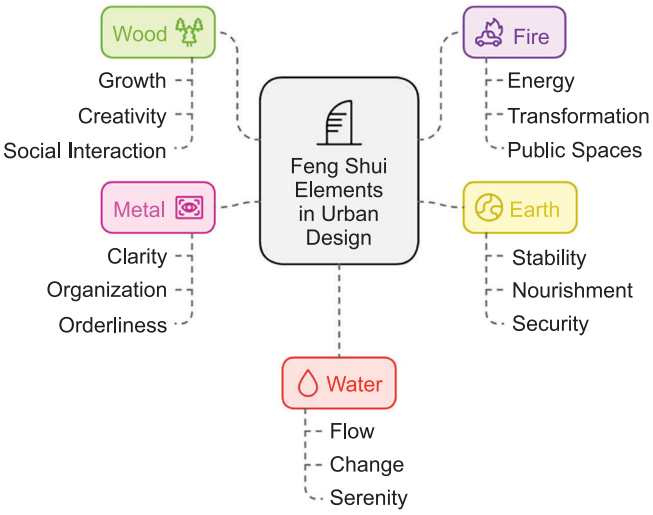

Fig. 7. Enhancing Social Interaction through Feng Shui
Source: own elaboration.

Urban Design and Energy

The design of public spaces directly influences the flow of energy, or Qi, shaping social patterns and community vitality. Building arrangements, pathways, and natural features such as trees and water can either facilitate or block this flow, affecting the livability of urban areas. Promoting free Qi circulation supports relaxation, connectivity, and health. Jinwei et al. (2020) show that well-arranged open areas and greenery reduce stress, improve air quality, and foster social interaction.

Design strategies that improve air circulation, daylight access, and thermal comfort also enhance the energetic quality of urban form. Research confirms that street layout and building height affect heat and light management, influencing user health and engagement (Chokhachian et al., 2020). Integrating natural features such as trees, water, and daylight into urban design calms users, supports positive environmental relations, and improves quality of life (Fallanca, 2021).

Energy Efficiency and Urban Design

Integrating sustainability with urban design is a hot topic for increasing energy efficiency and the usability of public space. Sustainable urban design integrates the building aspects with the environmental and social to create energy-efficient and healthy places for human beings (Rueda, 2019). Studies highlight that cities will continue to be improved by making efficient use of space and resources (UN-Habitat, 2016) via what is known as compact urban forms, which promote energy efficiency, for example, (Futcher et al., 2017) showed that taller buildings could positively reduce energy usage. Still, the impact of tall buildings on microclimates must also be considered so as not to create a hostile environment for residents due to wind speed obstructions and loss of daylight access.

To reduce ecological footprints, measures such as using recycled materials, optimizing orientation, and adopting passive strategies have been shown to improve both energy performance and social functionality (Kim & Kwon, 2018). Within Feng Shui philosophy, this aligns with the idea of balancing space and energy through colour, form, and materials that guide the flow of Qi, (Hamzah & AbdulJalil, 2019).

In summary, combining sustainability with urban design enhances efficiency and life quality, providing cities with greener, more socially vibrant public areas.

Influence of Energy on Social Interaction

Sustainable urban design reduces energy waste while facilitating social interaction by making spaces more responsive to human needs. Energy-conscious environments often integrate greenery, lighting, and air circulation to improve usability and encourage social mobility. Research shows that coupling public spaces with energy-efficient measures – such as renewable systems and passive strategies – significantly enhances opportunities for everyday exchanges (Ahmadi, 2018). Designs that optimize orientation, shading, and thermal comfort also extend outdoor activity. Futcher et al. (2017) demonstrate that compact, energy-efficient forms reduce urban heat islands, improve comfort, and foster greater social

✉Aaesha.Mohammed1300a@iurp.uobaghdad.edu.iq, ✉Dr.amerkinani@iurp.uobaghdad.edu.iq

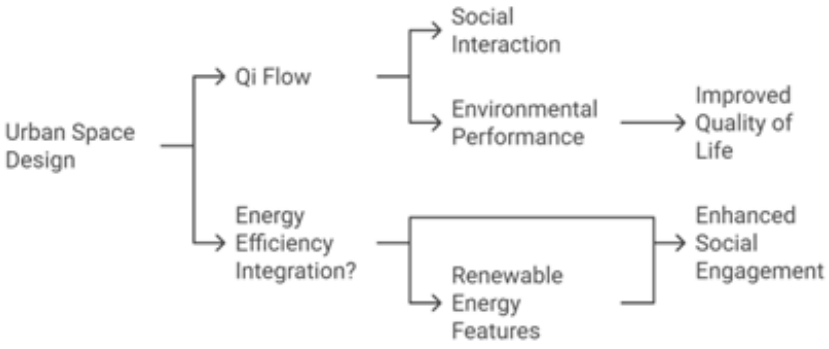

Fig. 8. Influence of Energy on Social Interaction
Source: own elaboration.

use of public space. Similarly, renewable technologies like solar panels and wind turbines can act as focal points for gathering, symbolizing sustainability while promoting conversation. In Singapore, studies confirm that solar harvesting and shaded block typologies jointly improve comfort and enable stronger social behaviour (Zhang et al., 2019).

At its core, energy-efficient design enhances livability by combining environmental performance with social engagement, fostering resilient and cohesive communities. Fig. 8 illustrates how energy-conscious design – through Qi flow, sustainability measures, and renewable features – supports both quality of life and stronger community ties.

Feng Shui in Urban Design Successful Applications

Across Asia, Feng Shui has shaped the planning and experience of public spaces. In China, it guided siting, orientation, and spatial organization, as seen in the planning of ancient capitals such as Beijing (Yu & Yang, 2016). In South Korea, Seoul's projects combined Feng Shui with modern place-making to foster harmony and engagement (Choi, 2017).

Beyond China and South Korea, Feng Shui has also influenced urban projects in other Asian contexts. In Singapore, landscape planning and city branding often draw upon Feng Shui alignments to enhance place identity and livability (Yuen, 2005). In Indonesia, the Asia Mega Mas development in Medan demonstrates how Feng Shui shaped the arrangement of commercial and residential areas, reinforcing connectivity and social interaction (Pohan et al., 2019). Similarly, Japanese garden-urban traditions, particularly in Kyoto, incorporated geomantic principles resonant with Feng Shui to achieve harmony between built and natural environments (Nakagawa, 1990). These diverse cases illustrate that Feng Shui-inspired approaches are not confined to East Asia alone but extend across the continent in ways adapted to local traditions.

In addition to East Asia, Feng Shui-inspired approaches have been adapted in diverse contexts. In Taipei's Jiuzhuang Community Garden, design for natural harmony supported sociability and well-being, especially during COVID-19 (Huang, 2023). In Shenzhen's Overseas Chinese Town Community, open lawns, seating, and water features promoted active use and harmonious coexistence (Shi et al., 2016).

In Tai-Lao communities, public spaces in Thailand are primarily rooted in local cultural models, but their design shows clear parallels with Feng Shui principles of flow and social harmony. These spaces emphasize collective interaction and well-being, which resonates with Feng Shui's concern for balance between body and space (Sattayakorn, 2019).

Comparable logics also appear in Baghdad. Al-Zawraa Park integrates water, greenery, and shaded walkways to support recreation, cultural events, and social engagement (Amanat Baghdad, 2010). Neigh-

✉Aaesha.Mohammed1300a@iurp.uobaghdad.edu.iq, ✉Dr.amerkinani@iurp.uobaghdad.edu.iq

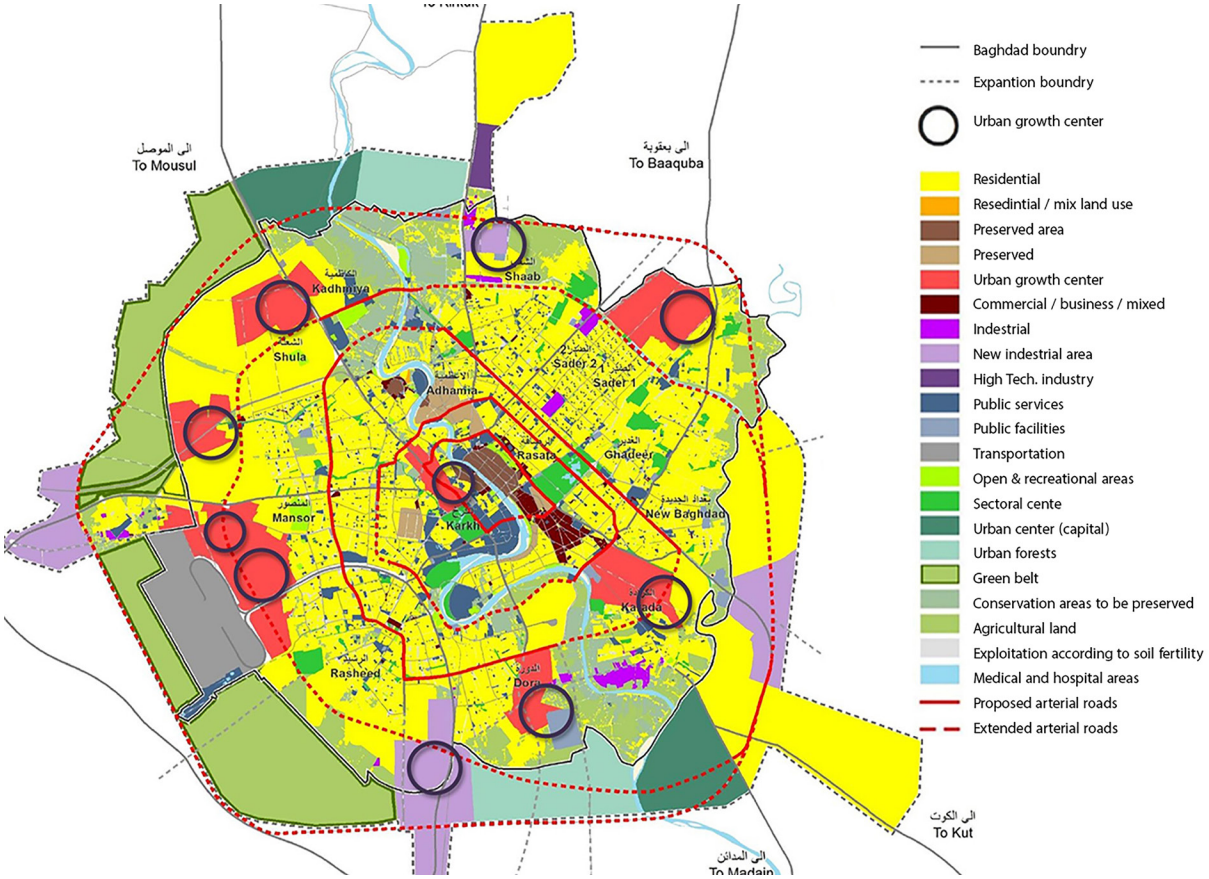

Fig. 9. Location of Al-Zawraa Park in Baghdad's Master Development Plan
Source: (Amanat Baghdad, 2010).

bourhoods like Al-Arabi and Al-Washash likewise show how orientation, vegetation, and communal gathering points foster cohesion – resonating with Feng Shui's values while rooted in Islamic traditions (Amanat Baghdad, 2010). Fig. 9 illustrates Al-Zawraa Park's role as a major recreational and ecological hub within Baghdad's master plan.

Challenges and Future Opportunities

Integrating Feng Shui into modern urban planning faces obstacles. Rapid urbanization, particularly in China, often favours fast, low-cost, and high-density construction that undermines the spatial and environmental harmony Feng Shui advocates. At the same time, modernization has reduced the role of cultural and spiritual values in planning, making application difficult when economic growth dominates priorities (Zevenbergen et al., 2018).

Nonetheless, Feng Shui aligns with sustainable city principles. Concepts such as Qi, balance, and natural elements resonate with contemporary green design and smart technologies, offering ways to combine environmental goals with social well-being (Bibri & Krogstie, 2017). Xu, (2016) further argues that some Feng Shui principles could support resilience and adaptation to challenges such as climate change and disaster prevention.

In Arab cities like Baghdad, master planning initiatives emphasizing green belts, open spaces, and water integration illustrate opportunities to reinterpret Feng Shui within Islamic traditions, reinforcing both environmental sustainability and community cohesion (Amanat Baghdad, 2010).

✉Aaesha.Mohammed1300a@iurp.uobaghdad.edu.iq, ✉Dr.amerkinani@iurp.uobaghdad.edu.iq

In short, while challenges remain, Feng Shui offers a valuable framework for sustainable, energy-efficient, and socially cohesive urban futures.

RESEARCH METHODOLOGY

Conceptual Framework & Operationalization

To translate Feng Shui philosophy into measurable proxies for public-space design, the study operationalizes the Five Elements as urban indicators. These indicators are aggregated into a composite Feng Shui Public-Space Index (FS-PSI) at the segment/cell level:

1. Wood (W): canopy coverage (%), tree count per 100 m, presence of linear planting, comfort shade minutes (daytime).
2. Fire (F): average horizontal illuminance (lx) at dusk, proxies of night-time activity (e.g., POIs open after 20:00, pedestrian counts).
3. Earth (E): proportion of earthen/stone seating and pavements, tactile and stability cues (benches continuity, surface regularity).
4. Metal (M): wayfinding/legibility score (signage density, edge clarity, intersection sightlines), uncluttered alignment of street furniture.
5. Water (Wa): presence and quality of water features, proximity to water (≤300 m), cooling proxies (measured/modelled PET or UTCI reduction near features).

All indicators are min–max normalized (0–1); element subscores are calculated as their mean, and the FS-PSI = (W + F + E + M + Wa) / 5.

The FS-PSI is then statistically tested against Space Syntax metrics and residents' perceptions to examine how environmental energy proxies align with spatial configuration and lived experience (Table 1).

Hypotheses:

H1: FS-PSI positively correlates with Integration and Choice.

H2: FS-PSI negatively correlates with Mean Depth and Entropy.

H3: Higher FS-PSI areas report higher levels of social interaction and perceived balance.

H4: After controlling for Integration, FS-PSI remains a significant predictor of perceived livability.

Research Aim

Aligned with the broader objectives, the methodology specifically aims to:

1. Analyze how urban design and architectural characteristics influence social interaction in Al-Arabi and Al-Washash neighbourhoods through Feng Shui design proxies.
2. Compare quantitative outcomes (Space Syntax and FS-PSI) with qualitative evidence (resident surveys) to identify spatial strengths, weaknesses, and opportunities for enhancing livability.

Table 1. Operationalization of the Five Elements into Public-Space Indicators (FS-PSI)

Element	Indicators	Examples / Measurement
Wood (W)	Canopy coverage (%), Tree count /100 m, Presence of linear planting, Comfort shade minutes (daytime)	% coverage, field survey
Fire (F)	Average horizontal illuminance at dusk (lx), Night-time activity proxies	Lux meter, POIs open after 20:00
Earth (E)	Share of earthen/stone seating & pavements, Tactile/stability cues	Material audit, benches continuity
Metal (M)	Wayfinding/legibility score, Edge clarity, Street furniture alignment	Observational score, signage density
Water (Wa)	Presence/quality of water feature, Proximity ≤300 m, Cooling proxy (PET/UTCI reduction)	Mapping, climate modelling

Source: own elaboration.

✉Aaesha.Mohammed1300a@iurp.uobaghdad.edu.iq, ✉Dr.amerkinani@iurp.uobaghdad.edu.iq

Study Sample

1. Participants: 120 respondents (60 per neighbourhood).
2. Sampling Strategy: stratified sampling approach was employed to ensure adequate representation of demographic and socioeconomic diversity. The strata were defined according to age, gender, and socioeconomic status, thereby capturing the heterogeneity of residents and minimizing bias in the survey results. From each neighbourhood, participants were proportionally selected across these strata based on estimated population distribution, ensuring balanced representation from different groups.
3. Justification of Sample Size: The sample of 120 respondents was considered both feasible and statistically sufficient for the purposes of neighbourhood-level urban studies. Comparable urban perception research (Ahmadi, 2018; Ujang et al., 2018) has demonstrated that samples in the range of 80–120 respondents are effective in detecting patterns of spatial perception and social interaction. Therefore, the chosen size enables reliable comparisons between the two neighbourhoods while balancing methodological rigor with practical fieldwork constraints.

Research Tools

Resident Survey:

1. A structured questionnaire based on a 5-point Likert scale.
2. Measures residents' perceptions of place energy, social interaction, and overall comfort.
3. The survey indicators are aligned with the study hypotheses:

H1 & H2: Items on accessibility, connectivity, and perceived energy balance are compared with Integration, Choice, Mean Depth, and Entropy.

H3: Items on frequency and quality of social interaction test whether higher FS-PSI areas correspond to stronger community ties.

H4: Items on livability and perceived balance assess whether FS-PSI remains a significant predictor after controlling for spatial configuration.

Space Syntax Analysis:

1. Utilized to assess spatial accessibility, integration, and interaction patterns within the urban fabric.
2. Two levels of analysis were conducted:
   a. Separate analysis for each neighbourhood.
   b. Combined analysis for both neighbourhoods to explore the effect of the dividing street.

Analytical Phases, Data Analysis, and Data Quality Assurance

Data Collection

1. Urban Data: Detailed maps of the neighbourhoods, including streets, buildings, and public amenities.
2. Survey Data: Distribution of questionnaires to residents in both neighbourhoods and collection of responses. The resident survey consisted of structured questions based on a 5-point Likert scale. The questionnaire included items on: (1) accessibility and ease of movement, (2) availability of green and water features, (3) comfort and safety during social interaction, (4) visual attractiveness and perceived balance of the environment, and (5) opportunities for social gatherings. These questions were designed to capture residents' perceptions of public spaces in relation to the Feng Shui Public-Space Index (FS-PSI). The responses were expected to provide insights into how spatial configuration (Space Syntax metrics) corresponds to perceived livability, social interaction, and energy balance, thereby addressing hypotheses H1–H4.

Space Syntax Analysis

1. Phase 1: Perform separate analyses for Al-Arabi and Al-Washash neighbourhoods to evaluate their individual spatial characteristics.
2. Phase 2: The same methodology was applied in a combined analysis of both neighbourhoods

✉Aaesha.Mohammed1300a@iurp.uobaghdad.edu.iq, ✉Dr.amerkinani@iurp.uobaghdad.edu.iq

as a single system. This phase, unlike the separate analysis, revealed the role of the dividing street in limiting integration, identified potential cross-neighbourhood connections, and enabled direct comparison of accessibility between Al-Arabi and Al-Washash.

Comparative Analysis

1. Space Syntax results for each neighbourhood and the combined analysis were compared with qualitative survey data.
2. Gaps and alignments between spatial outcomes and residents' subjective perceptions were identified to highlight areas of convergence and divergence.

Data Analysis

1. Quantitative (Space Syntax): Integration, choice, mean depth, entropy, and accessibility indices were calculated to identify high-traffic and socially active zones.
2. Qualitative (Resident Survey): Survey responses were analyzed using descriptive statistics (mean, standard deviation, median, quartiles) across Likert-scale items and categorized by neighbourhood to highlight distinctive patterns or concerns.
3. Synthesis: A comparative matrix integrated quantitative and qualitative findings, highlighting strengths and weaknesses in each neighbourhood and assessing the extent to which residents' perceptions aligned with syntactic metrics. This approach ensured that both spatial indicators and residents' perceptions were systematically analyzed to test hypotheses H1–H4.

Data Quality Assurance

Three data streams were triangulated to ensure validity:

1. Spatial Models: Axial-line models for Al-Arabi and Al-Washash were analyzed in DepthmapX 0.8.0 to obtain standard Space Syntax metrics (Connectivity, Choice, Integration [HH], Mean Depth, Entropy, Controllability, and Line Length).
2. Resident Survey: A cross-sectional survey (Likert 1–5) captured perceptions of accessibility, pedestrian comfort, safety, greenery, water features, social spaces, visual attractiveness, and the need for improvements.
3. Feng Shui Proxies (FS-PSI): Observable urban attributes were operationalized as proxies – Wood (trees/shade), Water (water features/cooling), Fire (lighting/night use), Earth (seating/surface stability), and Metal (legibility/edges/wayfinding) – and normalized to comparable 0–1 indicator.

CASE STUDY

Study Area

The case study is located in Al-Mansour district, Baghdad, covering two neighbourhoods: Al-Arabi (55 ha) and Al-Washash (75 ha), with a combined area of 130 hectares. Geographically, the site lies between latitudes 33°20'8.33"–33°19"30.25" and longitudes 44°20'22.55"–44°21'10.16". The boundaries are defined by 14 Ramadan Street (west), Al-Ma'mun College (north), Al-Mutanabbi district (south), and Al-Anaab informal housing (east), with Saad bin Abi Waqqas Street separating the two areas and linking to Al-Liqa'a Square.

Al-Arabi demonstrates a relatively regular grid street pattern, while Al-Washash is more fragmented and influenced by spontaneous construction – unregulated development beyond formal planning laws that reflect the socio-spatial realities of its time (Abbas & Abduljalil, 2025).

As shown in Fig. 10 (Al-Arabi) and (Al-Washash), this contrast provides an empirical ground to test the study hypotheses (H1–H4), linking the Feng Shui Public-Space Index (FS-PSI) with Space Syntax metrics and residents' perceptions.

✉Aaesha.Mohammed1300a@iurp.uobaghdad.edu.iq, ✉Dr.amerkinani@iurp.uobaghdad.edu.iq

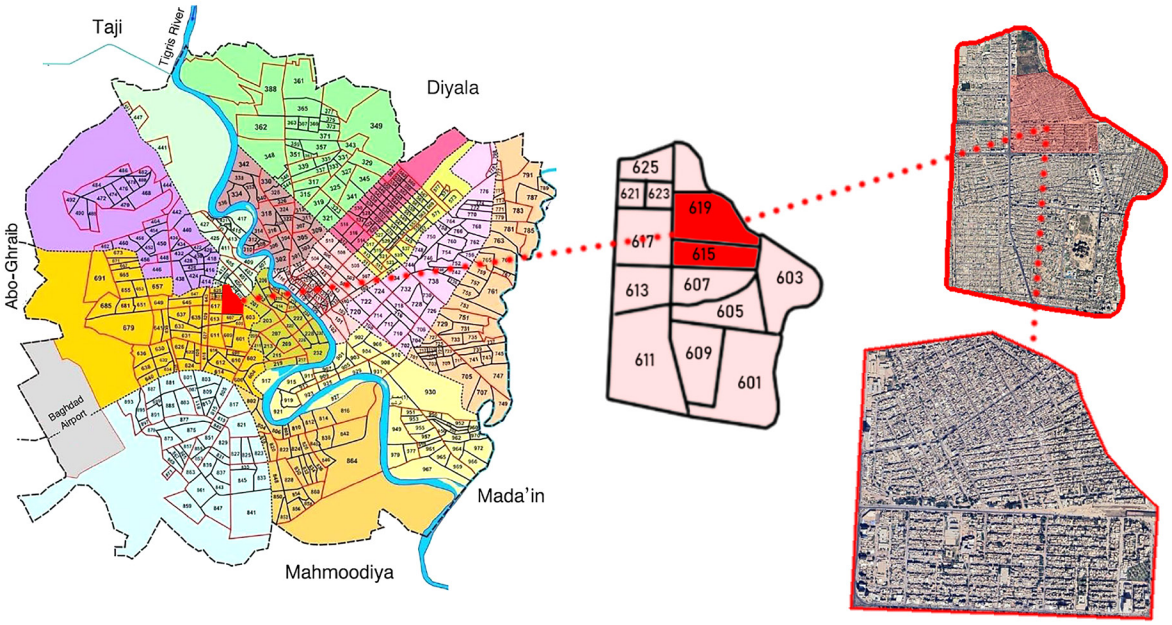

Fig. 10. Location of the study area (Al-Arabi and Al-Washash neighbourhoods in Baghdad)
Source: Researchers based on data from Baghdad Municipality, Basic Design Department, GIS Division (2024).

Practical Application Al-Arabi

This section analyzes the spatial configuration of the Al-Arabi neighbourhood in Baghdad using the Space Syntax methodology through DepthmapX 0.8.0. The aim is to evaluate how the street network supports connectivity, accessibility, and spatial harmony among urban elements. Key syntactic metrics – Connectivity, Integration, Choice, Mean Depth, Controllability, Entropy, and Line Length – were computed from the street-segment model. Descriptive statistics (mean, standard deviation, min, max) were processed in Excel to define the neighbourhood's spatial profile.

Results are interpreted through a combined Space Syntax–Feng Shui lens to reveal how spatial configuration influences energy flow (Qi), functionality, and opportunities for social interaction.

Connectivity of Al-Arabi neighbourhood

As shown in Fig. 11, axes with high connectivity (5–7) act as main corridors channeling movement and energy, while low values indicate peripheral zones where flow stagnates. The mean connectivity (4.20) reflects a moderate level of spatial linkage, and the standard deviation (1.13) indicates variation between core and edge streets. Axes above the 75th percentile (5–7) correspond to active routes with strong Qi flow. In Feng Shui, such paths symbolize harmonious and continuous energy circulation that enhances social

Count	Mean	Std Dev	Min	25%	Median	75%	Max
184	4.20	1.13	2.0	4.0	4.0	5.0	7.0

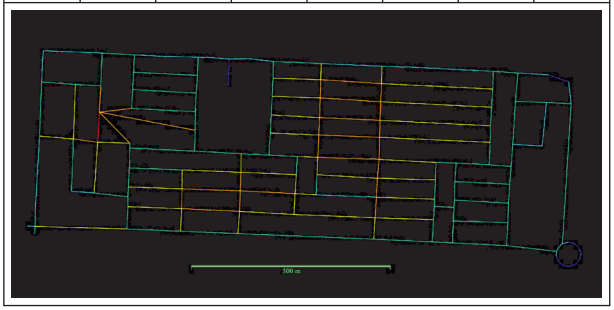

Fig. 11. Connectivity of Al-Arabi neighbourhood
Source: own elaboration.

✉Aaesha.Mohammed1300a@iurp.uobaghdad.edu.iq, ✉Dr.amerkinani@iurp.uobaghdad.edu.iq

interaction and vitality, confirming Hypothesis H1 that higher connectivity aligns with stronger FS-PSI values.

Choice of Al-Arabi neighbourhood

Fig. 12 highlights axes with high choice values in red, emphasizing their role as key urban arteries that channel movement and energy across the network. In Feng Shui, high choice values represent strong and evenly distributed Qi, promoting vitality and interaction, while low values indicate stagnation and isolation. The mean choice value (1292.78) suggests moderate route selection potential, and the standard deviation (1055.21) shows variation between central and peripheral streets. Axes above the 75th percentile (≈1617.5) denote highly active corridors aligned with higher FS-PSI scores and stronger social engagement.

Count	Mean	Std Dev	Min	25%	Median	75%	Max
184	1292.78	1055.21	0.0	580.75	961.5	1617.5	5650.0

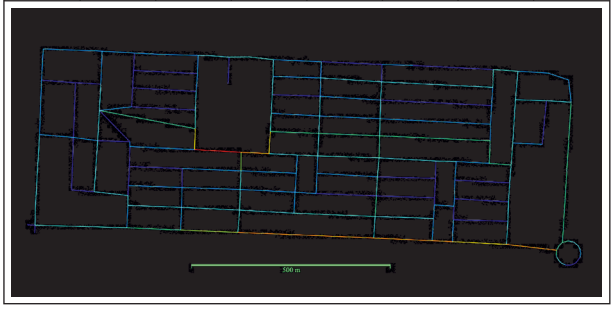

Fig. 12. Choice of Al-Arabi neighbourhood
Source: own elaboration.

Integration of Al-Arabi neighbourhood

Fig. 13 shows axes with high integration values (≥ 0.53) in orange, marking highly accessible and central areas. In Feng Shui, these represent energy convergence points where Qi concentrates and circulates throughout the network (Xu, 1998). The mean value (0.736) indicates overall good integration, while axes above 0.85 show strong spatial cohesion and social vitality, supporting Hypothesis H1 linking Integration and Choice with higher FS-PSI values.

Count	Mean	Std Dev	Min	25%	Median	75%	Max
184	0.736	0.135	0.353	0.643	0.744	0.849	0.950

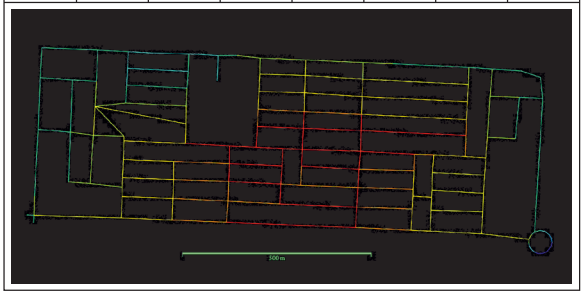

Fig. 13. Integration of Al-Arabi neighbourhood
Source: own elaboration.

Mean Depth of Al-Arabi neighbourhood

Fig. 14 shows axes with low mean depth values in green, indicating areas that are easily accessible from the network core, while higher values mark more isolated zones. In Feng Shui, lower depth reflects open, illuminated spaces where Qi flows freely and supports vitality, whereas higher depth suggests stagnation and weak circulation. The mean value (8.06) denotes generally good accessibility, and axes above the 75th percentile (≈8.76) indicate areas needing better spatial openness and energy balance.

Count	Mean	Std Dev	Min	25%	Median	75%	Max
184	8.06	1.66	6.25	6.88	7.70	8.76	15.11

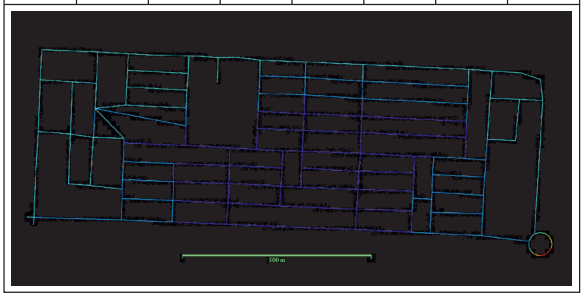

Fig. 14. Mean Depth of Al-Arabi neighbourhood
Source: own elaboration.

Controllability of Al-Arabi neighbourhood

Fig. 15 illustrates axes with high controllability values in purple, highlighting their role in regulating movement and energy. In Feng Shui, such points

✉Aaesha.Mohammed1300a@iurp.uobaghdad.edu.iq, ✉Dr.amerkinani@iurp.uobaghdad.edu.iq

maintain balance and stability within space. The mean value (0.35) reflects moderate spatial control, while higher values (≥ 0.36) denote well-ordered zones that enhance legibility and cohesion.

Count	Mean	Std Dev	Min	25%	Median	75%	Max
184	0.35	0.06	0.27	0.31	0.33	0.36	0.50

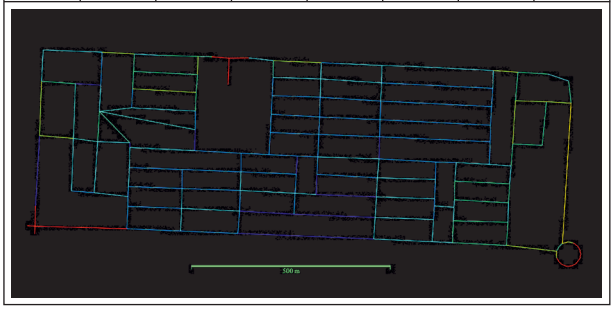

Fig. 15. Controllability of Al-Arabi neighbourhood
Source: own elaboration.

Entropy of Al-Arabi neighbourhood

Fig. 16 highlights axes with relatively high entropy values in yellow, marking areas where network complexity may slightly hinder energy flow. In Feng Shui, moderate entropy suggests balanced yet dynamic Qi, where variation supports liveliness without chaos. The mean value (3.78) indicates moderate-to-low complexity, reflecting a coherent structure with few areas needing greater clarity and openness.

Count	Mean	Std Dev	Min	25%	Median	75%	Max
3.78	4.66	0.18	3.48	3.63	3.74	3.92	4.16

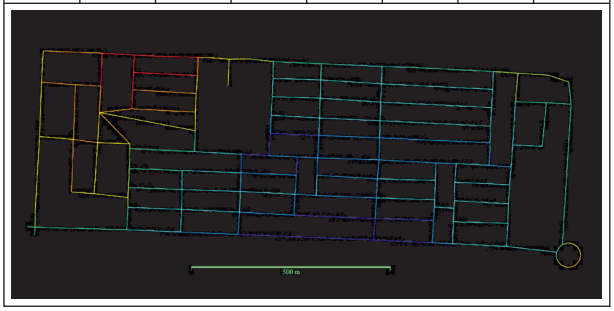

Fig. 16. Entropy of Al-Arabi neighbourhood
Source: own elaboration.

Line Length of Al-Arabi neighbourhood

Fig. 17 emphasizes long axes in cyan, functioning as main routes connecting different parts of the network. In Feng Shui, these resemble energy rivers that sustain balanced Qi flow and interaction between key points. The mean line length (82.63 m) indicates moderate network reach, while higher values (≥ 126.85 m) mark dominant paths that maintain spatial continuity. Longer, well-distributed axes support Hypothesis H2 by reducing stagnation and enhancing social interaction through stronger FS-PSI outcomes.

Count	Mean	Std Dev	Min	25%	Median	75%	Max
184	82.63	63.88	5.12	45.76	55.69	126.85	352.22

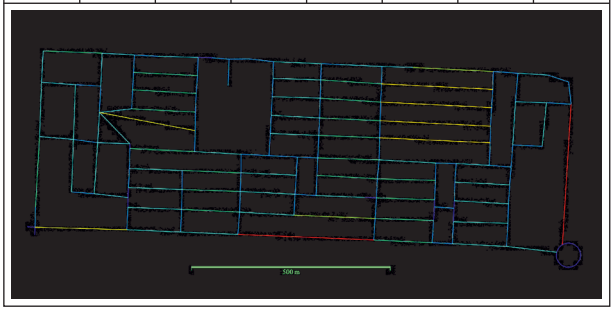

Fig. 17. Line Length of Al-Arabi neighbourhood
Source: own elaboration.

Practical Application for Al-Washash

This section analyzes the spatial configuration of the Al-Washash neighbourhood in Baghdad using DepthmapX 0.8.0 under the Space Syntax methodology. The aim is to assess how the street network supports connectivity, accessibility, and spatial harmony. Key metrics – Connectivity, Integration, Choice, Mean Depth, Controllability, Entropy, and Line Length – were processed in Excel to outline the spatial profile.

Results interpreted through a combined Space Syntax–Feng Shui lens show that higher connectivity and choice enhance Qi flow and accessibility, supporting Hypothesis H1 and indicating stronger FS-PSI outcomes.

✉Aaesha.Mohammed1300a@iurp.uobaghdad.edu.iq, ✉Dr.amerkinani@iurp.uobaghdad.edu.iq

Connectivity of Al-Washash neighbourhood

As shown in Fig. 18, axes with high connectivity (6–7) act as main arteries of movement and energy (Qi), supporting active social and spatial interaction. In Feng Shui, this reflects strong and continuous Qi flow, while low connectivity (1–2) indicates stagnation at peripheral zones. The mean connectivity (4.36) denotes a moderately linked network, and the standard deviation (1.16) shows variation between central and edge streets. Values above the 75th percentile (≥ 5) correspond to the most dynamic corridors aligned with higher FS-PSI scores, confirming Hypothesis H1 that connectivity enhances accessibility and vitality.

Count	Mean	Std Dev	Min	25%	Median	75%	Max
307	4.36	1.16	1.0	4.0	4.0	5.0	7.0

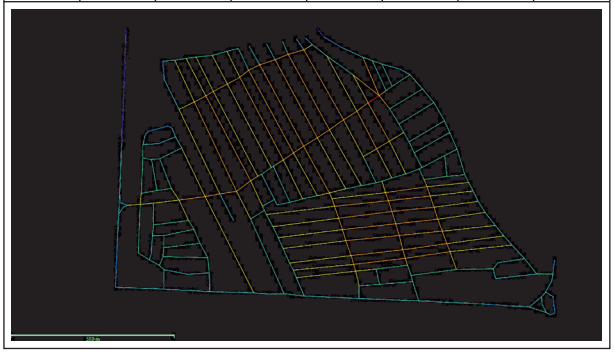

Fig. 18. Connectivity of Al-Washash neighbourhood
Source: own elaboration.

Choice of Al-Washash neighbourhood

Fig. 19 highlights axes with high choice values (above 3367.5) in red, representing main routes that channel movement and energy (Qi) through the network. In Feng Shui, these signify strong energy flow supporting social and economic vitality, while low values indicate limited circulation. The mean (2742.17) and high deviation (3678.63) show uneven flow, where few major streets dominate. This pattern supports Hypothesis H1, linking higher choice with improved accessibility and liveliness.

Count	Mean	Std Dev	Min	25%	Median	75%	Max
307	2742.17	3678.63	0.0	560.0	1445.0	3367.5	23105.0

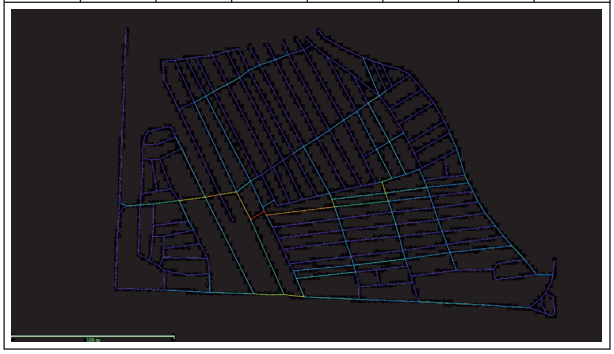

Fig. 19. Choice of Al-Washash neighbourhood
Source: own elaboration.

Integration of Al-Washash neighbourhood

Fig. 20 shows axes with high integration values (above 0.75) in orange, marking streets that are highly accessible and central to the network. In Feng Shui, these zones act as convergence points where Qi concentrates and circulates efficiently (Xu, 1998). The mean integration value (0.663) indicates moderate spatial accessibility, while the standard deviation (0.128) reflects noticeable variation between central and peripheral streets. Enhancing low-integration areas can therefore improve overall energy balance and social cohesion.

Count	Mean	Std Dev	Min	25%	Median	75%	Max
307	0.663	0.128	0.389	0.563	0.673	0.753	0.957

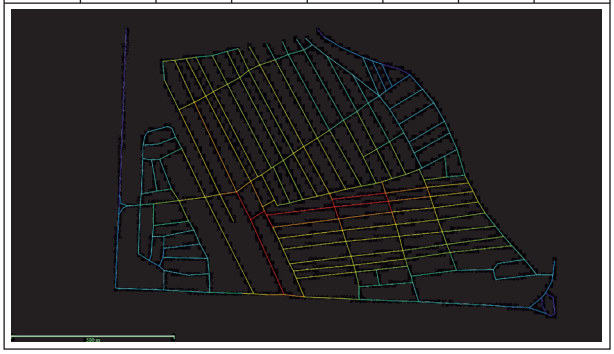

Fig. 20. Integration of Al-Washash neighbourhood
Source: own elaboration.

✉Aaesha.Mohammed1300a@iurp.uobaghdad.edu.iq, ✉Dr.amerkinani@iurp.uobaghdad.edu.iq

Mean Depth of Al-Washash neighbourhood

Fig. 21 shows axes with low mean depth values in green, indicating areas easily reached from the network's core, while higher values mark more isolated zones. In Feng Shui, lower depth reflects open, illuminated spaces with active Qi flow. The mean value (9.96) shows moderate accessibility, whereas higher values (>11.15) reveal deeper areas requiring design improvements to restore balanced energy and social activity.

Count	Mean	Std Dev	Min	25%	Median	75%	Max
307	9.96	1.85	6.97	8.58	9.49	11.15	15.68

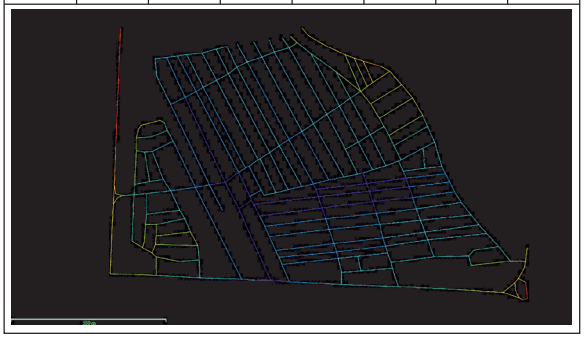

Fig. 21. Mean Depth of Al-Washash neighbourhood
Source: wn elaboration.

Controllability of Al-Washash neighbourhood

Fig. 22 illustrates axes with high controllability values in purple, marking key segments that regulate movement and Qi flow across the network. The mean value (0.34) indicates moderate spatial control, while higher values (>0.36) represent stable and harmonious zones that enhance legibility and social coherence.

Count	Mean	Std Dev	Min	25%	Median	75%	Max
307	0.34	0.05	0.25	0.31	0.33	0.36	0.60

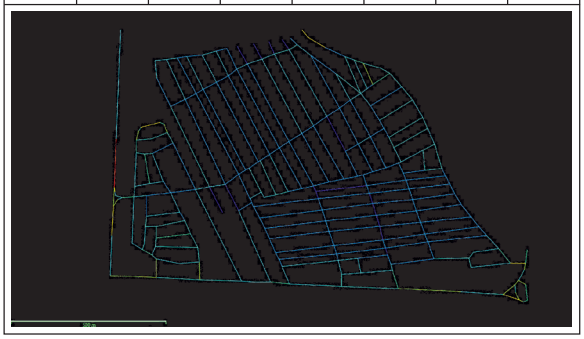

Fig. 22. Controllability of Al-Washash neighbourhood
Source: own elaboration.

Entropy of Al-Washash neighbourhood

Fig. 23 highlights axes with moderate entropy values in yellow, marking zones where network complexity slightly affects Qi circulation. The mean entropy (4.00) denotes low-to-moderate irregularity, reflecting a coherent urban structure. Higher values (≥ 4.18) represent areas where minor spatial adjustments could enhance harmony and accessibility.

Count	Mean	Std Dev	Min	25%	Median	75%	Max
307	4.00	0.22	3.47	3.82	3.99	4.18	4.50

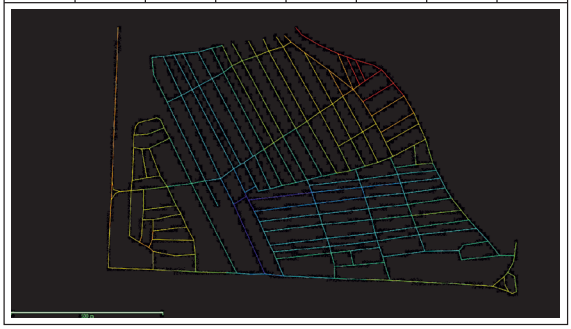

Fig. 23. Entropy of Al-Washash neighbourhood
Source: own elaboration.

Line Length of Al-Washash neighbourhood

Fig. 24 highlights long axes in cyan, serving as main routes connecting network parts. In Feng Shui,

Count	Mean	Std Dev	Min	25%	Median	75%	Max
307	78.26	65.66	7.66	36.07	50.18	102.56	351.39

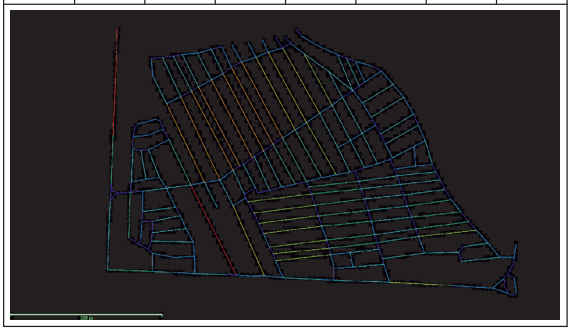

Fig. 24. Line Length of Al-Washash neighbourhood
Source: own elaboration.

✉Aaesha.Mohammed1300a@iurp.uobaghdad.edu.iq, ✉Dr.amerkinani@iurp.uobaghdad.edu.iq

these axes act as energy rivers, facilitating Qi circulation. The mean line length (78.26 m) indicates moderate-to-low continuity, while longer paths (≥ 102.56 m) enhance accessibility and sustain smoother energy flow.

Practical Application for Al-Arabi and Al-Washash Combined Analysis

This section analyses the combined spatial configuration of Al-Arabi and Al-Washash neighbourhoods in Baghdad using DepthmapX 0.8.0 under the Space Syntax framework. The objective is to assess how the integrated urban network supports connectivity, accessibility, and spatial harmony. Key syntactic metrics – Connectivity, Choice, Integration, Mean Depth, Controllability, Entropy, and Line Length – were processed in Excel to define the area's overall spatial profile. Results are interpreted through a Space Syntax–Feng Shui lens, revealing how spatial structure governs energy flow (Qi), functionality, and social interaction potential across both neighbourhoods.

Connectivity for Al-Arabi and Al-Washash Combined Analysis

Fig. 25 shows axes with high connectivity (6–7) functioning as the network's main arteries, channelling movement and Qi flow across both neighbourhoods. In Feng Shui, high connectivity reflects active and continuous energy circulation that enhances interaction and vitality, while low values (1–2) indicate stagnation and weak social ties.

The mean connectivity (4.40) suggests a moderately linked network, with the 75th percentile (5–7) marking the most active corridors supporting FS-PSI outcomes and confirming Hypothesis H1.

Count	Mean	Std Dev	Min	25%	Median	75%	Max
475	4.40	1.11	1.0	4.0	4.0	5.0	7.0

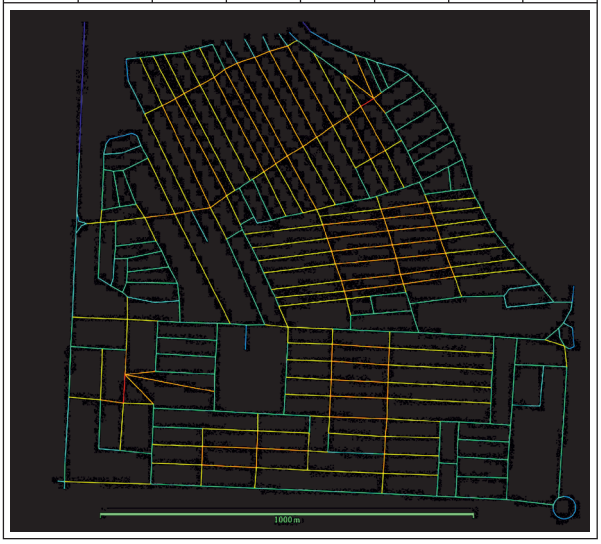

Fig. 25. Connectivity of Al-Arabi and Al-Washash neighbourhoods
Source: own elaboration.

Count	Mean	Std Dev	Min	25%	Median	75%	Max
475	5164.00	7542.32	0.0	1075.00	2658.0	6591.5	60786.00

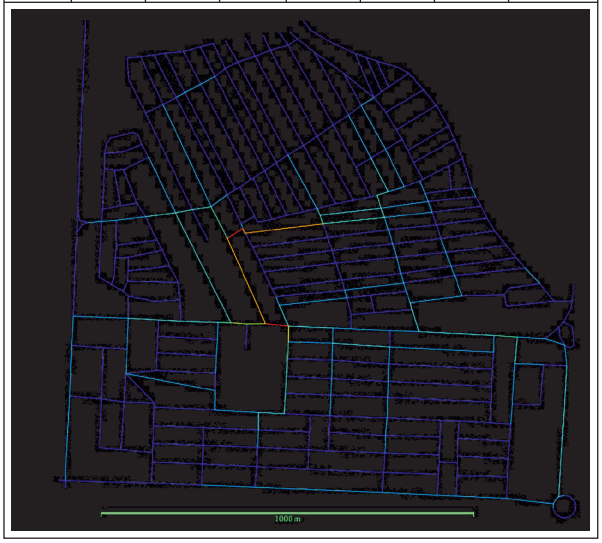

Fig. 26. Choice of Al-Arabi and Al-Washash neighbourhoods
Source: own elaboration.

Choice for Al-Arabi and Al-Washash Combined Analysis

Fig. 26 highlights axes with high choice values (above 6591.5) in red, functioning as key urban arteries that guide movement and Qi flow throughout the network. In Feng Shui, such paths represent strong energy channels that sustain vitality and accessibility, while lower values denote weaker circulation and partial isolation.

✉Aaesha.Mohammed1300a@iurp.uobaghdad.edu.iq, ✉Dr.amerkinani@iurp.uobaghdad.edu.iq

The mean choice (5164.0) indicates moderate flow efficiency, supporting Hypothesis H1, as higher choice corridors enhance spatial vitality and align with stronger FS-PSI performance.

Integration for Al-Arabi and Al-Washash Combined Analysis

Fig. 27 shows axes with integration values at or above 0.59 (median) in orange, representing highly accessible and central routes where Qi converges and circulates freely. In Feng Shui, these points correspond to energy hubs that enhance social and spatial interaction, while lower values denote isolated zones with stagnant energy. The mean integration (0.60) and 75th percentile (0.67) confirms strong spatial coherence in key corridors, supporting Hypothesis H1 that links integration with higher FS-PSI and overall network vitality.

Count	Mean	Std Dev	Min	25%	Median	75%	Max
475	0.600	0.104	0.323	0.534	0.593	0.673	0.892

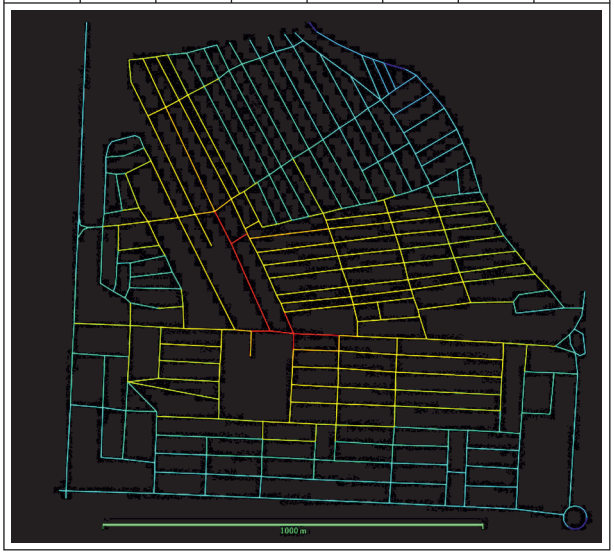

Fig. 27. Integration of Al-Arabi and Al-Washash neighbourhoods
Source: own elaboration.

Mean Depth for Al-Arabi and Al-Washash Combined Analysis

Fig. 28 shows axes with low mean depth values (around 10–12) in green, indicating areas that are easily accessible and well-connected to the network core. In Feng Shui, shallow depth symbolizes open and illuminated spaces where Qi flows smoothly, while higher depth (above 12.86) reflects isolation and stagnation. The mean depth (11.89) confirms moderate accessibility across the network, supporting Hypothesis H2, as shallower configurations enhance vitality and energy balance within urban spaces.

Count	Mean	Std Dev	Min	25%	Median	75%	Max
475	11.89	2.05	8.09	10.40	11.68	12.86	20.57

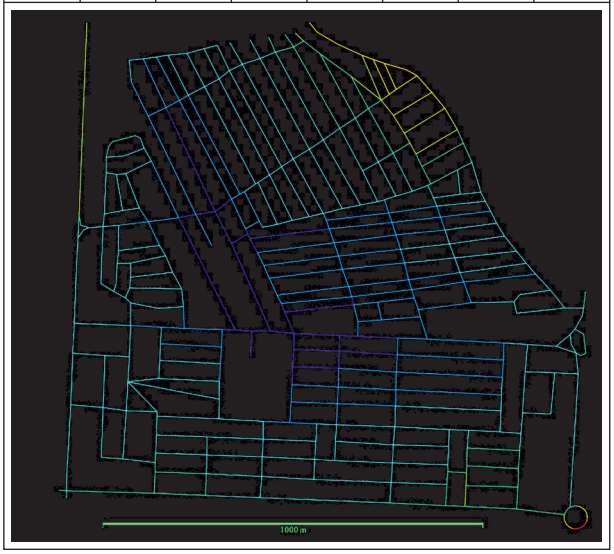

Fig. 28. Mean Depth of Al-Arabi and Al-Washash neighbourhoods
Source: own elaboration.

Controllability for Al-Arabi and Al-Washash Combined Analysis

Fig. 29 illustrates axes with high controllability values (≥ 0.39) in purple, functioning as spatial regulators that maintain stability and balanced Qi flow. In Feng Shui, these axes represent equilibrium points sustaining order and harmony. The mean controllability (0.36, SD = 0.06) indicates moderate

✉Aaesha.Mohammed1300a@iurp.uobaghdad.edu.iq, ✉Dr.amerkinani@iurp.uobaghdad.edu.iq

spatial stability, while higher values (up to 0.62) mark zones of stronger coherence and legibility, supporting Hypothesis H3, linking structured networks with balance, safety, and social interaction.

Count	Mean	Std Dev	Min	25%	Median	75%	Max
475	0.36	0.06	0.27	0.33	0.35	0.39	0.62

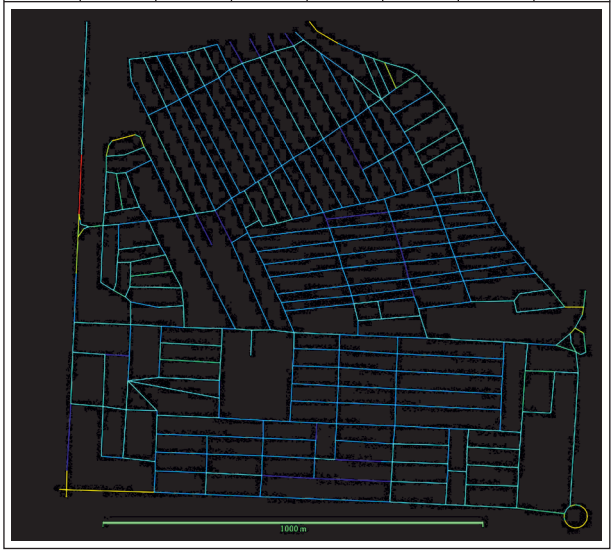

Fig. 29. Controllability of Al-Arabi and Al-Washash neighbourhoods
Source: own elaboration.

Entropy for Al-Arabi and Al-Washash Combined Analysis

Fig. 30 highlights axes with moderate entropy values (≥ 4.48) in yellow, marking zones where spatial complexity slightly influences movement and Qi flow. In Feng Shui, balanced entropy reflects an organized yet dynamic energy circulation that supports coherence and stability. The mean entropy (4.27, SD = 0.25) indicates moderate-to-low spatial irregularity, confirming Hypothesis H2, which links lower entropy with improved harmony and energy balance across the network.

Count	Mean	Std Dev	Min	25%	Median	75%	Max
475	4.27	0.25	3.72	4.09	4.27	4.48	4.76

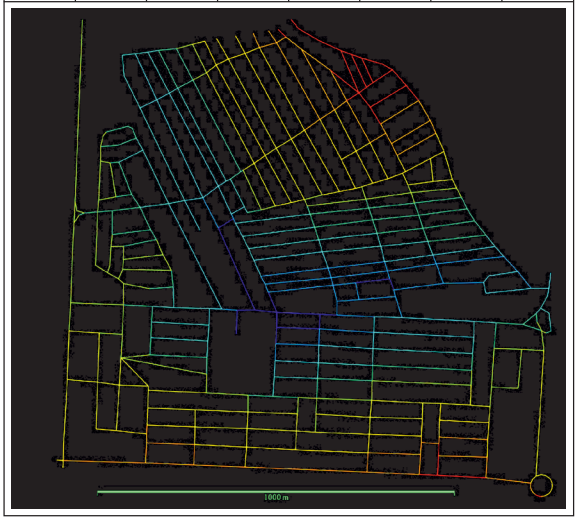

Fig. 30. Entropy of Al-Arabi and Al-Washash neighbourhoods
Source: own elaboration.

Line Length for Al-Arabi and Al-Washash Combined Analysis

Fig. 31 emphasizes long axes in cyan, functioning as main routes connecting different parts of the

Count	Mean	Std Dev	Min	25%	Median	75%	Max
475	4.27	0.25	3.72	4.09	4.27	4.48	4.76

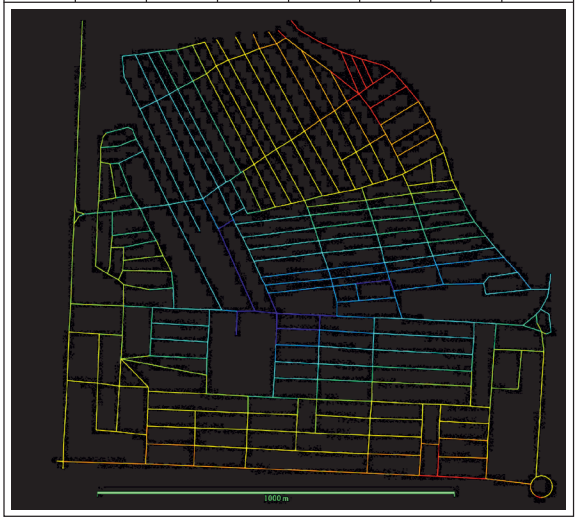

Fig. 31. Line Length of Al-Arabi and Al-Washash neighbourhoods
Source: own elaboration.

✉Aaesha.Mohammed1300a@iurp.uobaghdad.edu.iq, ✉Dr.amerkinani@iurp.uobaghdad.edu.iq

network. In Feng Shui, these axes resemble energy rivers that sustain movement and maintain balanced Qi flow. The mean line length (79.8 m, SD = 65.59) indicates moderate-to-low spatial continuity, while longer axes (≥ 118.04 m) enhance accessibility and energy circulation. These findings support Hypothesis H3, as extended yet balanced routes improve legibility, vitality, and community cohesion through stronger FS-PSI outcomes.

Analysis of Residents' Survey for Al-Arabi and Al-Washash Neighbourhoods

A survey was conducted to evaluate the residents' perceptions of urban design quality, aesthetics, and livability in the Al-Arabi and Al-Washash neighbourhoods. The analysis below provides main tables for each axis, along with an introduction and discussion of the results based on Feng Shui principles, which emphasize the balance and flow of "Chi" (energy) in the environment.

All survey items were measured on a five-point Likert scale (1 = very low, 5 = very high). Generally, mean values below 3.0 indicate weak performance, values between.

Accessibility and Connectivity

This axis evaluates the ease of accessing public spaces and the design of streets and pathways, which are critical for movement and connection within urban areas (Table 2).

Amenities and Facilities

This axis focuses on the availability of public facilities, such as parks and pedestrian infrastructure, which are essential for enhancing quality of life and social connection (Table 3).

Aesthetics and Environment

Aesthetics and the environment play a significant role in determining the attractiveness of neighbourhoods (Table 4). This axis evaluates the availability of natural elements such as green spaces and water features, which enhance positive energy flow (Chi).

Social Interaction and Community

This axis evaluates the availability of spaces supporting social activities and the perceived safety

Table 2. Results of Accessibility and Connectivity

Item	Mean	Std Dev	Interpretation
Ease of access to public spaces	2.65	1.20	The mean reflects a moderate level of accessibility, with some difficulties in accessing public spaces. In Feng Shui, accessible open spaces are essential for a smooth flow of "Chi," enhancing vibrancy in the environment.
Design of streets and pathways	2.70	1.16	Indicates that street and pathway design provide limited support for movement and traffic. From a Feng Shui perspective, pathways need to ensure free energy flow to boost the dynamism of movement.

Source: own elaboration.

Table 3. Results of Amenities and Facilities

Item	Mean	Std Dev	Interpretation
Proximity to public amenities (e.g., parks)	2.17	1.24	The mean reflects dissatisfaction with the proximity of public amenities like parks. Feng Shui links this result to a lack of natural energy flow (Chi) associated with green spaces, reducing the vibrancy of key areas.
Design that supports pedestrian comfort	2.35	1.08	Indicates that the current design does not sufficiently support pedestrian comfort. According to Feng Shui, comfortable pathways enhance natural energy flow, creating an inviting environment for social interaction.

Source: own elaboration.

✉Aaesha.Mohammed1300a@iurp.uobaghdad.edu.iq, ✉Dr.amerkinani@iurp.uobaghdad.edu.iq

Table 4. Results of Aesthetics and Environment

Item	Mean	Std Dev	Interpretation
Presence of green spaces and trees	2.52	1.34	This mean reflects residents' desire for more green spaces. Feng Shui emphasizes the importance of trees and natural spaces in enhancing positive energy flow, fostering vitality and a sense of belonging in the environment.
Presence of fountains or water features	1.85	1.11	Reflects a significant lack of water elements, which are essential for energy balance according to Feng Shui. Water enhances movement and energy flow, adding tranquillity and relaxation to public spaces.

Source: own elaboration.

during social interactions. These aspects enhance social energy flow (Chi) and community harmony (Table 5).

Aesthetics and Energy

This axis evaluates visual appeal and the sense of positive energy and balance, which significantly contribute to livability and the attractiveness of urban areas (Table 6).

Areas for Improvement

This axis focuses on residents' opinions about the need for general improvements in the areas studied (Table 7).

Overall, the survey results reveal moderate performance across both neighbourhoods, particularly in accessibility, amenities, and environmental aesthetics. Although no earlier neighbourhood-level study focused specifically on Al-Washash, these results align

Table 5. Results of Social Interaction and Community

Item	Mean	Std Dev	Interpretation
Availability of spaces for social gatherings	2.43	1.22	Reflects a lack of dedicated spaces for social activities. In Feng Shui, these spaces are central to enhancing social energy (Chi), which supports positive relationships among individuals.
Feeling of safety during social interaction	3.28	1.09	Safety levels are relatively good but need additional improvements. Feng Shui ties safety to balanced energy flow, where proper design and lighting can enhance this perception, fostering stability and comfort.

Source: own elaboration.

Table 6. Results of Aesthetics and Energy

Item	Mean	Std Dev	Interpretation
Visual attractiveness of design	2.56	1.16	Indicates that the visual design of the neighbourhood needs significant improvements. Feng Shui recommends integrating balanced elements, such as natural colours and patterns, to enhance energy flow and create a harmonious environment.
Sense of positive energy and balance	2.87	1.18	Reflects a partial lack of positive energy. From a Feng Shui perspective, this can be improved by integrating natural elements like plants and water with urban design to achieve overall balance in the environment.

Source: own elaboration.

Table 7. Results of Areas for Improvement

Item	Mean	Std Dev	Interpretation
Need for general improvements	4.72	0.49	Reflects a strong consensus among residents on the necessity for significant improvements. Feng Shui suggests that comprehensive improvements can restore energy balance and enhance the social and aesthetic appeal of the studied areas.

Source: own elaboration.

✉Aaesha.Mohammed1300a@iurp.uobaghdad.edu.iq, ✉Dr.amerkinani@iurp.uobaghdad.edu.iq

with broader findings reported by Amanat Baghdad (2010), confirming the validity of observed spatial and social trends.

DISCUSSION AND HYPOTHESES VALIDATION

The findings validate the study's hypotheses. H1 is confirmed as higher connectivity and integration correspond to stronger FS-PSI outcomes; H2 is supported by the observation that moderate spatial complexity slightly reduces livability; and H3 is affirmed through residents' reports that greener, safer, and better-balanced spaces enhance social interaction and energy flow.

Reframing the Findings through Feng Shui Proxies

Integrating Space Syntax and Feng Shui results reveal that sociability depends on both configuration and environmental balance. Variations in Integration, Choice, and Entropy align with the Five Elements as follows.

Wood (Trees, Shade, Vegetation)

Al-Arabi shows weak vegetation and shading, especially along deeper axes, reflected in low comfort scores (Mean = 2.52). Al-Washash's scattered greenery improves sociability and Integration. Design implication: add trees and shaded rest spots along mid-integration connectors to strengthen Wood energy and human comfort.

Water (Features, Cooling, Microclimate)

Both neighbourhoods lack water features (Mean = 1.85), corresponding with moderate Entropy (≈ 4.0–4.3) and limited centrality. Small fountains or rills at high-choice intersections would enhance microclimate and establish social focal points.

Fire (Lighting, Night-time Use, Energy)

Al-Washash residents report higher safety after dark (Mean = 3.28), while poor lighting limits Al-Arabi's evening use. Improved pedestrian lighting can extend public activity and reinforce Fire energy.

Earth (Materials, Surfaces, Seating Stability)

Missing rest areas in Al-Arabi (Mean = 2.43) relate to higher Mean Depth (≈ 9–12) and lower sociability. Shaded benches and durable surfaces can convert movement into interaction, stabilizing Earth energy.

Metal (Legibility, Edges, Wayfinding)

Al-Washash shows stronger legibility, while Al-Arabi's lower visual appeal (Mean = 2.56) and cluttered edges reduce clarity. Enhancing signage and boundaries would boost safety and social coherence.

Synthesis

Spatial configuration alone cannot explain social differences; vitality arises from the synergy between form and the Five Elements. Al-Washash's higher Integration and Connectivity combine with stronger Fire, Metal, and Wood proxies, while Al-Arabi's deficits in Water, Wood, and Earth suppress social potential. Lower satisfaction with greenery (2.52), water (1.85), and seating (2.43), contrasted with higher safety in Al-Washash (3.28), confirm that Feng Shui proxies meaningfully interpret spatial and perceptual quality in Baghdad's context.

Critical Discussion

Although Al-Washash outperforms Al-Arabi spatially, both exhibit moderate Entropy (≈ 4.0–4.3) and similar Controllability (≈ 0.34–0.36), reflecting coherent yet moderately varied networks. This indicates balanced Qi flow but limited diversity of spatial experience. While direct Feng Shui practice may face cultural limitations, the FS-PSI framework provides a universal diagnostic lens for sustainable

✉Aaesha.Mohammed1300a@iurp.uobaghdad.edu.iq, ✉Dr.amerkinani@iurp.uobaghdad.edu.iq

and inclusive urban design, aligning with SDG 11 and the New Urban Agenda by promoting greenery, light, stability, and spatial clarity as drivers of livability.

CONCLUSIONS

This study examined the Al-Arabi and Al-Washash neighbourhoods in Baghdad using Space Syntax, Feng Shui Public-Space Indicators (FS-PSI), and residents' surveys. Results show that Al-Washash has stronger spatial integration and connectivity (Connectivity = 4.36 vs. 4.20; Choice = 2742 vs. 1292), while Al-Arabi exhibits weaker controllability and fragmented spatial order. Although its entropy means (3.78) lower, the network still shows localized irregularities that slightly weaken energy balance.

Survey results confirmed these contrasts: Al-Arabi recorded low accessibility (Table 2), limited greenery (Mean = 2.52, Table 4) and water features (Mean = 1.85, Table 3), whereas Al-Washash showed higher safety (Mean = 3.28, Table 5) and clearer legibility. Both neighbourhoods emphasized the need for general improvements (Table 7). These findings support H1–H3 and partly H4, showing that sociability depends on the interaction between spatial configuration and Feng Shui proxies (Wood, Water, Fire, Earth, Metal).

The conclusions align with international evidence demonstrating that greenery and water features improve well-being (Finlay et al., 2015), environmental comfort supports social interaction (Matsuoka & Kaplan, 2008), perceived safety emerges from spatial–social balance (Ottoni et al., 2021), and aesthetic–functional quality enhances livability (Senetra et al., 2024). Overall, the FS-PSI framework proves effective as a transferable diagnostic tool for improving spatial harmony and social resilience in line with SDG 11 and the New Urban Agenda.

RECOMMENDATIONS: A GUIDE FOR DEVELOPING AL-ARABI AND AL-WASHASH NEIGHBOURHOODS

1. Enhance Spatial Connectivity and Integration

Redesign fragmented pathways and improve links between low-connectivity zones and main urban arteries. Adding new connectors will reduce spatial depth, strengthen accessibility, and promote smoother movement and Chi flow.

2. Increase Greenery and Water Features

Develop pocket parks, linear tree canopies, and shaded green corridors to mitigate thermal stress and stimulate social interaction. Complement these with fountains or rills to improve microclimate comfort – addressing residents' dissatisfaction with greenery (Mean = 2.52) and water features (Mean = 1.85) while reinforcing Wood and Water Feng Shui proxies.

3. Create Inclusive Gathering Spaces

Establish shaded plazas and durable seating areas that encourage social interaction and community activities. This directly responds to low satisfaction with social spaces (Mean = 2.43) and pedestrian comfort (Mean = 2.35).

4. Improve Spatial Legibility and Wayfinding

Clarify street hierarchy, signage, and visual edges – particularly in Al-Arabi – to enhance orientation and perceived safety. This aligns with moderate controllability and poor visual attractiveness (Mean = 2.56).

5. Upgrade Lighting to Enhance Safety

Install pedestrian-scale lighting at crossings and communal nodes. The moderate safety perception (Mean = 3.28) indicates potential for improvement through stronger Fire energy and extended evening use.

6. Adopt Context-Sensitive Feng Shui Principles

Integrate Five Elements proxies – Wood (greenery), Water (cooling), Fire (lighting), Earth (stability), and Metal (legibility) – as adaptable tools for urban harmony. This approach respects local cultural norms while improving livability and energy balance.

✉Aaesha.Mohammed1300a@iurp.uobaghdad.edu.iq, ✉Dr.amerkinani@iurp.uobaghdad.edu.iq

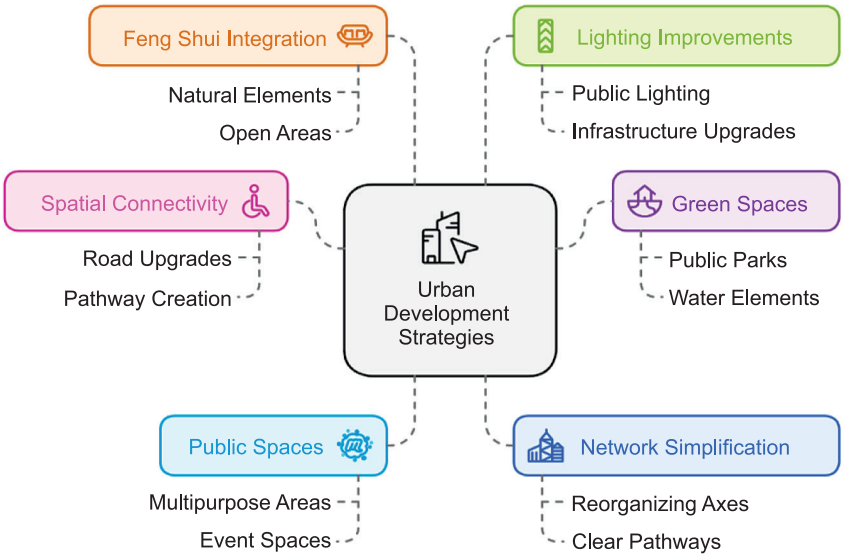

Fig. 32. Urban Development Strategies
Source: own elaboration.

7. Align with Global Sustainability Goals

Frame all interventions within UN SDG 11 (Sustainable Cities and Communities) and the New Urban Agenda, ensuring that local actions contribute to global targets for inclusivity, resilience, and well-being.

LIMITATIONS

This study has several limitations. It focused on two Baghdad neighbourhoods – Al-Arabi and Al-Washash – so the findings may not represent all urban contexts. The Feng Shui Public-Space Index (FS-PSI) offered useful correlations with Space Syntax metrics, yet the cross-sectional design prevented observing temporal changes or causal links. Survey data were self-reported and may involve bias. Finally, applying a Chinese philosophical framework within Baghdad's cultural context remains exploratory and interpretive rather than prescriptive.

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✉Aaesha.Mohammed1300a@iurp.uobaghdad.edu.iq, ✉Dr.amerkinani@iurp.uobaghdad.edu.iq

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✉Aaesha.Mohammed1300a@iurp.uobaghdad.edu.iq, ✉Dr.amerkinani@iurp.uobaghdad.edu.iq

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✉Aaesha.Mohammed1300a@iurp.uobaghdad.edu.iq, ✉Dr.amerkinani@iurp.uobaghdad.edu.iq

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✉Aaesha.Mohammed1300a@iurp.uobaghdad.edu.iq, ✉Dr.amerkinani@iurp.uobaghdad.edu.iq