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ORIGINAL ARTICLE

Towards enhancing urban quality of life in egypt's heritage areas: a case study of the religious complex Area in Al-Fustat, Old Cairo

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Abstract
This study examines the assessment and enhancement of urban quality of life (UQoL) within heritage areas, focusing on aligning development and upgrading strategies with heritage conservation and management. A comprehensive matrix was developed encompassing five dimensions- urban, mobility, socio-cultural, environmental, and economic-comprising 30 indicators such as housing, facilities, public spaces, income, and community participation. The theoretical framework was established through an extensive literature review and refined by analysing international heritage cities to ensure the matrix's robustness and applicability The matrix was applied to the Religious Complex Area in Al-Fustat, chosen for its historical richness, coexistence of different heritage monuments and dense housing, and strategic role in development plans. The study hypothesises that heritage management policies and urban quality of life are mutually interrelated, each influencing and reflecting the other. A mixed-methods approach was employed, integrating fieldwork with quantitative and qualitative tools, including surveys conducted with residents and expert respondents. The findings support both the theoretical framework and its practical application. They reveal notable strengths and weaknesses in current efforts; for instance, the socio-cultural dimension achieved the highest scores, reflecting strong community attachment and identity, while the environmental dimension scored lowest, indicating concerns and the need for targeted interventions. Moreover, researchers rated the urban dimension higher, whereas residents rated mobility slightly higher, revealing perceptual differences between technical assessment and lived experience. Based on these findings, the study proposes recommendations to guide balanced development in historic districts, aiming to enhance residents' well-being while preserving cultural identity.

Keywords Urban quality of life · Conservation and management of heritage areas · Religious complex Area et al.-Fustat · Community participation

1 Introduction

In recent decades, urban heritage management has gained growing attention, being increasingly recognized as a vital component of cities' identity, collective memory, and their cultural and economic value. Simultaneously, the concept of urban quality of life (UQoL) has emerged as a framework for assessing residents' satisfaction across services, environment, equity, and urban integration. Previous studies have explored UQoL and heritage management in various contexts. For example, Derakhshan [1] highlighted multidimensional aspects of UQoL, Fouad & Gomaa (2021) addressed urban related considerations in UQoL, and Osman et al. [2] developed a regional framework for assessing UQoL in heritage areas. Linking heritage management with UQoL is crucial, as effective conservation strategies can enhance residents' well-being, support social cohesion, and guide local development, while improvements in UQoL can, in turn, reinforce heritage preservation efforts.

Despite its role in promoting balanced urban development, the link between UQoL and heritage conservation and management remains insufficiently explored locally-particularly in areas with overlapping residential, touristic, and religious uses, such as Al-Fustat and the Religious

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Complex in Old Cairo, the southern part of Historic Cairo-. With its layered heritage spanning Roman, Jewish, Coptic, and Islamic traditions, the area offers a rich case for examining the interplay between heritage management and daily life. Accordingly, this study investigates how heritage management policies align with UQoL, aiming to identify key challenges and propose context-sensitive, applicable solutions that are primarily policy- and planning-oriented, with implications for design and governance. These solutions are tailored to the specific historical, social, and spatial characteristics of living heritage areas, addressing both heritage management objectives and residents' daily needs.

2 Research problem

The core research problem lies in the lack of an integrated framework linking heritage management and UQoL in Egypt. While the relationship between heritage conservation and UQoL has received growing attention internationally, it remains insufficiently theorised and empirically examined within the Egyptian context. Heritage management practices across many of Egypt's historic cities continue to prioritise the physical preservation of monuments over the lived experiences and well-being of local communities, resulting in fragmented and sometimes exclusionary urban outcomes. This overarching gap highlights the need to investigate how heritage management can be more effectively aligned with the enhancement of residents' quality of life across Egypt's heritage cities, thereby establishing a holistic and people-centred approach to urban heritage management.

3 Research aim

This study aims to develop and apply a comprehensive matrix of indicators to assess the interrelationship between heritage management policies and UQoL in Egypt's heritage areas. Unlike existing international frameworks (e.g., UNESCO, UN-Habitat, or general QoL indices), the proposed matrix is contextually tailored to heritage environments, integrating heritage conservation and management indicators with residents' perceptions of daily life. This locally adapted framework establishes a novel linkage between heritage preservation and measurable urban quality outcomes. Accordingly, the proposed framework encompasses five key dimensions-urban, mobility, socio-cultural, economic, and environmental-ensuring a multidimensional and systematic evaluation of UQoL. It is applied to the Religious Complex Area in Old Cairo, which is currently undergoing major redevelopment. The assessment seeks to identify strengths and weaknesses and to examine the effectiveness of management policies in their implementation, their alignment with UQoL indicators, and community perceptions. Ultimately, the study aims to develop evidence-based recommendations to better integrate heritage management policies with quality-of-life objectives.

4 Research hypothesis

This study hypothesizes that the efficiency and effectiveness of heritage conservation and management policies are closely correlated with UQoL in heritage areas. Each field is expected to both influence and reflect the other. The successful implementation of heritage management policies depends on their alignment with local residents' needs and how well they support community well-being. Conversely, improvements in UQoL are also anticipated to reinforce the effectiveness of heritage management efforts.

5 Methodology

This research adopts a mixed-methods approach, integrating both qualitative and quantitative components to comprehensively evaluate UQoL within heritage contexts. The qualitative dimension focuses on contextual interpretation and expert judgment, while the quantitative dimension ensures objectivity through measurable indicators and statistical validation. This integrated methodology aims at strengthening the validity and reliability of the findings.

5.1 Research methods

The methodological framework unfolds through eight sequential methods, each serving a distinct analytical purpose:

- **Literature review and matrix development**: A framework of 30 indicators was developed across five dimensions—urban, mobility, economic, socio-culture, and environmental- based on literature review and best practices. indicators include Public Spaces, Road Networks and Traffic, Economic Role of Heritage, Community Participation, and Integration of Environmental and Heritage Conservation. The matrix facilitates the diagnosis of strengths and weaknesses by converting qualitative evaluations into numerical scores. These scores are aggregated by dimension, enabling comparative analysis Across indicators.
- **International and regional case studies**: Comparative analyses of five examples of heritage cities-Zurich, Vienna, Copenhagen, Rabat, and Tunis-were conducted to

refine the proposed UQoL framework. These cases were selected for their proven success in integrating heritage management with urban livability improvement.

- **Expert consultation and indicator weighting**: A structured questionnaire was administered to 36 experts with academic and professional backgrounds in urban planning and heritage management. The sample primarily comprised Egyptian and Arab experts familiar with the regional heritage context, facilitating efficient communication and data collection through digital means. Experts assessed the importance of each indicator using a five-point Likert scale. The responses were analyzed descriptively, with mean values used to compare relative perceptions. Qualitative insights from expert interviews supported interpretation, and the results were used to determine indicator weights for evaluating UQoL in the Religious Complex area.
- **Case study selection**: The Religious Complex Area in Al-Fustat (Old Cairo) was chosen as the case study site due to its diverse religious and cultural heritage, inclusion in national revitalization plans, and rich urban fabric,, as well as the presence of various residential areas with active local communities and the existence of traditional crafts and diverse heritage-related activities.
- **Evaluation of UQoL in the study area**: A Field-based qualitative assessment was conducted to evaluate each indicator within the study area using the developed matrix. Indicators were rated as high, medium, or low, based on predefined evaluation criteria designed to reduce subjectivity, for example The public space condition is high when areas are clean and well-designed, moderate with partial maintenance, and low when poorly maintained or insufficient. The Ratings were then converted into numerical values for weighted analysis. Additionally, to ensure clarity and consistency in the operationalization of subjective indicators, the research team conducted semi-structured field interviews with residents at key activity nodes, supported by systematic on-site observational rounds. Participants were asked to express their perceptions of the social and experiential indicators, while researchers applied a unified evaluation scale to reduce individual interpretation bias. The qualitative impressions collected during this process were translated into standardized numerical scores, where high corresponded to 3, moderate to 2, and low to 1, enabling their systematic integration into the weighted analytical framework.
- **Community survey**: A structured questionnaire was administered to 103 respondents-including residents, workers, and visitors-using purposive sampling to capture those directly engaged with the area's daily life. Data was collected through field visits, face-to-face interviews, and online surveys to ensure demographic and occupational diversity. The responses were analyzed descriptively, with mean scores calculated for each indicator. then normalized and converted into relative weights to reflect their importance within the overall UQoL framework, ensuring a quantitatively robust evaluation.
- **Comparison of results**: The researchers' evaluation results were systematically compared with community survey responses to identify points of convergence and divergence. Subsequently, correlation coefficients were computed across the UQoL dimensions. This correlation analysis was specifically conducted to test the hypothesis that the effectiveness of heritage conservation and management policies is closely associated with UQoL performance, while also examining the degree of alignment between researchers' assessments and residents' perceptions.
- **Conclusions and recommendations**: Synthesized findings were used to assess UQoL performance in the study area to propose targeted recommendations that balance heritage preservation with the enhancement of quality-of-life.

5.2 Analytical and statistical techniques

A range of analytical techniques were applied to process and interpret the data obtained from the methods above:

- Descriptive statistics to summarize expert and community responses.
- Normalization procedures to convert mean indicator scores into relative weights.
- Weighted scoring analysis to determine the final UQoL index for the study area.
- Validity and reliability analysis was conducted to ensure the consistency and credibility of results.
- The Correlation analysis to examine relationships between dimensions and validate the robustness of the framework.

6 Literature review

6.1 Urban quality of life (UQoL): concept and dimensions

UQoL refers to the extent to which urban environments enhance the well-being and satisfaction of individuals by fulfilling their material, emotional, psychological, and social needs [3, 4]. It is considered a core component of community development, as it emphasizes improving living

conditions while enabling residents to actively participate in shaping their urban surroundings [5, 6]. Consequently, UQoL plays a central role in inclusive and balanced urban planning, guiding policies that aim to balance physical infrastructure, social cohesion, and residents' quality of life [7, 8]. UQoL consists of multiple interrelated dimensions: the physical, encompassing infrastructure and public services; mobility and accessibility, referring to movement and connectivity; the economic, focusing on income and employment; the political, reflecting civic engagement and governance; the social, involving interaction and cohesion; the psychological, linked to belonging and satisfaction; and the environmental, covering air and water quality, as well as green spaces, and ecological resilience [1].

Assessment of UQoL typically integrates both objective and subjective indicators. Objective indicators measure tangible, quantifiable aspects of urban life, such as housing conditions, availability and quality of services, infrastructure, and income levels. Subjective indicators capture residents' perceptions, satisfaction, and emotional attachment to their environment, reflecting social and psychological well-being. In heritage urban contexts, these indicators can be further tailored to include aspects such as community participation, sense of place, accessibility, and the condition of public spaces. This combined approach provides a comprehensive understanding of UQoL and supports the development of human-centered and context-sensitive urban policies [7, 9, 10]. Several international institutions have created frameworks to evaluate UQoL, including the Mercer Quality of Living Index, the Economist Intelligence Unit's Livability Index, the OECD's Better Life Index, WHOQOL by the World Health Organization, the City Prosperity Index (UN-Habitat), and the Happy City Index [11]. Key dimensions-such as education, housing, health, services, open spaces, socio-cultural factors, safety, governance, economy, and environment-were synthesized to ensure the matrix reflects international best practices while remaining adaptable to heritage urban contexts, supporting both residents' well-being and heritage preservation.

A comprehensive review of 21 key studies on UQoL informed the development of the indicator matrix used in this research. Core physical measures-such as housing availability, cost, and density; accessibility and quality of services, facilities, and road networks; and the presence of green and open spaces-were emphasized by Das (2007), Ulengin et al. (2001), Lee (2008), McMahon (2002), Appleyard (1981), Roback (1982), Berger et al. (2008), and Ben Ghodban [7]. Economic indicators including employment, income, and investment were highlighted by Santos and Martins (2007), Massam (2008), and Thinh et al. (2010). Social dimensions-covering community interaction, participation, satisfaction with place, identity, and equity-were central to Smith et al. (1997), McCrea et al. (2006), and Fahy and Cinneide (2006). Environmental and mobility-related factors such as walkability, pollution, and public transport quality featured in Sun (2005), Derakhshan [1], and Nikoofam and Mobaraki (2020). Finally, more comprehensive frameworks developed by Ariane [3], the Wellington City Council (2007), and Fouad and Gomaa (2021), and Osman et al. [2] integrated management, civic engagement, justice, and social well-being dimensions, reflecting an increasingly holistic understanding of urban livability in heritage contexts. These dimensions provide a structured foundation for evaluating UQoL in urban contexts.

Finally, the environmental dimension addressed water and air quality as well as open spaces and green areas, informed by a combination of global and local studies, including Thinh et al. (2010), Ariane [3], and Fouad & Gomaa (2021). This synthesis enabled the identification of commonly recognized indicators, their relative importance, and applicability to heritage contexts, providing a robust foundation for the tailored UQoL indicator matrix developed in this study. Drawing on global frameworks and an extensive literature review, a five-dimensional UQoL framework is proposed, comprising: urban (housing, services, urban integration); mobility (transport systems, pedestrian and cycling infrastructure); economic (employment, income, investment); socio-cultural (participation, identity, equity); and environmental (air and water quality, green spaces). This framework synthesizes commonly adopted indicators from previous studies, providing a structured foundation for evaluating UQoL in heritage contexts, while ensuring the indicator matrix is both evidence-based and contextually relevant.

While the reviewed literature identified seven broad dimensions, the framework proposed in this study consolidates them into five for analytical clarity and contextual relevance. The political dimension-centered on civic participation and governance-was integrated within the socio-cultural dimension, which encompasses notions of participation, identity, and social equity. Similarly, the psychological aspects of well-being, including sense of belonging and community attachment, were subsumed within the urban and socio-cultural dimensions. This consolidation avoids redundancy among overlapping concepts and ensures a more coherent structure for assessing UQoL in heritage areas.

6.2 UQoL in heritage areas

Heritage areas represent significant cultural and physical assets that embody collective memory and identity through their architectural, historical, and social values. However, they are increasingly threatened in developing countries

by neglect, poor management, inadequate maintenance, low public awareness, overcrowding, and unplanned urban expansion, all of which undermine their development [12, 13]. Traditional conservation methods that focus solely on physical restoration are no longer sufficient,instead, a comprehensive, multidimensional approach is essential, integrating economic, social, political, and environmental considerations. UNESCO [14] advocates aligning heritage preservation with integrated development through local economic enhancement, equity, and community participation.

Therefore, the aim of this study is to examine how heritage conservation and management policies interact with residents' daily lives and contribute to improvements in UQoL. Within this framework, heritage management and UQoL are likely to be interconnected in a reciprocal manner. This reciprocity reflects a continuous dynamic of mutual influence: the level of residents' well-being affects how communities engage with heritage projects and conservation policies, while these policies, in turn, shape people's perceptions, attachment, and interaction with their living environment. Such influence can be either positive or negative-well-managed conservation can enhance community pride and participation, whereas poorly planned interventions may cause displacement or social tension.

This relationship is also multi-layered, operating across different vertical levels (policy, governance, and heritage management) and horizontal dimensions (urban, social, economic, environmental). Heritage, the built environment, and the community each have distinct yet interconnected needs, and balancing them is essential for achieving both enduring conservation and an improved UQoL. However, this relationship is not without tensions. In practice, attempts to enhance UQoL in heritage settings often involve trade-offs between conservation priorities and contemporary urban needs. For instance, adaptive reuse projects can stimulate local economies and create employment opportunities but may simultaneously lead to gentrification and the displacement of long-term residents. Similarly, infrastructure upgrades designed to improve accessibility and service provision can unintentionally damage the historic urban fabric or alter the area's visual integrity. These potential conflicts highlight the need for balanced planning that aligns conservation ethics with urban revitalization, ensuring that development initiatives do not occur at the expense of heritage preservation and its responsible utilization.

In the urban dimension, heritage policies influence residential building conditions, service availability, visual character, activity diversity, and urban planning, including informal settlements. Preservation initiatives support long-term heritage protection while addressing emerging challenges. In mobility, such policies shape traffic patterns and road quality, enhancing urban circulation. Environmentally, conservation can mitigate pollution and other pressures on historic buildings. Socially, heritage initiatives foster community engagement, reinforcing local identity and sense of belonging. Economically, heritage supports local development through employment, income generation, investment, tourism, handicrafts, and adaptive reuse, providing tangible financial benefits. These interactions suggest that targeted heritage management can positively shape multiple dimensions of UQoL, while improvements in UQoL can, in turn, contribute to the long-term preservation of heritage assets. This analytical perspective underpins the study's hypothesis and provides a rationale for developing a tailored indicator matrix to assess and enhance UQoL in heritage contexts. Accordingly, adapting UQoL frameworks to heritage contexts necessitates learning from global heritage cities that have successfully implemented diverse approaches to balance heritage management with urban livability.

6.3 International examples of integrating heritage conservation and UQoL

This section reviews three European cities, Zurich, Vienna, and Copenhagen, consistently top-ranked in Mercer's QoL Index, which demonstrates successful integration of heritage management with high UQoL, making them valuable reference models. To explore regional relevance, Rabat and Tunis were included as Arab cities facing some challenges but generally outperforming Cairo in QoL rankings, offering context-specific insights for heritage-based urban development.

6.3.1 Zurich, Switzerland

Ranked first in [15] QoL Index, exemplifies the integration of heritage preservation with economic vitality and high UQoL [16]. Its historic Altstadt is strictly protected, while growth is directed to suburban areas. The city provides excellent public services, particularly in water, education, and healthcare [17]. Economically, as a global financial hub, Zurich benefits from banking, biotech, and cultural industries, with heritage sites like *IM-Viadukt* and *Cabaret Voltaire* adaptively reused to support economic diversity [18]. Socially, Social policies promote participation, inclusion, and equity, reflected in events like the Zurich Film Festival. Environmentally, the city prioritizes recycling, green spaces, and eco-friendly mobility, reducing emissions and improving urban health [16].

6.3.2 Vienna, Austria

Ranked second globally in [15] QoL Index, offers a leading model of heritage–UQoL integration [15]. Its historic core

is safeguarded by strict regulations and a buffer zone, while development is steered to the outskirts. The center favors pedestrians and cyclists, and adaptive reuse projects-like the Gasometers-combine heritage with modern use. Economically, Heritage sector contributed 5% of the Gross Domestic Product and over 100,000 jobs, notably in tourism and culture. Revitalized landmarks such as Coburg Palace reflect this economic value. Socially, Inclusive governance and public consultation enhance civic belonging [19]. Environmentally, Vienna maintains extensive green networks and relies on hydropower to reduce emissions [20].

6.3.3 Copenhagen, Denmark

Ranked fourth in [15] QoL Index, Copenhagen exemplifies integrated development rooted in historic identity [21]. Urban policies integrate heritage preservation with eco-friendly mobility, featuring over 40 km of cycling lanes and vast green areas [22]. The city ensures quality education, healthcare, and housing. Economically, its port status and tourism-supported by repurposed heritage sites like *Kødbyen* and *Paper Island*-have helped lower unemployment to 6.4% in 2023. Socially, Social policies promote participatory planning, volunteerism, and freedom of expression. Environmentally, Copenhagen aspires to be the world's first carbon-neutral capital, driven by clean transport, green belts, and a zero-waste strategy (The City of Copenhagen, 2010).

6.3.4 Rabat, Morocco

Rabat's medina, inscribed as a UNESCO World Heritage Site in 2012, exemplifies efforts to integrate heritage preservation with improved UQoL amid ongoing socio-economic pressures [23, 24]. Its historic core, including landmarks such as the Kasbah of the Udayas and Chellah, is preserved while urban rehabilitation and the "Rabat City of Light" initiative enhance public spaces, green areas, and mobility networks. Economically, these projects have stimulated tourism and craft investment, generating new opportunities, although unemployment and social disparities remain significant [25]. Socially, cultural events and community diversity foster coexistence and civic engagement, yet inequalities between historic and modern districts persist [26]. Environmentally, initiatives such as the Bouregreg Valley and Hassan II Gardens promote ecological balance and long-term resilience, though limited funding and uneven implementation constrain broader impact [26].

6.3.5 Tunis, Tunisia

Tunis's historic medina, a UNESCO World Heritage Site since 1979, exemplifies efforts to integrate heritage preservation with improved UQoL, reflecting layered heritage from Phoenician to modern times, with landmarks such as Al-Zaytuna Mosque and Dar Ben Abdallah Palace [27]. Urban restoration programs and tourism-oriented interventions, supported by international agencies, have enhanced housing conditions and public spaces [28]. Economically, these initiatives support tourism and traditional crafts, generating income and sustaining local artisans, though unemployment and limited participation of local residents remain challenges [29]. Socially, heritage festivals and cultural events reinforce local identity and a sense of belonging, but their seasonal and limited scope constrain deeper community engagement. Environmentally, waste management programs and green space initiatives demonstrate commitment to sustainability, although pollution, traffic, and infrastructure deterioration continue to pose significant pressures [30].

A comparative review of the five cities highlights how heritage management interacts with UQoL. European cases-Zurich, Vienna, and Copenhagen-show that strong institutions, stable financing, and strategic planning enable heritage preservation to integrate effectively with economic vitality, social inclusion, environmental sustainability, and mobility. Adaptive reuse in Zurich and Vienna supports economic diversification while maintaining historical character, though risks include suburban sprawl, over-commercialization, and rising living costs. Copenhagen's focus on eco-friendly mobility and green infrastructure offers lessons in environmentally responsible urban development rooted in historic identity. Arab cities, Rabat and Tunis, illustrate the tension between ambitious heritage-led projects and limited resources. Initiatives like Rabat's "City of Light" and urban rehabilitation in Tunis improve public spaces, tourism, and cultural visibility, yet benefits are uneven, and vulnerable communities may be marginalized. These cases emphasize prioritizing local needs, participatory governance, and balancing heritage conservation with socio-economic realities. Incremental, context-specific policies can advance both heritage preservation and UQoL.

While European cities provide models for institutional robustness, financing, and systematic planning, Arab cities demonstrate adaptive approaches under constraints. Key lessons include integrated heritage governance, the potential of adaptive reuse for economic stimulation, and the importance of social and environmental policies. Risks persist-sprawl and gentrification in Europe, uneven benefit and social exclusion in Arab contexts-but collectively,

these insights guide inclusive, context-aware heritage-based urban policies.

6.4 Developing UQoL indicators tailored to heritage areas

Based on previous studies, international rankings, and best practices, a comprehensive Urban Quality of Life (UQoL) matrix was developed to assess heritage areas, integrating conventional urban dimensions with heritage-specific indicators. The framework captures physical and non-physical aspects influencing liveability within historic contexts. Table 1 outlines these indicators and their assessment criteria, providing a practical tool for diagnosis, policymaking, monitoring, and evaluating community satisfaction. The matrix organizes indicators under five key dimensions to ensure balanced representation across urban, socio-culture, economic, environmental, and mobility domains. The urban dimension encompasses housing quality, public services, infrastructure, and visual harmony between historic and contemporary settings. The mobility dimension evaluates accessibility, transport efficiency, and the influence of transportation systems on heritage sites. The economic dimension addresses employment opportunities, investment, and heritage-based livelihoods, including traditional crafts. The socio-cultural dimension highlights community participation, cultural identity, and social cohesion fostered by heritage values. Finally, the environmental dimension examines pollution control, renewable energy use, and the integration of sustainability with heritage conservation.

7 Estimating the relative weights of UQoL indicators in heritage areas

Given the complexity of UQoL in heritage contexts, therefore assigning equal importance to all indicators is methodologically unsound. To determine their relative weights, a questionnaire was administered to 36 experts specialising in urban fields and heritage management. Participants rated each dimension and indicator using a five-point Likert scale, allowing the researchers to establish contextual prioritisation aligned with Egypt's heritage-specific challenges. The results indicated that the urban dimension ranked highest among all dimensions (34.21%). The socio-cultural dimension followed (20.51%). The economic dimension ranked third (19.63%). The environmental (12.98%) and mobility (12.66%) dimensions ranked lower, though they remain relevant. These findings offer a weighted framework to support evidence-based policy formulation and more effective resource allocation. Figure 1 presents the overall dimension weights, while Table 2 details the sub-indicator weights.

The expert survey results highlight the prioritisation of UQoL dimensions in Egypt's heritage context. The urban dimension achieved the highest ranking, underscoring the pivotal role of infrastructure, conservation of historic buildings, service provision, and public utilities in shaping residents 'experiences. The socio-cultural and economic dimensions showed substantial importance, underscoring the significance of cultural identity, community participation, and heritage-related economic activities such as tourism and traditional crafts. Meanwhile, the mobility and environmental dimensions showed relatively lower weights. The weighted indicators derived from these ratings are used as a structured framework to quantitatively assess UQoL. Although expert ratings may involve subjectivity, this was mitigated through multiple experts, aggregation of Likert-scale responses, and use of several indicators per dimension, ensuring a robust, evidence-based framework for heritage-focused urban planning.

8 Case study: the religious complex area in Al-Fustat, Old Cairo

The Religious Complex Area in Old Cairo was chosen as a case study for its exceptional heritage value. It encompasses the earliest urban core that later became an integral part of historic Cairo, characterised by a rich urban fabric shaped by successive civilisations and a unique religious identity that reflects the coexistence of the three Abrahamic faiths. Its central location, cultural diversity, and ongoing traditional crafts enhance both its spatial and symbolic significance [31]. The area's dense population allows for a nuanced understanding of local interaction with heritage and development challenges, while current governmental interventions provide a valuable context for examining their impact on UQoL. This part aims to assess UQoL indicators in the area and their alignment with heritage conservation and management policies, using a combined methodology of field surveys, urban analysis, and community questionnaires to evaluate satisfaction and identify strengths, weaknesses, and development priorities.

8.1 Overview of the study area

The Religions Complex Area is bounded by the Nile Corniche to the west, Salah Salem Street to the north, Al-Fustat Street to the south, and Al-Fustat Hills Park to the east. The core area covers around 1.12 km^2, but when adjacent development projects influencing the site are considered-particularly around Ain El-Sira Lake-the effective study area expands to 3.22 km^2 (Fig. 2). The recorded population was approximately 250,313 in 2017. This area formed the

Table 1 Matrix of UQoL in Heritage Areas
(Source: Authors)

Dimension	Indicators	Proposed Evaluation Criteria
Urban	Housing	Availability and condition of housing units/Levels of crowding
	Service Availability	Availability and adequacy of service facilities
	Public Utilities Efficiency	Availability and efficiency of infrastructure/Resident satisfaction
	Functional Diversity of Activities	Variety of uses/Responsiveness to residents' needs
	Quality of Public Spaces	Availability and quality of open spaces and landscaping
	Visual Identity	Urban harmony between historic and new buildings
	Informal Expansions	Presence, scale, and condition of unplanned areas
	Urban Management	Planning policies/Maintenance/Resident satisfaction
	Heritage Conservation and Management Policies	Effectiveness of heritage preservation management practices in safeguarding heritage assets
	Contribution of Heritage Places to Urban Needs	Extent of heritage sites' integration into the urban fabric and contribution to community needs
Mobility	Road Networks and Traffic	Connectivity/Traffic flow/Parking adequacy
	Public Transport	Availability and quality of transport services
	Pedestrian and Cycling Services	Availability and quality of pedestrian and cycling paths
	Impact of Transport on Heritage Buildings	Accessibility to heritage sites/Transport impact on historic fabric
Economic	Unemployment Rates	Local employment and integration into area projects
	Investment Rates	Private sector engagement/Attractiveness/SME support
	Income and Economic Growth	Income levels and their link to development projects
	Economic Role of Heritage	Revenue from heritage-based activities/Maintenance funding
	Support for Traditional Crafts	Readiness of heritage places for tourism and related services
	Suitability for Tourism Activities	Activation of heritage-related crafts as income source
Socio-Cultural	Social Justice and Public Rights	Equality in access/Inclusive design/Services for special needs
	Community Communication	Cultural and social events that promote cohesion
	Community Participation	Local involvement in decision-making (e.g. surveys)
	Identity and Sense of Belonging	Emotional attachment to place/Participation in heritage activities
	Awareness and Responsibility Towards Heritage	Awareness and connection to heritage/Preservation responsibility
	Social Role of Heritage Places	Heritage as a social resource/Outcome of events linked to heritage
Environ-mental	Pollution and Waste Management	Water and air quality/Clean energy use/Waste recycling plans
	Clean and Renewable Energy Use	Use of renewable energy in buildings and services
	Green Spaces	Percentage and quality of green areas
	Integration of Environmental and Heritage Conservation	Pollution impact on heritage places/Environmental awareness/Eco-heritage initiatives

heart of the ancient city of Al-Fustat, founded in 641 AD by Amr Ibn Al-As under Caliph Umar Ibn Al-Khattab. As Africa's first Islamic capital, Al-Fustat held strategic importance due to its proximity to the Nile and the Roman fortress (called Babylon fortress), offering better access to Arabian peninsula than Alexandria, the former capital of Roman Egypt [31, 32]. Subsequent expansions saw the establishment of Al- 'Askar, Al-Qata'i, and later Fatimid Cairo in 969 AD. Al-Fustat suffered partial destruction by fire toward the end of the Fatimid era, and under the Ayyubids it was

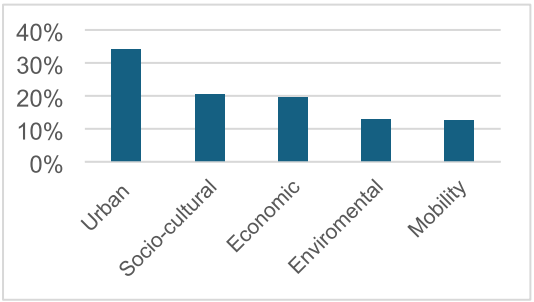


Fig. 1 Relative Weights of UQoL Dimensions in Heritage Areas Based on Expert Survey-
(Source: Authors)

integrated with Al- 'Askar and Fatimid Cairo to form a unified walled city. The area hosts a rare ensemble of ancient Abrahamic monuments (Figs. 3, 4, 5, 6, 7, 8), including the Hanging Church, Saints Sergius and Bacchus Church, St George's Church, Ben Ezra Synagogue, and Amr Ibn Al-As Mosque, along with the ruins of the Roman-era Babylon Fortress and the Coptic Museum. It also features traditional crafts in Pottery Village, Darb 1718 (Fig. 9), and the Fustat Market (Fig. 10), all supporting the local economy and reinforcing cultural identity [33], State Information Service, 2023).

8.2 Conservation efforts in the religions complex area

Old Cairo was inscribed in 1979 on the World Heritage List as a core component of Historic Islamic Cairo,and UNESCO studies in 1980 recommended focusing conservation efforts on six main architectural clusters and improving socio-economic conditions (URHC, 2025). However, the 1992 earthquake caused extensive damage to Islamic and Christian monuments, prompting international restoration initiatives. Ongoing risks include groundwater damage to church floors (M. [34] and vibrations from nearby infrastructure such as railways and metro lines [35, 36]. Informal housing

Table 2 Matrix of UQoL in Heritage Areas, Ranked by Relative Weights
(Source: Authors)

Dimensions/Indicators		Mean Score	Relative Weight (Indicator)	Relative Weight (Dimension)
Urban	Housing	4.2	3.37%	34.21%
	Service Availability	4.6	3.69%	
	Public Utilities Efficiency	4.5	3.61%	
	Functional Diversity of Activities	3.8	3.04%	
	Quality of Public Spaces	4.3	3.45%	
	Visual Identity	4.4	3.53%	
	Informal Expansions	4.1	3.29%	
	Urban Management	4.1	3.29%	
	Heritage Conservation and Management Policies	4.7	3.77%	
	Contribution of Heritage Places to Urban Needs	4.0	3.21%	
Mobility	Road Networks and Traffic	4.2	3.37%	12.66%
	Public Transport	4.0	3.21%	
	Pedestrian and Cycling Services	4.2	3.37%	
	Impact of Transport on Heritage Buildings	3.4	2.72%	
Economic	Unemployment Rates	3.4	2.72%	19.63%
	Investment Rates	4.0	3.21%	
	Income and Economic Growth	3.5	2.80%	
	Economic Role of Heritage	4.4	3.53%	
	Support for Traditional Crafts	4.5	3.61%	
	Suitability for Tourism Activities	4.7	3.77%	
Socio-Cultural	Social Justice and Public Rights	4.0	3.21%	20.51%
	Community Communication	4.0	3.21%	
	Community Participation	4.3	3.45%	
	Identity and Sense of Belonging	4.6	3.69%	
	Awareness and Responsibility Towards Heritage	4.5	3.61%	
	Social Role of Heritage Places	4.2	3.37%	
Environm ental	Pollution and Waste Management	4.4	3.53%	12.99%
	Clean and Renewable Energy Use	3.7	2.96%	
	Green Spaces	3.9	3.13%	
	Integration of Environmental and Heritage Conservation	4.2	3.37%	
Total Relative Weights: 100% (Indicators)—100% (Dimensions)				

Fig. 2 Boundaries of the Study Area.
(Source: Authors based on google maps)

Fig. 3 Babylon Fortress
(Source: authors)

Fig. 4 The Hanging Church
(Source: authors)

Fig. 5 St. George Church
(Source: authors)

Fig. 6 The Jewish Synagogue
(Source: authors)

has also disrupted the area's architectural coherence [31]. The Religious Complex Development Project (1999–2002), led by the Ministry of Culture in cooperation with UNIDO, restored key religious landmarks and launched the Fustat

Fig. 7 Amr Ibn Al-As Mosque
(Source: authors)

Fig. 8 The Coptic Museum
(Source: authors)

Fig. 9 Darb 1718 in Fustat –
(Source: Authors)

Fig. 10 Crafts Exhibition –
(Source: Authors)

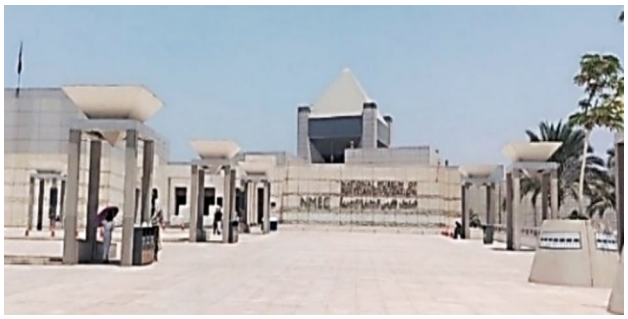


Fig. 11 The Museum of Egyptian Civilisation
(Source: Authors)

Fig. 12 Development of Ain El-Sira Lake
(Source: Authors)

Handicrafts Market [37]. More recently, a total of 350 buildings has been restored, and public infrastructure has been upgraded, including the creation of a new plaza adjacent to the Amr Ibn Al-As Mosque to accommodate the growing number of worshippers and visitors.

8.3 Recent development projects in the context of Al-Fustat Area

In recent years, the Egyptian government has undertaken a series of large-scale initiatives aimed at rehabilitating Al-Fustat area by enhancing its urban fabric, replacing deteriorated structures, reviving its historical and touristic role, and improving public services. Due to their geographic proximity, these interventions have had a direct impact on the Religious Complex Area. One of the most prominent projects is the National Museum of Egyptian Civilisation, inaugurated in 2021 following the internationally celebrated Royal Mummies Parade. The museum gained global attention for its extensive historical collection [38] (Fig. 11). Complementing this, the Ain El-Sira Lake-previously a neglected body of water-was redeveloped through comprehensive landscaping, the addition of pedestrian walkways, dining areas, a theatre, fountains, and water treatment systems, creating a visual and functional connection with the museum [39] (Fig. 12).

Additionally, Al-Fustat Hills Park, which is currently under construction over an area of 500 feddans, is set to include expansive gardens, cultural and service centres, and the relocation of the Nabil Darwish Ceramics Museum to the Handicrafts Centre, in an effort to consolidate heritage-related functions (Fayez, 2024; General information authority, 2025) (Fig. 13). Another major project is the redevelopment of Magra El-Oyoun Aqueduct area, which involved the removal of informal settlements and the relocation of leather workshops to Al-Rubiki City. The site was transformed into a heritage-inspired urban setting with cultural features, aiming to position it as a touristic destination (Fig. 14-a,b). Furthermore, the Mashhad of Al-Tabataba, a rare monument from the Ikhshidid era, was carefully dismantled and relocated from its structurally threatened site near Ain El-Sira to a secure location within the Museum of Egyptian Civilisation [40]) (Fig. 15). Finally, the Fustat Metro Station (part of Cairo Metro Line 4) is currently under construction and will serve as a vital link between Al-Fustat and the broader Cairo metro network. This development is expected to significantly enhance mobility and improve accessibility to heritage sites [41].

Fig. 13 Fustat Hills Park Project
(Source: General information authority, 2025)

Fig. 14 a, b. Redevelopment of the Magra El-Oyoun Aqueduct.
(Source: Authors)

Fig. 15 Mashhad of Al-Tabataba.
(Source: Authors)

8.4 Assessment of the existing urban context around the religions complex

The field survey, conducted in January 2025, revealed a marked contrast within the urban fabric (Fig. 16), reflecting both the area's historical evolution and recent urban interventions. The northern section displays a regular grid pattern, indicative of relatively modern urban planning, whereas the southern section is characterised by a dense, irregular layout shaped by historical layering. This southern zone represents a core area for traditional crafts-particularly pottery-with numerous workshops, showrooms, and the Fawakher School contributing to the area's distinct identity. Building conditions vary across the site (Fig. 17). Deterioration is primarily concentrated in the southern sector, especially near the Tenth of Ramadan Bridge. In contrast, buildings in the northern and western zones tend to be in relatively better condition. Building heights also differ noticeably: southern buildings typically range from three to six storeys, while those in the north frequently exceed six storeys (Fig. 18). Land use analysis (Fig. 19) indicates a predominance of residential and mixed-use functions. Currently, accessible green space within the Religious Complex area is minimal, estimated at approximately 0.08 km^2, representing nearly 2.5% of the total study area. The ongoing Al-Fustat Hills Park project, covering 1.69 km^2 with 88% designated as landscaped green zones, is expected to increase green coverage to nearly 46% of the extended study area (3.22 km^2). This development will substantially enhance environmental quality and urban liveability. The current assessment, however, reflects existing conditions prior to project completion, Recreational and cultural amenities are concentrated in central locations, whereas educational and healthcare facilities are largely situated at the periphery. This uneven distribution adversely affects accessibility for residents [42].

8.5 Visual character of the urban surroundings of the religions complex

Despite the presence of significant heritage and religious landmarks, the visual character surrounding the Religions

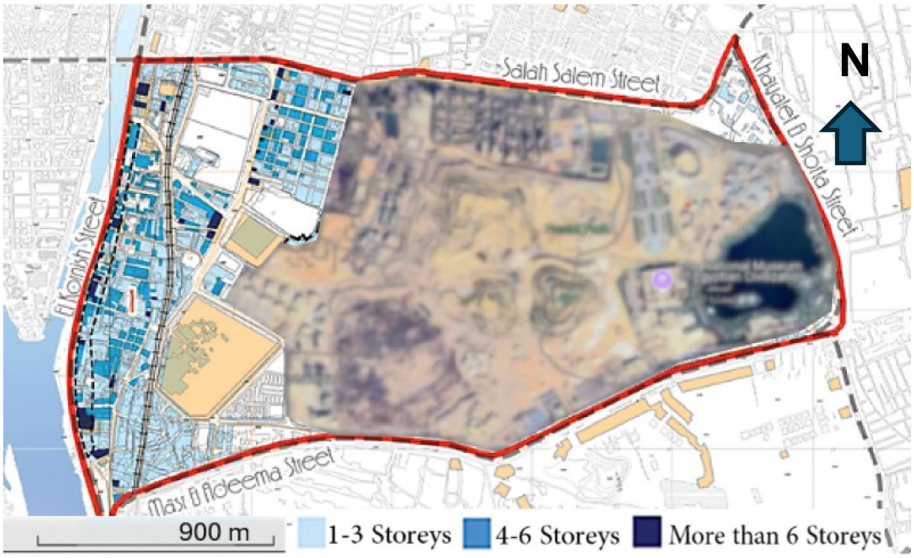


Fig. 16 Urban Fabric of the Study Area. Source: [42]

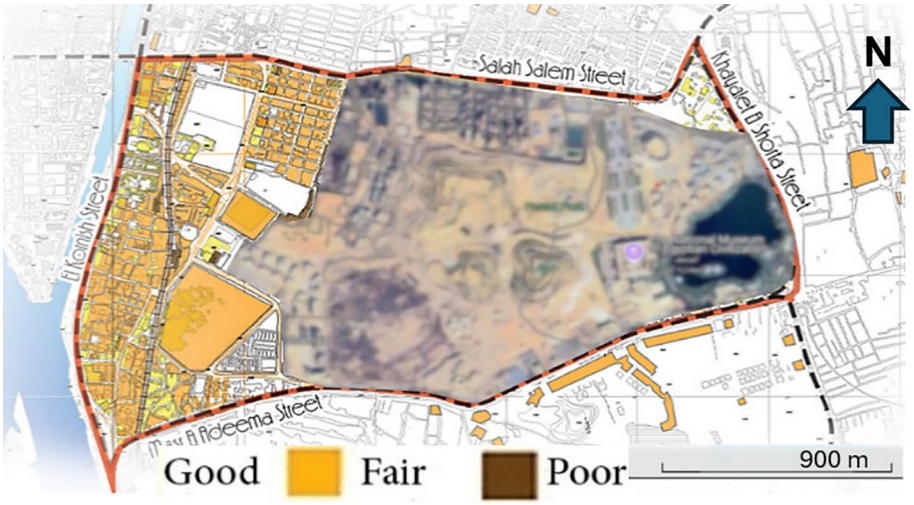


Fig. 17 Building Conditions in the Study Area. Source: [42]

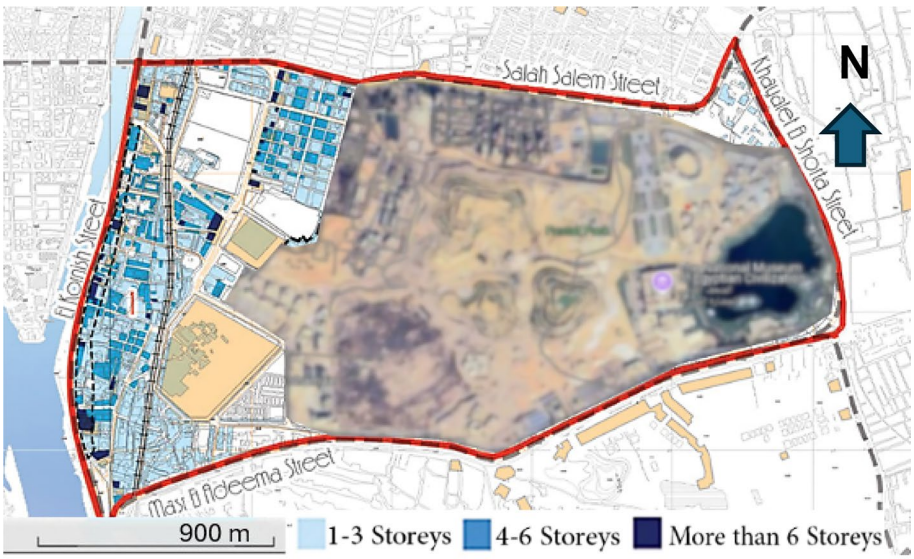


Fig. 18 Building Heights in the Study Area. Source: [42]

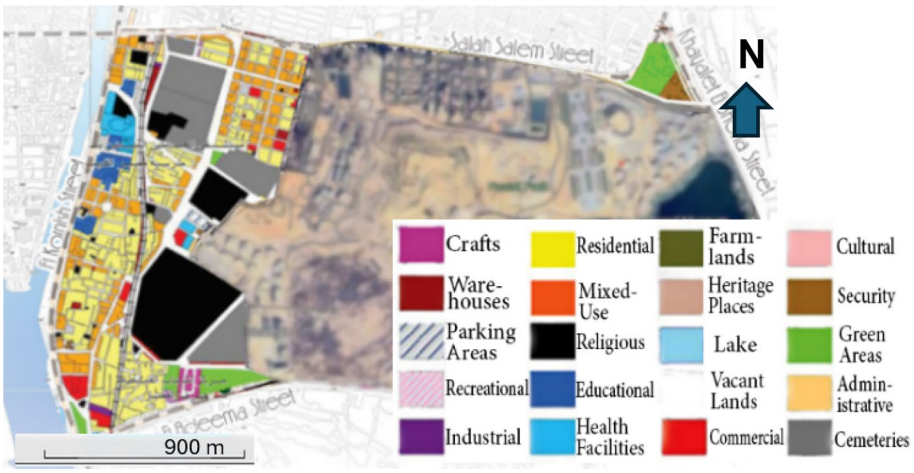


Fig. 19 Land Use in the Study Area. Source: [42]

Fig. 20 Exhibition at Darb 1718 (Source: Authors)

Fig. 21 An old Building near Babylon Fortress (Source: Authors)

Complex remains inconsistent. In the southern area, particularly near the Babylon Fortress and the Churches Complex, a distinctive architectural identity is evident. This is expressed through contextually sensitive sites such as Darb 1718, the Pottery Village, and the Traditional Crafts Centre, which reflect design approaches inspired by local

Fig. 22 Buildings the Tenth of Ramadan Bridge (Source: Authors)

heritage (Fig. 20). However, signs of visual degradation are widespread. Many historic houses suffer from structural deterioration (Fig. 21), and extensive informal expansions-especially in proximity to the Tenth of Ramadan Bridge-undermine the overall visual coherence of the area (Fig. 22). In the western sector, which overlooks the Churches Complex and Amr Ibn Al-As Mosque, visual harmony is minimal. While there is some consistency in façade colours, the lack of traditional architectural features limits the area's cultural and aesthetic integration (Fig. 23).

Al-Fustat Market, located adjacent to Amr Ibn Al-As Mosque, reflects the traditional character of the area (Fig. 24). The mosque serves as a visual anchor, particularly following the development of a new plaza aimed at increasing capacity and reinforcing its religious and social roles. However, visual harmony is undermined by inconsistent building heights and architectural styles in the surrounding residential area, despite efforts to repaint façades. In contrast, the eastern sector-home to several government buildings-shows better alignment with the heritage context

Fig. 23 Visual Scene Opposite Amr Ibn Al-As Mosque on Hassan Al-Anwar Street
(Source: Authors)

Fig. 24 Al-Fustat Market
(Source: Authors)

Fig. 25 Waste Management Unit
(Source: Authors)

(Fig. 25). The northern area, by comparison, exhibits the least cohesion, marked by stylistic fragmentation, disordered signage, and a weak urban identity. These disparities highlight the uneven nature of past interventions and the lack of consistency in applying context-sensitive design principles.

8.6 Evaluation of UQoL in the religious complex area

The researchers qualitatively assessed UQoL in the study area using the matrix derived from the theoretical framework, consisting of five main dimensions and thirty sub-indicators. Each indicator was evaluated through several secondary criteria on a three-level qualitative scale (High–Medium–Low). Initially, Google Earth imagery and recent academic studies that had previously carried out urban surveys of the area were utilised to establish a spatial and physical baseline. These were subsequently verified and updated through multiple field visits and photographic documentations conducted by the research team. The evaluation process was conducted through a combination of direct observation, document analysis, and informal interactions with the local community.

Clear definitions were established for each level of the evaluation scale, providing a predefined and standardised basis for assessment. For instance, within the urban dimension, the housing indicator was assessed according to the physical condition of buildings: high when walls and ceilings were in good condition, moderate for minor cracks or early signs of deterioration, and low for evident decay, dampness, or mould. A similar approach was applied to basic services such as electricity and sewage, where infrastructure coverage and reliability determined performance levels. In the economic dimension, the indicator on average individual income was rated high when income was sufficient to cover basic needs, moderate when it adequately met essential necessities, and low when it fell below the adequacy.

Social and cultural indicators were evaluated through direct interaction with residents during community and cultural events-particularly within the Potters' Village-and through informal conversations held at Amr Ibn Al-As

Mosque, which serves as a central social hub for the local community. the indicators included the regularity of social events and citizen participation in decision-making. High ratings were assigned where frequent cultural activities and open participatory mechanisms existed; medium ratings reflected irregular or limited initiatives; and low ratings indicated absence or ineffectiveness of such efforts. For example, in the "sense of belonging" indicator, participants were asked: "Do you feel connected and attached to the area where you live?" Responses were recorded using the Yes/Maybe/No format and subsequently converted into numerical values (Yes = 3, Maybe = 2, No = 1) to compute averages.

In the environmental dimension, availability of green spaces and heritage protection measures were key. Well-distributed and functional green areas, along with active preservation plans, earned high ratings. Limited or underutilised spaces and incomplete preservation efforts scored medium, while scarcity and visible degradation scored low. Similarly, urban mobility was assessed based on the condition and planning of road networks and pedestrian routes, using the same three-tier scale. Economic indicators were evaluated using both officially published data and field-based observation of the local living standards, such as the general condition of housing units, ownership and condition of vehicles, and the visible commercial activity in the area. Additionally, informal interviews with shop owners, bazaar workers, and artisans contributed to understanding the economic and cultural dynamics of the area.

Qualitative ratings were converted into numerical values to facilitate comparison between the researchers' assessment and that of the local community sample. This also allows for future comparisons with other heritage areas using the same matrix. The three rating levels were coded as follows: High = 3, Medium = 2, and Low = 1, applied to each sub-criterion. Each indicator's mean score was calculated by summing the criteria values and dividing by their number. To calculate each dimension's total score, indicator scores were multiplied by their fractional relative weights, based on expert's survey, and then summed. These totals, representing cumulative scores, were converted into percentages using the following formula: Percentage for each dimension = [(∑ (Indicator scores × Relative weights)) – Minimum score] ÷ (Maximum score – Minimum score). The maximum score is the total if all indicators received the highest rating (3), multiplied by their weights as concluded from the expert survey. The minimum score assumes all indicators received the lowest rating (1). The resulting percentage reflects the performance level of that dimension within the potential improvement range for UQoL.

8.7 Results of the researchers' evaluation of UQoL in the religious complex area

The UQoL assessment in the study area focused on five key dimensions, each reflecting specific strengths and challenges based on field observations and local feedback rising from informal conversations and participatory observations during everyday social and cultural settings. Table 3 outlines the detailed evaluation and numerical conversions. Several general findings emerge from its analysis:

8.7.1 Urban dimension

Ratings ranged from high (e.g., heritage preservation, functional diversity, infrastructure), to medium (e.g., housing, public spaces), and low (e.g., informal areas due to inadequate planning). The northern and western zones displayed relatively better conditions, while the southern zone exhibited signs of residential decline. Services were moderately available but unevenly distributed, with limited access to education and healthcare in central areas. Nevertheless, ongoing development reflects institutional recognition of the area's heritage value.

8.7.2 Socio-cultural dimension

This dimension scored highly in terms of social cohesion, identity, and sense of belonging, while public participation received lower ratings due to limited community involvement in decision-making processes. Regular social and religious events reflect strong community ties, though inadequate inclusion of persons with disabilities remains a challenge. Enhanced participatory mechanisms are needed, considering the socio-cultural significance of heritage and traditional crafts.

8.7.3 Economic dimension

Scores ranged from medium to high for heritage-related tourism and development, but investment and income levels were low. According to the Central Agency for Public Mobilization and Statistics (CAPMAS), urban unemployment in Egypt declined to 9.6% in 2024, down from 9.9% in 2023 [43]. This unemployment level remains relatively high compared to the national average of 6.6%, indicating that urban areas still experience notable economic pressure despite recent improvements. The local economy depends largely on traditional crafts and tourism, especially pottery, which require increased support. Moreover, recent national figures show that gross capital formation represented approximately 13% of Gross Domestic Product (GDP)GDP in 2024, a relatively modest level compared

Table 3 Evaluation of UQoL Indicators Achieved in the Vicinity of RC– (Source: Authors)

Dimensions & Indicators		Indicator Evaluation Criteria	Evaluation Level	Mean Indicator Score (The sum of criteria values divided by their number)	Weighted Indicator Score (Mean score × Relative weight)	Total Score of Each Dimension
Urban	Housing	Physical condition of buildings	◑ Mid	2	0.067	0.837 *(Represents 72.17% of the total possible improvement range for this dimension)*
		Construction materials and finishes	◑ Mid			
		Area and population density	◑ Mid			
	Service Availability	Health services	◑ Mid	2.33	0.086	
		Educational services	◑ Mid			
		Cultural and recreational services	• High			
	Public Utilities Efficiency	Availability of electricity	• High	3	0.108	
		Availability of water	• High			
		Availability of sanitation	• High			
	Functional Diversity of Activities	Recreational activities	• High	3	0.091	
		Cultural activities	• High			
		Social activities	• High			
	Quality of Public Spaces	Condition of public spaces	◑ Mid	2.33	0.080	
		Accessibility to public spaces	• High			
		Availability of amenities	◑ Mid			
	Visual Identity	Cleanliness/Maintenance of facades	◑ Mid	2	0.071	
		Architectural character consistency	◑ Mid			
	Informal Expansions	Condition of informal expansions	o Low	1	0.033	
		Service availability in informal areas	o Low			
		Infrastructure in informal areas	o Low			
	Urban Management	Urban compliance	• High	3	0.099	
		Compliance with regulations	• High			
	Heritage Conservation and Management Policies	Condition of heritage buildings	• High	3	0.113	
		Compliance with conservation requirements	• High			
		Suitability of surrounding activities	• High			
	Contribution of Heritage Places to Urban Needs	Utilisation of heritage sites	• High	2.75	0.088	
		Role of heritage sites as landmarks	• High			
		Integration with transport networks	• High			
		Integration with public services	◑ Mid			
Mobility	Road Networks and Traffic	Condition of road networks	• High	2.33	0.079	*0.290 (Represents 64.26% of the total possible improvement range for this dimension)*
		Traffic flow	◑ Mid			
		Availability of parking spaces	◑ Mid			
	Public Transport	Geographic coverage efficiency	• High	2.5	0.080	
		Transport networks integration	• High			
		Condition of vehicles	◑ Mid			
		Transport cost for residents	◑ Mid			
	Pedestrian and Cycling Services	Availability of sidewalks and pathways	• High	2	0.067	
		Pedestrian access & signals	◑ Mid			
		Availability of bicycle lanes	o Low			
	Impact of Transport on Heritage Buildings	Accessibility to heritage landmarks	• High	2.33	0.063	
		Transport impact on heritage	◑ Mid			
		Availability of parking areas	◑ Mid			

Table 3 (continued)

Dimensions & Indicators		Indicator Evaluation Criteria	Evaluation Level	Mean Indicator Score (The sum of criteria values divided by their number)	Weighted Indicator Score (Mean score × Relative weight)	Total Score of Each Dimension
Economic	Unemployment Rates	General unemployment rate	◑ Mid	2	0.054	*0.413 (Represents 55.02% of the total possible improvement range for this dimension)*
		Employment rates in local projects	◑ Mid			
	Investment Rates	Investment-to-GDP ratio	o Low	1	0.032	
	Income and Economic Growth	Income compared to the poverty line	◑ Mid	2	0.056	
		living conditions and asset ownership	◑ Mid			
	Economic Role of Heritage	Contribution to tourism attraction	• High	2.33	0.082	
		Investment attraction	◑ Mid			
		Job creation	◑ Mid			
	Support for Traditional Crafts	Craft centers availability	• High	2.33	0.084	
		Official support for traditional crafts	◑ Mid			
		Promotion of traditional crafts	◑ Mid			
	Suitability for Tourism Activities	Area's attractiveness to tourists	• High	2.75	0.104	
		Availability of tourism infrastructure	• High			
		Diversity of available tourism activities	• High			
		Tourism promotion and marketing	◑ Mid			
Socio-Cultural	Social Justice and Public Rights	Equal opportunities among residents	◑ Mid	2	0.064	*0.527 (Represents 78.29% of the total possible improvement range for this dimension)*
		Equality in rights and duties	◑ Mid			
		Provision for people with special needs	◑ Mid			
	Community Communication	Level of social cohesion	• High	3	0.096	
		Organisation of community events	• High			
		Availability of suitable venues for activities	• High			
	Community Participation	Civic engagement level	• High	2	0.069	
		Resident participation	o Low			
	Identity and Sense of Belonging	Sense of belonging to the place	• High	3	0.111	
		Willingness to stay	• High			
	Awareness and Responsibility Towards Heritage	Awareness of heritage places value	• High	3	0.108	
		Affection to heritage places	• High			
	Social Role of Heritage Places	Social interaction	• High	2.33	0.079	
		Official support for social activities	◑ Mid			
		Community–government cooperation	◑ Mid			
Environmental	Pollution and Waste Management	Air, water, and soil pollution rates	◑ Mid	2	0.071	*0.230 (Represents 38.61% of the total possible range of improvement)*
	Clean and Renewable Energy Use	Use of renewable energy sources (solar, wind, thermal cells)	o Low	1	0.029	
	Green Spaces	Ratio of green areas in the district	◑ Mid	2	0.063	
		Quality and maintenance of green areas	◑ Mid			
	Integration of Environmental and Heritage Conservation	Environmental impact on heritage buildings	◑ Mid	2	0.067	

to emerging-economy benchmarks, reinforcing the limited investment capacity observed in the study [44]. This demonstrates that despite the area's strategic location and potentialities, investment remains limited in scale.

8.7.4 Environmental dimension

Generally rated as medium. The area suffers from a lack of green spaces, low adoption of clean energy, and moderate levels of pollution, according to IQ Air, the annual average concentration of PM2.5 in Egypt in 2024 was approximately 39.77 $\mu g/m^3$[45], a level significantly above WHO recommended limits, indicating persistent air quality challenges. Although the new project of "Al-Fustat Hills Park" may contribute to improvements; however, its impact has not yet been fully realized.

8.7.5 Urban mobility dimension

Rated medium to high. While road networks and transport availability are generally adequate, infrastructure for pedestrians and cyclists is insufficient. Heritage sites are affected by traffic, and the heavy reliance on tuk-tuks highlights the need for mobility solutions that respect the area's historic character**.**

Based on the above analysis, a comparison can be made between the performance of the UQoL dimensions within the study area (Fig. 26). The socio-cultural dimension received the highest score, reflecting the area's significant value to both residents and visitors across heritage, tourism, religious, and artisanal domains. It is followed by the urban dimension, attributed to the area's rich archaeological and touristic landmarks, as well as recent large-scale development projects initiated by the government in Al-Fustat area. However, challenges persist, particularly in relation to informal expansions, deteriorating building conditions, and lack of architectural coherence in certain parts. In third place is the mobility dimension, suggesting existing strengths constrained by issues such as inadequate pedestrian and cycling

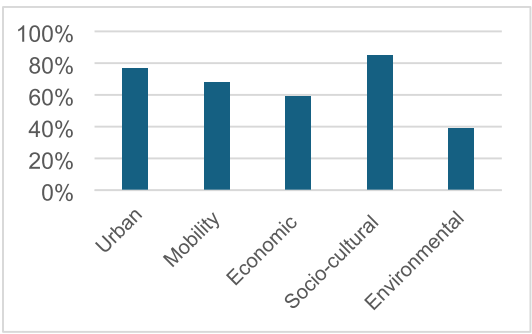


Fig. 26 Researchers' assessment of UQoL dimensions based on the proposed matrix.
(Source: Authors)

infrastructure, limited traffic flow, insufficient parking, the unsuitability of certain transport types (e.g., the prevalence of tuk-tuks), and the long-term impact of vibrations and noise on heritage buildings. The economic dimension ranks fourth, indicating difficulties in converting the area's heritage, tourism, and craft- related assets into tangible economic benefits for the local population. Lastly, the environmental dimension scored the lowest, primarily due to pollution from vehicular traffic and the absence of an implemented renewable energy plan. To calculate the overall performance rate for the area, the following formula was applied: Overall Performance Rate = (Sum of all dimension scores multiplied by their relative weights – Minimum)/(Maximum – Minimum). The result was 64.70%, indicating the area's current position within the total potential range for improving UQoL.

8.8 Survey of a sample from the local community in the study area

A structured field questionnaire was developed to capture residents' perceptions of UQoL indicators in the Religious Complex Area. This step complemented the researchers' evaluation and enabled a comparative analysis to validate the proposed assessment framework. The questionnaire addressed the key dimensions and indicators of the proposed matrix after converting them into simplified, clear questions. Most items employed a five-point Likert scale to measure satisfaction or perceived performance, allowing for detailed quantitative analysis. Some diagnostic questions adopted direct closed-ended formats (e.g., Yes/No/Maybe) to assess the presence of specific conditions or services. For example, the question on the level of conservation of heritage buildings was rated on a Likert scale, whereas the question on housing density (i.e., whether multiple families reside in a single unit) followed a closed format. Participants were recruited through purposive sampling to ensure representation of different user groups of the heritage area. Residents were approached in their neighbourhoods and during community events; shop owners and artisans were engaged through local markets and craft workshops; visitors were invited to participate at historic sites and museums; and heritage specialists were contacted through local institutions and conservation offices. This approach ensured the inclusion of diverse perspectives reflecting both daily users and external visitors of the area.

Following data collection, a comprehensive statistical analysis was conducted using Stata software. This included a reliability assessment using Cronbach's Alpha to verify internal consistency across dimensions. All dimensions exceeded the minimum acceptable threshold of 0.6, with alpha values ranging from 0.738 to 0.91, indicating strong

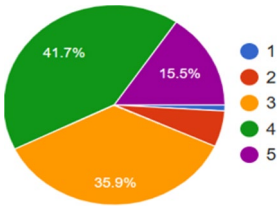


Fig. 27 Satisfaction with public facilities

tool reliability and internal coherence. Construct validity testing confirmed that each group of questions effectively measured its intended dimension, with particularly high validity scores in the heritage and urban components. Descriptive statistics were applied to examine the sample characteristics and general response trends, while correlation analyses explored relationships among variables and supported the robustness of the findings.

8.8.1 Analysis and results of the community questionnaire responses

The community survey was conducted within the study area, targeting local residents, workers, visitors, and heritage specialists aged over 18 years, with no restriction on educational background. Data collection combined in-person distribution and online dissemination to ensure broad participation. Initial contact was established through informal conversations with residents, shop owners, craftsmen, and visitors in various public and cultural spaces such as mosques, churches, local bazaars, handicraft workshops, and the metro station. These discussions were used to explore participants' perceptions of the five UQoL dimensions-urban, economic, environmental, social, and mobility-while emphasising subjective aspects such as personal satisfaction, sense of belonging, and attitudes toward heritage preservation. Following these interactions, participants were invited to complete the online questionnaire (Google Form), which complemented the qualitative insights with structured data.

A total of 103 valid responses were obtained, providing an adequate representation for exploring community perceptions. The sample composition comprised 46.6% residents, 9.7% workers, 31.1% visitors, and 12.6% specialists. Among respondents, 60.2% were male and 39.8% female. Age distribution showed a balanced sample, with 35% aged 18–25, 40% aged 25–45, 20% aged 46–65, and 5% above 65, ensuring representation across key age groups. In terms of occupation, 40.8% worked in the private sector, 16.5% in government, 20.4% were self-employed, 19.4% students, and 2.9% homemakers. Educational levels were predominantly high (60.2%), followed by intermediate (30.1%) and postgraduate (3.9%). Most residents lived in families of four to five members, reflecting the typical household size

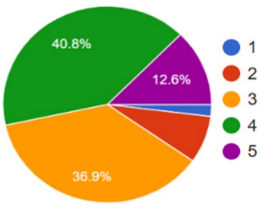


Fig. 28 Satisfaction with services

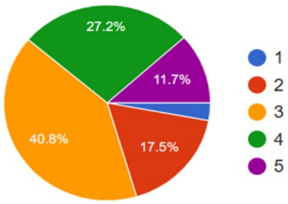


Fig. 29 Satisfaction with housing

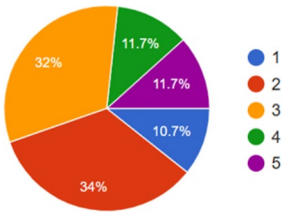


Fig. 30 Evaluation of the informal areas

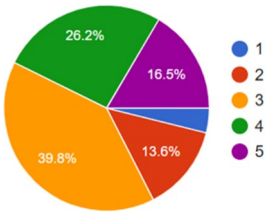


Fig. 31 Evaluation of public spaces

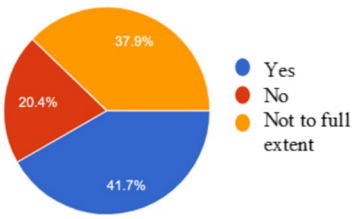


Fig. 32 Evaluation of urban character

in the study area. The following is a detailed analysis of the questionnaire results for each UQoL dimension.

- **Urban dimension:** Survey results for the urban dimension (Figs. 27, 28, 29, 30, 31, 32) revealed varied responses. Most participants rated housing conditions and availability as moderate to high, though some localized issues prompted negative feedback. Approximately one-third reported residential overcrowding. Basic services were generally accessible but in need of improvement-particularly in education and healthcare-with concerns raised about their uneven distribution, favouring tourist zones over residential areas. Public spaces received moderate evaluations, although 17.47% expressed dissatisfaction, likely due to the area's dense urban fabric and

limited open space. Nevertheless, future enhancements are anticipated through projects such as Al-Fustat Hills Park. More than half of respondents expressed dissatisfaction with visual coherence and façade maintenance, highlighting disparities between main roads and inner alleyways. Informal areas received moderate to low ratings, indicating a critical issue that requires urgent intervention to preserve the site's heritage significance.

- **Mobility dimension:** Survey findings (Figs. 33, 34, 35) revealed generally positive perceptions, with over half of the participants expressing satisfaction with traffic flow and road quality-reflecting recent improvements, particularly along major routes such as Al-Fustat Road and its connection to the Civilizations Axis. However, 28.16% responded neutrally, suggesting inconsistencies between main roads and narrower, less maintained residential streets. Public transport received favourable ratings due to the area's strategic location and its access to metro and bus lines. In contrast, parking availability was rated poorly, highlighting a significant challenge stemming from space limitations within the historic fabric. Responses on pedestrian and bicycle infrastructure were mixed: half of the respondents expressed satisfaction, others gave moderate to low evaluations. This reflects ongoing enhancements near heritage sites, yet persistent problems in inner streets-such as poorly maintained sidewalks, shared pedestrian-vehicle spaces, and an overall lack of cycling infrastructure.
- **Economic dimension:** Survey responses (Figs. 36, 37, 38) indicated that most participants perceived unemployment levels as moderate, with some viewing them as either high or low. This reflects a general awareness of unemployment as a persistent issue-though not critical-affecting household stability, likely due to reliance on informal or seasonal employment. Income levels were largely reported as low to moderate, highlighting the need for targeted economic support and skill development programs. A significant number of respondents answered "Maybe" when asked about local employment in ongoing projects, reflecting either a lack of transparency in hiring mechanisms or weak communication between implementing agencies and residents. Similarly, responses regarding private sector involvement were mixed, suggesting perceived ambiguity or limited visible impact. This underlines the importance of aligning private initiatives more closely with local economic needs. Over half of the participants also expressed varying degrees of dissatisfaction with the support provided to small enterprises and the underutilisation of heritage sites as potential economic assets.
- **Socio-cultural dimension**: Survey findings (Figs. 39, 40, 41, 42, 43, 44) reflected a strong public awareness of the area's architectural heritage, as demonstrated by the community's emotional attachment, knowledge of

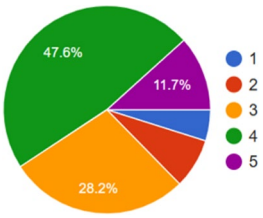


Fig. 33 Evaluation of the road network

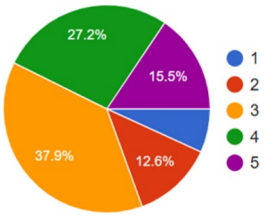


Fig. 34 Parking availability

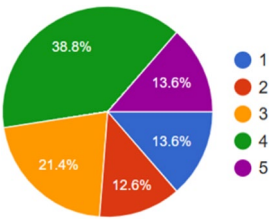


Fig. 35 Pedestrian & bicycle pathways

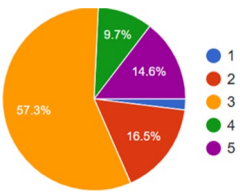


Fig. 36 Unemployment rate

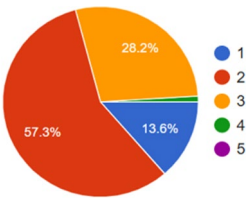


Fig. 37 Evaluation of income levels

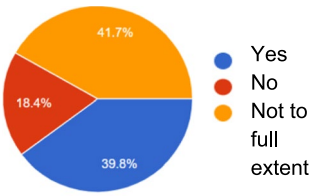


Fig. 38 Heritage-driven economy

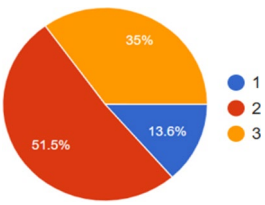


Fig. 39 Visits to heritage sites

Fig. 40 Sense of belonging

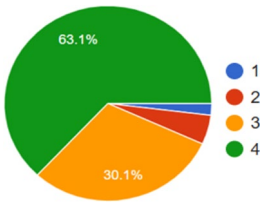


Fig. 41 Participation in events

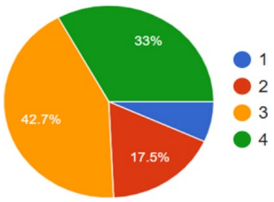


Fig. 42 Satisfaction with heritage preservation

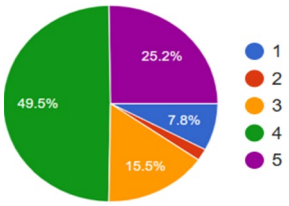


Fig. 43 Participation in decision-making

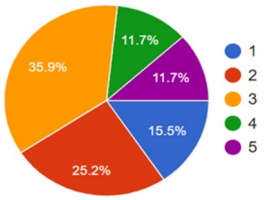
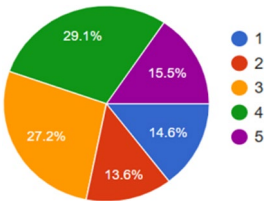


Fig. 44 Accessibility for people with disabilities



historic landmarks, and participation in site visits and cultural events. A vast majority (91.26%) expressed a strong sense of belonging to the area, underscoring its unique symbolic and cultural significance. Differences between residents and visitors in levels of attachment suggest that daily interaction and long-term presence in heritage settings foster deeper emotional connections than occasional visits or media exposure. Regarding social event venues, one-third acknowledged their existence but noted a need for improvement; 27.18% rated them as moderately functional, 13.59% considered them in poor condition, and 5.83% reported their absence-indicating the presence of basic infrastructure but with limitations in quality and distribution. In terms of community participation (Fig. 43), 35.92% were neutral, while 25.24% stated that they were only informed of decisions after they had been made-highlighting weak participatory mechanisms. As for accessibility for

Fig. 45 Evaluation of pollution

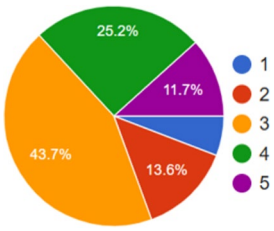


Fig. 46 Use of renewable energy

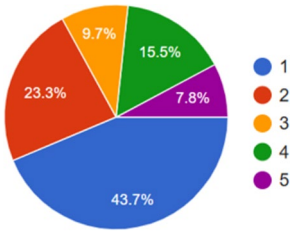
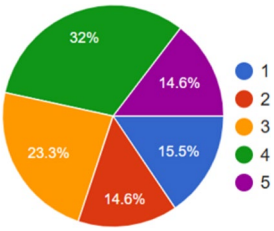


Fig. 47 Evaluation of green spaces



people with disabilities (Fig. 44), 29.13% considered it adequate, 27.18% rated it as moderate, and 28.15% reported it as rarely available suggesting growing institutional awareness but limited implementation.

- **Environmental dimension:** (Figs. 45, 46, 47) Findings show that 45.63% of participants adopted a neutral stance on pollution levels, possibly due to varying local conditions or limited environmental awareness, while 16.51% reported high pollution levels that could harm heritage buildings. Other respondents perceived low or negligible pollution, likely influenced by recent developments such as the National Museum, Ain El-Sira Park, and the removal of leather workshops near Magra El-Oyoun Aqueduct. A significant lack of clean energy use was also reported, with minimal adoption of solar or renewable technologies (Fig. 46), attributed to the absence of targeted governmental or community-driven initiatives. Regarding green spaces (Fig. 47), about half of the participants expressed satisfaction-particularly near the museum and in light of the upcoming Al-Fustat Hills Park-while 30.09% reported dissatisfaction, likely due to limited greenery and poor-quality open spaces in densely populated residential areas.

8.8.2 The participants' mean ratings for UQoL indicators in the study area

Participants' mean ratings of UQoL indicators, and their satisfaction levels were calculated based on questionnaire

responses. All subjective indicators in the questionnaire, including those with three-option responses (Yes/No/Maybe) and five-point Likert-scale items, were operationalized by converting responses into numerical values. For three-option items, responses were coded as Yes = 3, Maybe = 2, No = 1, The mean score for this indicator was calculated by multiplying the number of respondents in each category by the corresponding numerical code, summing the results, and dividing by the total number of respondents. Since the questionnaire employed a five-point Likert scale, the responses were converted into an equivalent three-point scale to facilitate comparison with the researchers' evaluations. This conversion was performed using the following equation: Three-point value = (Five-point value − 1)/2 + 1. ". Each converted score was then multiplied by the corresponding indicator's fractional relative weight as concluded from the expert survey. The resulting values were summed to estimate the percentage achieved for each dimension, following the same methodology and equations used in the researchers' assessment. For clearer interpretation of the percentage results derived from the evaluation matrix,

a five-tier performance scale was adopted. This scale ensures consistency with the five-point assessment structure used throughout the study. Accordingly, indicator and dimension scores were classified as follows: very low (< 40%), low (40–55%), moderate (56–70%), high (71–85%), and very high (> 85%). Table 4 presents these calculations in detail. The results indicate that the socio-cultural dimension ranked highest, achieving 79.96% of its potential improvement range, followed by the mobility dimension at 75.97%, the urban dimension at 64.29%, the economic dimension at 60.87%, and finally, the environmental dimension at 44.63% (Fig. 48). The overall UQoL score for the area was 65.76% of the total potential improvement range.

9 Discussion

The results of the previous analyses and evaluations can be discussed on three main levels. The first involves a comparison between the assessments provided by community survey and those conducted by the researchers, to identify areas of convergence and divergence. The second focuses on analysing the correlations among the various dimensions of UQoL, which helps to check the existence of a reciprocal relationship between the effectiveness of heritage management policies and UQoL-forming the core hypothesis of this study. The third level presents a comparison between the study area and international examples in achieving UQoL.

9.1 The comparison between participants' and researchers' evaluations

The comparison between the researchers' evaluation and the community survey reveals a notable alignment in the assessment of UQoL dimensions (Fig. 49), with a minor difference of approximately 1% in the total score. This convergence supports the validity of the adopted methodology and affirms the applicability of the proposed evaluation matrix. The observed differences fall within a reasonable range, reflecting expected variation in perspectives between the specialists and the public. For instance, researchers assigned a relatively higher score to the urban dimension- received 70% from participants compared to 75% from researchers-,likely due to reliance on technical and objective criteria that may not be equally perceived by the community. Conversely, the community rated mobility slightly higher (78%) than by researchers (72%), possibly reflecting daily familiarity or lower expectations. This divergence resulted in a reversed ranking of these two dimensions between the two groups. The evaluations of the economic and socio-cultural dimensions were more closely aligned-particularly the latter (65% vs. 60% and 80% vs. 78%, respectively),while the environmental dimension received the lowest score from both from both participants (48%) and researchers (42%), indicating shared concern and the need for targeted intervention. Each dimension's score was derived according to the predefined weighting system validated by experts, ensuring consistency between qualitative observation and quantitative scoring. the reliability of these evaluations was supported by the validity and consistency tests previously conducted for the expert weighting process.

At the sub-indicator level, the comparison between the researcher's evaluation and the community survey also demonstrated general consistency, with minor differences reflecting divergent perspectives (Fig. 50). Strong alignment was observed in indicators such as housing (2.0 vs. 2.0), service provision (2.33 vs. 2.5), road networks (2.33 vs. 2.25), public transport (2.5 vs. 2.5), unemployment (2.0 vs. 2.0), traditional crafts (2.33 vs. 2.5), community participation (2.0 vs. 2.0), identity (3.0 vs. 2.9), heritage awareness (3.0 vs. 2.9), pollution (2.0 vs. 2.0), and renewable energy use (1.0 vs. 1.0)—highlighting a shared understanding of key UQoL factors. However, researchers tended to assign higher scores to technical and policy-related indicators, including infrastructure (3.0 vs. 2.5), diversity of activities (3.0 vs. 2.0), urban management (3.0 vs. 2.5), heritage conservation frameworks (3.0 vs. 2.5), public space provision (2.33 vs. 2.0), and tourism activities (2.75 vs. 2.0)- areas that may not be as directly experienced or recognized by the community. In contrast, community participants assigned higher scores to indicators such as informal urban expansion (1.0 vs. 1.5),

Table 4 Evaluation of Urban QoL Indicators by Questionnaire Sample – (Source: Authors)

Dimension & Indicator		Mean Score *(5-point scale)*	Converted Score *(3-point scale)*	Indicator Score *(3-point score × Relative weight)*	Total Score per Dimension
Urban	Housing	3.0	2.0	0.067	*0.783 (64.29% of potential improvement range)*
	Service Availability	4.0	2.5	0.092	
	Public Utilities Efficiency	4.0	2.5	0.090	
	Functional Diversity of Activities	3.0	2.0	0.061	
	Quality of Public Spaces	3.0	2.0	0.069	
	Visual Identity	4.5	2.75	0.097	
	Informal Expansions	2.0	1.5	0.049	
	Urban Management	4.0	2.5	0.082	
	Heritage Conservation and Management Policies	4.0	2.5	0.094	
	Contribution of Heritage Places to Urban Needs	4.0	2.5	0.080	
Mobility	Road Networks and Traffic	3.5	2.25	0.076	*0.319 (75.97% of potential improvement range)*
	Public Transport	4.0	2.5	0.080	
	Pedestrian and Cycling Services	4.0	2.5	0.084	
	Impact of Transport on Heritage Buildings	4.8	2.9	0.079	
Economic	Unemployment Rates	3.0	2.0	0.054	*0.436 (60.87% of potential improvement range)*
	Investment Rates	3.0	2.0	0.064	
	Income and Economic Growth	3.5	2.25	0.063	
	Economic Role of Heritage	4.0	2.5	0.088	
	Support for Traditional Crafts	4.0	2.5	0.090	
	Suitability for Tourism Activities	3.0	2.0	0.075	
Socio-Cultural	Social Justice and Public Rights	4.0	2.5	0.080	*0.534 (79.96% of potential improvement range)*
	Community Communication	4.0	2.5	0.080	
	Community Participation	3.0	2.0	0.069	
	Identity and Sense of Belonging	4.8	2.9	0.107	
	Awareness and Responsibility Towards Heritage	4.8	2.9	0.105	
	Social Role of Heritage Places	4.5	2.75	0.093	
Environ-mental	Pollution and Waste Management	3.0	2.0	0.071	*0.246 (44.63% of potential improvement range)*
	Clean and Renewable Energy Use	1.0	1.0	0.030	
	Green Spaces	4.0	2.5	0.078	
	Integration of Environmental and Heritage Conservation	3.0	2.0	0.067	

visual character (2.0 vs. 2.75), green spaces (2.0 vs. 2.5), income levels (2.0 vs. 2.25), investment opportunities (1.0 vs. 2.0), social justice (2.0 vs. 2.5), and social support (2.33 vs. 2.75). These differences may stem from residents' emotional and social connection to the area, which can shape perceptions even amid ongoing challenges. The findings underscore the importance of integrating expert analysis with community perspectives to achieve a comprehensive and context-sensitive assessment of UQoL.

Both evaluations indicated a moderate overall performance for the Religious Complex area. Regarding the urban dimension, the results reflect both significant progress and ongoing challenges in heritage conservation and urban management. Major restoration initiatives, such as the Religious Complex Development Project (1999–2002)

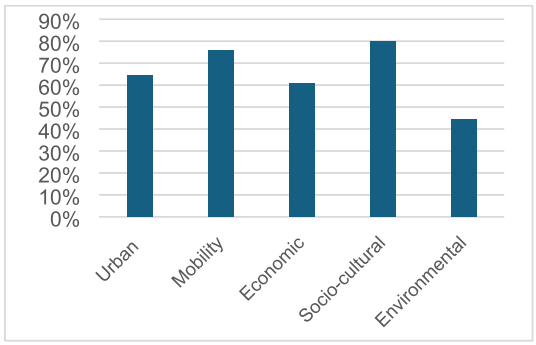


Fig. 48 Survey participants' evaluation of UQoL dimensions in the study area
(Source: Authors)

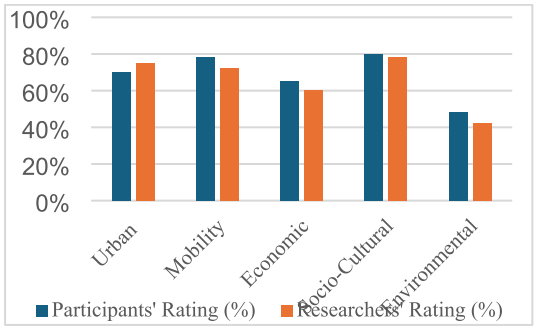


Fig. 49 Comparison Researchers' and Participants' Evaluations across Dimensions
(Source: Authors)

and the rehabilitation of numerous heritage buildings, have enhanced the area's visual identity and service provision. In addition, broader urban interventions in Al-Fustat-such as the National Museum of Egyptian Civilisation, the redevelopment of Ain El-Sira Lake, and the rehabilitation of Magra El-Oyoun-have further improved infrastructure and public spaces, contributing to stronger performance in urban management and accessibility. Nevertheless, the study also identified several urban challenges, including informal settlements, uneven service provision, and tourism pressures, which continue to limit the area's overall development potential.

The socio-cultural dimension achieved the highest relative performance, demonstrating strong cultural identity, social cohesion, and sense of belonging, albeit with limited civic engagement. The economic and mobility dimensions showed moderate performance levels, reflecting the impact of insufficient investment, constrained employment diversity, and weak transport connectivity. In contrast, the environmental dimension ranked lowest, primarily due to the current scarcity of green spaces and limited integration of environmental considerations within planning policies. Collectively, these results suggest that informal settlements, service disparities, and tourism pressures continue to constrain UQoL across the study area.

Slight discrepancies between researchers and community evaluations underline differing interpretive frameworks: researchers tended to prioritise infrastructure, management efficiency, and regulatory control, while community participants placed greater emphasis on mobility and socio-cultural aspects linked to everyday experience. The integration of quantitative survey results with qualitative insights from interviews enabled a comprehensive understanding of both objective and perceptual dimensions of heritage life, underscoring the importance of participatory and context-sensitive approaches in heritage-led urban regeneration.

To strengthen the interpretation of these findings, it is important to situate them within the broader literature on UQoL in heritage contexts. The overall alignment between researcher-based and community-based evaluations reflects what previous studies have described as a structural overlap between expert assessments and lived experience in heritage context, particularly regarding social cohesion, identity, and service provision (Smith et al., 1997; McCrea et al., 2006; [14]). The relatively high socio-cultural scores are consistent with international evidence arguing that heritage settings inherently reinforce belonging, cultural continuity, and symbolic attachment. Conversely, the lower environmental performance corresponds to well-documented constraints

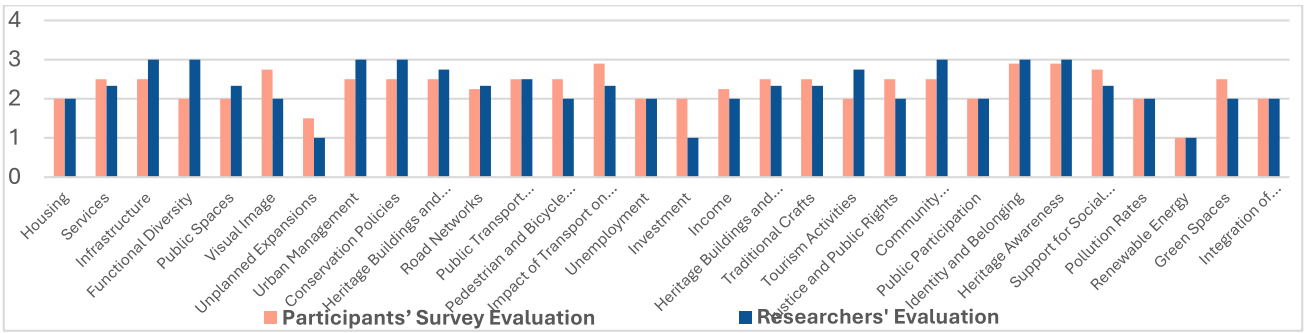


Fig. 50 Comparison Between Researchers' and Participants' Evaluations at the Sub-Indicator Level
(Source: Authors)

Table 5 Correlation Coefficients –
(Source: Authors, using Stata software)

Dimensions	Heritage	Urban	Mobility	Environmental	Socio-Cultural	Economic
Heritage	1.0000					
Urban	0.7891***	1.0000				
Mobility	0.7673***	0.8331***	1.0000			
Environmental	0.5651***	0.7550***	0.7005***	1.0000		
Socio-Cultural	0.6984***	0.8137***	0.7517***	0.7599***	1.0000	
Economic	0.5899***	0.6896***	0.5230***	0.6175***	0.7251***	1.0000

*Significant at 0.1; **Significant at 0.05; ***Significant at 0.01*

in heritage districts within developing cities, where limited green areas, pollution, and infrastructural pressures restrict environmental quality [1, 12]. The observed divergence in certain indicators, such as mobility and urban management, also reflects patterns noted in the literature, where experts prioritise regulatory and structural considerations while residents emphasise daily-use functions and accessibility [13, 26]. Overall, the comparative evaluation aligns closely with established theoretical debates on the differentiated ways in which heritage management shape UQoL outcomes, reinforcing the validity of the adopted framework.

9.2 Correlation analysis of UQoL dimensions

Pearson correlation analysis was conducted using Stata software to statistically test the relationships between heritage-related and UQoL dimensions. The analysis considered standard deviations of the variables within the dataset to ensure normalized comparisons, as the Pearson coefficient inherently standardizes values relative to their mean and variance. The coefficients are used to measure the strength and direction of relationships between variables, ranging from −1 to+1. In the context of UQoL assessment in heritage areas, they offer insights into how improvements in one dimension (e.g., urban or socio-cultural) relate to changes in others, such as the economic dimension (Abou Allam, 2009). These correlations gain validity when paired with statistical significance testing (p-value), with values below 0.05 indicating statistically reliable results. To check the interrelationship between heritage policies and UQoL, all heritage-related indicators were consolidated into a single "Heritage Dimension," and correlated with the other five UQoL dimensions.

The analysis shows that Survey results from the local community revealed statistically significant positive correlations at the 0.01 level. The strongest association was with the Urban Dimension (r=0.7891), followed by Mobility (r=0.7673) and the Socio-Cultural Dimension (r=0.6984), underscoring heritage's key role in shaping urban character, mobility, and identity. Moderate yet significant correlations were also found with the Economic (r=0.5899) and Environmental (r=0.5651) dimensions, suggesting heritage's

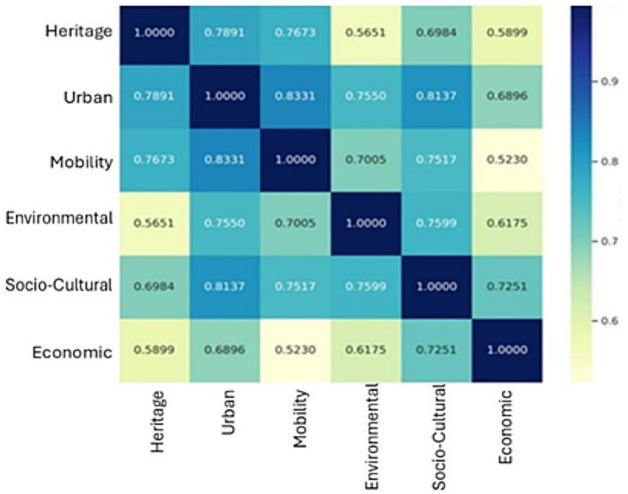


Fig. 51 Heatmap of Urban QoL Dimension Correlations.
(Source: Authors)

potential-though limited-to foster economic development and environmental sustainability in the study area.

The analysis considered standard deviations of the variables within the dataset to ensure normalized comparisons. All correlations were verified within a 95% confidence interval to ensure statistical reliability, accounting for the moderate sample size (n=103). The coefficients (r) and their significance levels (p<0.01) are shown in Table 5, reflecting strong and statistically significant relationships across dimensions.

These findings align with the outcomes of the previously discussed international examples, which demonstrate that cities ranking highest in quality-of-life indicators are, in essence, heritage cities that implement integrated and effective heritage management policies. Such policies, in turn, have a positive impact on quality-of-life levels. Conversely, cities with lower rankings often face challenges in managing their heritage. Overall, the results from both the theoretical and case study analyses reinforce the research hypothesis of a reciprocal relationship between the effectiveness of heritage management policies and UQoL.

The correlation analysis was extended to explore interrelationships among all dimensions, visualised through a heat map (Fig. 51), where darker shades indicate stronger

correlations. Results positioned the urban as a core driver of UQoL, strongly linked to mobility, socio-cultural, and environmental dimensions. In contrast, the economic dimension showed weaker correlations, reflecting limited economic returns from heritage conservation for residents and underscoring the need for targeted interventions to strengthen its role.

While the Pearson correlation results support the study's hypothesis of a reciprocal relationship between heritage management effectiveness and UQoL, a closer examination reveals important nuances. The strongest correlations were observed with the urban, mobility, and socio-cultural dimensions, indicating that heritage policies most directly influence spatial organization, movement patterns, accessibility, and community identity. By contrast, the economic and environmental dimensions exhibited relatively weaker to moderate associations, suggesting that current heritage interventions are insufficient alone to ensure economic growth or environmental performance. These weaker associations can be attributed to a combination of structural and contextual constraints, including limited heritage-based employment opportunities, modest support for traditional crafts, inadequate green spaces, environmental pressures such as pollution, and the modest economic returns experienced by residents, all of which constrain the efficiency and effectiveness of heritage management efforts.

Overall, these findings indicate that although integrated heritage management generally enhances UQoL, its impacts on economic and environmental outcomes are context-dependent and not automatic. Sustained improvement therefore requires complementary planning measures, active community engagement, and targeted resource allocation tailored to local conditions and policy frameworks.

9.3 Comparative discussion: the study area and the international examples

When compared with the international examples- Zurich, Vienna, Copenhagen, Rabat, and Tunis- the Religious Complex area in Al-Fustat demonstrates a developing approach toward integrating heritage preservation with UQoL. While European cities such as Zurich, Vienna, and Copenhagen operate within mature institutional systems that embed heritage management into broader environmental, mobility, and socio-economic frameworks, Al-Fustat's trajectory remains primarily project-oriented, driven by targeted national initiatives. Recent interventions- including Al-Fustat Hills Park, the National Museum of Egyptian Civilization (NMEC), and the Magra El-Oyoun redevelopment- indicate increasing alignment with global practices related to public-space enhancement, and cultural tourism. however, they still fall short of constituting a fully institutionalized governance model.

In this respect, Al-Fustat shares structural similarities with regional counterparts such as Rabat and Tunis, where large-scale state-led regeneration has produced visible improvements but continues to face challenges tied to socio-economic disparities, funding stability, and policy continuity. A comparative reading of the five cities shows that the effectiveness of heritage- UQoL integration is ultimately shaped by governance maturity and sustained community participation. Within this spectrum, Al-Fustat occupies an intermediate position: recent projects illustrate a progressive national direction, but the absence of long-term institutional frameworks limits the capacity to achieve durable, citywide impacts. This positioning provides valuable regional insight into how heritage-based urban development can evolve within broader national modernization efforts.

9.4 Limitations of the study

To ensure methodological transparency, several limitations should be acknowledged:

- **Scope of the Study:** The wide scope of the study was intentionally adopted in order to capture the multi-dimensional nature of UQoL in heritage areas. However, we agree that each dimension could indeed be expanded into a more specialized study in the future. In this paper, we aimed to provide a comprehensive framework as a starting point, while recognizing the potential for subsequent research to delve deeper into specific dimensions with more refined and detailed indicators.
- **Single Case Study:** The research adopted an exploratory approach based on a single case study. Although this limits the generalizability of the results, the primary intention was to test the applicability of the proposed evaluation framework within a real heritage context. Old Cairo was purposefully selected as a representative and complex setting that reflects challenges commonly observed in other heritage areas in Egypt.
- **Sample Size:** The sample size of 103 local residents provided valuable indicative insights into community perceptions. Nevertheless, this number remains relatively limited when considering the diversity of social backgrounds, age groups, and levels of interaction with the study area. Future research would benefit from expanding the participant pool to enhance representativeness, improve statistical reliability, and capture a wider spectrum of community attitudes.
- **Mitigating Probable Subjectivity**: A certain degree of subjectivity is inevitably embedded in the evaluation process. This limitation was mitigated by providing

clear, standardized definitions for each performance level as a consistent reference for assessment. Expert and Community surveys are similarly susceptible to situational influences, personal expectations, and recent experiences. To address this issue, the Likert-scale responses were aggregated and analyzed at the group level, ensuring that the results captured broader collective tendencies rather than individual opinions.

- **Precision of the Assessment:** The use of mean values derived from 3-point and 5-point scales may reduce data precision by simplifying respondents' choices. Nevertheless, this approach served as an indicative means of comparing relative perceptions and evaluations in a simple way, rather than producing exact interval measurements or implying precise quantitative differences.

10 Conclusions and recommendations

The study developed a structured matrix of indicators to evaluate UQoL within heritage contexts, comprises five principal dimensions-urban, mobility, socio-cultural, economic, and environmental-each incorporating a set of key indicators tailored to the specific characteristics of heritage areas. The matrix was derived from an extensive review of academic literature, international ranking systems, and successful global practices. It was further refined through an expert survey to assign relative weights and ensure its relevance to the local context of heritage area in Egypt.

To test the validity and applicability of the matrix and its associated evaluation mechanism, the framework was applied to the Religious Complex Area in Al-Fustat, Old Cairo. The assessment combined researchers' field analysis with a structured community survey, enabling a comparative evaluation of strengths and weaknesses. The results revealed significant strengths in the socio-cultural dimension, which achieved the highest score-reflecting the residents' strong sense of belonging, their cultural and religious engagement, and their deep connection to the heritage identity of the area. The urban dimension also demonstrated strong performance due to the presence of key historical monuments and recent state-led development initiatives such as the Al-Fustat Hills project. Regarding mobility, the area's proximity to metro lines and key public transport networks contributed positively, although further enhancement of pedestrian and cycling infrastructure remains needed. The economic dimension showed potential through traditional crafts and heritage tourism, but persistent structural challenges limited its overall impact. Environmentally, some modest improvements were observed, particularly in areas affected by recent redevelopment.

Conversely, the assessment identified several interrelated challenges influenced by structural, policy, and socio-economic factors that continue to shape the area's development dynamics. The emergence of informal urban extensions indicates a degree of misalignment between planning frameworks and residents' housing needs, reflecting the complexity of balancing regulatory control with social realities. Issues of building maintenance and architectural coherence appear to be affected by financial limitations, overlapping institutional responsibilities, and the absence of unified design guidance. Variations in service provision-particularly between central monument zones and adjacent residential areas-suggest an imbalance in investment priorities, pointing to opportunities for more inclusive urban management. From an environmental perspective, the limited integration of green spaces and renewable energy reflects spatial constraints and the need for a more comprehensive heritage development framework. Many of these aspects are being progressively addressed through the Al-Fustat Hills development plans, which promote integrated heritage management, environmental enhancement, and expanded green infrastructure. In economic terms, challenges such as unemployment and the underrepresentation of traditional crafts highlight the importance of stronger private-sector engagement and adaptive regulatory mechanisms. Furthermore, community participation and accessibility could be further strengthened to enhance inclusivity and support more responsive governance practices. Addressing these issues requires institutional and policy reforms that promote participatory planning, equitable investment, and management of heritage, a support and promotion system for traditional crafts, affordable housing, and heritage-based employment while embedding environmental responsibility and universal design to foster resilient, livable heritage environments.

Building on this methodological framework, the comparison between researchers' assessments and community perspectives revealed a high degree of consistency, although certain discrepancies were noted. These variations likely stem from the lived experiences of residents and the daily challenges they face, which influence their perceptions-which may not always align with the more technical and objective lens of the researchers. This underscores the difficulty of fully capturing UQoL in heritage settings through external observation alone and highlights the need for sustained engagement with the local context. It also reinforces the importance of incorporating community perspectives into the evaluation process, as residents are key contributors to the production of knowledge about their own environment. These findings warrant further investigation to better understand the underlying causes of these perceptual gaps.

Moreover, the results reaffirm that heritage preservation should not be regarded merely as the safeguarding of

physical structures, but as part of an integrated development approach that actively involves local communities in shaping urban policy. The study also demonstrated a statistically significant and positive correlation between the heritage dimension and all other UQoL dimensions. This result aligns with findings from the analysis of international examples, further reinforcing the notion of a reciprocal relationship between heritage policies and UQoL. The relatively weaker correlations with the economic and environmental dimensions suggest the need for more targeted policy frameworks to effectively connect heritage policies with economic vitality and environmental resilience. These interdependencies indicate that enhancing UQoL in heritage areas requires a comprehensive and integrated strategy, in which heritage is not treated as a separate component but as a central pillar of integrated urban development.

The analysis indicates that heritage management practices significantly influence UQoL outcomes, with existing policies, such as the Antiquities Protection Law No. 117/1983 and the Urban Harmony Guidelines, providing a structured basis for managing historic environments. However, their impact remains limited due to weak enforcement and a predominant focus on the physical aspects of heritage, with insufficient engagement of social, economic, and environmental dimensions. Although Egypt's Vision 2030 recognizes these broader pillars, it does not specify how they should be operationalized within heritage-led urban development. Accordingly, integrating these dimensions into current frameworks is essential for advancing a more inclusive approach capable of improving UQoL in heritage areas.

In practical terms, the findings outline clear policy directions for improving UQoL in heritage contexts. Priorities include rehabilitating deteriorated housing in alignment with the Cairo Governorate Strategic Urban Development Plan and the Urban Upgrading and Informal Settlements Development Framework, enforcing design guidelines, Urban Harmony Regulations as defined by the National Organization for Urban Harmony, and ensuring equitable service provision consistent with the Infrastructure Pillar Egypt Vision 2030, enhancing pedestrian and public transport networks to strengthen mobility in accordance with the Sustainable Urban Mobility Plan for Greater Cairo and the National Climate Change Strategy 2050; and supporting local crafts, small enterprises, and heritage-based tourism through financial incentives reflecting the Fustat Crafts Development Program and the Ministry of Tourism and Antiquities Cultural Tourism Strategy to stimulate the local economy.

Promoting community participation and inclusive governance can reinforce socio-cultural cohesion and attachment to heritage identity as outlined in the Governance and Community Engagement Framework of Egypt Vision 2030, "The integration of renewable energy, improved waste management, and small-scale green interventions is consistent with the National Environmental Action Plan, while the National Solid Waste Management Strategy provides a framework for addressing the remaining environmental gaps. Future strategies should systematically combine expert and community perspectives through participatory evaluation mechanisms as guided by the Local Administration Law and community engagement requirements in local development planning that link technical assessment with lived experience. Together, these measures provide a practical framework for implementing integrated, heritage-based urban development.

Accordingly, the study recommends further application of the proposed matrix across other heritage sites in Egypt-not only to enable comparative analysis but also to refine the matrix and test its adaptability across diverse cultural and urban contexts. While the matrix currently incorporates key indicators, it can be expanded to include more detailed sub-indicators. Applying it to different heritage settings and to larger, more diverse population samples would enhance its validity and comprehensiveness. A follow-up assessment of the Religious Complex Area is also recommended after the completion of the ongoing development projects particularly those linked to the Historic Cairo Development Program and the Cairo Governorate Strategic Plan, to evaluate their impact on UQoL and the effectiveness of the implemented heritage and urban interventions.

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Declarations

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