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Testing the Limits of Sustainability Assessment in Urban Regeneration: A Critical Analysis of Urban Planning–Design Consistency in an Iraqi Historic City Center

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ABSTRACT

Traffic domination and urban fabric deterioration, among other issues, are becoming a growing challenge for historic urban centers, as is the competition between urban development and heritage protection. Sustainability assessment frameworks are commonly applied to urban regeneration projects, but there is uncertainty about whether they are effective in terms of how they can be used to underpin coherent urban design outcomes. This study examines how the sustainability assessment frameworks relate to pedestrian-oriented urban design decisions in a formal regeneration project in the historic center of Kufa, Iraq, critically. The study uses document-based analytical methods to re-examine the planning documents, circulation schemes, street sections, urban design drawings and visual materials as evidence of analysis to test the consistency of urban planning and urban design. The results show the effectiveness of the sustainability assessment frameworks in supporting the strategic alternative ranking and pedestrian oriented planning policies. Spatial and visual analysis, however, does reveal some discrepancies between the intentions of the plan and its implementation and application in the urban realm in terms of traffic dominance, street configuration and historic urban continuity. The research also proves that sustainability assessment tools do not necessarily take into account limitations if they are not directly linked to the urban design-control frameworks in place. It also illustrates how document analysis is used as a critical tool to analyse urban regeneration projects in historic urban contexts with limited data.

1. INTRODUCTION

Historic urban centers face complex pressures resulting from physical deterioration, traffic congestion, functional change, and the need to preserve heritage identity. Recent studies on Iraqi urban environments also indicate increasing traffic pressure and mobility-related challenges that negatively affect pedestrian movement and urban spatial quality within dense urban centers. In this context, urban regeneration is no longer just about the physical restoration, but is now a planning and design process that will embrace a balance of mobility, accessibility, social vitality and historic urban character protection [1-3].

In recent years, sustainability assessment framework has been applied increasingly in urban regeneration projects to assess planning alternatives and aid decision-making. Typically, these frameworks contain environmental, social, economic and institutional indicators. But they are not only dependent on the quality of the assessment matrix, but also on how diligently assessment results are translated into clear decisions for urban design [4, 5].

Urban planning documents such as formal planning documents, maps, circulation diagrams, street sections and visual materials are typically the primary sources of evidence to consider when assessing planning decisions in data-poor urban settings and in many cities of the Middle East [6, 7]. Recent studies on Iraqi urban environments also highlight increasing spatial pressures and uncontrolled urban transformation processes affecting urban sustainability within rapidly changing urban contexts [8].

These documents should not be viewed merely as a description of the planning process, but should also be read as analytical evidence that can be used to test the consistency between the planning intentions and the urban design outcomes [9].

For this reason, the subject of this study is a formal urban regeneration project, which aims to re-evaluate the historic city center of Kufa (Iraq) in a critical manner. The study does not attempt to reproduce the original project or to validate its outputs, but rather focuses on how the results of sustainability assessment were used to inform decisions on pedestrian-oriented urban design. The relationship between planning goals, assessment indicators, mobility proposals, street scale design tools and observed outcomes on the street are emphasized.

The overall thesis of this research is that sustainability assessment frameworks can be useful in prioritizing urban regeneration alternatives but are less effective in isolation from related operational urban design mechanisms. For this reason, the study aims at highlighting the level of consistency

between urban planning and design in the project and at unveiling the boundaries of sustainability assessment as an urban design tool for the pedestrian-oriented revitalisation of a historic urban context.

This study adds to the urban regeneration and plan evaluation literature by providing a document-based analytical framework to assess urban planning – design consistency of pedestrian-oriented regeneration projects in historic city centres. The study goes beyond the conventional sustainability assessment studies that are mostly based on the use of alternative ranking, and critically reviews how sustainability-oriented planning goals are realised into coherent spatial and urban design results.

The research also brings its own methodological contribution by paying attention to the planning document, the circulation scheme, the street section and the urban design drawing, rather than simply focusing on the products of the planning process. More specifically, it treats these documents as a source of analytical evidence instead of describing project products, especially in the context of historic urban areas, where data is scarce, such as the centers of Iraqi cities.

2. RESEARCH PROBLEM

Although sustainability assessment frameworks have become more common in urban regeneration projects, the effectiveness of the tools in guiding decisions related to pedestrian urban design in historic city centres is not clear. Sustainability indicators are often included in planning documents, but they are not always consistent with planning goals and mobility policies and the impacts of the resulting spatial planning solutions.

This is especially important in historic urban settings where the organization of traffic and urban interventions have a direct impact on the identity of the heritage, the human scale of space and the continuity of the historic fabric. However, there remains a lack of critical studies about the relationship between sustainability assessment systems and the consistency of urban planning–design in formal regeneration projects, particularly in Iraqi historic cities.

2.1 Main research question

To what extent do sustainability assessment frameworks effectively translate pedestrian-oriented urban planning policies into coherent urban design outcomes within historic city centers?

3. THEORETICAL FRAMEWORK AND LITERATURE REVIEW

3.1 Sustainable urban regeneration in historic city centers

The processes of urban regeneration have gained a new momentum in recent years. Recently, the concept of urban regeneration has come into a new momentum.

In the historic city centres, urban regeneration has shifted from demolition-based to more integrative approaches that include conservation of historic sites, improvement of mobility, economic rehabilitation and public space enhancement. The current concepts of regeneration stress that historic urban environment should be considered as living spatial system instead of separated heritage artefact [10-14].

In this context, pedestrian-oriented regeneration has emerged as an important priority in sustainable urban development, for its ability to increase accessibility, decrease traffic density, enhance social interaction, and maintain human-scale urban spaces [15, 16]. The adoption of pedestrian-oriented measures in historic city centres, however, is not always easy, due to the opposition between accessibility requirements, traffic flow, commerce and the conservation of the historic fabric.

3.2 Sustainability assessment and urban planning

Sustainability assessment frameworks have become increasingly adopted into urban planning processes as tools to assess development alternatives and to inform the decision-making process. These frameworks usually use environmental, social, economic and institutional criteria to assess the level of sustainability compatibility of urban projects [1, 15].

Although their use is widespread, there have been several studies claiming that sustainability assessment systems are mainly applied in the strategic planning level and lack adequate spatial and design control of urban interventions [17, 18]. This can lead to high assessment scores on projects that result in an urban environment that does not meet the requirements for pedestrian comfort, visual coherency or historic continuity.

3.3 Urban planning–design consistency

The policies and mobility strategies adopted in cities are established through urban planning, while the development goals are transformed into streets, public spaces, circulation systems and spatial experiences through urban design [4, 19]. Recent urban design literature highlights that poor design-planning integration often leads to urban outcomes that are less than expected, even as planning policies are aimed at sustainability.

It is especially noticeable with respect to pedestrian-oriented regeneration projects, where planning documents might emphasize walkability, traffic reduction, and the creation of a pedestrian realm, while design proposals may still prioritize vehicular orientation or include spatial interventions that are conflicting with the historic urban fabric [20].

3.4 Plan evaluation and document-based analysis

Plan evaluation research involves reviewing the internal consistency, implementation potential and spatial impact of the planning documents [21, 22]. In urban environments, where there is little data available, a planning report, circulation diagram, street section, map and visual documentation can serve as analytical evidence for understanding planning rationales, and assessing urban interventions [23, 24].

In recent studies, methods of analysis that focus on documents and images have been increasingly used to re-examine the formal planning projects in a critical way beyond their intended results. This practice is also very useful in older urban areas with limited quantitative urban data.

3.5 Research gap

Document-based and image-based analytical techniques have been increasingly used in recent studies to assess urban regeneration and historic urban environments, especially in cities where there is limited access to data [23, 24]. But there has been little critical research dealing with the real outcomes of urban design in formal regeneration projects that take sustainability as an aim of planning policies.

The literature available mostly deals with sustainability assessment in the strategic planning level or with the physical and visual evaluation of historic urban environments separately. Lack of attention has been paid, however, to testing whether frameworks for sustainability assessment are coherent with pedestrian-oriented planning objectives, and whether the observed spatial design outcomes are coherent with each other in the context of historic city centers.

Recent scholarship also emphasizes the importance of plan evaluation, implementation gaps, heritage-sensitive urban governance, and historic urban landscape approaches as analytical tools for examining the relationship between planning objectives and spatial implementation within historic urban regeneration projects.

This gap is especially significant in historic urban contexts like the city centres of Iraq, where planning documents, circulation schemes and urban design drawings are the key pieces of analytical evidence to consider when assessing regeneration interventions.

Thus, in this study, a critical evaluation framework based on documents is developed and used to investigate the relationship between sustainability assessment, urban planning goals, mobility structures and urban design outcomes in Kufa historic center in Iraq.

4. METHODOLOGY

4.1 Data provenance

The materials analysed in this study have been obtained from the official documents of the urban regeneration project in the historic center of Kufa, Iraq, namely Urban Regeneration for Kufa City Center - Report: Comprehensive Urban Design for City Center (2014). They were prepared with the supervision of the Iraqi Ministry of Municipalities and Public Works, and with the technical support of the General Directorate of Urban Planning and planning consultants. Circulation schemes, street sections, urban design drawings, regeneration alternatives, maps and visual documentation of the regeneration project were all included. This study is not a reproduction of the original planning project, but an independent, academic re-assessment of the planning–design consistency undertaken using document-based and visual analytic techniques. The author had no involvement in the preparation of the original regeneration project documents, as shown in Table 1.

The original planning documents for the regeneration contained planning options and sustainability evaluation frameworks developed during the official urban regeneration process. The analytical matrices and consistency evaluations presented in this study were independently reconstructed for academic evaluation purposes. Document-based and visual analysis of circulation schemes, street sections, urban design drawings and observed spatial relationships were used to develop the reconstructed assessments which were used to examine the consistency of planning and design within the historic urban environment.

Table 1. Data provenance and source materials

Planning Document / Material	Producing Institution	Year	Author Participation
Urban Regeneration for Kufa City Center – Phase Five Report	Iraqi Ministry of Municipalities and Public Works / General Directorate of Urban Planning	2014	No

4.2 Analytical framework and evaluation procedure

This study uses critical evaluation of documents to analyse the consistency between the results of the sustainability assessment and pedestrian-based urban design, in the context of a formal urban regeneration project in the historic center of Kufa, Iraq.

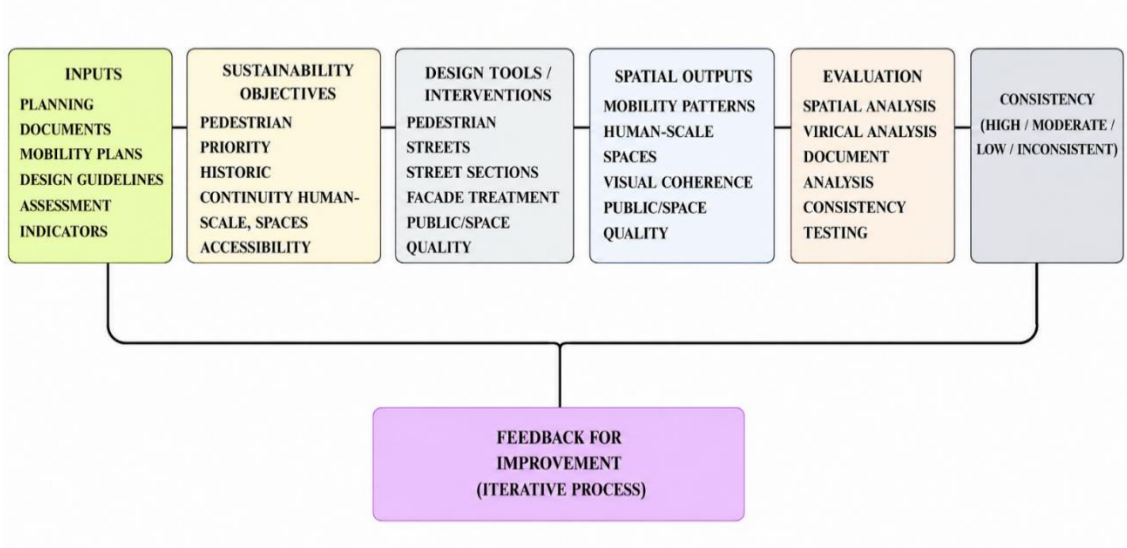

Figure 1. Analytical framework of urban planning–design consistency

The research sets aside the logic of sustainability that was present in the urban regeneration, and the evaluative analytical framework developed by the author for critical examination of planning–design consistency. Although the overall project framework dealt with the strategic planning level, the analytical framework applied in this study aimed to test the extent to which sustainability-oriented planning goals were manifested as concrete spatial and urban design results in the historic urban landscape.

The research re-analyzes the planning documents, the urban regeneration alternatives, the circulation plans, the street sections, the maps and the visual materials that are found in them, as analytical evidence to assess the link between the planning objectives, sustainability indicators, mobility proposals, and urban design outputs.

The analytical process was geared towards the definition of pedestrian-oriented sustainability goals, the exploration of the design translation of these goals into urban design instruments, and the examination of the planning intentions and the observable spatial characteristics of the proposed interventions in the historic urban context. In the manner illustrated in Figure 1.

The analytical framework used in this study aims to analyze the correlation between pedestrian-oriented sustainability goals and pedestrian-oriented urban design outcomes in historic urban areas.

This framework brings together main sustainability concepts and planning goals, analytical indicators, urban design tools and measurable space results in a comprehensive way to assess the planning/design consistency within the regeneration project.

Instead of using a broad sustainability rating system, the study uses a shorter set of analytical components that are specifically related to pedestrian access, mobility structure, human-scale urban space and historic urban continuity.

Analytical evidence to test planning–design consistency included circulation plans, street sections, urban design drawings, and visual documentation.

The level of planning–design consistency was assessed qualitatively through comparative analysis between planning goals related to sustainability, urban design instruments and spatial results in the regeneration project. Consistencies were defined based on the degree of consistency between planning intentions and spatial implementation.

Table 2. Conceptual and analytical framework components

Concept	Indicator	Design Tool	Evaluation Source
Pedestrian accessibility	Walkability	Pedestrian streets	Circulation plans
Human-scale environment	Spatial continuity	Street sections	Urban design drawings
Historic continuity	Visual coherence	Façade treatment	Visual analysis
Traffic reduction	Vehicular control	Mobility organization	Spatial analysis

A high consistency is achieved by a good match between the sustainability goals and the urban design outcomes, in terms of pedestrian access, human scale spatial quality and continuity with the historic fabric. Moderate or partial consistency indicates low-level interventions aimed at sustainability, which are still constrained by spatial structures dominated by traffic flows or by the lack of integration of pedestrian elements. Weak consistency relates to interventions that formally meet planning goals but create conditions that are spatially and/or visually incompatible with the historic urban fabric or pedestrian-oriented planning principles, as shown in Table 2.

Document-based spatial and visual analysis was used as a qualitative approach to the analytical indicators. To maximize methodological transparency and consistency, operational rules were drawn up to define the degree of planning–design consistency, categorised according to pedestrian accessibility, traffic dominance, spatial continuity and historic urban compatibility. The analytical weight was equal for all indicators, as shown in Table 3.

A document-based spatial and visual analysis was used to qualitatively assess all indicators using equal analytical weight.

Table 3. Operational coding rules for evaluation indicators

Indicator	High / Strong Consistency	Moderate / Partial Consistency	Weak / Low Consistency
Pedestrian priority	Pedestrian movement dominates most corridor space with limited vehicle access	Mixed pedestrian and vehicular use	Vehicular traffic dominates major corridor sections
Historic continuity	Continuous historic façades and human-scale spatial character preserved	Partial continuity with some incompatible interventions	Fragmented visual identity and intrusive modifications
Walkability	Continuous pedestrian access and comfortable movement	Pedestrian access improved only in selected areas	Interrupted pedestrian movement due to traffic dominance
Traffic reduction	Minimal vehicular penetration within historic core	Controlled but still visible vehicle movement	Persistent traffic-oriented street structure

5. PRACTICAL APPLICATION AND RESULTS

5.1 Study area and spatial environment

The study area was selected as the historic center of Kufa, Iraq; because it is one of the most important historic centers in the Iraqi historic urban context in terms of history and religion and urban importance. The area is an important heritage environment, featuring a high density of urban areas, a range of land uses, religious activities, traditional commercial functions, and growing mobility pressures.

The historic centre of Kufa also has symbolic and religious importance in the context of Iraqi urban heritage because the city's historic streets, the traditional market structures, religious destinations and patterns of pedestrian movement all constitute an important element of the city's spatial identity and historic continuity.

The study area is a complex environment of use that combines pedestrian circulation, vehicular circulation,

conservation of heritage, and urban renewal needs. The conditions are conducive for exploring the connection between sustainability assessment frameworks and pedestrian-oriented urban design decisions.

The research is based on the documents of the regeneration, which consist of planning alternatives, circulation plans, street sections, urban design schemes and visual documentation of the historic urban environment.

The study area is illustrated in Figure 2, which shows the location of the study area, the regeneration boundary and the main urban structure analysed in this research.

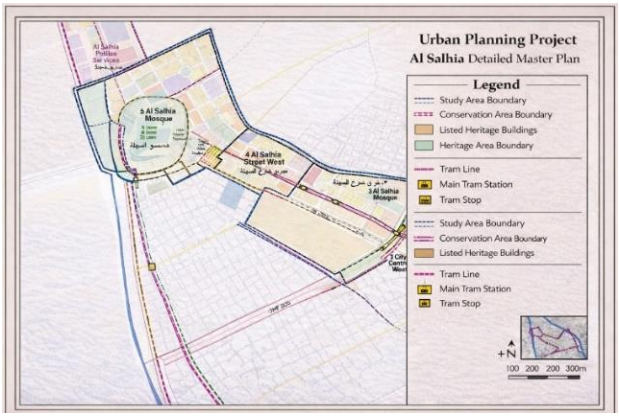

Figure 2. Study area within the historic center of Kufa

The analytical evaluation was oriented around the selected indicators that dealt with pedestrian accessibility, mobility structure, human scale urban space, historic continuity and traffic dominance, in order to analyze the level of consistency between the proposed regeneration interventions and the planning and design.

5.2 Pedestrian-oriented planning and mobility structure

The circulation schemes analysed imply that the regeneration project formally embraces the principles for pedestrian planning by decreasing the flow of vehicles in part of the historical center and by creating pedestrian routes and systems of controlled accessibility.

The planning level of the sustainability assessment framework focuses on pedestrianization, accessibility and traffic reduction as main indicators of sustainable urban regeneration. This is a theoretical convergence of the planning documents on sustainability goals and mobility policies.

The proposed circulation structure and street organization, however, show that vehicular circulation still prevails for several major urban corridors surrounding and penetrating the historic centre. The proposed mobility structure is thus a partial translation of the pedestrian-priority goals to actual urban design interventions.

The analysis also points to the existence of a few sections of streets with the spatial structure of traffic, in which the permeability of pedestrian flow is reduced and the effectiveness of human-scale spaces in the historic material is lessened, as shown in Table 4.

Table 4. Evaluation matrix of planning–design consistency

Planning Objective	Sustainability Indicator	Urban Design Tool	Observed Spatial Outcome	Degree of Consistency
Reduce vehicular dominance	Pedestrian priority	Pedestrian streets	Vehicular movement remains dominant along major corridors	Partial
Improve accessibility	Walkability	Street organization	Improved pedestrian access in selected areas	Moderate
Preserve human-scale environment	Historic continuity	Street sections	Some traffic-oriented sections weaken pedestrian continuity	Weak–Moderate
Enhance public-space quality	Social interaction	Public-space organization	Partial improvement of gathering spaces	Moderate

The link between sustainability indicators and observed spatial outcomes indicates that the linkage between planning goals and urban design actions is not completely effective. Although the reduction of pedestrian use and mobility was explicitly addressed in the planning process, the spatial arrangement of a number of the key corridors remain to support the continued preeminence of the car in the sensitive historic centres.

This means that the connection between the indicators for sustainability and the urban design-control mechanisms is still limited. Therefore, planning intentions are not always manifested in coherent human-scale spatial configurations or continuous pedestrian environments within the historic urban fabric.

5.3 Urban design consistency and historic urban fabric

The visual and spatial analysis indicates that there are different levels of consistency between the findings of the sustainability assessment and the urban design interventions.

The most compatible solution in the sustainability matrix was the one that embraced the preservation approach, but there are still a number of proposed interventions that make changes to the space which may alter the continuity and visual coherence of the historic urban environment.

Figure 3. Visual fragmentation within the historic urban fabric

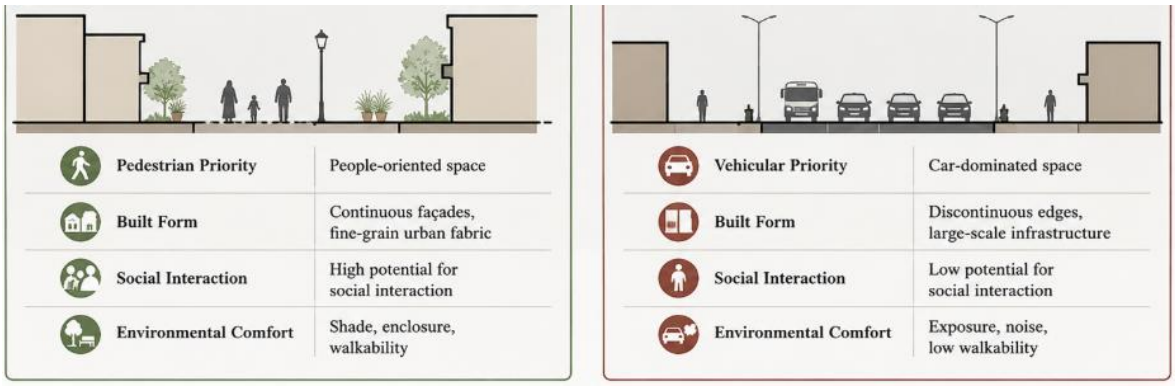

Figure 4. Human-scale versus traffic-dominated urban space

Proposed urban design treatments tend to enhance accessibility and space organisation for public use, although not all of them are clearly traffic independent, meaning that they do not match the principles of pedestrian-oriented urban regeneration.

Visual analysis of the historic town shows that there are significant discrepancies between sustainability-related planning goals and proposed interventions in space. There are several areas in the historic centre for which some irregular commercial signage, ad hoc extensions and fragmented façade treatments have caused a degradation of the visual quality, reducing the continuity of the historic urban character (Figure 3).

The difference between narrow, human-scale alleys and streets dominated by cars (Figure 4) is further evidence of the spatial conflict between pedestrian-oriented design principles and the persistence of vehicles in the dominant role of the major streets.

Further, some design interventions proposed also make spatial and visual changes, which are not sensitive to the scale of the historic fabric. These interventions are formally in line with sustainability assessment results, but slightly clash with the concepts of visual continuity and historic urban preservation.

It is important to retain a sense of continuity and the quality of pedestrian space in the historic urban fabric of Kufa; this is enhanced by its sensitivity.

The results have shown that subtle visual and spatial mismatch can happen at the urban design level and may be disregarded by sustainability assessment frameworks, especially if the assessment indicators are not directly tied up to detailed design-control mechanisms.

Table 5. Visual and spatial consistency assessment

Urban Element	Observed Condition	Impact on Historic Fabric	Consistency Level
Commercial signage	Irregular and fragmented	Weakens visual continuity	Low
Street sections	Traffic-oriented	Reduces pedestrian comfort	Partial
Public spaces	Partially improved	Moderate social activation	Moderate
Façade treatments	Inconsistent interventions	Affects historic identity	Weak–Moderate

The spatial tension between the planning goals set for the street and the actual street configuration of several proposed urban interventions is illustrated by comparing historic alleys with streets that are dominated by traffic.

Table 5 presents the main inconsistencies found in the visual and spatial aspects of the proposed urban interventions, as a result of the analytical evaluation.

The table shows that there are a number of urban design interventions that only partially support the desired sustainability goals, especially in terms of visual continuity and the quality of the space for walking.

5.4 Planning–design misalignment

The clear differences between planning objectives, sustainability indicators and the spatial outcomes that can be seen show a partial disconnect between planning intentions and urban design implementation.

Although pedestrianization, human-scale urban spaces and minimizing vehicular dominance are reflected in planning documents, some of the proposed design solutions still maintain the spatial organization of traffic in sensitive historic places.

The incompleteness of the sustainability assessment frameworks indicates that they do not automatically ensure consistent urban design results if they are not accompanied by design-control mechanisms that can translate planning goals into measurable spatial actions.

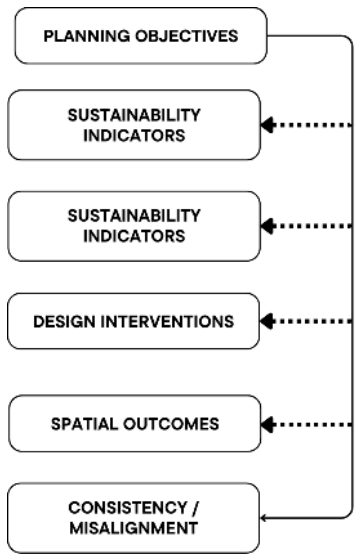

Figure 5. Planning–design misalignment process

Table 6. Comparison of urban regeneration alternatives

Alternative	Intervention Level	Mobility Approach	Impact on Historic Fabric	Sustainability Compatibility
Reconstruction	High	Traffic-oriented	Negative	Low
Preservation	Low	Pedestrian-oriented	Positive	High
Selective Redevelopment	Medium	Mixed mobility structure	Moderate	Medium–High

Figure 5 shows how inconsistencies occur in the process of implementing planning objectives into detailed spatial and urban design interventions.

The analytical process shows that this discrepancy between the planning goals and implementation in space occurs in the translation of the sustainability indicators into the concrete work of urban design. This is what makes it possible that a formally sustainable planning alternative could result in spatial and visual inconsistencies in a historic urban context.

Table 4 shows that alternatives for the regeneration project have been split into two categories: strong and weak. Table 4 compares the regeneration alternatives in terms of their intensity, mobility structure, impact on the historic fabric and compatibility with sustainability, as shown in Table 6.

The multi-criteria assessment showed that the alternative that prioritized preservation was the most suitable one when considering its compatibility with the sustainability goals, especially in terms of pedestrian access, historic continuity and low impact on the historic fabric.

The spatial and visual review of the proposed interventions, however, reveals that several design decisions have been rather intrusive and particularly in the organization of traffic and the configuration of street-sections. This mismatch suggests that in the context of the historic urban environment, sustainability assessment does not always produce a coherent urban design outcome.

The conclusions indicate that the integration of sustainability assessment frameworks can be successful in the strategic planning level to rank regeneration options, but less successful in controlling the urban design translation process in detail.

5.5 Linking planning policies to urban design outcomes

The link between the planning goals and the urban design products were explored by analysing how the policies for sustainability were interpreted into concrete spatial and mobility interventions in the historic centre.

The analysis shows that the introduction of sustainability indicators in planning documents is not necessarily linked to the full consistency between the planning intentions and the urban design implementation. Pedestrian approaches and historic preservation goals were formally adopted into the regeneration framework, but a number of proposed interventions continued to preserve the transportation-dominated spatial structure and the visual intrusion of changes in sensitive historic places, as shown in Table 7.

The matrix shows that the implementation of sustainability-related planning policies into urban design interventions is not consistent in all spatial components. Pedestrian access and the arrangement of public space had moderate consistency, whereas interventions focused on traffic reductions and historic identity preservation showed less consistency between planning intentions and spatial outcomes observed.

This is a confirmation that sustainability indicators are not enough if they are not clearly linked to the urban design-control mechanisms that will guide detailed actions of the spatial level in the context of historic urban environments.

Table 8 outlines the connections between analytical indicators, visual and spatial evidence from the planning documents and figures, and evaluative judgments for critical assessment of planning–design consistency with respect to the regeneration project.

Table 7. Planning–design consistency evaluation matrix

Planning Objective	Sustainability Indicator	Urban Design Tool	Observed Spatial Outcome	Degree of Consistency
Reduce vehicular dominance	Pedestrian priority	Pedestrian streets	Vehicular movement remains dominant along major corridors	Partial
Improve walkability	Accessibility	Street organization	Improved pedestrian access in selected areas	Moderate
Preserve historic identity	Human-scale environment	Façade rehabilitation	Some interventions conflict with historic character	Weak–Moderate
Enhance public-space quality	Social interaction	Public-space organization	Partial improvement of gathering spaces	Moderate

Table 8. Indicator–evidence–judgment analytical matrix

Indicator	Evidence	Observation	Judgment	Justification
Pedestrian priority	Figure 4	Traffic remains dominant on major corridors	Partial	Vehicular movement still dominates key streets
Walkability	Circulation plans	Improved pedestrian access in selected areas	Moderate	Pedestrian movement improved partially
Historic continuity	Figure 3	Fragmented signage and façades	Weak	Visual continuity is reduced
Human-scale environment	Street sections	Traffic-oriented street proportions	Weak–Moderate	Pedestrian comfort is weakened
Traffic reduction	Mobility plans	Limited vehicle control	Moderate	Traffic reduction applied selectively
Public-space quality	Urban design drawings	Partial improvement of public spaces	Moderate	Gathering spaces improved in some areas

6. RESULTS

The results show that the sustainability assessment framework created in the context of the urban regeneration project was successful in establishing alternatives that focus on preservation and encouraging pedestrian-oriented planning goals at the strategic level.

But the spatial and visual re-evaluation confirmed that there are some discrepancies between the results of sustainability assessment and the suggested urban design interventions. While planning documents highlighted pedestrian access, a decrease in vehicular presence and small scale environments, a number of proposed spatial interventions retained road-oriented structures and visually penetrating elements in sensitive historic locations.

The analysis also shows that sustainability assessment frameworks are better at helping to rank the alternatives and make policy decisions than at providing guidance on the fine details of translating policy objectives into coherent urban design outcomes.

The study also shows that document-based critical analysis is suitable methodological approach for the assessment of urban regeneration project in data-poor historic urban contexts. The research validates the link between planning documents, circulation schemes and urban design drawings as analytical evidence, and not as project outputs; indicating that weak integration between sustainability indicators and urban design control mechanisms can result in partial inconsistencies between planning aims and project outcomes for pedestrian-oriented regeneration projects.

7. CONCLUSIONS

This research critically analysed the relationship between the sustainability assessment frameworks and pedestrian-oriented urban design decisions in a formal urban regeneration project for the historic centre of Kufa, Iraq.

The results show that sustainability assessment tools can be successfully used to rank different regeneration options and to help achieve planning goals oriented towards pedestrian traffic. The research also shows that if a project is both sustainable and compatible in the planning phase, this does not necessarily lead to a coherent spatial, visual or human scale urban design result in historic urban environments.

Whereas in the historic heart of cities like Kufa – where spatial sensitivity, heritage continuity, religious value and traffic density combine to give highly complex urban regeneration conditions – this challenge becomes particularly critical.

Planning intentions and design translation were found to be partially not matching, especially in terms of traffic organization, street-section configuration and continuity of the historic urban fabric. The inconsistencies suggest that sustainability assessment systems are limited when they aren't tied to direct urban design-control systems.

The study also underscores the importance of document-based critical analysis as a valuable means for assessing the urban regeneration projects in data-poor historic urban environments. The research can be applied to enhance the urban planning–design evaluation methods and bring a closer relationship between the sustainability assessment and the planning–design consistency of historic city centers by using planning documents, circulation schemes and urban design drawings as analytical evidence.

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